

CPC COOPERATIVE PATENT CLASSIFICATION

G PHYSICS (NOTES omitted)

INSTRUMENTS

G05 CONTROLLING; REGULATING (NOTES omitted)

G05B 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 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](#))

NOTES

1. This subclass covers features of control systems or elements for regulating specific variables, which are clearly more generally applicable.
2. This subclass does not cover:
 - a. systems for controlling or regulating non-electric variables in general, which are covered by subclass [G05D](#);
 - b. systems for regulating electric or magnetic variables in general, which are covered by subclass [G05F](#);
 - c. systems specially adapted for the control of particular machines or apparatus provided for in a single other subclass, which are classified in the relevant subclass for such machines or apparatus, provided that there is specific provision for control or regulation relevant to the special adaptation. Otherwise, classification is made in the most appropriate place in this subclass.
3. In this subclass, the following terms or expressions are used with the meanings 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".
4. In this subclass, details or specific control systems are classified in the group relevant to that system, if not otherwise provided for.

WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

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 H03D 13/00)	5/04	. fluidic
		6/00	Internal feedback arrangements for obtaining particular characteristics, e.g. proportional, integral, differential (in automatic controllers G05B 11/00)
1/01	. electric	6/02	. electric
1/02	. . for comparing analogue signals	6/05	. fluidic
1/022	. . . {using discharge tubes}		
1/025	. . . {using inductance means}	7/00	Arrangements for obtaining smooth engagement or disengagement of automatic control
1/027	. . . {using impedance bridges}	7/02	. electric
1/03	. . for comparing digital signals	7/04	. fluidic
1/04	. . with sensing of the position of the pointer of a measuring instrument		
1/06	. . . continuous sensing	9/00	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)
1/08	. . . stepwise sensing		
1/11	. fluidic		
5/00	Anti-hunting arrangements		
5/01	. electric	9/02	. electric

9/03	. . with multiple-channel loop, i.e. redundant control systems	13/021	. . . {in which a variable is automatically adjusted to optimise the performance}
9/05	. fluidic	13/0215	. . . . {using trial and error method, including "peak-holding"}
11/00	Automatic controllers (G05B 13/00 takes precedence)	13/022	. . . . {using a perturbation of the variable}
11/01	. electric	13/0225	. . . . . {being a periodic perturbation}
11/011	. . {details of the correcting means}	13/023	. . . . . {being a random or a self-induced perturbation}
11/012	. . {details of the transmission means}	13/0235	. . . . . {using steepest descent or ascent method}
11/013	. . . {using discharge tubes}	13/024	. . . {in which a parameter or coefficient is automatically adjusted to optimise the performance}
11/015	. . . {using rotating amplifiers}	13/0245	. . . . {not using a perturbation signal}
11/016	. . . {using inductance means}	13/025	. . . . {using a perturbation signal}
11/017	. . . {using photo-electric means}	13/0255	. . . {the criterion being a time-optimal performance criterion}
11/018	. . . {using thermal amplifiers}	13/026	. . . {using a predictor}
11/06	. . 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)	13/0265	. . {the criterion being a learning criterion}
11/10	. . . the signal transmitted being dc	13/027	. . . {using neural networks only}
11/12	. . . the signal transmitted being modulated on an ac carrier	13/0275	. . . {using fuzzy logic only}
11/14	. . 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)	13/028	. . . {using expert systems only}
11/16	. . . Two-step controllers, e.g. with on-off action	13/0285	. . . {using neural networks and fuzzy logic}
11/18	. . . Multi-step controllers	13/029	. . . {using neural networks and expert systems}
11/26	. . in which the output signal is a pulse-train	13/0295	. . . {using fuzzy logic and expert systems}
11/28	. . . using pulse-height modulation; using pulse-width modulation	13/04	. . involving the use of models or simulators
11/30	. . . using pulse-frequency modulation	13/041	. . . {in which a variable is automatically adjusted to optimise the performance}
11/32	. . with inputs from more than one sensing element; with outputs to more than one correcting element	13/042	. . . {in which a parameter or coefficient is automatically adjusted to optimise the performance}
11/36	. . with provision for obtaining particular characteristics, e.g. proportional, integral, differential	13/044	. . . . {not using a perturbation signal}
11/38	. . . for obtaining a proportional characteristic	13/045	. . . . {using a perturbation signal}
11/40	. . . for obtaining an integral characteristic	13/047	. . . {the criterion being a time optimal performance criterion}
11/42	. . . for obtaining a characteristic which is both proportional and time-dependent, e.g. P.I., P.I.D.	13/048	. . . {using a predictor}
11/44	. pneumatic only	15/00	Systems controlled by a computer (G05B 13/00 , G05B 19/00 take precedence; automatic controllers with particular characteristics G05B 11/00 ; computers per se G06)
11/46	. . without auxiliary power	15/02	. electric
11/48	. . with auxiliary power	17/00	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)
11/50	. . . in which the output signal represents a continuous function of the deviation from the desired value, i.e. continuous controllers	17/02	. electric
11/52	. . . in which the output signal represents a discontinuous function of the deviation from the desired value, i.e. discontinuous controllers	19/00	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)
11/54	. . . . Two-step controllers, e.g. with on-off action	19/02	. electric
11/56	. . . . Multi-step controllers	19/04	. . Programme control other than numerical control, i.e. in sequence controllers or logic controllers (G05B 19/418 takes precedence; numerical control G05B 19/18)
11/58	. . with inputs from more than one sensing element; with outputs to more than one correcting element		
11/60	. hydraulic only		
13/00	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; machine learning G06N 20/00)		
13/02	. electric		
13/0205	. . {not using a model or a simulator of the controlled system}		

- 19/0405 . . . {Programme-control specially adapted for machine tool control and not otherwise provided for ([B23Q takes precedence](#); [G05B 19/06 - G05B 19/16 take precedence](#))}
- 19/041 . . . {Function-oriented details}
- 19/0415 . . . {adapting phase duration according to measured parameters}
- 19/042 . . . using digital processors ([G05B 19/05 takes precedence](#))
- 19/0421 . . . {Multiprocessor system}
- 19/0423 . . . {Input/output}
- 19/0425 . . . {Safety, monitoring}
- 19/0426 . . . {Programming the control sequence}
- 19/0428 . . . {Safety, monitoring ([G05B 19/0423 takes precedence](#))}
- 19/045 . . . 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
- 19/048 . . . Monitoring; Safety
- 19/05 . . . Programmable logic controllers, e.g. simulating logic interconnections of signals according to ladder diagrams or function charts
- 19/052 . . . {Linking several PLC's}
- 19/054 . . . {Input/output}
- 19/056 . . . {Programming the PLC}
- 19/058 . . . {Safety, monitoring}
- 19/06 . . . using cams, discs, rods, drums, or the like ([mechanical programme-control apparatus G05G 21/00](#))
- 19/063 . . . {for sequential programme-control without delivering a reference value}
- 19/066 . . . {for delivering "step function", a slope function or a continuous function}
- 19/07 . . . where the programme is defined in the fixed connection of electrical elements, e.g. potentiometers, counters, transistors
- 19/075 . . . {for delivering a step function, a slope or a continuous function ([G05B 19/06 takes precedence](#); [function generators per se H03K, G06G](#))}
- 19/08 . . . using plugboards, cross-bar distributors, matrix switches, or the like
- 19/10 . . . using selector switches
- 19/102 . . . {for input of programme steps, i.e. setting up sequence}
- 19/104 . . . {characterised by physical layout of switches; switches co-operating with display; use of switches in a special way}
- 19/106 . . . {for selecting a programme, variable or parameter}
- 19/108 . . . {characterised by physical layout of switches; switches co-operating with display; use of switches in a special way}
- 19/12 . . . using record carriers
- 19/122 . . . {using cards, tapes or discs having conductive paths ([G05B 19/128 takes precedence](#))}
- 19/124 . . . {using tapes, cards or discs with optically sensed marks or codes ([G05B 19/128, G05B 19/14 take precedence](#))}
- 19/126 . . . {using cards, tapes or discs having protuberances ([G05B 19/128 takes precedence](#))}
- 19/128 . . . {the workpiece itself serves as a record carrier, e.g. by its form, by marks or codes on it}
- 19/14 . . . using punched cards or tapes ([G05B 19/128 takes precedence](#))}
- 19/16 . . . using magnetic record carriers ([G05B 19/128 takes precedence](#))}
- 19/18 . . 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](#))
- 19/182 . . . {characterised by the machine tool function, e.g. thread cutting, cam making, tool direction control ([G05B 19/21 - G05B 19/40 take precedence](#))}
- 19/184 . . . {Generation of cam-like surfaces}
- 19/186 . . . {Generation of screw- or gearlike surfaces}
- 19/188 . . . {characterised by special applications and not provided for in the relevant subclasses, (e.g. making dies, filament winding)}
- 19/19 . . . 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
- NOTE**
- In this group, the measuring system for an axis is used to measure the displacement along that axis. This measurement is used as position-feedback in the servo-control system.
- 19/195 . . . {Controlling the position of several slides on one axis}
- 19/21 . . . using an incremental digital measuring device
- 19/23 . . . for point-to-point control
- 19/231 . . . {the positional error is used to control continuously the servomotor according to its magnitude}
- 19/232 . . . {with speed feedback only}
- 19/234 . . . {with current or torque feedback only}
- 19/235 . . . {with force or acceleration feedback only}
- 19/237 . . . {with a combination of feedback covered by [G05B 19/232 - G05B 19/235](#)}
- 19/238 . . . {the positional error is only used to control speed in steps according to distance left, or to give a stop signal when error reaches zero}
- 19/25 . . . for continuous-path control
- 19/251 . . . {the positional error is used to control continuously the servomotor according to its magnitude}
- 19/253 . . . {with speed feedback only}
- 19/255 . . . {with current or torque feedback only}

- 19/256 {with force or acceleration feedback only}
- 19/258 {with a combination of feedback covered by [G05B 19/253](#) - [G05B 19/256](#)}
- 19/27 using an absolute digital measuring device
- 19/29 for point-to-point control
- 19/291 {the positional error is used to control continuously the servomotor according to its magnitude}
- 19/293 {with speed feedback only}
- 19/295 {with current or torque feedback only}
- 19/296 {with force or acceleration feedback only}
- 19/298 {with a combination of feedback covered by [G05B 19/293](#) - [G05B 19/296](#)}
- 19/31 for continuous-path control
- 19/311 {the positional error is used to control continuously the servomotor according to its magnitude}
- 19/313 {with speed feedback only}
- 19/315 {with current or torque feedback only}
- 19/316 {with force or acceleration feedback only}
- 19/318 {with a combination of feedback covered by [G05B 19/313](#) - [G05B 19/316](#)}
- 19/33 using an analogue measuring device
- 19/35 for point-to-point control
- 19/351 {the positional error is used to control continuously the servomotor according to its magnitude}
- 19/353 {with speed feedback only}
- 19/355 {with current or torque feedback only}
- 19/356 {with force or acceleration feedback only}
- 19/358 {with a combination of feedback covered by [G05B 19/353](#) - [G05B 19/356](#)}
- 19/37 for continuous-path control
- 19/371 {the positional error is used to control continuously the servomotor according to its magnitude}
- 19/373 {with speed feedback only}
- 19/375 {with current or torque feedback only}
- 19/376 {with force or acceleration feedback only}
- 19/378 {with a combination of feedback covered by [G05B 19/373](#) - [G05B 19/376](#)}
- 19/39 using a combination of the means covered by at least two of the preceding sub-groups [G05B 19/21](#), [G05B 19/27](#), and [G05B 19/33](#)
- 19/40 Open loop systems, e.g. using stepping motor
- 19/401 characterised by control arrangements for measuring, e.g. calibration and initialisation, measuring workpiece for machining purposes ([G05B 19/19](#) takes precedence)
- 19/4015 {going to a reference at the beginning of machine cycle, e.g. for calibration}
- 19/402 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)
- 19/404 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)
- 19/406 characterised by monitoring or safety ([G05B 19/19](#) takes precedence)
- 19/4061 Avoiding collision or forbidden zones
- 19/4062 Monitoring servoloop, e.g. overload of servomotor, loss of feedback or reference
- 19/4063 Monitoring general control system ([G05B 19/4062](#) takes precedence)
- 19/4065 Monitoring tool breakage, life or condition
- 19/4067 Restoring data or position after power failure or other interruption
- 19/4068 Verifying part programme on screen, by drawing or other means
- 19/4069 Simulating machining process on screen ([G05B 19/4068](#) takes precedence)
- 19/408 characterised by data handling or data format, e.g. reading, buffering or conversion of data
- 19/4083 {Adapting programme, configuration}
- 19/4086 {Coordinate conversions; Other special calculations}
- 19/409 characterised by using manual 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)
- 19/4093 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
- 19/40931 {concerning programming of geometry}
- 19/40932 {Shape input}
- 19/40933 {Selecting figure elements from a menu table}
- 19/40935 {Selection of predetermined shapes and defining the dimensions with parameter input}
- 19/40936 {Defining geometry with a high level language}
- 19/40937 {concerning programming of machining or material parameters, pocket machining}
- 19/40938 {Tool management}
- 19/4097 characterised by using design data to control NC machines, e.g. CAD/CAM ([G05B 19/4093](#) takes precedence; [CAD in general G06F 30/00](#))
- 19/4099 Surface or curve machining, making 3D objects, e.g. desktop manufacturing
- 19/41 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)

- 19/4103 Digital interpolation
- 19/4105 Analog interpolation
- 19/414 . . . Structure of the control system, e.g. common controller or multiprocessor systems, interface to servo, programmable interface controller
- 19/4141 {characterised by a controller or microprocessor per axis}
- 19/4142 {characterised by the use of a microprocessor (G05B 19/4141 takes precedence)}
- 19/4144 {characterised by using multiplexing for control system}
- 19/4145 {characterised by using same processor to execute programmable controller and numerical controller function [CNC] and PC controlled NC [PCNC]}
- 19/4147 {characterised by using a programmable interface controller [PIC]}
- 19/4148 {characterised by using several processors for different functions, distributed (real-time) systems (G05B 19/4141 takes precedence)}
- 19/4155 . . . characterised by programme execution, i.e. part programme or machine function execution, e.g. selection of a programme
- 19/416 . . . characterised by control of velocity, acceleration or deceleration (G05B 19/19 takes precedence)
- 19/4163 {Adaptive control of feed or cutting velocity (without NC B23Q 15/12)}
- 19/4166 {Controlling feed or in-feed (G05B 19/4163 takes precedence)}
- 19/418 . . 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]
- 19/41805 . . . {characterised by assembly}
- 19/4181 . . . {characterised by direct numerical control [DNC]}
- 19/41815 . . . {characterised by the cooperation between machine tools, manipulators and conveyor or other workpiece supply system, workcell}
- 19/4182 {manipulators and conveyor only}
- 19/41825 {machine tools and manipulators only, machining centre}
- 19/4183 . . . {characterised by data acquisition, e.g. workpiece identification}
- 19/41835 . . . {characterised by programme execution}
- 19/4184 . . . {characterised by fault tolerance, reliability of production system}
- 19/41845 . . . {characterised by system universality, reconfigurability, modularity}
- 19/4185 . . . {characterised by the network communication}
- 19/41855 {by local area network [LAN], network structure}
- 19/4186 {by protocol, e.g. MAP, TOP}
- 19/41865 . . . {characterised by job scheduling, process planning, material flow}
- 19/4187 {by tool management}
- 19/41875 . . . {characterised by quality surveillance of production}
- 19/4188 . . . {characterised by CIM planning or realisation}
- 19/41885 . . . {characterised by modeling, simulation of the manufacturing system}
- 19/4189 . . . {characterised by the transport system}
- 19/41895 {using automatic guided vehicles [AGV] (control of position or course of AGV's G05D 1/00)}
- 19/42 . . . 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
- 19/4202 . . . {preparation of the programme medium using a drawing, a model}
- 19/4205 {in which a drawing is traced or scanned and corresponding data recorded}
- 19/4207 {in which a model is traced or scanned and corresponding data recorded}
- 19/421 . . . Teaching successive positions by mechanical means, e.g. by mechanically-coupled handwheels to position tool head or end effector (G05B 19/423 takes precedence)
- 19/423 . . . 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
- 19/425 . . . Teaching successive positions by numerical control, i.e. commands being entered to control the positioning servo of the tool head or end effector
- 19/427 . . . 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)
- 19/43 . . fluidic
- 19/44 . . . pneumatic
- 19/46 . . . hydraulic
- 21/00** **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)**
- 21/02 . . . electric
- 23/00** **Testing or monitoring of control systems or parts thereof (monitoring of programme-control systems G05B 19/048, G05B 19/406)**
- 23/02 . . . Electric testing or monitoring
- 23/0202 . . . {in which a transfer function of a process is calculated (Frozen)}

WARNING

Group [G05B 23/0202](#) is no longer used for the classification of documents as of August 1, 2018. The content of this group is being reclassified into groups [G05B 23/0205](#) - [G05B 23/0297](#).

Groups [G05B 23/0205](#) - [G05B 23/0297](#) are incomplete pending reclassification from group [G05B 23/0202](#).

Groups [G05B 23/0202](#) and [G05B 23/0205](#) - [G05B 23/0297](#) should be considered in order to perform a complete search.

23/0205	. . . {by means of a monitoring system capable of detecting and responding to faults}	23/024	. . . . . {Quantitative history assessment, e.g. mathematical relationships between available data; Functions therefor; Principal component analysis [PCA]; Partial least square [PLS]; Statistical classifiers, e.g. Bayesian networks, linear regression or correlation analysis; Neural networks}
	WARNING		
	Groups G05B 23/0205 - G05B 23/0297 are incomplete pending reclassification of documents from group G05B 23/0202 .	23/0243	. . . . . {model based detection method, e.g. first-principles knowledge model}
	Groups G05B 23/0202 and G05B 23/0205 - G05B 23/0297 should be considered in order to perform a complete search.	23/0245	. . . . . {based on a qualitative model, e.g. rule based; if-then decisions}
23/0208	. . . {characterized by the configuration of the monitoring system}	23/0248	. . . . . {Causal models, e.g. fault tree; digraphs; qualitative physics}
23/021	. . . . {adopting a different treatment of each operating region or a different mode of the monitored system, e.g. transient modes; different operating configurations of monitored system}	23/0251	. . . . . {Abstraction hierarchy, e.g. "complex systems", i.e. system is divided in subsystems, subsystems are monitored and results are combined to decide on status of whole system}
23/0213	. . . . {Modular or universal configuration of the monitoring system, e.g. monitoring system having modules that may be combined to build monitoring program; monitoring system that can be applied to legacy systems; adaptable monitoring system; using different communication protocols}	23/0254	. . . . . {based on a quantitative model, e.g. mathematical relationships between inputs and outputs; functions: observer, Kalman filter, residual calculation, Neural Networks}
23/0216	. . . . {Human interface functionality, e.g. monitoring system providing help to the user in the selection of tests or in its configuration}	23/0256	. . . . {injecting test signals and analyzing monitored process response, e.g. injecting the test signal while interrupting the normal operation of the monitored system; superimposing the test signal onto a control signal during normal operation of the monitored system}
23/0218	. . . {characterised by the fault detection method dealing with either existing or incipient faults}	23/0259	. . . {characterized by the response to fault detection}
23/0221	. . . . {Preprocessing measurements, e.g. data collection rate adjustment; Standardization of measurements; Time series or signal analysis, e.g. frequency analysis or wavelets; Trustworthiness of measurements; Indexes therefor; Measurements using easily measured parameters to estimate parameters difficult to measure; Virtual sensor creation; De-noising; Sensor fusion; Unconventional preprocessing inherently present in specific fault detection methods like PCA-based methods}	23/0262	. . . . {Confirmation of fault detection, e.g. extra checks to confirm that a failure has indeed occurred}
23/0224	. . . . {Process history based detection method, e.g. whereby history implies the availability of large amounts of data}	23/0264	. . . . {Control of logging system, e.g. decision on which data to store; time-stamping measurements}
23/0227	. . . . . {Qualitative history assessment, whereby the type of data acted upon, e.g. waveforms, images or patterns, is not relevant, e.g. rule based assessment; if-then decisions}	23/0267	. . . . {Fault communication, e.g. human machine interface [HMI]}
23/0229	. . . . . {knowledge based, e.g. expert systems; genetic algorithms}	23/027	. . . . . {Alarm generation, e.g. communication protocol; Forms of alarm}
23/0232	. . . . . {based on qualitative trend analysis, e.g. system evolution}	23/0272	. . . . . {Presentation of monitored results, e.g. selection of status reports to be displayed; Filtering information to the user}
23/0235	. . . . . {based on a comparison with predetermined threshold or range, e.g. "classical methods", carried out during normal operation; threshold adaptation or choice; when or how to compare with the threshold}	23/0275	. . . . {Fault isolation and identification, e.g. classify fault; estimate cause or root of failure}
23/0237	. . . . . {based on parallel systems, e.g. comparing signals produced at the same time by same type systems and detect faulty ones by noticing differences among their responses}	23/0278	. . . . . {Qualitative, e.g. if-then rules; Fuzzy logic; Lookup tables; Symptomatic search; FMEA}
		23/0281	. . . . . {Quantitative, e.g. mathematical distance; Clustering; Neural networks; Statistical analysis}
		23/0283	. . . . {Predictive maintenance, e.g. involving the monitoring of a system and, based on the monitoring results, taking decisions on the maintenance schedule of the monitored system; Estimating remaining useful life [RUL] (preventive maintenance, i.e. planning maintenance according to the available resources without monitoring the system G06Q 10/06)}

23/0286	. . . . {Modifications to the monitored process, e.g. stopping operation or adapting control}	2219/1128	. . . . Several networks linked to host computer
23/0289	. . . . . {Reconfiguration to prevent failure, e.g. usually as a reaction to incipient failure detection}	2219/1129	. . . . Serial addressed modules on bus
23/0291	. . . . . {Switching into safety or degraded mode, e.g. protection and supervision after failure}	2219/1131	. . . . I-O connected to a bus
23/0294	. . . . . {Optimizing process, e.g. process efficiency, product quality}	2219/1132	. . . . High speed bus between plc and plc or programming device
23/0297	. . . . . {Reconfiguration of monitoring system, e.g. use of virtual sensors; change monitoring method as a response to monitoring results}	2219/1133	. . . . Sensor actuator, asi, bus, network
24/00	Open-loop automatic control systems not otherwise provided for	2219/1134	. . . . Fieldbus
24/02	. electric	2219/1135	. . . . Profibus
24/04	. fluidic	2219/1136	. . . . Canbus
99/00	Subject matter not provided for in other groups of this subclass	2219/1137	. . . . Peer to peer communication
2219/00	Program-control systems	2219/1138	. . . . Configuration of I-O
2219/10	. Plc systems	2219/1139	. . . . By using software configurable circuit, integrated, pga between cpu and I-O
2219/11	. . Plc I-O input output	2219/1141	. . . . Modify manually, using keyboard configuration of module
2219/1101	. . . Remote I-O	2219/1142	. . . . Load in replacement I-O stored configuration
2219/1102	. . . Speed up I-O manipulation	2219/1143	. . . . Base configuration contains all I-O modules, deselect not present modules
2219/1103	. . . Special, intelligent I-O processor, also plc can only access via processor	2219/1144	. . . . Program, program I-O module
2219/1104	. . . Display state of connection of I-O	2219/1145	. . . . Normal scan of I-O and direct acces of some I-O independent from normal scan
2219/1105	. . . I-O	2219/1146	. . . . Scanning sequence as function of previous logic expression
2219/1106	. . . Pneumatic, hydraulic output module connected to plc module	2219/1147	. . . . Variable rate of scan
2219/1107	. . . Hardware expansion of function of plc, programmable, connected in output line	2219/1148	. . . . If I-O module cannot be scanned in time, report to controller
2219/1108	. . . Relay module	2219/1149	. . . . I-o in groups, serviced according to critical inputs, tasks matched to I-O
2219/1109	. . . Expansion, extension of I-O	2219/1151	. . . . Fast scanning of I-O to put I-O status in image table
2219/11101	. . . Verifying ram data correct, validity, reload faulty data with correct data	2219/1152	. . . . I-O module delivers interrupt on event, store port and 10ms timestamp in buffer
2219/1111	. . . I-o grouped on one board	2219/1153	. . . . Scan only some I-O registers, use flags
2219/1112	. . . Bit addressing, handling	2219/1154	. . . . Reading repeatedly input state, try again
2219/1113	. . . Address setting	2219/1155	. . . . Switching over from one input to another one
2219/1114	. . . Address by module name	2219/1156	. . . . Special latches release all simultaneously
2219/1115	. . . Avoid to give two different addresses to same I-O, no duplicate	2219/1157	. . . . I-O used either as input or as output
2219/1116	. . . Position of module in loop, ring determines address of module	2219/1158	. . . . Control of output current
2219/1117	. . . Parallel input addressed as memory	2219/1159	. . . . Image table, memory
2219/1118	. . . Peripherals have a key to determine kind of peripheral	2219/1161	. . . . Signal processing, detect or deliver analog signals
2219/1119	. . . Key is 8-resistors connected to either 0-or-1 to form a byte key	2219/1162	. . . . Forcing I-O
2219/1121	. . . Read key multiplexed, 16-bit wide, connect some resistors to reversed potential	2219/1163	. . . . Multiplexer for analog signals
2219/1122	. . . Program address module after installation, connect programmer into module	2219/1164	. . . . Latch for output or input
2219/1123	. . . Poll and detect connected I-O addresses, not connected means high address	2219/1165	. . . . Disable I-O card by preventing current flow
2219/1124	. . . Transfer address to module, decrement, send this as address for next module	2219/1166	. . . . Create optimum data blocks for transmission
2219/1125	. . . I-O addressing	2219/1167	. . . . Pulse wave output
2219/1126	. . . Conversion table between original defined module address and actual physical address	2219/1168	. . . . Peak amplitude for input, nul amplitude for activating output
2219/1127	. . . Selector for I-O, multiplex for I-O	2219/1169	. . . . Activating output if input changes, transition input and output not yet on
		2219/1171	. . . . Detect only input variation, changing, transition state of variable
		2219/1172	. . . . Direct negation, inversion of inputsignal
		2219/1173	. . . . Activating output only if powersupply is sufficient
		2219/1174	. . . . Input activates directly output and <u>vice versa</u>
		2219/1175	. . . . Activating output repeatedly for guaranteed turning on of output
		2219/1176	. . . . I-O signal processing, adaption, conditioning, conversion of signal levels
		2219/1177	. . . . Insertion mistake
		2219/1178	. . . . Display states of I-O in time

2219/1179	. . .	Safety, on error, fault, block, inhibit output	2219/13002	. . .	Transfer rom content to ram, load ram from non volatile memory
2219/1181	. . .	Detection of I-O faults, shut down of I-O	2219/13003	. . .	Initial program load, host to controller
2219/1182	. . .	I-O isolation, optical	2219/13004	. . .	Programming the plc
2219/1183	. . .	On error shut off output by independent system, not normal I-O	2219/13005	. . .	Subroutine
2219/1184	. . .	Test ability of input for on, off capability	2219/13006	. . .	Prom burning
2219/1185	. . .	Feedback of output status to input module and compare with command	2219/13007	. . .	Program hardwired logic, pld, fpga when out of machine, or inactive
2219/1186	. . .	Redundant inputs parallel, outputs series, load safe switch off, AND condition	2219/13008	. . .	Quicker execution of jumps when repeating same kind of operation
2219/1187	. . .	Test input value with stored limits, permissible range, plausibility	2219/13009	. . .	State machine instructions
2219/1188	. . .	Detection of inserted boards, inserting extra memory, availability of boards	2219/13011	. . .	Batch control
2219/1189	. . .	Duplicated I-O also triple	2219/13012	. . .	Using other programs, adapting program to machine, exchanging or rom
2219/1191	. . .	I-O voter	2219/13013	. . .	Transferring ram to eprom see also prom burning
2219/1192	. . .	Output of interfaces parallel, for safe load switch on, OR condition	2219/13014	. . .	Expanding functions of display by modular hardware
2219/1193	. . .	I-O ram as buffer for signals and self test for I-O bus	2219/13015	. . .	Semi automatic, manual automatic
2219/1194	. . .	Send dummy, check data to I-O to check correct I-O connection	2219/13016	. . .	Jump while output is disabled, or disabling output when running test instruction
2219/1195	. . .	Critical I-O monitored by safety module connected to plc, other I-Os by plc self	2219/13017	. . .	Macro instructions
2219/1196	. . .	Intelligent, smart I-O can function independently, monitoring limit values	2219/13018	. . .	Conversion ladder diagram to decision system, machine code, language
2219/1197	. . .	Each interface, module has simulation module which takes over control	2219/13019	. . .	Translate program in order to be used on different plc
2219/1198	. . .	Activate output only if power of the output signal is sufficient	2219/13021	. . .	Convert Petri net to ladder diagram
2219/1199	. . .	Inserting or taking out of boards during power on, hot plug in	2219/13022	. . .	Convert source program to intermediate program
2219/12	. . .	Plc mp multi processor system	2219/13023	. . .	Convert natural language, graphic to coded states, input
2219/1201	. . .	Each plc can act as master, flying master	2219/13024	. . .	Convert digital logic of hardware circuit into plc software
2219/1202	. . .	Modules with same hardware and software	2219/13025	. . .	Convert batch recipe into plc program
2219/1203	. . .	Expand logical expression over multiple controllers	2219/13026	. . .	Convert ladder to event chaining, internal state for fpga or similar
2219/1204	. . .	Multiprocessing, several plc's, distributed logic control	2219/13027	. . .	Convert time chart to relation vector to calculate plc I-O state as function of time
2219/1205	. . .	Memory access for different processors, memory arbitration, mailbox	2219/13028	. . .	Convert plc type program in pc type program for running in pc environment
2219/1206	. . .	All processors are loaded with same program, only part of program is loaded	2219/13029	. . .	Enter values with incremental keys
2219/1207	. . .	Download programcode to node, I-O and execute programcode	2219/13031	. . .	Use of touch screen
2219/1208	. . .	Communication, exchange of control, I-O data between different plc,	2219/13032	. . .	Different menus on screen, softkeys
2219/1209	. . .	Exchange control, I-O data to other plc, individually, without host	2219/13033	. . .	Code wheel to enter data, push button to accept
2219/1211	. . .	Exchange control, I-O data to other plc, using separate synchronizing,	2219/13034	. . .	Operator interface derived from comment label in program
2219/1212	. . .	Exchange control data between plc's only when other plc's are inactive	2219/13035	. . .	Name, address duplication detection for program components, symbols
2219/1213	. . .	All plc send their input to a common image memory, output directly send out	2219/13036	. . .	Tracing, use of dummy ladder to collect signals together in one
2219/1214	. . .	Real-time communication between plc, Ethernet for configuration, monitor	2219/13037	. . .	Tracing
2219/1215	. . .	Master slave system	2219/13038	. . .	Comment, message data displayed with program instructions
2219/1216	. . .	Interlock problem, avoid sending data to slave when slave processes data	2219/13039	. . .	Print out of program, printer for program
2219/13	. . .	Plc programming	2219/13041	. . .	Display ladder or logic diagram, mnemonics, switch between two display
2219/13001	. . .	Interrupt handling	2219/13042	. . .	Display logic diagram, LOP
			2219/13043	. . .	Display statement, instruction list, IL, BL, AWL
			2219/13044	. . .	Display as flow chart, SFC, FUP
			2219/13045	. . .	Additional data to restore ladder diagram from machine instructions

2219/13046	. . .	Display status of edited program segments: inserted, deleted, replaced	2219/13089	. . .	Skip part of expression evaluation if no influence on end result
2219/13047	. . .	Display data on chart with comment, message about type of data	2219/13091	. . .	Use of precalculated and stored values to speed up calculations
2219/13048	. . .	Display of ladder, RLD, RLL, KOP	2219/13092	. . .	Speed up, evaluation of expressions between brackets
2219/13049	. . .	Display progress of program, state, highlight, colour	2219/13093	. . .	Using functions like arithmetic timers in program
2219/13051	. . .	Display status of I-O in intelligible, easy to understand language	2219/13094	. . .	Using a-d convertor as function
2219/13052	. . .	Display of ladder diagram	2219/13095	. . .	Pid regulator
2219/13053	. . .	Edit by use of a ladder mask, raster, enter a symbol and select place in mask	2219/13096	. . .	Fuzzy control function
2219/13054	. . .	Enter a symbol and number of times symbol to be used in ladder diagram	2219/13097	. . .	Function is true macro program, not subroutine, conversion to machine
2219/13055	. . .	Place cursor, enter symbol, move cursor	2219/13098	. . .	Nc function to control axis, written in C or not
2219/13056	. . .	Edit conversion, jump table interactively	2219/13099	. . .	Function block, OOP, various functions grouped, called by name as servo
2219/13057	. . .	Automatic search for unused, available address; assign to symbol	2219/13101	. . .	Function block instance, only one function block exists, several instances
2219/13058	. . .	One instruction of plc generates a whole independent sequence, relay	2219/13102	. . .	Function is a user written program, separate from rest
2219/13059	. . .	If not able to execute instruction block, skip and execute next	2219/13103	. . .	Adaptive selftuning regulator
2219/13061	. . .	Selection between sequential and conditional program	2219/13104	. . .	Assembly, machine code, instruction list, AWL, IL, BL
2219/13062	. . .	Booting	2219/13105	. . .	Two or more languages, ladder diagram or progression, basic program
2219/13063	. . .	Synchronization between modules	2219/13106	. . .	Natural language, use simple words like move, rotate,
2219/13064	. . .	Execute reverse sequence	2219/13107	. . .	Logic symbols, plan LOP, functional block symbols FBS, functional programming FUP
2219/13065	. . .	Tasks for executing several programs asynchronously	2219/13108	. . .	Flow diagram, sequential function chart with transitions and states SFC Grafcet
2219/13066	. . .	Execute next step if state, control zone changes	2219/13109	. . .	Pld programmable logic device software for plc
2219/13067	. . .	Use of variables, symbols in instructions, to indicate mechanisms, interfaces	2219/13111	. . .	Expert system
2219/13068	. . .	Program divided in operation blocks, groups, tasks each executed	2219/13112	. . .	Petri net
2219/13069	. . .	Execute bit operation during instruction fetch cycle for word operation	2219/13113	. . .	Read image of sequence ladder diagram, flow chart drawing, translate into code
2219/13071	. . .	Non time critical program by processor, time critical program by hardware	2219/13114	. . .	Use of relative addresses for program
2219/13072	. . .	Super scalar computing	2219/13115	. . .	Optimize ladder diagram block by rearrangement of serial and parallel
2219/13073	. . .	Several interacting programs, each for a separate machine, exchange of start, stop	2219/13116	. . .	Machine code, instruction for processor
2219/13074	. . .	Result of bit operation can modify or stop instruction execution	2219/13117	. . .	Two languages, ladder diagram and machine code for processor
2219/13075	. . .	User program, then interlock program to override certain conditions	2219/13118	. . .	Decompiler, translate machine code to hll, reverse processing, easy modification
2219/13076	. . .	Interprete in pc a ladder diagram, use of sequence engine	2219/13119	. . .	Compiler
2219/13077	. . .	Interlock conditions stored in tables	2219/13121	. . .	DDE direct data exchange, DLL dynamic library linking
2219/13078	. . .	Sequence operation and interlock set programs are separated	2219/13122	. . .	Flow chart program activates several ladder diagrams, each controls one machine
2219/13079	. . .	Solving stored logic function if value is equal target value	2219/13123	. . .	C language
2219/13081	. . .	Select between initialisation and normal control instructions sequence plc	2219/13124	. . .	Step language
2219/13082	. . .	Parallel execution of bit operations	2219/13125	. . .	Use of virtual, logical connections
2219/13083	. . .	Jumps	2219/13126	. . .	Csl computer simulation language
2219/13084	. . .	Rom or eprom with conditional instructions	2219/13127	. . .	Hybrid sfc for description of sequence, ladder diagram for conditions, interlock
2219/13085	. . .	Plc controls several machines in sequence	2219/13128	. . .	Relay ladder diagram, RLL RLD KOP
2219/13086	. . .	Priority interrupt	2219/13129	. . .	Automatic documentation of program
2219/13087	. . .	Separate interrupt controller for modules	2219/13131	. . .	Select out several languages: FBD, SFC, RLL or RLD
2219/13088	. . .	Analyzing only relevant rows of ladder diagram	2219/13132	. . .	Select out several languages: FBD and SFC
			2219/13133	. . .	Select control languages out of FB RLL or RLD, SFC, ST

2219/13134	. . .	Two or more languages mixed, RLD, SFC, FBD, IL, ST, relay ladder, function block, sequential function, instruction list, structured text mixed to form logic control program
2219/13135	. . .	Using audio and-or video playback
2219/13136	. . .	Translate spreadsheet into code
2219/13137	. . .	Interpreter considers hierarchy of plc in system structure for programming it
2219/13138	. . .	High level language HLL, structured text ST, resembles pascal
2219/13139	. . .	CAD, design plc system by inputting desired failure, fault behaviour
2219/13141	. . .	Derive sequence program from design, cad data of machine
2219/13142	. . .	Debugging, tracing
2219/13143	. . .	Manual testing
2219/13144	. . .	GUI graphical user interface, icon, function bloc editor, OI operator interface
2219/13145	. . .	Graphical input of network of symbols, simulation on screen, translate to machine
2219/13146	. . .	Process image blocks have a relation to software function blocks
2219/13147	. . .	Program using time charts
2219/13148	. . .	Object oriented programming
2219/13149	. . .	Encapsulated actuator model with standardized interface: state, action, interlock
2219/13151	. . .	Correction of program using grammatical error detection
2219/13152	. . .	Modification of program
2219/13153	. . .	Modification, change of program in real time
2219/13154	. . .	Patching rom to correct program
2219/13155	. . .	Inserting instructions in program
2219/13156	. . .	IC-memory card
2219/13157	. . .	Tape
2219/13158	. . .	Non volatile memory, no battery
2219/13159	. . .	Cassette
2219/13161	. . .	Easily exchangable rom, eeprom cassette, earom
2219/13162	. . .	Core memory
2219/13163	. . .	Light pen
2219/13164	. . .	Remote and local programming unit, control panel
2219/13165	. . .	Program plc by independent build in processor
2219/13166	. . .	Program intelligent I-O separate from main plc
2219/13167	. . .	Personal computer pc
2219/13168	. . .	With contact pins
2219/13169	. . .	Voice, oral, vocal, speech announcement
2219/13171	. . .	Portable, detachable programming unit
2219/13172	. . .	Remote programming from computer
2219/13173	. . .	Selection out of all possible programs with switch
2219/13174	. . .	Pc, computer connected to plc to simulate machine
2219/13175	. . .	For each input corresponding delay time for output response
2219/13176	. . .	Functionality of a complex controlled systems, composed of sub-systems
2219/13177	. . .	Select next stimuli as function of input state of previous step, so useless stimuli skipped
2219/13178	. . .	Reiterate simulation till minimum delay stimuli, original contact stat
2219/13179	. . .	Reiterate simulation for different conditions or subsystems
2219/13181	. . .	Selection of limited stimuli, inputs for simulation
2219/13182	. . .	With petrinets
2219/13183	. . .	Connect simulation card with overlay into control system, to learn programming
2219/13184	. . .	Pc, computer connected to plc to simulate only part of machine
2219/13185	. . .	Software function module for simulation
2219/13186	. . .	Simulation, also of test inputs
2219/13187	. . .	Checking validity of data
2219/13188	. . .	Checking program data, parity, key
2219/13189	. . .	On error, look in table for alternative allowed next instruction
2219/13191	. . .	Inhibit next step if signature fails, response different from stored response
2219/13192	. . .	Eeprom and software interlock, user cannot change ram data
2219/13193	. . .	Examine needed I-O, detect connected I-O, execute program only if proper I-O
2219/13194	. . .	Build in measurement processing time and input time, input time must be smaller
2219/13195	. . .	Protected programs, running these programs
2219/13196	. . .	Check if instruction for special module is valid for that module
2219/13197	. . .	Host and remote version of ladder program, avoid different versions
2219/13198	. . .	Safety, forbid dangerous instruction, instruction order while programming
2219/13199	. . .	On error choose another program
2219/14	. .	Plc safety
2219/14001	. . .	Detect direction, sign of change of signal
2219/14002	. . .	Independent processor, coprocessor monitors plc
2219/14003	. . .	Pc, personal computer monitors contact data of several plc's
2219/14004	. . .	On error I-O control state is substituted by actual state to continue
2219/14005	. . .	Alarm
2219/14006	. . .	Safety, monitoring in general
2219/14007	. . .	Plc as standalone for safety control of machine
2219/14008	. . .	Pc monitors plc
2219/14009	. . .	Manual override control, digital or analog, between plc and machine
2219/14011	. . .	Explosion free control, intrinsically safe
2219/14012	. . .	Safety integrity level, safety integrated systems, SIL, SIS
2219/14013	. . .	IN, dual plc worker coworker, switch, OUT persistency
2219/14014	. . .	Redundant processors and I-O
2219/14015	. . .	Dual plc's, processors and dual I-O
2219/14016	. . .	Triple plc's, processors and dual I-O, triple modular redundant
2219/14017	. . .	Triple plc's, processors and triple I-O
2219/14018	. . .	IN, plc and comparator, error detector, backup, standby plc, switch, update OUT
2219/14019	. . .	Dual IN, crosscoupled relay, dual AND, dual OUT
2219/14021	. . .	IN, direct link parallel to plc, AND, OUT
2219/14022	. . .	Dual IN, dual plc with dual OUT comparator, dual AND, dual OUT
2219/14023	. . .	IN, three plc and 2-out-of-3 processor voter, 2-out-of-3 output voter, OUT

2219/14024	. . .	Dual IN, three plc with comparator, dual 2-out-of-3 output voter, dual OUT	2219/14073	. . .	Real time modeling of plc behaviour, display pictogram of system
2219/14025	. . .	Dual IN, relay parallel to plc with comparator, dual AND, feedback OUT, dual OUT	2219/14074	. . .	Signature analysis, recorded states, zones are compared to actual
2219/14026	. . .	IN, relay, direct link parallel to plc, AND, OUT	2219/14075	. . .	Test of interface
2219/14027	. . .	IN, plc and comparator, feedback OUT, OUT	2219/14076	. . .	Test of sensor
2219/14028	. . .	Dual IN, plc and comparator, feedback OUT, AND, OUT	2219/14077	. . .	Detect difference in signal between identical channels, if plausible
2219/14029	. . .	Dual IN, plc and comparator, feedback OUT, dual AND, OUT	2219/14078	. . .	If fault in next cycle persists, declare channel faulty
2219/14031	. . .	Dual plc, dual I-O, single actuator, crosscoupling IN and OUT	2219/14079	. . .	If signal out of range, use for next cycle previous detected signal
2219/14032	. . .	Dual plc, dual I-O, crosscoupling analog IN of first plc to OUT of second plc	2219/14081	. . .	Take average, mean of two valid signals of same input
2219/14033	. . .	Dual plc, dual I-O bus, dual I-O amplifier	2219/14082	. . .	Sample input signal again to verify if signal is correct
2219/14034	. . .	Quad system, dual worker coworker, output voter, switch	2219/14083	. . .	Derive diagnostic program from model needed for sequence program
2219/14035	. . .	Single analog I-O IN, dual signal processing, dual plc	2219/14084	. . .	Remote diagnostic
2219/14036	. . .	Detection of fault in processor	2219/14085	. . .	Memory testing
2219/14037	. . .	Fault in I-O communication	2219/14086	. . .	Watch dog
2219/14038	. . .	Fault in I-O racks, point level	2219/14087	. . .	Selecting parameters or states to be displayed on panel, displaying states
2219/14039	. . .	Fault in sensor, actuator	2219/14088	. . .	Display result of computation, calculation
2219/14041	. . .	Influence of execution of interrupts	2219/14089	. . .	Display of control states on cards, by leds
2219/14042	. . .	Process time	2219/14091	. . .	Message generation, composer from variables and states, zones
2219/14043	. . .	Detection of abnormal temperature	2219/14092	. . .	Display menu and its code, sense code, compare with registered code
2219/14044	. . .	Operating time test for over or under conditions	2219/14093	. . .	Display matrix of relay, contact symbols, select and show time
2219/14045	. . .	Parameter, over or under condition detection	2219/14094	. . .	Display instruction with corresponding states, markers
2219/14046	. . .	Current flow	2219/14095	. . .	Library of pictures to display process, pictogram
2219/14047	. . .	Open circuit, broken line, cable	2219/14096	. . .	Voice, vocal, speech alarm
2219/14048	. . .	Short circuit	2219/14097	. . .	Display of error messages
2219/14049	. . .	Broken led, signalling device	2219/14098	. . .	Displaying instructions for monitoring state of machine
2219/14051	. . .	Correct polarity of supply	2219/14099	. . .	What kind of fault, first fault latch indication
2219/14052	. . .	Detect missing module	2219/14101	. . .	Indication of status in a ready, off, running of fault state
2219/14053	. . .	Power failure, loss, abnormal battery	2219/14102	. . .	Fault stages, confinement, logical segregation of I-O, separate modules
2219/14054	. . .	Self test	2219/14103	. . .	Detection on or off-line, latency from failure occurrence to fault recognition
2219/14055	. . .	Make log, journal, history file of state changes	2219/14104	. . .	Fault masking, redundant module is selected, fault will not propagate
2219/14056	. . .	Monitor only particular devices which are required for execution of process	2219/14105	. . .	Retry, reacquire input data and start fault sequence again
2219/14057	. . .	Compare response time, time interval with reference response time, interval	2219/14106	. . .	Reconfiguration of components or graceful degradation, degrade
2219/14058	. . .	Diagnostic, using expert, knowledge based system	2219/14107	. . .	Recovery, after detection or reconfiguration, effect an error eliminati
2219/14059	. . .	Selftest of voting, switching unit	2219/14108	. . .	Restart of processing
2219/14061	. . .	On-off-line diagnostic	2219/14109	. . .	Repair on or off-line
2219/14062	. . .	Diagnostic of dead state, machine does not function anymore	2219/14111	. . .	Reintegration, after correction of fault, failed module reinserted
2219/14063	. . .	Diagnostic of degrading performance	2219/14112	. . .	Diagnostic, troubleshooting
2219/14064	. . .	Portable diagnostic unit, offline	2219/14113	. . .	Fault tolerant objectives for equipment, controller
2219/14065	. . .	Checking step, diagnostic routine at end of each scan	2219/14114	. . .	Integrity, error detector, switch off controller, fail safe
2219/14066	. . .	Look up table to determine particular fault conditions			
2219/14067	. . .	Log, history of key, input information before last fault occurred			
2219/14068	. . .	Compare operation time of each independent block, group with stored			
2219/14069	. . .	Dual watch dog, one for operating system, other for user program			
2219/14071	. . .	Test of equipment, system without using actual system			
2219/14072	. . .	Test of I-O scanner			

2219/14115	. . .	Rapid recovery after fault detection	2219/15017	. . .	Optical fiber
2219/14116	. . .	Safe, emergency shutdown, esd of system	2219/15018	. . .	Communication, serial data transmission, modem
2219/14117	. . .	Emergency shut down of control processor, power down	2219/15019	. . .	RS232 serial
2219/14118	. . .	Interlock of control switches	2219/15021	. . .	Convertor between plc and pc built into serial communication line
2219/14119	. . .	Inhibit remote control	2219/15022	. . .	Synchronous serial data transmission
2219/14121	. . .	Dual hand control	2219/15023	. . .	Data packet, each module reads input stream and replaces with output
2219/14122	. . .	Prevent conflicting writing of data; use lock flags	2219/15024	. . .	RS422, balanced lines, xor, only one transmitter, receiver, RS485
2219/14123	. . .	Majority voting, dynamic redundant, persistency and integrity	2219/15025	. . .	Before starting communication between modules, initialize modules
2219/14124	. . .	Redundant network, client server nodes	2219/15026	. . .	Detection of data transmission faults
2219/14125	. . .	Redundant I-O racks, interfaces to points	2219/15027	. . .	RS485, MPI multipoint interface, multiple transmitters, receivers connected
2219/14126	. . .	Redundant I-O points, two sensors, actuators for same point	2219/15028	. . .	Controller and device have several formats and protocols, select common one
2219/14127	. . .	Redundant communication between processor and I-O	2219/15029	. . .	I-O communicates with local bus at one end and with fieldbus at other end
2219/14128	. . .	Redundant I-O rack has spare slots, hot repair feature, spare blocks f	2219/15031	. . .	RS485 for service connection to module
2219/14129	. . .	Primary, worker and backup, coworker plc for testing I-O	2219/15032	. . .	Exchange objects having I-O, configuration, status, parameters, functions attributes
2219/14131	. . .	Work by plc, all plc function in parallel, synchronous data exchange	2219/15033	. . .	Exchange objects between cpu and intelligent I-O, stored in their memory
2219/14132	. . .	Dual plc, each monitors other	2219/15034	. . .	Serial transmission using one line for data and one line for clock
2219/14133	. . .	Each plc is different from others	2219/15035	. . .	Select between simplex, only reading I-O data or duplex, also writing to interface
2219/14134	. . .	Each plc is programmed by different person	2219/15036	. . .	Control words for interface itself and for connected I-O
2219/14135	. . .	Single plc, load between two I-O to plus and two I-O to ground	2219/15037	. . .	Fail safe communication
2219/14136	. . .	Redundancy, masking redundancy, avoid failure but no fault detection	2219/15038	. . .	Internet, tcp-ip, web server see under S05B219-40
2219/14137	. . .	Restart, power up of processor, outputs are off, disabled or hold last state	2219/15039	. . .	Display of reference, set value, of measured, feedback value
2219/14138	. . .	Each independent operation block, group has own restart, home position	2219/15041	. . .	Sense area of screen, compare if corresponds with correct area
2219/14139	. . .	On the fly software replacement in case of error	2219/15042	. . .	Synoptic display of process, mimic diagram
2219/14141	. . .	Restart	2219/15043	. . .	Lcd, 7-segment displays ten different states
2219/14142	. . .	Low impedance bus	2219/15044	. . .	Multiple lcd, alphanumeric display
2219/14143	. . .	Structure, low pass filter, debouncing input, output driver with ramp	2219/15045	. . .	Portable display unit
2219/14144	. . .	Galvanic isolation	2219/15046	. . .	Low-high intensity display, flashing
2219/14145	. . .	Serial feedback of several states of output	2219/15047	. . .	Colour display
2219/15	. . .	Plc structure of the system	2219/15048	. . .	Microprocessor
2219/15001	. . .	Local remote switch control	2219/15049	. . .	Timer, counter, clock-calendar, flip-flop as peripheral
2219/15002	. . .	Image table in I-O expansion module	2219/15051	. . .	Dual port memory
2219/15003	. . .	Interbus-s	2219/15052	. . .	Communication processor, link interface
2219/15004	. . .	Identify kind of module, control unit connected	2219/15053	. . .	Microcontroller
2219/15005	. . .	Set switches defining control function	2219/15054	. . .	LIFO for storing intermediate results
2219/15006	. . .	Set configuration from master control station	2219/15055	. . .	FIFO
2219/15007	. . .	On reinsertion board, power up, program setting, configuration automatically set	2219/15056	. . .	DMA
2219/15008	. . .	Identify connected I-O and store in address table	2219/15057	. . .	FPGA field programmable gate array
2219/15009	. . .	Object oriented configuring, graphical display of plant	2219/15058	. . .	Tristate interface
2219/15011	. . .	Configuration of operating system	2219/15059	. . .	Floating point coprocessor
2219/15012	. . .	Configuration software for networks	2219/15061	. . .	RISC processor for plc
2219/15013	. . .	Set configuration, address of connected module from fixed non volatile	2219/15062	. . .	Battery backup
2219/15014	. . .	Configure priorities of different tasks	2219/15063	. . .	Real time clock
2219/15015	. . .	Assign functions to group of complete or partial cells, modules	2219/15064	. . .	MMU, memory management unit
2219/15016	. . .	Initialize amount of memory space needed in module	2219/15065	. . .	Optimize program memory space
			2219/15066	. . .	Use of external memory
			2219/15067	. . .	Using a mixture of memories

- 2219/15068 . . . SBC single board computer, UCM universal control module
- 2219/15069 . . . Use of function modules with timer, counter, relay functions and I-O
- 2219/15071 . . . Circuit in module connected to bus over two contacts, closed in operat
- 2219/15072 . . . Modules in daisy chain, connected by parallel cable
- 2219/15073 . . . Interface card, module has own power supply independent from pc
- 2219/15074 . . . Modules on bus and direct connection between them for additional logic
- 2219/15075 . . . Each connected module has own power suppl
- 2219/15076 . . . Stackthrough modules, modules are stacked, no need for backplane
- 2219/15077 . . . Modular structure, memory tables hold data about type of connected apparatus and data format
- 2219/15078 . . . Modules, construction of system
- 2219/15079 . . . Multitasking, real time multitasking
- 2219/15081 . . . Period length ratio between application and communication task is settable
- 2219/15082 . . . Dos operating plc system
- 2219/15083 . . . Operating system, microsoft windows
- 2219/15084 . . . MSDOS
- 2219/15085 . . . Windows NT
- 2219/15086 . . . Windows-95
- 2219/15087 . . . Open control system
- 2219/15088 . . . Prestabilized power supply followed by another stabilized power supply
- 2219/15089 . . . Double, parallel power supply, double, two rails for power supply
- 2219/15091 . . . Power and data bus
- 2219/15092 . . . Power supply with extended range inputs
- 2219/15093 . . . For each module a power supply
- 2219/15094 . . . Clock for power converters also for microprocessor and I-O
- 2219/15095 . . . Power supply for input, output derived from microprocessor pin
- 2219/15096 . . . Cpu controls power supply on I-O modules
- 2219/15097 . . . Power supply
- 2219/15098 . . . Switching power on only when system needs control, stand by
- 2219/15099 . . . Bus arbitration
- 2219/15101 . . . Personal computer pc and plc, slot plc, same kernel
- 2219/15102 . . . Programmer simulates, behaves like a programming drum
- 2219/15103 . . . Microprogram stored in rom or ram
- 2219/15104 . . . Microprogram rom is externally attached
- 2219/15105 . . . Hardwired logic to accelerate, speed up execution of instructions
- 2219/15106 . . . High speed limited function sub plc together with slow speed general
- 2219/15107 . . . Linesolver, columnsolver
- 2219/15108 . . . Intelligent I-O is a plc itself, with limited interface
- 2219/15109 . . . Intelligent interface is much faster than main plc
- 2219/15111 . . . Intelligent interface behaves like a plc, by special communication pro
- 2219/15112 . . . Two cpu control plc, select cpu, video switch, with special key
- 2219/15113 . . . Common display, monitor for two controlling cpu
- 2219/15114 . . . Coprocessor connected to main via bus and separate channel
- 2219/15115 . . . Pc serves as plc, programming panel, monitoring panel
- 2219/15116 . . . Pc implements plc, in application program, plc instruction register
- 2219/15117 . . . Radio link, wireless
- 2219/15118 . . . Shared memory
- 2219/15119 . . . Backplane controller
- 2219/15121 . . . Plc build into application, like power invertor
- 2219/15122 . . . Less frequent used subroutines arranged at high addresses
- 2219/15123 . . . Plc with build in console, I-O and communication
- 2219/15124 . . . Plc integrated in plug, connector
- 2219/15125 . . . Multiple kernels
- 2219/15126 . . . Calculate duration of cycle
- 2219/15127 . . . Bit and word, byte oriented instructions, boolean and arithmetic operations
- 2219/15128 . . . Ternary logic instead of binary
- 2219/15129 . . . Separating address and databus
- 2219/15131 . . . Pipeline registers
- 2219/15132 . . . Bank switching
- 2219/15133 . . . Opto isolation, optical separation
- 2219/16 . . . Plc to applications
- 2219/161 . . . Nuclear plant
- 2219/162 . . . Transfer line
- 2219/163 . . . Dometique, domestic, home control, automation, smart, intelligent house
- 2219/20 . . . Pc systems
- 2219/21 . . . Pc I-O input output
- 2219/21001 . . . Analog input
- 2219/21002 . . . Neural classifier for inputs, groups inputs into classes
- 2219/21003 . . . Proximity switch as input
- 2219/21004 . . . Microprocessor plus electromechanical, cam control for output
- 2219/21005 . . . Several slave modules connected to same I-O of master, multiplexed by master
- 2219/21006 . . . Detect position switches, connect resistances, analog value gives position
- 2219/21007 . . . A processor to evaluate signals of detector only, I-O processor
- 2219/21008 . . . Read in analog values by microprocessor, potentiometer, resistor taps
- 2219/21009 . . . Display states of I-O
- 2219/21011 . . . Forcing I-O
- 2219/21012 . . . Configurable I-O
- 2219/21013 . . . Microcontroller and power output switches integrated on same chip
- 2219/21014 . . . Interface, module with relays
- 2219/21015 . . . Easy expansion, extension of I-O
- 2219/21016 . . . I-O has own power supply
- 2219/21017 . . . Use of stack memory between processor and machine
- 2219/21018 . . . Connect sensors to a concentrator, concentrators to bus
- 2219/21019 . . . Split, separate urgent from non urgent, interrupt from status inputs, store in two register
- 2219/21021 . . . Intelligent I-O, executes tasks independently from main cpu

2219/21022	. . . Telephone ring interface, detect ring sequence to control devices	2219/21062	. . . Pc and I-O bus manager and network nodes linked to I-O clusters
2219/21023	. . . Midi interface	2219/21063	. . . Bus, I-O connected to a bus
2219/21024	. . . Analog output	2219/21064	. . . Calibration: automatic of a-d convertor, store null and maximum in eeprom
2219/21025	. . . To address single module, assign a group with only that single module	2219/21065	. . . Module calibrates connected sensor
2219/21026	. . . Indirect addressing of I-O through a control register	2219/21066	. . . Disconnect data line from module before, reconnect after configuration
2219/21027	. . . Address extension, module with several I-O, command has subaddress for each I-O	2219/21067	. . . Set group of module by hardware for each module, no program protocol
2219/21028	. . . Address of module determined by position	2219/21068	. . . Configure input signals either as interrupt or status signals
2219/21029	. . . Address of module determined by function of module	2219/21069	. . . At start up check I-O and store addresses in secure device
2219/21031	. . . Address of module determined by signature : type, value of measured, controlled data of module	2219/21071	. . . Configuration, each module has a settable address, code wheel, encoder
2219/21032	. . . Controlled module in a ring, each module detects its own address	2219/21072	. . . Write, modify address into module by optical means, laser
2219/21033	. . . Serial transfer address to each module, decrement, if zero module found	2219/21073	. . . Each module has push button, trigger circuit to initialise address setting
2219/21034	. . . Address I-O	2219/21074	. . . Master has keyboard to enter address of called slave
2219/21035	. . . Identification with serial header	2219/21075	. . . Initialise each module random, count down, if zero master sets address
2219/21036	. . . Each connected module has own address and address of originator of message	2219/21076	. . . Plug, connector with build in decoding, encoding for module
2219/21037	. . . Serial time multiplex bus, programming each module with one delayed line TDM	2219/21077	. . . Module address fixed, defined by fixed identification lines on motherboard
2219/21038	. . . Special clock line, module counts clock until equal to its address	2219/21078	. . . Fixed address of slot on motherboard changed, using address convertor, decoder
2219/21039	. . . Slaves, modules in daisy chain, each handles control data, transmits to next	2219/21079	. . . Allocate at start up also to each controlled device a code for the master
2219/21041	. . . Detect length of packet of pulses to recognise address	2219/21081	. . . At start up, check I-O configuration and store addresses in ram
2219/21042	. . . Address a group, a zone	2219/21082	. . . At start, send first address to all modules, manually trigger first module and so on
2219/21043	. . . Device address and subdevice address and function address	2219/21083	. . . At start up detect if connected devices are input or output devices
2219/21044	. . . Modules with same address are each selected by different transmission speed	2219/21084	. . . Actuate module, seek response by counting up address, store address on response
2219/21045	. . . Modules with same address are each selected by different modulation	2219/21085	. . . Define type of I-O, analog, digital, pulse
2219/21046	. . . Address a single module out of a group	2219/21086	. . . Configuration menu program for I-O
2219/21047	. . . Select module if address of module equals required address, compare addresses	2219/21087	. . . Define sensor type, resistance, thermocouple, thermistor, voltage, current
2219/21048	. . . Compare fixed address of module to required address	2219/21088	. . . Define name and address of I-O
2219/21049	. . . Poll and detect connected I-O modules, address terminator, address line high	2219/21089	. . . Detect configuration of I-O regularly
2219/21051	. . . Modules able to communicate to other modules are connected to arbiter	2219/21091	. . . First module initializes its address, then signals next to do same, serial
2219/21052	. . . Modules having a common function are allocated ascending number to address	2219/21092	. . . At start up, autoconfigure module for proper I-O execution, bootstrap
2219/21053	. . . Each unit, module has unique identification code, set during manufacturing, fMAC address	2219/21093	. . . Module has a configuration part for own logic and one for application logic
2219/21054	. . . Connector on bus has two rows of contacts, if one contact is connected, other not	2219/21094	. . . Different connectors for serial transmission as function of machine or connected sensor
2219/21055	. . . Number of halfwaves equals number of I-O, send block of halfwaves, synchro gap	2219/21095	. . . Screen, display connected directed to control system via optical fibre
2219/21056	. . . Decoding on module, module can be inserted anywhere, fixed address in bus connector	2219/21096	. . . Connection of machine to pc via centronics, parallel port
2219/21057	. . . Buslines connecting modules are offset by one line from module to module	2219/21097	. . . DMA
2219/21058	. . . Find address by activating power and detect which address gives feedback	2219/21098	. . . Connect pc to machine, controller, module via serial port
2219/21059	. . . I-O in address space	2219/21099	. . . Two independent interfaces, one for pc, other for remote monitoring
2219/21061	. . . Adapter bus connected to centronics	2219/21101	. . . Connect I-O interface to joystick port

2219/21102	. . .	Pc control of device over normal remote control connected between them	2219/21143	. . .	Sample analog signal between superposed digital signal
2219/21103	. . .	Connect pc to machine, controller, module via PCMCIA	2219/21144	. . .	Link between input and output, output only activated if corresponding input on
2219/21104	. . .	Wire pc connector to output of controlled module, for printer, modem, other module	2219/21145	. . .	Fuse in case of overcurrent
2219/21105	. . .	Read in data only if value changes, transition to save processor time	2219/21146	. . .	If real status is different from controlled status stop motor
2219/21106	. . .	If specific I-O not updated in memory, priority access of I-O, data directly to microprocessor	2219/21147	. . .	Time critical I-O shut off by I-O module, otherwise by processor
2219/21107	. . .	Change sensivity of detection if input value is very low	2219/21148	. . .	Over current protection on clock line
2219/21108	. . .	Module, I-O module consisting of counters and comparators	2219/21149	. . .	If read write error, keep last I-O status for next cycle
2219/21109	. . .	Field programmable gate array, fpga as I-O module	2219/21151	. . .	Activate output only if power sufficient
2219/21111	. . .	Each module has a push button to bypass control and switch module on	2219/21152	. . .	If output defect, switch it off
2219/21112	. . .	Each module has push button to turn module off	2219/21153	. . .	In order to follow higher data input rate, shut off non essential peripherals
2219/21113	. . .	Bus interface has multiplexer, control register, data shift register	2219/21154	. . .	Over current protection
2219/21114	. . .	Universal input, AC or DC	2219/21155	. . .	Over voltage protection
2219/21115	. . .	Same connector can represent either input or output	2219/21156	. . .	Over temperature protection
2219/21116	. . .	Universal cabling; control interface between processor and devices	2219/21157	. . .	Broken, open line, cable, circuit, faulty connection
2219/21117	. . .	Universal I-O, same pin is input or output, bidirectional	2219/21158	. . .	Activate I-O only after system stabilises from start up
2219/21118	. . .	Two sensors on same line, superpose pulsed digital on analog signal	2219/21159	. . .	If I-O defect, warning light, operator pushes buttom, cpu disconnects I-O
2219/21119	. . .	Circuit for signal adaption, voltage level shift, filter noise	2219/21161	. . .	Send dummy, check data to I-O to check correct I-O connection
2219/21121	. . .	Output only enabled during a short period of positive going power supply	2219/21162	. . .	Detect short circuit of cable
2219/21122	. . .	Programmable signal discrimination, input can be used for several functions	2219/21163	. . .	Test I-O if functional or safe value
2219/21123	. . .	Impedance matching	2219/21164	. . .	Resistors between transmitter and receiver, against disturbances
2219/21124	. . .	A-d conversion if input signal is analog, no a-d conversion if input signal is digital	2219/21165	. . .	Zenerdiodes for protection of output of transmitter, input of receiver
2219/21125	. . .	Digital value of analog signals depends on range between signal and threshold	2219/21166	. . .	Output state, over resistance, coupled back to input to monitor output
2219/21126	. . .	Signal processing, filter input	2219/21167	. . .	Intelligent I-O monitors also local load, controlled object
2219/21127	. . .	Signal adaption I-O	2219/21168	. . .	Couple, feedback each output to corresponding input to verify output
2219/21128	. . .	Change control signal, first max or min signal, then normal desired signal	2219/21169	. . .	Low voltage protection
2219/21129	. . .	Low pass filter for input	2219/22	. . .	Pc multi processor system
2219/21131	. . .	Sample two input values, one in positive wave, other in negative wave, average	2219/2202	. . .	Controller calculates a control parameter from values sent by other controllers
2219/21132	. . .	Window for signal	2219/2203	. . .	Grid, array of controllers
2219/21133	. . .	Module to adapt connection of signals to general connector	2219/2204	. . .	Use default values if communication with other controllers not available
2219/21134	. . .	Signal adaption circuit build into connector	2219/2205	. . .	Multicore
2219/21135	. . .	On closing contact, clean contact with large current, then normal signal current	2219/2206	. . .	Microprocessor for display and parameter input, link to control microprocessor
2219/21136	. . .	Detection of zero crossing for command and maximum for reading value	2219/2207	. . .	Microcontroller combined with state sequencer
2219/21137	. . .	Analog to digital conversion, ADC, DAC	2219/2208	. . .	Each processor controls a different function of the machine
2219/21138	. . .	Variable filtering as function of kind of sensor signal	2219/2209	. . .	Only one processor is permitted to execute a common function at a time
2219/21139	. . .	Input activates directly output and <u>vice versa</u>	2219/2211	. . .	Active controllers are allocated more time if request rate is low
2219/21141	. . .	Latched I-O	2219/2212	. . .	All processors are loaded with same program, only part of program is used
2219/21142	. . .	Read input signal when switching power supply is not switched	2219/2213	. . .	Local processor uses data from own local store and data from other stations
			2219/2214	. . .	Multicontrollers, multimicrocomputers, multiprocessing

2219/2215	. . .	Process directly process signals without interrupt or polling	2219/23012	. . .	Derive sequence program from design, cad data of machine CADCS
2219/2216	. . .	Define module independent and module specific element, interconnection, capability	2219/23013	. . .	Build up program by selecting function modules as function of amount paid for it, charging, payment
2219/2217	. . .	First cluster runs normal program, second cluster runs different program	2219/23014	. . .	Conversion of ASCII scripting language to machine code
2219/2218	. . .	Join two clusters of processors together	2219/23015	. . .	Convert input signals to universal machine control signals represented by music
2219/2219	. . .	Processor starts application program only if it receives predetermined data	2219/23016	. . .	Accelerate input, exponent as function of pressure, time, turning speed, keys for 10-to-1
2219/2221	. . .	Only common memory in host, master, no local memory in slave, local controller	2219/23017	. . .	Page, scroll key
2219/2222	. . .	Use of priority levels for gaining access to resources	2219/23018	. . .	Enter parameters by combinations of keys and duration of actuation of keys
2219/2223	. . .	Use a different frequency to address each processor	2219/23019	. . .	Joystick delivers reference function as function of speed of its movement, except about null
2219/2224	. . .	Processor sends data to next, downstream processor	2219/23021	. . .	Gesture programming, camera sees hand, displays it on screen, grasp buttons
2219/2225	. . .	Communication, CPU accesses own I-O and next CPU over dual port memory	2219/23022	. . .	Production design metaphore, tool, operation like input system
2219/2226	. . .	Processor accesses own I-O and I-O of all processors connected on his right	2219/23023	. . .	Control knobs, levers integrated into display, display parameters near knobs
2219/2227	. . .	Common memory as well as local memory	2219/23024	. . .	Delivers reference when in neutral position, otherwise delivers desired value
2219/2228	. . .	Master detects and configures slaves	2219/23025	. . .	Overlay, template for keys with different meaning
2219/2229	. . .	Multiprocessing, change over from master slave to peer to peer, no master	2219/23026	. . .	Recognise user input pattern and present possible intended program
2219/2231	. . .	Master slave	2219/23027	. . .	Database with information on how to control or test different appliances
2219/2232	. . .	Master executes modified program on slave demand	2219/23028	. . .	Switch function of panel, detect this and execute other orders
2219/2233	. . .	Each slave can control several other slaves	2219/23029	. . .	Up down, increment decrement keys, jog, sequentially show functions or values
2219/2234	. . .	Each slave can function in stand alone if master fails	2219/23031	. . .	Simulate control panel to give remote instructions
2219/2235	. . .	Each slave has library of states during which operation is permitted to start	2219/23032	. . .	Input of data from second control unit if first fails
2219/2236	. . .	Master determines critical time when each of slaves must be controlled	2219/23033	. . .	Variable pressure on key gives input value
2219/2237	. . .	Selection of master or slave	2219/23034	. . .	Press once on key to raise signal, twice to lower signal
2219/2238	. . .	Several masters at same time	2219/23035	. . .	Same knob, different functions, turn for pulses, push to enter value
2219/2239	. . .	Reallocate, reschedule execution of controlled functions if one processor fails	2219/23036	. . .	Same knob, different function, normal for parameter, value, pushed to enter value
2219/2241	. . .	Real time database, each processor stores in local memory used variables	2219/23037	. . .	Touch key integrated in display
2219/2242	. . .	Program references to variable by absolute address, update of absolute address	2219/23038	. . .	Select function by amplitude of analog value, potentiometer, resistor taps
2219/2243	. . .	Detect incompatibilities between control devices	2219/23039	. . .	Remote programmer
2219/23	. . .	Pc programming	2219/23041	. . .	Enter analog value
2219/23001	. . .	Expansion of control words, code of standard language to increase functionality	2219/23042	. . .	Only increment key
2219/23002	. . .	Petrinet	2219/23043	. . .	Remote and local control panel, programming unit, switch
2219/23003	. . .	Bumpless control transfer, map corresponding operation states to operation tables	2219/23044	. . .	Transparent overlay with touch sensors, put over display panel, select function
2219/23004	. . .	Build up program so that safety conditions are met, select most stable states	2219/23045	. . .	Function key changes function as function of program, associated pictogram
2219/23005	. . .	Expert design system, uses modeling, simulation, to control design process	2219/23046	. . .	Selection out of menu by function keys
2219/23006	. . .	Finite state modeling	2219/23047	. . .	Operating, repair manual stored in memory
2219/23007	. . .	CAD to develop sequential control system, use data also to test	2219/23048	. . .	Knob to select program serves also as indicator for progress of program
2219/23008	. . .	Computer aided software engineering, program generation, case tools, CASE	2219/23049	. . .	Control panel serial, RS232 connected to controller
2219/23009	. . .	Automatic documentation of program			
2219/23011	. . .	Sequence control design using pc, cad of control system CADCS			

2219/23051	. . .	Remote control, enter program remote, detachable programmer	2219/23091	. . .	Multiple consoles, panels to issue concurrent commands to different groups I-O
2219/23052	. . .	Matrix, plugboard like control panel with modules for display, switches	2219/23092	. . .	Soft up down keys, simulated on screen
2219/23053	. . .	Knob with tactile feedback, representing clicks, detents programmed	2219/23093	. . .	Input a code representing a device function
2219/23054	. . .	Simulate response on entered parameters and display, quicker response	2219/23094	. . .	Debounce key
2219/23055	. . .	Cursor keys to select cells of a spreadsheet with control parameter, enter value	2219/23095	. . .	If knob pushed during power up, knob can be used afterwards as data input
2219/23056	. . .	Foot pedal, control, operated	2219/23096	. . .	Use single button, knob to enter code number, equals number of pushes
2219/23057	. . .	Position of knob, pedal detected by encoder, addresses memory for functions	2219/23097	. . .	Messages to operator in mother tongue, selection out of different languages
2219/23058	. . .	Knob, pedal selects ranges, functions and controls in each range as function of position	2219/23098	. . .	Manual control, via microprocessor instead of direct connection to actuators
2219/23059	. . .	Configuration of pedal, knob with code card, adapt pedal to person	2219/23099	. . .	Switches on panel, connected to serial port
2219/23061	. . .	Variable range of knob, pedal for each function, adapt to person	2219/23101	. . .	Enter quality parameters to select control parameters
2219/23062	. . .	Position of knob, pedal detected by bundle of optical fibres	2219/23102	. . .	Quality parameter is low energy consumption of machine
2219/23063	. . .	Double, two foot pedal	2219/23103	. . .	Quality parameter is high production rate
2219/23064	. . .	Entry of function or parameter during manipulation of tool, operation	2219/23104	. . .	Change display of window to another as function of settable active display time of window
2219/23065	. . .	Manual override of program	2219/23105	. . .	Window, drop, pull down menus
2219/23066	. . .	Same knob starts two different functions	2219/23106	. . .	Cockpit metaphore, condensed representation, urgent things better shown
2219/23067	. . .	Control, human or man machine interface, interactive, HMI, MMI	2219/23107	. . .	Push on flashing alarm indicator, corresponding window pops up on whole screen
2219/23068	. . .	Give instructions, messages to operator	2219/23108	. . .	Floorplan, room metaphore, dedicated windows, unchangeable but can be selectable
2219/23069	. . .	Illuminated, lighting up keys, build in led, display, show sequence data entry	2219/23109	. . .	Configuration of display device, operator panel
2219/23071	. . .	If up, down key is selected, linear display of values appears, pops up	2219/23111	. . .	Adapt control signal logarithmic
2219/23072	. . .	Telephone, dial as control panel	2219/23112	. . .	Ramp, slope connection between two reference values
2219/23073	. . .	Keyboard decoding by microprocessor	2219/23113	. . .	Reread, retransmit several times data for valid data, redundant command
2219/23074	. . .	Each control unit can control own associated load or as central control	2219/23114	. . .	Maintain parameter setting for a while to avoid changes due to noise
2219/23075	. . .	Control unit can switch load on off or can also go into program mode	2219/23115	. . .	Buffer
2219/23076	. . .	Pushbuttons to manually up or down control of motor also for entry of program	2219/23116	. . .	Input signal can be sent simultaneously to several processors
2219/23077	. . .	Reconfigurable remote programmer, learn control signals for different devices	2219/23117	. . .	Lookup table, interpolation between points
2219/23078	. . .	Input a code representing a sequence of operations	2219/23118	. . .	Column and line select in memory to access address data in second memory, tree
2219/23079	. . .	Local programmer can switch to remote to use same capabilities as remote	2219/23119	. . .	Display state, variable only when needed, energy saving
2219/23081	. . .	MMI design, operator workplace design	2219/23121	. . .	Display graphics with corresponding text
2219/23082	. . .	Enter parameters with two hands, dead man knob, switch, pedal	2219/23122	. . .	Display on off time chart for different events
2219/23083	. . .	Joystick with buttons for menu and function selection, scrolling, +sign and -sign	2219/23123	. . .	Production report
2219/23084	. . .	Synoptic display of available, selectable control modules with their functions	2219/23124	. . .	Notepad, message from other operator
2219/23085	. . .	Several users can enter data simultaneously to same processor	2219/23125	. . .	Switch display to show different things, test or normal state
2219/23086	. . .	Menu is sequentially selected and read from cd disk and guides operator	2219/23126	. . .	Display tree structure of whole system or relevant info after function selection
2219/23087	. . .	Programmable selector switch, can be programmed by connected apparatus	2219/23127	. . .	Switch from one kind of display to other, selected by duration discrimination
2219/23088	. . .	Same switch to power control and to set references of several devices	2219/23128	. . .	Switch from one kind of display to other when parameter is changed
2219/23089	. . .	Key cap label rewritten, changed to indicate changed or alternate functions	2219/23129	. . .	Animated display, changes as function of parameters
			2219/23131	. . .	Select on large display part of pictogram to show on display of used workstation
			2219/23132	. . .	Multifunction display

2219/23133	. . .	Animated, rotating fan indicates speed, flashing bulb for intensity	2219/23178	. . .	Display status of currently selected controlled devices
2219/23134	. . .	Display history of used, selected programs, their frequency	2219/23179	. . .	Warning display if heavy energy consuming program steps are selected
2219/23135	. . .	Display to console, panel which sends parameters, commands	2219/23181	. . .	Use of sound, acoustic, voice
2219/23136	. . .	Display all subsystems, select one and display screen corresponding to subsystem	2219/23182	. . .	3D display of controlled system
2219/23137	. . .	Display program step, instruction number	2219/23183	. . .	Display effects of high level commands
2219/23138	. . .	Linear, bar display of variables	2219/23184	. . .	Display different states by using two leds, first blinks, then second, then both
2219/23139	. . .	Segment display	2219/23185	. . .	Setting of internal dipswitches, jumpers
2219/23141	. . .	Flat panel, thin film electro luminescent	2219/23186	. . .	Visual display of workpiece with actions to execute on
2219/23142	. . .	Colour display	2219/23187	. . .	Display number of each program
2219/23143	. . .	Adjustable display	2219/23188	. . .	Software independent and dependent of hardware
2219/23144	. . .	Kind of display, matrix like display, large surface	2219/23189	. . .	Information is code
2219/23145	. . .	Blinking, flickering display	2219/23191	. . .	Command to control simultaneously several machines
2219/23146	. . .	Programmable, reconfigurable via microprocessor or coding switches	2219/23192	. . .	A limited number of programs to be used by plurality of machines, multiplex
2219/23147	. . .	LCD liquid crystal display	2219/23193	. . .	Memory stores lifetime, different settings, configurations of controlled device
2219/23148	. . .	Helmet display, mounted on head of operator	2219/23194	. . .	Check validity data by writing in sector control data and check data
2219/23149	. . .	Dual, two displays	2219/23195	. . .	Memory stores available, allowable, possible options, variations, alternatives of program or modules
2219/23151	. . .	Highlight	2219/23196	. . .	From lookup table and real time clock, select actual daylight period
2219/23152	. . .	Large and several smaller displays for each workstation, each own cursor on large display	2219/23197	. . .	Curve entered with pen on touchscreen
2219/23153	. . .	Controlled load, lightbulb, roller blind itself acts as display to acknowledge command	2219/23198	. . .	Disk with segments connected to separate input of microprocessor, represents different values
2219/23154	. . .	Line of light diodes LED	2219/23199	. . .	Reference value, setpoint for regulator
2219/23155	. . .	Display on screen reference value and sequence steps	2219/23201	. . .	Value is analog signal
2219/23156	. . .	Show upper, lower value, position with upper, lower segment of 7-segment display	2219/23202	. . .	Curve, surface represents analog value, line, surface follower
2219/23157	. . .	Display process, synoptic, legend, pictogram, mimic	2219/23203	. . .	Curve represents analog value, tv scan
2219/23158	. . .	Display of evaluated and selectable program	2219/23204	. . .	Reference in coded form
2219/23159	. . .	Display plurality of parameters simultaneously	2219/23205	. . .	Reference together with sequence commands
2219/23161	. . .	Hand held terminal PDA displays machine control program when user is near that machine	2219/23206	. . .	Set reference as function of position, for compensations
2219/23162	. . .	Display real time or time already elapsed or rest time for program	2219/23207	. . .	Capacitive detection of line
2219/23163	. . .	Display enlarged, zoomed detail and small overall schematic, plan	2219/23208	. . .	Potentiometer
2219/23164	. . .	Display data on a scrolling line, ticker display	2219/23209	. . .	Linear potentiometers with multiple sliders
2219/23165	. . .	Display of parameter plus permissible, allowable range	2219/23211	. . .	Limit value to tolerances, ranges, plausibility
2219/23166	. . .	Display program in fast, quick, speed mode	2219/23212	. . .	Store entered data, program status, reread regularly, against data loss
2219/23167	. . .	Display of selected sequence, permissible sequence	2219/23213	. . .	Check validity of entered data
2219/23168	. . .	Display progress of program	2219/23214	. . .	Checksum CRC
2219/23169	. . .	Operation field together with control parameters	2219/23215	. . .	Check data validity in ram, keep correct validity, compare rom ram
2219/23171	. . .	Display dynamic change of process, animation	2219/23216	. . .	Extend processing time by extending enable signal with special output signal
2219/23172	. . .	Different states with one LED, blinking, on and off or different colours	2219/23217	. . .	Parallel processing
2219/23173	. . .	Display modified program together with original program to see differences	2219/23218	. . .	Interrupt queued requests only at the end of each segment of each of requests
2219/23174	. . .	Display of parameter and several suggested values for that parameter	2219/23219	. . .	Different tasks in different memory, called as function of priority of tasks
2219/23175	. . .	What to display: program channels, running of program	2219/23221	. . .	Each event can have two sub events, device can be activated twice in cycle
2219/23176	. . .	Display entered data for each controlled station	2219/23222	. . .	On off time tables, as function of angle, each linked to groups for device selection, pointer
2219/23177	. . .	Indicate all selected devices operating currently			

2219/23223	. . .	During each cycle, different on off sequences can be used	2219/23264	. . .	Assembly language, pass parameters by registers instead of stack
2219/23224	. . .	Offset on off signals for different sections	2219/23265	. . .	Select device driver for actuator, sensor
2219/23225	. . .	Program system from more than one source	2219/23266	. . .	Compiler
2219/23226	. . .	Table with data on how to execute the same function in different modules	2219/23267	. . .	Program derived from sequence time diagram and stored in table
2219/23227	. . .	Environment conditions affect execution of program	2219/23268	. . .	Forth
2219/23228	. . .	Program execution, if external programs exist, execute them instead of internal	2219/23269	. . .	Program provides for communication protocol with device, equipment
2219/23229	. . .	Execute first current program, then select new program	2219/23271	. . .	Decompiler, translate machine code to HLL, reverse processing, easy modification
2219/23231	. . .	Mark objects, execute sequence according to mark	2219/23272	. . .	Natural language, use simple words like move, rotate
2219/23232	. . .	Execute program from added, expansion rom, memory	2219/23273	. . .	Select, associate the real hardware to be used in the program
2219/23233	. . .	Input state executes immediately corresponding block program	2219/23274	. . .	Link graphical data for display automatically into program
2219/23234	. . .	In real time loop do one of the control modules and a safety module program	2219/23275	. . .	Use of parser
2219/23235	. . .	Set address code in register to switch between program in ram and in eeprom, flash	2219/23276	. . .	Use of virtual, logical connections
2219/23236	. . .	Table lookup driven system	2219/23277	. . .	Use of separate interface software, main program calls functions from it
2219/23237	. . .	Program execution by message passing	2219/23278	. . .	Program by data flow
2219/23238	. . .	TV microprocessor executes also home control, monitoring of appliances	2219/23279	. . .	Enter simple words: start motor, pc translates boolean equations into orders
2219/23239	. . .	Execute other program during idle time of main program, or between interrupts	2219/23281	. . .	PEARL process experimental automation real time language
2219/23241	. . .	Idle, during idle time of main program, a game can be played	2219/23282	. . .	Detect erroneous instructions in asic systems
2219/23242	. . .	Synthesize time logic circuits	2219/23283	. . .	Debugging, breakpoint
2219/23243	. . .	Specification language	2219/23284	. . .	Eliminate redundant states in finite state machine
2219/23244	. . .	Ascii script: one line is read each time, each letter controls a device	2219/23285	. . .	Enable, disable hardware logic to implement finite state machines
2219/23245	. . .	Block, buffer the inputs when executing critical process, read them when finished, for a finite state machine	2219/23286	. . .	Graphical representation of finite machine states to help operator
2219/23246	. . .	Create control program by demonstrating behaviours using widget and inferencing them	2219/23287	. . .	Executing sequential program concurrently with state machine instructions
2219/23247	. . .	Widget have states, properties, events associated, demonstrate control behaviour	2219/23288	. . .	Adaptive states; learning transitions
2219/23248	. . .	Integrate function blocks from different machines; CORBA, RMI protocols	2219/23289	. . .	State logic control, finite state, tasks, machine, fsm
2219/23249	. . .	Using audio and or video playback	2219/23291	. . .	Process, graphic programming of a process, text and images
2219/23251	. . .	Use two or more different programming languages in same program	2219/23292	. . .	Use of model of process, divided in part models with IN, OUT and actuator
2219/23252	. . .	High level language HLL, basic, control language	2219/23293	. . .	Automated assembly of machine control software, reusable software components
2219/23253	. . .	Expert system	2219/23294	. . .	Whole program to first processor, transfer to next processor if not for 1st
2219/23254	. . .	Interactive programming, sentence on screen filled in by operator	2219/23295	. . .	Load program and data for multiple processors
2219/23255	. . .	Object oriented programming, OOP	2219/23296	. . .	Load, update new program without test program, save memory space
2219/23256	. . .	Hybrid programming, part sequence, part continuous	2219/23297	. . .	Remote load of program with cellular, wireless, satellite connection
2219/23257	. . .	Grafcet	2219/23298	. . .	Remote load of program, through internet
2219/23258	. . .	GUI graphical user interface, icon, function bloc editor, labview	2219/23299	. . .	Remote load of program, through fieldbus
2219/23259	. . .	Synchronous language	2219/23301	. . .	Load program from file system of a controller
2219/23261	. . .	Use control template library	2219/23302	. . .	Load program in data blocks
2219/23262	. . .	DDE direct data exchange, DLL dynamic library linking	2219/23303	. . .	Load program, optical connection between programmer and eeprom
2219/23263	. . .	C++	2219/23304	. . .	Download program from host
			2219/23305	. . .	Transfer program into prom with passwords
			2219/23306	. . .	Load program from host, remote load, non volatile card to volatile, ram
			2219/23307	. . .	Initial program loader, ipl, bootstrap loader

2219/23308	. . .	Transfer program from ram to eprom, flash, card	2219/23354	. . .	Hard disk
2219/23309	. . .	System boot only allowed after inputting user identification, password	2219/23355	. . .	Magnetic card
2219/23311	. . .	Load new program together with test program	2219/23356	. . .	Programmable, pluggable module, logic set up on front of module
2219/23312	. . .	Load program from attached device to control that device	2219/23357	. . .	Grammophone record, disk
2219/23313	. . .	Load program to initial configure machine, then erase and install userprogram	2219/23358	. . .	Program card with integrated control panel, flexible circuit
2219/23314	. . .	Switch between initialisation, program, test, end of programming, erase mode	2219/23359	. . .	Screw like form of record carrier
2219/23315	. . .	Normal and emulated, pass through for disabled persons modes	2219/23361	. . .	Ram card with write protection switch
2219/23316	. . .	Standby, inactive, sleep or active, operation mode	2219/23362	. . .	Floppy diskette
2219/23317	. . .	Safe mode, secure program, environment in case of error, intrusion	2219/23363	. . .	Barcode
2219/23318	. . .	Mode, two mode, directly from console or download from host	2219/23364	. . .	Bubble memory
2219/23319	. . .	Microprocessor control or manual control	2219/23365	. . .	Ferrite memory
2219/23321	. . .	Switch between manual, automatic, inching or step by step mode, select mode	2219/23366	. . .	Temperature induced on tape, sensors read temperature as program data
2219/23322	. . .	Hand, manual or automatic	2219/23367	. . .	Card with picture of work to be done, together with selectable codes
2219/23323	. . .	Select between entry and execution of program	2219/23368	. . .	VRAM videoram
2219/23324	. . .	Separate update program onboard	2219/23369	. . .	Memory in controlled device is ram, rom
2219/23325	. . .	Transfer modified data from ram to eprom, flash after system have run several cycles	2219/23371	. . .	Fixed and variable memory for parameters or user program
2219/23326	. . .	Clone, duplicate hardware functions of another device	2219/23372	. . .	XY matrix, switching controlled by pc
2219/23327	. . .	Modification of program in real time	2219/23373	. . .	Interactive guidance by voice message
2219/23328	. . .	Modification program	2219/23374	. . .	Set potentiometer automatically
2219/23329	. . .	Modification, correction entered values	2219/23375	. . .	Function switch, knob with piezo, strain gauge
2219/23331	. . .	Patch program during non execution, tables to load modified program	2219/23376	. . .	Template for program, set values to template
2219/23332	. . .	Override stored parameters	2219/23377	. . .	Touch screen, with representation of buttons, machine on screen
2219/23333	. . .	Modify program and store it	2219/23378	. . .	Touch sensitive key
2219/23334	. . .	Use of table with addresses for different modules, write new table if modified	2219/23379	. . .	Knob, delivering pulses, digipot, electronic potentiometer
2219/23335	. . .	History, log of program modifications	2219/23381	. . .	Balls with different properties circulate and form the sequence
2219/23336	. . .	Identification of program, application, device to be controlled	2219/23382	. . .	Knobs with build in illumination, legend
2219/23337	. . .	Modify if history of program coincides with history of modifying data	2219/23383	. . .	Lightpen
2219/23338	. . .	Transfer modified program from ram to eprom, flash	2219/23384	. . .	Tape, card with magnetic, luminescent, iron particles for sequence
2219/23339	. . .	Update diskette, cassette initiates bootstrap program to load eprom, flash	2219/23385	. . .	Programming pencil, touch probe
2219/23341	. . .	Only new module in high level language, combine with existing modules	2219/23386	. . .	Voice, vocal command or message
2219/23342	. . .	Pluggable rom, smart card	2219/23387	. . .	Trackball
2219/23343	. . .	Earom, alterable eeprom, erasable	2219/23388	. . .	Mixture of different means, joystick, keys, pedals, fader, potentiometer
2219/23344	. . .	Changeable memory, program	2219/23389	. . .	Modular program, each process has corresponding program module
2219/23345	. . .	Memory is eeprom	2219/23391	. . .	Each module can transfer data to I-O or other module and has parameter memory
2219/23346	. . .	Permeability of pin sets frequency of oscillator, record carrier	2219/23392	. . .	Change execution time ratio of several programs
2219/23347	. . .	Eprom	2219/23393	. . .	Set finish, end time and total program time to calculate, derive begin, start time
2219/23348	. . .	Programmed parameter values in memory, rom, function selection and entry, no cpu	2219/23394	. . .	Set time constant
2219/23349	. . .	Pluggable pin module, fits in corresponding female receptacle, coded plug	2219/23395	. . .	Set value of limit switches, high low value
2219/23351	. . .	Film	2219/23396	. . .	Enter start and end of selected program
2219/23352	. . .	Ram rom memory	2219/23397	. . .	Set day, week
2219/23353	. . .	Endless tape, loop	2219/23398	. . .	Set start time and duration
			2219/23399	. . .	Adapt set parameter as function of measured conditions
			2219/23401	. . .	Programmer has connection with pc to enter parameters into system directly by pc
			2219/23402	. . .	Edit reference value on screen by lightpen
			2219/23403	. . .	Store edited program also in detachable programmer, can be used elsewhere

2219/23404	. . .	If data error detected, switch automatically to program mode	2219/23445	. . .	Real time simulation
2219/23405	. . .	Change settings of events for a whole group of related events	2219/23446	. . .	HIL hardware in the loop, simulates equipment to which a control module is fixed
2219/23406	. . .	Programmer device, portable, handheld detachable programmer	2219/23447	. . .	Uses process simulator to develop, simulate faults, fault tree
2219/23407	. . .	Program machine during execution of other program in real time	2219/23448	. . .	Find optimum solution by simulating process with constraints on inputs
2219/23408	. . .	Handheld programmer has cover to protect operator from environment	2219/23449	. . .	Use of an additional dedicated processor for emulating sensor output
2219/23409	. . .	Portable, detachable programmer has emulation for fixed control panel	2219/23451	. . .	Software in the loop, bypass function, execute new program parts on external device
2219/23411	. . .	Voltage supply or allow, not inhibit signal to memory on connection of programmer	2219/23452	. . .	Simulate sequence on display to control program, test functions
2219/23412	. . .	Discriminate with id code the module to be programmed	2219/23453	. . .	Pc simulates equipment and is connected to sequencer to test program
2219/23413	. . .	Remote programmer can only program a device if nearby, narrow beam communication	2219/23454	. . .	Execute program in fast mode, real system has no time to respond
2219/23414	. . .	Pc as detachable program, debug, monitor device for control system	2219/23455	. . .	Determine capability of machine by simulating model of capability of its parts
2219/23415	. . .	Program each station with specific data, all, global with general, common data	2219/23456	. . .	Model machine for simulation
2219/23416	. . .	Enter application program into I-O module, like motion program, servo program	2219/23457	. . .	Programmer magnetically attachable to machine
2219/23417	. . .	Read program from pluggable memory card	2219/23458	. . .	Remote controller pluggable, attachable to pc
2219/23418	. . .	Read tape, card forward, backward, in two directions	2219/23459	. . .	Keyboard attachable, pluggable into household apparatus
2219/23419	. . .	Automatic passage of tape to reader	2219/23461	. . .	Module has coded cams darking optical detectors
2219/23421	. . .	Record program on tape, disk, memory	2219/23462	. . .	No local entry panel, only central remote programmer for all appliances
2219/23422	. . .	Learn parameters by producing a small number of objects	2219/23463	. . .	Before controlling module execute monitoring of module and its resources
2219/23423	. . .	Record playback	2219/23464	. . .	Use signatures to know module is not corrupt, cfc, control flow checking
2219/23424	. . .	Select construction element from function library	2219/23465	. . .	Master processor blocks input of data to slaves
2219/23425	. . .	Selection of program, adaptive to process	2219/23466	. . .	Block, latch entry keys once program launched
2219/23426	. . .	Layout of program choice around knob according to used intensity	2219/23467	. . .	Code and program on two objects to be assembled, compared for compatibility
2219/23427	. . .	Selection out of several programs, parameters	2219/23468	. . .	Before switch to execution of second, non failsafe program, inhibit I-O for it
2219/23428	. . .	Select program from look up tables as function of detector states, pointer, index to program	2219/23469	. . .	Execute alternatively a failsafe, proven program and a non failsafe program
2219/23429	. . .	Selection as function of connected machine	2219/23471	. . .	Interrupt after set time non failsafe program, switch to failsafe program
2219/23431	. . .	Change program on detection of deviations	2219/23472	. . .	Confirmation of user for the selection of a program setting
2219/23432	. . .	Select as function of different connected tools, each tool has its parameters	2219/23473	. . .	Program stopped if consumed current to high
2219/23433	. . .	Selection of program as function of connected keyboard, panel	2219/24	. . .	Pc safety
2219/23434	. . .	Select automatically preferred program data, ordered to most used program	2219/24001	. . .	Maintenance, repair
2219/23435	. . .	Select a program per zone to be controlled	2219/24002	. . .	Clock failing, adaptive to clock
2219/23436	. . .	Select by dipswitches on power on	2219/24003	. . .	Emergency stop
2219/23437	. . .	Each operator can select his own program, data entry	2219/24004	. . .	If control lever, joystick, handle is released, spring return to neutral
2219/23438	. . .	Select application program as well as connected control device	2219/24005	. . .	Inhibit update control program if default values has been changed by program during processing
2219/23439	. . .	Select additional programfunctions by pushing two different keys	2219/24006	. . .	Code coverage memory:contains data about addressed addresses during program run
2219/23441	. . .	Select between user program selection or service program selection	2219/24007	. . .	Backup data if microprocessor not responding
2219/23442	. . .	As function of colour or number code on object to be treated	2219/24008	. . .	Safety integrity level, safety integrated systems SIL SIS
2219/23443	. . .	Upon detected function changes of remote device, activate proper local program	2219/24009	. . .	If board, card is retrieved, then disconnect first power, then block machine
2219/23444	. . .	Select as function of surface property, characteristic of object handled by machine	2219/24011	. . .	Transmit warning, error message to all devices in a list

2219/24012	. . .	Use camera of handheld device, head mounted display	2219/24058	. . .	Remote testing, monitoring independent from normal control by pc
2219/24013	. . .	Unlatch all relays in common with microprocessor	2219/24059	. . .	Diagnostic programmed in state logic
2219/24014	. . .	Protection to extract, insert circuit board	2219/24061	. . .	Simulator, generates input signals, shows output signals of logic
2219/24015	. . .	Monitoring	2219/24062	. . .	During simulation, test inhibit output to actuators
2219/24016	. . .	Unlatch for repair	2219/24063	. . .	Select signals as function of priority, importance for diagnostic
2219/24017	. . .	Powering up, starting machine supervised by microprocessor	2219/24064	. . .	Sample rate variable as function of importance of alarm signals
2219/24018	. . .	Computer assisted repair, diagnostic	2219/24065	. . .	Real time diagnostics
2219/24019	. . .	Computer assisted maintenance	2219/24066	. . .	Monitor only devices essential to current process
2219/24021	. . .	Separate processor for monitoring system	2219/24067	. . .	Processor stores variables, events and date in eeprom, for external monitor
2219/24022	. . .	Stop error message after a number of repeated error events	2219/24068	. . .	Find intermittent errors
2219/24023	. . .	Stop error message after permission operator, acknowledgement	2219/24069	. . .	Diagnostic
2219/24024	. . .	Safety, surveillance	2219/24071	. . .	Online service documentation
2219/24025	. . .	Remove board with system on power, hot plug in, swap, docking, life insertion	2219/24072	. . .	Detect faulty circuit, display on screen and replace it
2219/24026	. . .	Latch, block unlatch, unblock	2219/24073	. . .	Avoid propagation of fault
2219/24027	. . .	Circuit, independent from microprocessor, detects contact switch to allow power to actuator	2219/24074	. . .	Probability of defect, seriousness or severity of defect, fault
2219/24028	. . .	Explosion free control, intrinsically safe	2219/24075	. . .	Predict control element state changes, event changes
2219/24029	. . .	Alarm if wrong device, apparatus is connected to control module	2219/24076	. . .	Markov model for safety analysis
2219/24031	. . .	Fpga takes over control if emergency or programmed stop, to shut down sequence	2219/24077	. . .	Module detects wear, changes of controlled device, statistical evaluation
2219/24032	. . .	Power on reset, powering up	2219/24078	. . .	Debounce, correct periodicity of command
2219/24033	. . .	Failure, fault detection and isolation	2219/24079	. . .	Detect correct command wave form
2219/24034	. . .	Model checker, to verify and debug control software	2219/24081	. . .	Detect valid sequence of commands
2219/24035	. . .	Superpose testsignal on normal I-O lines, through transfo and rectifier	2219/24082	. . .	Detect if driver, actuation circuit is correct
2219/24036	. . .	Test signal generated by microprocessor, for all I-O tests	2219/24083	. . .	Detect if actuators are correct, react
2219/24037	. . .	Switch on pin of microprocessor for test	2219/24084	. . .	Remote and local monitoring, local result to remote, remote takes action
2219/24038	. . .	Several test signals stored in memory and used as input signals	2219/24085	. . .	Analyze, trace fault signals according to tree, table
2219/24039	. . .	Test sequence time and sequence profile	2219/24086	. . .	Expert system, guidance operator, locate fault and indicate how to repair
2219/24041	. . .	Pc as detachable debug, monitor device for control system	2219/24087	. . .	After correct repair, update fault tree
2219/24042	. . .	Signature analysis, compare recorded with current data, if error then alarm	2219/24088	. . .	Simulate process graphically using feedback from real, to prevent or repair
2219/24043	. . .	Test memory comparing with known stored valid memory states	2219/24089	. . .	Change colour of message after reading message
2219/24044	. . .	Second controller monitors diagnostics system of first controller	2219/24091	. . .	Display indication out of order, alarm indication
2219/24045	. . .	Test if memory card is inserted, present	2219/24092	. . .	Warning display lights, lamps, leds on module
2219/24046	. . .	Test if controller has enough memory available	2219/24093	. . .	Display, show place of error, fault
2219/24047	. . .	Count certain number of errors, faults before delivering alarm, stop	2219/24094	. . .	Voice alarm
2219/24048	. . .	Remote test, monitoring, diagnostic	2219/24095	. . .	Show timely order of errors
2219/24049	. . .	Use of control bits	2219/24096	. . .	Show number of error event
2219/24051	. . .	Two test pins, one for input and one for output	2219/24097	. . .	Camera monitors controlled machine
2219/24052	. . .	Set switch on for diagnostic	2219/24098	. . .	Scan and display states of all actuators if controller fails
2219/24053	. . .	Diagnostic of controlled machine	2219/24099	. . .	On error, send error over lightdiode to external pc, display
2219/24054	. . .	Self diagnostic	2219/24101	. . .	Stop error message after a certain time
2219/24055	. . .	Trace, store a working, operation history	2219/24102	. . .	Display status of controller
2219/24056	. . .	Portable, detachable module to input test signals, read test results	2219/24103	. . .	Graphical display of proces as function of detected alarm signals
2219/24057	. . .	Set jumper on board to change user mode to diagnostic mode	2219/24104	. . .	Operator can select a graphical screen at his will as help diagnostic

2219/24105	. . .	Perform an initial display process to check displays	2219/24146	. . .	Configure actuators to be switched off in case of emergency stop
2219/24106	. . .	Display instructions, program statements together with monitored parameter value	2219/24147	. . .	Program entry, inhibit manual control if in automatic mode
2219/24107	. . .	Display centrally detected user, function changes of remote device	2219/24148	. . .	Inhibit local control if in remote
2219/24108	. . .	Correct fault so that microprocessor functions correctly, without reset	2219/24149	. . .	Inhibit program entry if an essential sensor of apparatus is missing, broken
2219/24109	. . .	Execute first diagnostic, service program before normal control program	2219/24151	. . .	Inhibit programming if physical resources are missing, no gas for heating
2219/24111	. . .	Inhibit control until control lever is first set to neutral position	2219/24152	. . .	Normal and emergency program are integrated
2219/24112	. . .	Delay software reset until critical operations are finished	2219/24153	. . .	System controller can control independent from host
2219/24113	. . .	No transmission of errors to central during intervention of maintenance operator	2219/24154	. . .	Password with time limited access to system, protect protocol
2219/24114	. . .	Continue program if crashed microprocessor, program module is not crucial	2219/24155	. . .	Load, enter program if device acknowledges received password, security signal
2219/24115	. . .	Continue critical operation only if detector, operator input is satisfied	2219/24156	. . .	Inhibit program entry, keyboard by entering sequence of certain keys
2219/24116	. . .	Reprogram inserted module, reread parameters to enable operation machine	2219/24157	. . .	Block, inhibit certain inputs by entering certain keycode
2219/24117	. . .	If error detected, shut down	2219/24158	. . .	Access only for service, hide, forbidden tamperfree keys, program
2219/24118	. . .	Inhibit, disable control if program module not inserted or wrong module addressed	2219/24159	. . .	Several levels of security, passwords
2219/24119	. . .	Compare control states to allowed and forbidden combination of states	2219/24161	. . .	Use of key, in key is stored access level
2219/24121	. . .	On fault, detect bit pattern to indicate kind of fault and stop program	2219/24162	. . .	Biometric sensor, fingerprint as user access password
2219/24122	. . .	Inhibit automatic control if in manual control	2219/24163	. . .	Authentication tag in configuration file
2219/24123	. . .	Alarm filtering, level and direct precursor, required action, blocking condition	2219/24164	. . .	Parts of program accessible only during execution, no access with programming tool
2219/24124	. . .	Identification of program, if not assigned for machine, reject, stop	2219/24165	. . .	Use codes to activate features of controller
2219/24125	. . .	Watchdog, check at timed intervals	2219/24166	. . .	Permit from several operators to allow access
2219/24126	. . .	Program stopped if instruction not executed or if output module is missing	2219/24167	. . .	Encryption, password, user access privileges
2219/24127	. . .	Disable, inhibit control signal in I-O interface if alarm status set	2219/24168	. . .	Identify connected programmer to allow control, program entry
2219/24128	. . .	Command and intermediate error feedback used to verify correct execution	2219/24169	. . .	Identification of last person who changed program
2219/24129	. . .	means for safety such as resettable fuse, PPTC	2219/24171	. . .	Supervisor code to change passwords
2219/24131	. . .	Noise rejection, shielding board, bus, lines	2219/24172	. . .	Use of second password, different from first
2219/24132	. . .	Over voltage protection	2219/24173	. . .	One sensor, two I-O channels each for different processor
2219/24133	. . .	Ground each module and total system	2219/24174	. . .	One channel is used for communication while other is tested, in redundant I-O
2219/24134	. . .	Use of high voltage 28-Volt logic level	2219/24175	. . .	Redundant communication channel, if one fails use the other
2219/24135	. . .	Use of infra red for optical limit switch against day light	2219/24176	. . .	Central controller may override redundant controller
2219/24136	. . .	Monitor load state of battery	2219/24177	. . .	State machine arbitrates which redundant controller is active
2219/24137	. . .	Non volatile memory to store program on power loss	2219/24178	. . .	Controlled device decides which redundant controller will be active
2219/24138	. . .	Battery backup	2219/24179	. . .	Redundant storage of control parameters
2219/24139	. . .	Recovery from power loss, failure	2219/24181	. . .	Fail silent nodes, replicated nodes grouped into fault tolerant units
2219/24141	. . .	Capacitor backup	2219/24182	. . .	Redundancy
2219/24142	. . .	Program has a protected, independent part and a free programmable part	2219/24183	. . .	If error, spare unit takes over, message to master, confirm new configuration
2219/24143	. . .	Inhibit control if device does not answer a start signal within time interval	2219/24184	. . .	Redundant I-O, software comparison of both channels
2219/24144	. . .	Load new program, overwrite old program only if machine is halted	2219/24185	. . .	After repair, update redundant system during non critical periods
2219/24145	. . .	Test for collision of actuated devices, articles, if interference inhibit entry	2219/24186	. . .	Redundant processors are synchronised
			2219/24187	. . .	Redundant processors run identical programs
			2219/24188	. . .	Redundant processors run different programs

2219/24189	. . .	Redundant processors monitor same point, common parameters	2219/25016	. . .	Eiba bus, european installation bus association, ib installation bus
2219/24191	. . .	Redundant processors are different in structure	2219/25017	. . .	ASI actuator sensor interface, bus, network
2219/24192	. . .	Configurable redundancy	2219/25018	. . .	Only actuator bus, network
2219/24193	. . .	Two transducers for same parameter	2219/25019	. . .	Parallel processors coupled to bus by configurable interface card
2219/24194	. . .	One channel monitors correct programcode execution, other correct process state	2219/25021	. . .	Profibus
2219/24195	. . .	Compare data in channels at timed intervals, for equality	2219/25022	. . .	LAN local area network for controllers
2219/24196	. . .	Plausibility check in channels for correct sequence or result	2219/25023	. . .	Sercos serial real time communications system between servo and cpu
2219/24197	. . .	Dual analog output ports, second takes over if first fails	2219/25024	. . .	Bitbus from intel
2219/24198	. . .	Restart, reinitialize, boot system after fault detection, hanging up, stalling	2219/25025	. . .	Only sensor bus
2219/24199	. . .	Recover from fault, malfunction, go to safe state, correct and set new sequence	2219/25026	. . .	Lon local operating network, uses neuron chip with three microprocessors
2219/24201	. . .	Inhibit restart program if start switch fails in normal run mode	2219/25027	. . .	GSC general serial channel
2219/24202	. . .	After failure and stop of program, special switch to restart	2219/25028	. . .	Power, data and clock bus
2219/24203	. . .	Restart, recover from error only if detected states equal stored states	2219/25029	. . .	Additional logic to mirror certain signals, permits node to adapt to bitrate
2219/24204	. . .	Select restore procedure corresponding to matched abnormal condition, table	2219/25031	. . .	TTCAN bus, time triggered can bus
2219/24205	. . .	Slow down processor activity if temperature rises above limit	2219/25032	. . .	CAN, canbus, controller area network bus
2219/24206	. . .	Identification by portable memory in a key	2219/25033	. . .	structure, control, synchronization, data, alarm, connect I-O line to interface
2219/24207	. . .	If processor overloaded, reduce messages sent by other systems to it	2219/25034	. . .	Connect module to data, monitor, control lines, extra I-O and power to connector
2219/24208	. . .	Go into safety mode if communications are interrupted	2219/25035	. . .	Star network
2219/24209	. . .	Create film in case of error	2219/25036	. . .	Two clocks, high frequency for normal and low frequency for battery low, sleep
2219/24211	. . .	Override normal program, execute urgency program so machine operates safe	2219/25037	. . .	Clock line and data line loop in a contrary sense, for data stability, settling
2219/24212	. . .	Set off alarm state manually, acknowledge to restart normal control	2219/25038	. . .	During negative cycle of power supply, processor is set to active, else inactive
2219/24213	. . .	No shut down if after emergency detection, all control parameters are safe	2219/25039	. . .	Clock
2219/24214	. . .	Detect if analog output signal is within range	2219/25041	. . .	Select between several clock signals
2219/24215	. . .	Scada supervisory control and data acquisition	2219/25042	. . .	Clock derived from power supply
2219/24216	. . .	Supervision of system	2219/25043	. . .	Superposition time and other pulses
2219/25	. . .	Pc structure of the system	2219/25044	. . .	Radio controlled clock
2219/25001	. . .	CEBUS consumers electronics bus	2219/25045	. . .	Electronic cam, encoder for sequence control as function of position, programmable switch pls
2219/25002	. . .	Interbus-S, output serial out, input serial in, as one shift register	2219/25046	. . .	Real time clock to sample I-O states and store them in memory
2219/25003	. . .	M3S bus with six lines, two power, two canbus, one to initialize, one as dead man switch	2219/25047	. . .	Common clock for redundant processors
2219/25004	. . .	Power and data bus	2219/25048	. . .	Master clock and several frequency dividers, for motion and sequence control
2219/25005	. . .	Fluid bus for communication in process system with several fluidic control modules	2219/25049	. . .	Master processor gives timing information to slaves
2219/25006	. . .	Interface connected to fieldbus	2219/25051	. . .	For serial communication a separate clock and data line
2219/25007	. . .	UMS bus	2219/25052	. . .	VCO voltage controlled oscillator
2219/25008	. . .	Different buses, protocols on same line, also dsl	2219/25053	. . .	Frequency pulses as function of speed
2219/25009	. . .	Profinet-I-O, producer-consumer mode	2219/25054	. . .	Calibration timer, compare 1st, number of pulses during calibration with second counter
2219/25011	. . .	Domotique, I-O bus, home automation, building automation	2219/25055	. . .	During calibration adapt vco, counter to deliver wanted frequency, pulses
2219/25012	. . .	Two different bus systems	2219/25056	. . .	Automatic configuration of monitoring, control system as function of operator input, events
2219/25013	. . .	G64-bus	2219/25057	. . .	Configuration stored in distributed database for real time use
2219/25014	. . .	Fieldbus general name of bus connected to machines, detectors, actuators	2219/25058	. . .	Job setup, use also library to select job setup
2219/25015	. . .	Gpib-488, iee-488, hp bus, parallel instrumentation bus	2219/25059	. . .	Iterative configuration of identical modules, only config first one, copy to other
			2219/25061	. . .	Configuration stored in central database
			2219/25062	. . .	Detect physical location of field device
			2219/25063	. . .	Force node into an inactive state when required

2219/25064	. . .	Update component configuration to optimize program execution	2219/25105	. . .	By cable integrated in controlled machine, fixed
2219/25065	. . .	Configure attributes of parameters	2219/25106	. . .	Pluggable card, magnetic, smart with configuration data, pulled out after loading
2219/25066	. . .	Configuration stored in each unit	2219/25107	. . .	Pluggable card, magnetic or smart with configuration data, staying in device
2219/25067	. . .	Graphic configuration control system	2219/25108	. . .	Dipswitches combined with bcd switch instead of multiple dipswitches
2219/25068	. . .	Check correct configuration of device	2219/25109	. . .	Eeprom loaded from external device with configuration data
2219/25069	. . .	Pseudo redundance, eliminate failing element and reconfigure system	2219/25111	. . .	Using broadcast message
2219/25071	. . .	Synoptique display of system configuration, layout, evolution	2219/25112	. . .	Using firmware stored in processor
2219/25072	. . .	Initialise each module during start up	2219/25113	. . .	Strapping diodes
2219/25073	. . .	Configuration of keys and related display, shown on keys	2219/25114	. . .	Jumpers
2219/25074	. . .	Check system, change failing element, compare with stored configuration	2219/25115	. . .	Card, board with configuration switches
2219/25075	. . .	Select interconnection of a combination of processor links to form network	2219/25116	. . .	Pluggable, detachable cassette loads configuration
2219/25076	. . .	Configure connected module only if allowed, registered module	2219/25117	. . .	Resistors, value, combination defines a digital value
2219/25077	. . .	Each module can be programmed for number of input and output	2219/25118	. . .	Matrix to connect sensor to corresponding actuator
2219/25078	. . .	Store in ram a second program adapted to local conditions	2219/25119	. . .	Dipswitches dipschalter
2219/25079	. . .	Function module makes bus termination, creates local bus on ok from central	2219/25121	. . .	What, which input or output to be connected to key or display
2219/25081	. . .	Clone, copy configuration from first device, in teach mode, to second identical device	2219/25122	. . .	Stop angle and status of different on off states
2219/25082	. . .	Display name of configuration, to recognise how device has been set, programmed	2219/25123	. . .	Change controller pin configuration
2219/25083	. . .	For each subsystem a configuration	2219/25124	. . .	Configure attributes of parameters
2219/25084	. . .	Select configuration as function of operator	2219/25125	. . .	Relationship between different functions of a controller
2219/25085	. . .	Several function expansion units for master, main unit, universal system	2219/25126	. . .	Synchronize communication based on internal clock of microprocessor
2219/25086	. . .	Assign functions to group of complete or partial cells, modules	2219/25127	. . .	Bus for analog and digital communication
2219/25087	. . .	Selector switch to set function of each module	2219/25128	. . .	Transmission with higher frequency than the processing frequency
2219/25088	. . .	Define scale value of analog signal, min and max value	2219/25129	. . .	Programming a multitasking, virtual sensor network shared by various users
2219/25089	. . .	Define state of digital signal, open, closed, maintained, momentary	2219/25131	. . .	Collect several parameters and transmit in block to control microprocessor
2219/25091	. . .	Of alternative and parallel parts of program into synchronised tasks	2219/25132	. . .	Superposition data signals on power lines for actuators
2219/25092	. . .	Customized control features, configuration	2219/25133	. . .	Serial parallel conversion
2219/25093	. . .	During start, integration into machine, send module functionality to scheduler	2219/25134	. . .	All interfaces load their data in shift register, then serial read out
2219/25094	. . .	At start, I-O modules receive functionality and check with its own functionality	2219/25135	. . .	On data line multiplex data and control words
2219/25095	. . .	Detect kind of display to configure display routine	2219/25136	. . .	Transmission with variable frequency, set by operator
2219/25096	. . .	Detect addresses of connected I-O, modules	2219/25137	. . .	Optical window for communication
2219/25097	. . .	Detect control panel connected, select corresponding program and parameters	2219/25138	. . .	Transmit data from rotating devices
2219/25098	. . .	Detect connected sensors, set parameters, gain automatically	2219/25139	. . .	Use of separate buscouple interface
2219/25099	. . .	Detect configuration I-O and select needed program	2219/25141	. . .	Normal display led used also for communication purposes
2219/25101	. . .	Detect connected module, load corresponding parameters, variables into module	2219/25142	. . .	Lan between host and main controller, other network between main and sub controllers
2219/25102	. . .	Detect connected actuator, by code, select compensation non linearity	2219/25143	. . .	Buffer for communication between two cpu
2219/25103	. . .	Detect during start, number of modules, groups, sub groups	2219/25144	. . .	Between microcomputers, processors
2219/25104	. . .	Detect transfer of control module, use mean default values instead of normal	2219/25145	. . .	I-O communicates with local bus at one end and with fieldbus at other end
			2219/25146	. . .	Communication between main and expansion unit, only clock and data
			2219/25147	. . .	Before communication, check if optical fiber is correctly attached
			2219/25148	. . .	Before communication, check if I-O is powered

2219/25149	. . .	Receiver detects communication error and requests emitter to retransmit data	2219/25202	. . .	Internet, tcp-ip, web server : see under S05B219-40
2219/25151	. . .	Check appropriate protocol voltage levels	2219/25203	. . .	Keep correct order of messages sent, of messages sequence
2219/25152	. . .	Parity detection	2219/25204	. . .	Translate between different communication protocols
2219/25153	. . .	Checking communication	2219/25205	. . .	Encrypt communication
2219/25154	. . .	Detect error, repeat transmission on error, retransmit	2219/25206	. . .	Protocol: only devices with changed states communicate their states, event
2219/25155	. . .	Encoded transmission against noise	2219/25207	. . .	Only devices with changed states can receive control signals for actuator
2219/25156	. . .	Full echo communication check, echo back	2219/25208	. . .	Control message, address and command portion
2219/25157	. . .	Checksum CRC	2219/25209	. . .	Device status answer, response, acknowledge
2219/25158	. . .	Watchdog	2219/25211	. . .	Broadcast mode, length message, command, address of originator and destination
2219/25159	. . .	Respond to signal if initialisation and address are received within set interval	2219/25212	. . .	Master address node, node answers ready, master sends command, node executes it
2219/25161	. . .	Only receiving station, read several times message, select correct one or reject	2219/25213	. . .	Synchronisation, address and data
2219/25162	. . .	Contention, if several transmitters avoid collision, by separate transmitter code	2219/25214	. . .	Wait, delay after message
2219/25163	. . .	Transmit twice, redundant, same data on different channels, check each channel	2219/25215	. . .	Time triggered protocol for fault tolerant real time application
2219/25164	. . .	Loopback	2219/25216	. . .	Packet switching
2219/25165	. . .	Token ring network	2219/25217	. . .	Configure communication protocol, select between several
2219/25166	. . .	USB, firewire, ieee-1394	2219/25218	. . .	Broadcast mode, originator, destinator address, command, check data
2219/25167	. . .	Receive commands through mobile telephone	2219/25219	. . .	Probe packet to determine best route for messages
2219/25168	. . .	Domotique, access through internet protocols	2219/25221	. . .	Identification of messages and their relative priority
2219/25169	. . .	Half duplex, repeater	2219/25222	. . .	Mailbox, email, mail system
2219/25171	. . .	Serial, RS232	2219/25223	. . .	Slave has registers to indicate master, acknowledge, transfer address, read write
2219/25172	. . .	Duplex	2219/25224	. . .	Fieldbus messages services fms
2219/25173	. . .	SCSI	2219/25225	. . .	Peripheral messages services pms, for sensor actuator
2219/25174	. . .	Ethernet	2219/25226	. . .	Combine CSMA-CD and TDM time multiplexed for rapid status exchange
2219/25175	. . .	Modem, codec coder decoder	2219/25227	. . .	Polling time is variable for each node, as function of time needed for each node
2219/25176	. . .	RS485, differential data signals, xor	2219/25228	. . .	Scheduling communication on bus
2219/25177	. . .	Using fm frequency modulation, fsk, biphase code	2219/25229	. . .	Partition control software among distributed controllers
2219/25178	. . .	Serial communication, data, also repeater	2219/25231	. . .	Command, task has deadline, time limit to be executed
2219/25179	. . .	Parallel	2219/25232	. . .	DCS, distributed control system, decentralised control unit
2219/25181	. . .	Repeater	2219/25233	. . .	Avoid communication delay by sending command and event, if event present, execute command
2219/25182	. . .	Serial between host and modules, nodes, parallel in node to microcontroller	2219/25234	. . .	Direct communication between two modules instead of normal network
2219/25183	. . .	Serial AND-OR parallel interface in one circuit	2219/25235	. . .	Associate a sequence function to each control element, event signature
2219/25184	. . .	Number of modules interfaces optimized in relation to applications with which to link	2219/25236	. . .	Detail, detect presence of operator to wake up system
2219/25185	. . .	Single serial line, virtual second line is earth	2219/25237	. . .	Drive record carrier
2219/25186	. . .	Bluetooth	2219/25238	. . .	Personalize message
2219/25187	. . .	Transmission of signals, medium, ultrasonic, radio	2219/25239	. . .	Relay assisted triac, in series for safety
2219/25188	. . .	Superposition high frequency data signal on power lines, current carrier	2219/25241	. . .	Serial bus controller
2219/25189	. . .	Current mode sensor I-O, current loop, 40-mA loop instead of voltage	2219/25242	. . .	Relay
2219/25191	. . .	Current loop	2219/25243	. . .	Digital filter
2219/25192	. . .	Infrared			
2219/25193	. . .	Coaxial cable			
2219/25194	. . .	Twin core, twisted cable			
2219/25195	. . .	Multiwire cable, parallel			
2219/25196	. . .	Radio link, transponder			
2219/25197	. . .	Optical, glass fiber			
2219/25198	. . .	Router: transfers data from wireless to wired networks, router: wired to wired			
2219/25199	. . .	Router brouter broadcast configuration data periodically to update control units			
2219/25201	. . .	Program communication between remote I-O and controller via remote connection program object			

2219/25244	. . .	State matrix connected to controller	2219/25296	. . .	Identification module, type connected I-O, device
2219/25245	. . .	Keyboard encoder chip used as sequence controller	2219/25297	. . .	Identify controlled element, valve, and read characteristics
2219/25246	. . .	Habituation, rehabilitation and recovery chip, responds only to critical information	2219/25298	. . .	System identification
2219/25247	. . .	Program drum and reverse drum driven by timer motor	2219/25299	. . .	Address memory with variable frequency
2219/25248	. . .	Microcontroller as time switch	2219/25301	. . .	Expansion of system, memory
2219/25249	. . .	Counter, timer plus microprocessor for real time, jitter	2219/25302	. . .	Program and data in separate memory
2219/25251	. . .	Real time clock	2219/25303	. . .	Decode processor status bits to switch, select between memories
2219/25252	. . .	Microprocessor	2219/25304	. . .	Memory subdivided in separate blocks, high, low addressable with same address
2219/25253	. . .	Transputer	2219/25305	. . .	MMA, memory management, set ram and eprom part for flash memory, store state also
2219/25254	. . .	DSP digital signal processor	2219/25306	. . .	Modules with hardwired logic
2219/25255	. . .	Neural network	2219/25307	. . .	Each module has file with all components in module and the available components
2219/25256	. . .	Module is timer with variable time delay	2219/25308	. . .	Ecu, standard processor connects to asic connected to specific application
2219/25257	. . .	Microcontroller	2219/25309	. . .	Module in ring for power supply and ring for command signals
2219/25258	. . .	ASIC	2219/25311	. . .	Each module near controlled machine
2219/25259	. . .	Bus arbiter	2219/25312	. . .	Pneumatic, hydraulic modules, controlled valves
2219/25261	. . .	Hand calculator as time switch	2219/25313	. . .	Clamp module on controlled system by magnet
2219/25262	. . .	Oscillator to multiply pulses to counter	2219/25314	. . .	Modular structure, modules
2219/25263	. . .	Solid state simulating relay logic	2219/25315	. . .	Module, sequence from module to module, structure
2219/25264	. . .	Synchronizer for pulses	2219/25316	. . .	Control unit and actuator in one unit, module
2219/25265	. . .	Flash memory	2219/25317	. . .	Control unit, sensor and actuator in one unit, module
2219/25266	. . .	Microcontroller combined with plc	2219/25318	. . .	Power supply module in common for all modules
2219/25267	. . .	Shift register	2219/25319	. . .	Standard connector between modules
2219/25268	. . .	PLD programmable logic device	2219/25321	. . .	Connection modules by flexible printed circuit, printed cable, multiway, ribbon
2219/25269	. . .	Lifo	2219/25322	. . .	Stackthrough modules, modules are stacked, no need for backplane
2219/25271	. . .	Neuron controller, for lan	2219/25323	. . .	Intelligent modules
2219/25272	. . .	Hall sensor, switch	2219/25324	. . .	Modules connected to serial bus
2219/25273	. . .	Fuzzy logic combined with delay element	2219/25325	. . .	Each connected module has own power supply
2219/25274	. . .	Communication processor, link interface	2219/25326	. . .	Module with low maintenance connected to removable module with high maintenance
2219/25275	. . .	Analog switch	2219/25327	. . .	Single channel module
2219/25276	. . .	Fifo	2219/25328	. . .	Module connected to parallel bus
2219/25277	. . .	Tristate	2219/25329	. . .	Each module, segment has only either a sensor or an actuator
2219/25278	. . .	Timer plus microprocessor	2219/25331	. . .	Module connected to canbus and to controlled device
2219/25279	. . .	Switch on power, awake device from standby if detects action on device	2219/25332	. . .	Module capability concerns allowable I-O and required sequence of operations
2219/25281	. . .	Detect usage of machine, adapt sleep mode timer	2219/25333	. . .	Modules on bus and direct connection between them for additional logic functions
2219/25282	. . .	Alternative energy for fieldbus devices	2219/25334	. . .	Each module contains several channels, each with an input and an output
2219/25283	. . .	Evaluate available energy prior to wireless transmitter-receiver activation	2219/25335	. . .	Each module has connections to actuator, sensor and to a fieldbus for expansion
2219/25284	. . .	Standby only for memory, prom	2219/25336	. . .	Cascaded modules, one module connects to other, I-O, computing expansion
2219/25285	. . .	Standby only for real time clock	2219/25337	. . .	Sbc single board computer, stand alone
2219/25286	. . .	Switch on power, awake controlled machine from standby if command signal	2219/25338	. . .	Microprocessor
2219/25287	. . .	Power for display leds I-O only when case is open	2219/25339	. . .	Supervisory plus control computer
2219/25288	. . .	Detector to standby state if signal below certain level	2219/25341	. . .	Single chip programmable controller
2219/25289	. . .	Energy saving, brown out, standby, sleep, powerdown modus for microcomputer			
2219/25291	. . .	Set module, component to sleep if no event or no other module needs it			
2219/25292	. . .	Standby for display, switch on if operator wants to use it			
2219/25293	. . .	Identify control parameters for several workpieces, control, both in parallel			
2219/25294	. . .	Part, workpiece, code, tool identification			
2219/25295	. . .	Identification has information on relationship with other controllers			

2219/25342	. . .	Real time controller	2219/25387	. . .	Control sequences so as to optimize energy use by controlled machine
2219/25343	. . .	Real time multitasking	2219/25388	. . .	Race conditions
2219/25344	. . .	In one cycle, application task is executed, if time is left, communication or user interface task is executed	2219/25389	. . .	Macro's, subroutines
2219/25345	. . .	Linux, preemption, low-latency patches for real time linux	2219/25391	. . .	Start, stop sequence of different parts of machine, copier, textile, glass
2219/25346	. . .	Several operating systems in one device	2219/25392	. . .	Convert control signal to deliver pulse modified in time and width
2219/25347	. . .	Multitasking machine control	2219/25393	. . .	Speed, delay, stand still of record carrier controlled, more commands possible
2219/25348	. . .	Windows expansion for real time control under windows	2219/25394	. . .	Execute next step on feedback of result of previous step
2219/25349	. . .	Operating system, Microsoft Windows	2219/25395	. . .	Clock dependant, select next cyclus, step as function of parameter
2219/25351	. . .	MSDOS	2219/25396	. . .	Add pulses or stop pulses as function of changing clock, speed to compensate
2219/25352	. . .	Preemptive for critical tasks combined with non preemptive, selected by attribute	2219/25397	. . .	Compare real date with programmed date, if equal execute next command
2219/25353	. . .	Inductive coupling of power, transformer	2219/25398	. . .	Sampling period is a product of integer number and scheduler interrupt period
2219/25354	. . .	Power or secondary control signal derived from received signal	2219/25399	. . .	Variable, settable clock or cycle, phase duration
2219/25355	. . .	Motor winding used as power transformator	2219/25401	. . .	Compensation of control signals as function of changing supply voltage
2219/25356	. . .	Inductive coupling of power and signal	2219/25402	. . .	Detect occurrence of signal by higher sampling when parameter value within range
2219/25357	. . .	Regulation of energy coupling	2219/25403	. . .	Compare real clock time with programmed time, if equal execute next command
2219/25358	. . .	During detection of input, switch over to dc power	2219/25404	. . .	Command order is delayed as function of expected and real delay
2219/25359	. . .	Special power supply	2219/25405	. . .	Command order is delayed, corrected as function of speed
2219/25361	. . .	DC-DC convertor on board	2219/25406	. . .	Delay as function of detected characteristics of controlled element
2219/25362	. . .	UPS, no break	2219/25407	. . .	Delay between operations
2219/25363	. . .	Dual power supply, for digital circuit and for analog signals	2219/25408	. . .	Given order is latched for a certain delay in order te execute order surely
2219/25364	. . .	For each module a powersupply	2219/25409	. . .	Feedforward of control signal to compensate for delay in execution
2219/25365	. . .	Initialize parameters	2219/25411	. . .	Priority interrupt
2219/25366	. . .	Detect code, kind connected machine, device before execution of program	2219/25412	. . .	Separate interrupt for, from each interface
2219/25367	. . .	Control of periodic, synchronous and asynchronous, event driven tasks together	2219/25413	. . .	Interrupt, event, state change triggered
2219/25368	. . .	Start group of motors, machines in sequence, power up, down sequence	2219/25414	. . .	Interrupt without saving register states
2219/25369	. . .	Control of states, real time	2219/25415	. . .	Between processors using a single line and a switch
2219/25371	. . .	Recharge apparatus with material, only when needed or during specific time	2219/25416	. . .	Interrupt
2219/25372	. . .	Sequence command, next step if reference equals ramp signal level	2219/25417	. . .	Identify capabilities necessary to produce article
2219/25373	. . .	Detection position of program drum	2219/25418	. . .	Enter description of capabilities of each module
2219/25374	. . .	Home selection	2219/25419	. . .	Scheduling
2219/25375	. . .	If error, execute subroutine for alternative command, no shut down	2219/25421	. . .	Using resource data relative to each component, module of control system
2219/25376	. . .	Repeat part of program, kind of subroutine	2219/25422	. . .	Aperiodic scheduling, executed only on certain condition
2219/25377	. . .	New sequence as function of deviation from predicted result, state	2219/25423	. . .	Verification of controlled value by comparing with recorded value, signature
2219/25378	. . .	Stop machine after execution of some instructions on tape, marked by code	2219/25424	. . .	Mixture of wall connectors, some with fixed address others no address
2219/25379	. . .	Operation on rotating table provided with a plurality of cases	2219/25425	. . .	Personal computer
2219/25381	. . .	Restart program at predetermined position, crash recovery after power loss	2219/25426	. . .	Microcontroller in smart card directly controls machine, runs control program
2219/25382	. . .	Skip sequences	2219/25427	. . .	Controller inside socket, wall connector, distributor, junction box
2219/25383	. . .	Jump			
2219/25384	. . .	Analog I-O to microprocessor to set switch moment for next step			
2219/25385	. . .	Control speed of conveyor as function of missing objects, to speed up			
2219/25386	. . .	Program execution as function of direction, forward or backward			

2219/25428	. . .	Field device	2219/25472	. . .	Synchronise controllers, sensors, measurement with data bus
2219/25429	. . .	Microprocessor mounted near controlled machine, cheaper line connection	2219/25473	. . .	Compensation variable cycle time, synchronized processes
2219/25431	. . .	Dual Port memory	2219/25474	. . .	Synchronize microprocessor with process or I-O
2219/25432	. . .	Multiplex	2219/25475	. . .	Sequence synchronized with machine axis, like knitting machine
2219/25433	. . .	Dataflow processor	2219/25476	. . .	Synchronous state change by clock as function of allowed states to skip certain states
2219/25434	. . .	Microprocessor and control logic integrated on same circuit board	2219/25477	. . .	Master waits for signal from slave, slave active thereafter, during limited time
2219/25435	. . .	Multiplex for analog signals	2219/25478	. . .	Synchronize several controllers using syncline
2219/25436	. . .	Main board connected to bundle of analog input lines	2219/25479	. . .	Synchronize controllers using messages, add transmission time afterwards
2219/25437	. . .	Main board coupled to bundle of digital and analog input lines	2219/25481	. . .	Broadcast to each controller an address of part of program to be used
2219/25438	. . .	Counter controls device, machine directly or via decoder	2219/25482	. . .	Synchronize several sequential processes, adjust
2219/25439	. . .	Use of flexible printed circuit	2219/25483	. . .	Synchronize several controllers using messages over data bus
2219/25441	. . .	Piggy back mounting	2219/25484	. . .	Synchronize microprocessor and connected, controlled state machine
2219/25442	. . .	Europa card	2219/26	. . .	Pc applications
2219/25443	. . .	Connect pc card to industrial bus, additional timing and adapting logic	2219/2601	. . .	Dispense machine glue, paste, flow
2219/25444	. . .	Stick label over opening for card, to seal opening and indicate program status	2219/2602	. . .	Wafer processing
2219/25445	. . .	Electric wiring inside pneumatic, hydraulic path	2219/2603	. . .	Steering car
2219/25446	. . .	Serial port has power connected to pin for external device	2219/2604	. . .	Test of external equipment
2219/25447	. . .	Detachable program unit can be replaced by supplementary display	2219/2605	. . .	Wastewater treatment
2219/25448	. . .	Control module is pluggable into wall connector	2219/2606	. . .	Tape transport, take up, rewind, play
2219/25449	. . .	Constructive details	2219/2607	. . .	Infusion controller
2219/25451	. . .	Connect module to bus using interface with adaptive logic	2219/2608	. . .	Hospital bed
2219/25452	. . .	Bootstrap logic and ram integrated in serial connector	2219/2609	. . .	Process control
2219/25453	. . .	Encoder, control knob connected to same microprocessor pins as keyboard matrix	2219/2611	. . .	Microprocessor driven caliper, to measure length distances
2219/25454	. . .	Retrofitting	2219/2612	. . .	Data acquisition interface
2219/25455	. . .	Buscouple interface can be integrated in actuator	2219/2613	. . .	Household appliance in general
2219/25456	. . .	Piggy back controller, old controller functions as before, new functions by new	2219/2614	. . .	HVAC, heating, ventilation, climate control
2219/25457	. . .	Replace old processor by more powerful processor on additional card	2219/2615	. . .	Audio, video, tv, consumer electronics device
2219/25458	. . .	Opto isolation, optical separation	2219/2616	. . .	Earth moving, work machine
2219/25459	. . .	Reed relay separation	2219/2617	. . .	Eye, ophthalmic, surgery system
2219/25461	. . .	Transformer separation	2219/2618	. . .	Lubrication, greasing
2219/25462	. . .	Galvanic separation, galvanic isolation	2219/2619	. . .	Wind turbines
2219/25463	. . .	Optical separation for signals, transformer separation for power	2219/2621	. . .	Conveyor, transfert line
2219/25464	. . .	MBO motherboard, backplane special layout	2219/2622	. . .	Press
2219/25465	. . .	Output of one module connected to input next module by lines on motherboard	2219/2623	. . .	Combustion motor
2219/25466	. . .	Motherboard has data, address, power and module identification lines	2219/2624	. . .	Injection molding
2219/25467	. . .	Detect if expansion board is connected	2219/2625	. . .	Sprinkler, irrigation, watering
2219/25468	. . .	Disconnect automatically high voltage supply when taking out a module	2219/2626	. . .	Sewing
2219/25469	. . .	Inserting or taking out circuit boards during power on	2219/2627	. . .	Grinding machine
2219/25471	. . .	Replace existing control system with new different system in real time	2219/2628	. . .	Door, window
			2219/2629	. . .	Assembly line
			2219/2631	. . .	Blasting, explosion
			2219/2632	. . .	Hemodialysis
			2219/2633	. . .	Washing, laundry
			2219/2634	. . .	Loom, weaving
			2219/2635	. . .	Glass forming
			2219/2636	. . .	Reproduction, image copying machine
			2219/2637	. . .	Vehicle, car, auto, wheelchair
			2219/2638	. . .	Airconditioning
			2219/2639	. . .	Energy management, use maximum of cheap power, keep peak load low

2219/2641	. . .	Fork lift, material handling vehicle	2219/31021	. . .	Between lan and machine, communication adapter which serves also sensors
2219/2642	. . .	Domotique, domestic, home control, automation, smart house	2219/31022	. . .	Planner and coordinator, decision and direct control level
2219/2643	. . .	Oven, cooking	2219/31023	. . .	Master production scheduler and microprocessor and schedule analysis and shop control
2219/2644	. . .	Sterilizer	2219/31024	. . .	Superior controller and internal, external resources controller modules
2219/2645	. . .	Vending, distribute drinks	2219/31025	. . .	PAC production activity controller
2219/2646	. . .	Printing	2219/31026	. . .	Diagnostic controller coupled to field and to redundant process controllers
2219/2647	. . .	Dentist	2219/31027	. . .	Computer assisted manual assembly CAA, display operation, tool, result
2219/2648	. . .	Central heating	2219/31028	. . .	Selecting workpieces from one or more containers by robot with vision
2219/2649	. . .	Burner	2219/31029	. . .	Program for assembly, show exploded article
2219/2651	. . .	Camera, photo	2219/31031	. . .	Assembly, manipulator cell
2219/2652	. . .	Medical scanner	2219/31032	. . .	Two workstations alternatively, one assembles, other is prepared for next
2219/2653	. . .	Roller blind, shutter, sunshade	2219/31033	. . .	Record on site dimensions of pipe, tube configuration, to install pipe
2219/2654	. . .	Fridge, refrigerator	2219/31034	. . .	Component identifier and location indicator corresponding to component
2219/2655	. . .	Cd player	2219/31035	. . .	Disable assembly if one of component compartments lacks
2219/2656	. . .	Instrumentation	2219/31036	. . .	Load component into corresponding compartment, bin, storage before assembly
2219/2657	. . .	Blood, urine analyzer	2219/31037	. . .	Compartment, bin, storage vessel sensor to verify correct bin is loaded
2219/2658	. . .	Heat pump	2219/31038	. . .	Watchdog, timer to alert if operator does not executes operation within time
2219/2659	. . .	Elevator	2219/31039	. . .	Count assembled parts, change program during assembly if number reached
2219/2661	. . .	Milking robot	2219/31041	. . .	Machine balancing, distribute articles evenly over machines
2219/2662	. . .	Photocopier	2219/31042	. . .	Enter pallet configuration, geometry, number of parts
2219/2663	. . .	Tractor	2219/31043	. . .	Bin, storage identifier and workstation identifier
2219/2664	. . .	Audio light, animation, stage, theatre light	2219/31044	. . .	Assembly of modular products, variant configurability
2219/2665	. . .	Detonator, fuze	2219/31045	. . .	Show bin, compartment and number of parts to be pick up
2219/2666	. . .	Toy	2219/31046	. . .	Aid for assembly, show display on screen next workpiece, task, position to be assembled, executed
2219/2667	. . .	Crane	2219/31047	. . .	Display image of finished workpiece on screen, show how, where to mount next part
2219/2668	. . .	Fuel cells	2219/31048	. . .	Project on workpiece, image of finished workpiece, info or a spot
2219/2669	. . .	Handling batches	2219/31049	. . .	Minimize assembly time, by grouping part types into pallet groups
2219/2671	. . .	Mail processing system	2219/31051	. . .	Hybrid system, combine expert system with traveling salesman problem TSP
2219/30	. . .	Nc systems	2219/31052	. . .	Find feasible assembly sequences
2219/31	. . .	From computer integrated manufacturing till monitoring	2219/31053	. . .	Planning, generate assembly plans
2219/31001	. . .	CIM, total factory control	2219/31054	. . .	Planning, layout of assembly system
2219/31002	. . .	Computer controlled agv conveys workpieces between buffer and cell	2219/31055	. . .	Interpretation of assembly design data
2219/31003	. . .	Supervise route, reserve route and allocate route to vehicle, avoid collision	2219/31056	. . .	Selection of assembly processes, preferred assembly sequences
2219/31004	. . .	Move vehicle to battery charge or maintenance area	2219/31057	. . .	Selection of assembly equipment, system
2219/31005	. . .	Detect obstacles on path of vehicle	2219/31058	. . .	Determination of assembly tooling, fixture
2219/31006	. . .	Monitoring of vehicle	2219/31059	. . .	Selection of inspection devices
2219/31007	. . .	Floor plan, map stored in on-board computer of vehicle			
2219/31008	. . .	Cooperation mobile robots, carrying common pallet, object or pushing together			
2219/31009	. . .	Connector between AGV and station			
2219/31011	. . .	Communication network identical to transport network			
2219/31012	. . .	Optimize number of vehicles			
2219/31013	. . .	Second AGV with wafers already underway before processing first finished			
2219/31014	. . .	Synchronization between AGV movement and workpiece treatment chambers			
2219/31015	. . .	Host, model group and workstation computer deliver each proper control data			
2219/31016	. . .	General NC system executes tasks not present in specialised machine tools			
2219/31017	. . .	Architecture, host controls several CNC, each acting as a server to a pmc			
2219/31018	. . .	Virtual factory, modules in network, can be selected and combined at will			
2219/31019	. . .	Each station along transferline is independent			

2219/31061	. . .	Selection of assembly process parameters	2219/31101	. . .	Configuration file with format of relevant messages for different equipment
2219/31062	. . .	Calculation of assembly times	2219/31102	. . .	Program network controller, connected devices
2219/31063	. . .	Integrate assembly and task planning	2219/31103	. . .	Configure parameters of controlled devices
2219/31064	. . .	Minimal precedence constraint for components, link between components	2219/31104	. . .	Remote configuration of parameters of controlled devices
2219/31065	. . .	Disassembly evaluation	2219/31105	. . .	Remote control of network controller
2219/31066	. . .	Virtual assembly disassembly planning	2219/31106	. . .	Auto configuration, each module responsible for own configuration
2219/31067	. . .	Assembly partitioning, find sub assembly removable without disturbing plan	2219/31107	. . .	Start up of object manager module
2219/31068	. . .	Relative positioning of assembled parts with small geometric deviations	2219/31108	. . .	Can controller in full can, detects if message is for controller
2219/31069	. . .	Cell controller, setup machine of cell during operation of other machines	2219/31109	. . .	Can controller in basic can, microcontroller detects if message is for controller
2219/31071	. . .	Prevent order interference, no order to machine not setup for that order	2219/31111	. . .	Can controller and microcontroller integrated
2219/31072	. . .	Prevent batch breakup, no mix up of output of different machines	2219/31112	. . .	Interface, SIOMS standard I-O for mechatronic systems, device drivers
2219/31073	. . .	Decide when to create or reconfigure a cell	2219/31113	. . .	General, vendor independent display and control interface for sensor actuator
2219/31074	. . .	Decide which machines are to be used in a cell	2219/31114	. . .	Sensor on off switch level can be set and displayed by detachable module
2219/31075	. . .	Modular cell elements	2219/31115	. . .	Network controller
2219/31076	. . .	Controller for cell, for robot motion, for supervision	2219/31116	. . .	A-D interface between asi and fieldbus
2219/31077	. . .	Laser cutting table and handling and gripping and attachment robot and layup table	2219/31117	. . .	Each node has several, three channels, for control, for data, for addressing
2219/31078	. . .	Several machines and several buffers, storages, conveyors, robots	2219/31118	. . .	Universal interface between asi and fieldbus, for any fielddevice
2219/31079	. . .	Two workstations and two manipulators working together or independent	2219/31119	. . .	Fielddevice comprises also controller and pneumatic actuator and sensor
2219/31081	. . .	Detect position robot, agv relative to machine to start communication	2219/31121	. . .	Fielddevice, field controller, interface connected to fieldbus
2219/31082	. . .	NDDS network data delivery service, producers and consumers model	2219/31122	. . .	Bridge between networks
2219/31083	. . .	In server store virtual nodes for controlled machines, with states for map	2219/31123	. . .	Multi mode network controller, monitor, control, configuration, maintenance
2219/31084	. . .	Part of module exchanges high level messages, other part proprietary messages	2219/31124	. . .	Interface between communication network and process control, store, exchange data
2219/31085	. . .	Application scripts; in web server, not sent to client	2219/31125	. . .	Signal, sensor adapted interfaces build into fielddevice
2219/31086	. . .	Communication of carriage, agv data, workpiece data at each station	2219/31126	. . .	Transmitter coupled to fieldbus and to sensor, a-d conversion
2219/31087	. . .	Transmission device between workcell and central control	2219/31127	. . .	Repeater between two networks
2219/31088	. . .	Network communication between supervisor and cell, machine group	2219/31128	. . .	No repeater, split into several analog segments and common digital, can, expansion
2219/31089	. . .	Direct communication between cooperating parts of a cell, not over server	2219/31129	. . .	Universal interface for different fieldbus protocols
2219/31091	. . .	One client handled by several servers	2219/31131	. . .	Field device with gateway functions for communication with pc and other field devices
2219/31092	. . .	Network server for communication between plc's, using server	2219/31132	. . .	FDT interfacing profibus field device drivers DTM with engineering tool
2219/31093	. . .	Communication between sensors, actuators and gateway	2219/31133	. . .	Contactless connector, identify module wirelessly, short distance like less than twenty cm
2219/31094	. . .	Data exchange between modules, cells, devices, processors	2219/31134	. . .	PCD profinet component description, field device description module
2219/31095	. . .	Read write intelligent chip on workpiece, pallet, tool for data exchange	2219/31135	. . .	Fieldbus
2219/31096	. . .	Data carrier, communication by exchange of floppy disk	2219/31136	. . .	Name of bus, canbus, controller area network
2219/31097	. . .	Display travels with workpiece, package, order, special orders can be inserted	2219/31137	. . .	Sercos serial real time communications system between servo and cpu
2219/31098	. . .	Configuration editor for networking interconnection	2219/31138	. . .	Profibus process fieldbus
2219/31099	. . .	Configuration of transfer control between several subsystems	2219/31139	. . .	Lon local operating network, using neuron chip
			2219/31141	. . .	Eiba european installation bus association
			2219/31142	. . .	Devicenet, can based net
			2219/31143	. . .	Sds smart distributed system, can based

2219/31144	. . .	Interbus-S	2219/31191	. . .	Shorten header, message can be sent with less bytes, short form PDU
2219/31145	. . .	Ethernet	2219/31192	. . .	Token passing protocol, priority token passing
2219/31146	. . .	Bati bus, for home habitation building automation	2219/31193	. . .	Midi communication standard
2219/31147	. . .	Simatic S5-bus	2219/31194	. . .	Multimedia integration into fieldbus
2219/31148	. . .	Imbus	2219/31195	. . .	WAP wireless application protocol, wireless web application
2219/31149	. . .	P-net	2219/31196	. . .	SOAP, describes available services and how to call them remotely
2219/31151	. . .	Lan local area network	2219/31197	. . .	Near field communication nfc
2219/31152	. . .	Separate lan for sensors, detectors	2219/31198	. . .	VPN virtual private networks
2219/31153	. . .	Serial bus for plug in modules, each connection has own supply	2219/31199	. . .	UDP-IP
2219/31154	. . .	Actuator sensor bus, asi, intelligent actuator, motor, sensor	2219/31201	. . .	Frequency shift keying modulation, fsk
2219/31155	. . .	Ringbus	2219/31202	. . .	Semiconductor equipment communication standard SECS
2219/31156	. . .	Network structure, internet	2219/31203	. . .	Purpose, identification of messages, programs, variables
2219/31157	. . .	Star network, hub	2219/31204	. . .	Blind node, executes control, data acquisition without having operator interfaces
2219/31158	. . .	Wan wide area network	2219/31205	. . .	Remote transmission of measured values from site, local to host
2219/31159	. . .	Intranet	2219/31206	. . .	Exchange of parameters, data, programs between two station, station and central or host or remote
2219/31161	. . .	Java programcode or simular active agents, programs, applets	2219/31207	. . .	Master sends global files to autonomous controllers, feedback of process status
2219/31162	. . .	Wireless lan	2219/31208	. . .	Server node to watch, store message, variable, data between lon, network
2219/31163	. . .	Neutral bus with intelligent coupler for all kind of fieldbuses	2219/31209	. . .	Master actuator sensor interface has priority over host, build into host
2219/31164	. . .	Bus for analog and digital communication	2219/31211	. . .	Communicate diagnostic data from intelligent field device controller to central
2219/31165	. . .	Control handover in wireless automation networks	2219/31212	. . .	Intelligent local node can handle emergency without communication over net
2219/31166	. . .	Access data by name, object, stored in list, database	2219/31213	. . .	Synchronization of servers in network
2219/31167	. . .	Object, data object as network variable	2219/31214	. . .	Discontinuous communication controlled by server
2219/31168	. . .	Use of node, sensor, actuator and control object	2219/31215	. . .	Upon modification of data in one database, automatic update of mirror databases
2219/31169	. . .	Object manager contains client, control and communication and start and planning server	2219/31216	. . .	Handshake between machine and agv; readiness to load, unload workpiece
2219/31171	. . .	Each data object has corresponding identification for object manager, associative	2219/31217	. . .	Merge, synchronize process data and network data for trend analysis
2219/31172	. . .	All object managers use same algorithm to search server	2219/31218	. . .	Scheduling communication on bus
2219/31173	. . .	Start different object manager as function of priority list	2219/31219	. . .	Fixed deadline monotonic scheduling dm, set each message id to unique priority
2219/31174	. . .	Load, use different protocols, formats, emulators for different systems	2219/31221	. . .	Non preemptive earliest deadline ed, message id contains deadline
2219/31175	. . .	Message comprises identification of sender, receiver, command and parameter	2219/31222	. . .	Mixed traffic scheduler, ed for high speed and dm for low speed messages
2219/31176	. . .	Universal, same protocol to control all kind of drives, dc, ac, step motor	2219/31223	. . .	Main controller with three levels of serial networks
2219/31177	. . .	Protocol, sdhc serial data link control	2219/31224	. . .	Supervisor, cell controllers in parallel bus, machine controllers in serial bus
2219/31178	. . .	Hdlc high level data link control	2219/31225	. . .	System structure, plc's and pc's communicate over lan
2219/31179	. . .	Master sends message with address of slave to all slaves, slave answers, interrupt	2219/31226	. . .	Multitasking server connected to general network and to nc machines
2219/31181	. . .	Controller and device have several formats and protocols, select common one	2219/31227	. . .	External network for proces data, internal network for transport, handling only
2219/31182	. . .	Address by pulse sequence, control by pulse width, module filters out own control	2219/31228	. . .	Host, gateways and parallel backbone, multiprocessor computer node, fieldbus
2219/31183	. . .	Token ring	2219/31229	. . .	Supervisor, master, workstation controller, automation, machine control
2219/31184	. . .	Fip fieldbus instrumentation protocol			
2219/31185	. . .	Mapi message application interface for windows			
2219/31186	. . .	TCP-IP internet protocol			
2219/31187	. . .	Csma-cd csma-cd-w carrier sense multiple access collision detection wireless			
2219/31188	. . .	Combine csma-cd and tdm time multiplexed for rapid status exchange			
2219/31189	. . .	Time multiplex			

2219/31231	. . .	Lan and stations and fieldbus, each station controls own I-O	2219/31272	. . .	Avoid piling up, queue of workpieces, accommodate surges
2219/31232	. . .	Lan and station, each station has plc controlling own I-O over bus	2219/31273	. . .	Buffer conveyor along main conveyor
2219/31233	. . .	Map network and server in node and server controlled ethernet with machine nodes	2219/31274	. . .	Convey products, move equipment according to production plan in memory
2219/31234	. . .	Host, router and backplane bus, communication with host or backplane	2219/31275	. . .	Vehicle to convey workpieces is manually operable
2219/31235	. . .	St network, each module of first controls second similar network etc., tree	2219/31276	. . .	Transport a lot to stations, each with different types of manufacturing equipment
2219/31236	. . .	Plc exclusive network connected to map	2219/31277	. . .	Dispatching rules, shortest travel time or bidding based to reduce empty travel
2219/31237	. . .	Host and rs232, rs485 to network controller and rs232 to controlled devices	2219/31278	. . .	Store optimum number of workpiece, between max min, in bins, compartment, save travel time
2219/31238	. . .	First network connected by repeater to second, second connected by repeater to third	2219/31279	. . .	Prevent introduction of two pallets in same cell
2219/31239	. . .	Cache for server to fast support client	2219/31281	. . .	Calculate optimum path for conveying workpieces
2219/31241	. . .	Remote control by a proxy or echo server, internet - intranet	2219/31282	. . .	Data acquisition, BDE MDE
2219/31242	. . .	Device priority levels on same bus, net, devices processes data of exactly lower priority device	2219/31283	. . .	Communication memory, storage, ram, eprom on workpiece or pallet
2219/31243	. . .	Add serial number to message from station to check missing messages in host	2219/31284	. . .	Set begin and end of collection time for concerned machines, parameters
2219/31244	. . .	Safety, reconnect network automatically if broken	2219/31285	. . .	Send required data to computer as function of specified condition
2219/31245	. . .	Redundant bus, interbus, with two masters	2219/31286	. . .	Detect position of articles and equipment by receivers, identify objects by code
2219/31246	. . .	Firewall	2219/31287	. . .	Indicate output for data, screen or printer or database
2219/31247	. . .	Reconnect network if connection was broken	2219/31288	. . .	Archive collected data into history file
2219/31248	. . .	Multiple data link layer masters, if one fails, other takes over	2219/31289	. . .	Read card with operator and another card with process, product, work order info
2219/31249	. . .	Display name of communication line and number of errors detected and corrected	2219/31291	. . .	Store value detected signal and machine name and name of part of machine, mask
2219/31251	. . .	Redundant access, wireless and hardware access to fielddevices	2219/31292	. . .	Data in categories, each with a priority factor
2219/31252	. . .	Watchdog, client sends regulary message to server, server must answer	2219/31293	. . .	Enter size measurements, store in data base, analyze and identify in size data group
2219/31253	. . .	Redundant object manager	2219/31294	. . .	Compare measurements from sensors to detect defective sensors
2219/31254	. . .	Request from client waits until corresponding server functions again	2219/31295	. . .	Use integrated controller, processor during product, car assembly for ide, display, test
2219/31255	. . .	Verify communication parameters, if wrong, refuse communication	2219/31296	. . .	Identification, pallet object data and program code for station
2219/31256	. . .	Object managers arranged in logical ring for monitoring purposes	2219/31297	. . .	Read only that ide information which is needed for specific operation
2219/31257	. . .	Redundant wireless links	2219/31298	. . .	Store on actual pallets also id of several other upstream, following pallets
2219/31258	. . .	Compensate control in case of missing message	2219/31299	. . .	If workpiece rejected, write in id and erase operation code
2219/31259	. . .	Communication inhibited during certain process steps	2219/31301	. . .	Restore lost id by using entry number of preceding, following pallet
2219/31261	. . .	Coordination control	2219/31302	. . .	Verify id data and reread, rewrite or alarm on fault
2219/31262	. . .	Dcca dynamic coordinated concurrent activities	2219/31303	. . .	If workpiece transferred to other pallet, transfer also id
2219/31263	. . .	Imbedded learning for planner, executor, monitor, controller and evaluator	2219/31304	. . .	Identification of workpiece and data for control, inspection, safety, calibration
2219/31264	. . .	Control, autonomous self learn knowledge, rearrange task, reallocate resources	2219/31305	. . .	Robot arm identifies object during movement
2219/31265	. . .	Control process by combining history and real time data	2219/31306	. . .	Read identification only if object is present
2219/31266	. . .	Convey, transport tool to workcenter, central tool storage	2219/31307	. . .	Identification structure is partly a copy of operating structure
2219/31267	. . .	Central tool storage, convey a whole tool drum, magazine to workcenter	2219/31308	. . .	Capture image asynchronously with processing of analysis, identification
2219/31268	. . .	Central workpiece storage, convey workpiece, work pallet, holder to workcell	2219/31309	. . .	Identification workpiece and time limit for processing of workpiece
2219/31269	. . .	Convey tool and workpiece to workcenter			
2219/31271	. . .	Priority workpiece pallet selected instead of routine workpiece pallet			

2219/31311	. . .	Data are id, destination, number of pieces, alternative destination, process data	2219/31355	. . .	Fault, if one station defect, stop it, other stations take over
2219/31312	. . .	Identify pallet, bag, box code	2219/31356	. . .	Automatic fault detection and isolation
2219/31313	. . .	Measure weight, dimension and contents of box, tray	2219/31357	. . .	Observer based fault detection, use model
2219/31314	. . .	Store in workpiece detected defects	2219/31358	. . .	Markov model
2219/31315	. . .	Use of data by host, send work order to operator after pallet detection	2219/31359	. . .	Object oriented model for fault, quality control
2219/31316	. . .	Output test result report after testing, inspection	2219/31361	. . .	Verify if right controllers are connected to carrier, conveyor controller
2219/31317	. . .	Outputs delivery ordersheet, relating to finished products, to packing cell	2219/31362	. . .	Verify correct configuration of system
2219/31318	. . .	Data analysis, using different formats like table, chart	2219/31363	. . .	Action, if one station defect, execute special program for other stations
2219/31319	. . .	Use data groups as inventory control value, adapt inventory need to new data	2219/31364	. . .	If one station defect, return other stations to original programmed modes
2219/31321	. . .	Print, output finished product documentation, manual using id of all workpieces assembled, processed	2219/31365	. . .	Send message to most appropriate operator as function of kind of error
2219/31322	. . .	Work still to be done on workpiece	2219/31366	. . .	Operate faulty tool in degraded mode
2219/31323	. . .	Database for CIM	2219/31367	. . .	MMS manufacturing message specification, rs511, iso9506
2219/31324	. . .	Distributed real time knowledge, database	2219/31368	. . .	MAP manufacturing automation protocol
2219/31325	. . .	Machine selection support, use of database	2219/31369	. . .	Translation, conversion of protocol between two layers, networks
2219/31326	. . .	Database to manage communication networks	2219/31371	. . .	VMD virtual manufacturing device for robot task control, cell
2219/31327	. . .	Directory service for database	2219/31372	. . .	Mes manufacturing execution system
2219/31328	. . .	Objects report their location to directory service	2219/31373	. . .	Vou virtual operative organisational unit, extension of vmd
2219/31329	. . .	Distributed, among several servers, directory service	2219/31374	. . .	FAL fieldbus application layer, application service elements ase and application relations ar
2219/31331	. . .	Select manufacturing information by entering product number	2219/31375	. . .	LAS link active scheduler, distribute bandwidth between processing nodes
2219/31332	. . .	Back order management with back order, part maker delivery, production databases	2219/31376	. . .	MFL material flow
2219/31333	. . .	Database to backup and restore factory controllers	2219/31377	. . .	From stored machine groups and relation machine workpiece, send workpiece to idle
2219/31334	. . .	Database with devices, configuration, of plant	2219/31378	. . .	Queue control
2219/31335	. . .	Database of address of devices registers in different networks, mapping	2219/31379	. . .	Master monitors controllers, updates production progress, allocates resources
2219/31336	. . .	Store machines performance; use it to control future machining	2219/31381	. . .	Matrix cluster, machines in cell according to parts, row is part, column is machines
2219/31337	. . .	Failure information database	2219/31382	. . .	Find shortest way, route
2219/31338	. . .	Design, flexible manufacturing cell design	2219/31383	. . .	Compare ratio of running work with optimum, decrease number of idle machines
2219/31339	. . .	From parameters, build processes, select control elements and their connection	2219/31384	. . .	Produce construction sequence, make parts, store, assemble equipment, ship
2219/31341	. . .	Design of factory information system	2219/31385	. . .	Determine rate of MFL out of each process within each workstation
2219/31342	. . .	Design of process control system	2219/31386	. . .	Determine size of batch of material for each process to meet mfl rate
2219/31343	. . .	Design of factory, manufacturing system control	2219/31387	. . .	If resources, material, pieces under tolerance level, renew them until upper level
2219/31344	. . .	Element, file server	2219/31388	. . .	Just in time JIT, kanban is box to control flow of workpiece
2219/31345	. . .	Map backbone bus	2219/31389	. . .	Pull type, client order decides manufacturing
2219/31346	. . .	Network manager	2219/31391	. . .	Administration tasks and factory control tasks
2219/31347	. . .	Communication adaptors between network and each machine	2219/31392	. . .	Lims laboratory information and management system
2219/31348	. . .	Gateway	2219/31393	. . .	Object oriented engineering data management
2219/31349	. . .	Server node as operator panel, with display for lon	2219/31394	. . .	Field management, low level, instruments and controllers acting in real time
2219/31351	. . .	Expert system to select best suited machining centre	2219/31395	. . .	Process management, specification, process and production data, middle level
2219/31352	. . .	Expert system integrates knowledges to control workshop	2219/31396	. . .	Business management, production, document, asset, regulatory management, high level
2219/31353	. . .	Expert system to design cellular manufacturing systems			
2219/31354	. . .	Hybrid expert, knowledge based system combined with ann			

2219/31397	. . .	Instrument information management, subset of process management	2219/31438	. . .	Priority, queue of alarms
2219/31398	. . .	Simultaneous, concurrent engineering	2219/31439	. . .	Alarms can be warning, alert or fault
2219/31399	. . .	Station corrects nc program, sends back modified program to program generator	2219/31441	. . .	Simocode, overload protection, detection of trips, life time connected to fieldbus
2219/31401	. . .	Keep notebook for keeping track of process, can be executed to make product	2219/31442	. . .	Detect if operation on object has been executed correctly in each station
2219/31402	. . .	Keep log book, for activities of a station, equipment	2219/31443	. . .	Keep track of nc program, recipe program
2219/31403	. . .	EDI electronic data exchange	2219/31444	. . .	Compare actual manufacturing sequence with simulated sequence, correct actual
2219/31404	. . .	Computer assisted complaint management, customer complaint	2219/31445	. . .	Detect changed working conditions, to correct machine load, balance
2219/31405	. . .	EDM electronic data management	2219/31446	. . .	Detect if workpiece, object present
2219/31406	. . .	Data management, shop management, memory management	2219/31447	. . .	Process error event detection and continuous process image detection, storage
2219/31407	. . .	Machining, work, process finish time estimation, calculation	2219/31448	. . .	Display at central computer, slave displays for each machine unit
2219/31408	. . .	Cost calculation of use of certain machine types	2219/31449	. . .	Monitor workflow, to optimize business, industrial processes
2219/31409	. . .	Calculation approach time	2219/31451	. . .	Petrinet for monitoring process
2219/31411	. . .	Down time, loss time estimation, calculation	2219/31452	. . .	Send a warning message that an event has to be monitored before the event occurs
2219/31412	. . .	Calculate machining time, update as function of load, speed	2219/31453	. . .	Repeat sending warnings to operator until certain event is monitored
2219/31413	. . .	Estimate capacity of plant	2219/31454	. . .	Keep track of vehicles
2219/31414	. . .	Calculate amount of production energy, waste and toxic release	2219/31455	. . .	Monitor process status
2219/31415	. . .	Cost calculation in real time for a product manufactured	2219/31456	. . .	Product progress, taking into account products on vehicle
2219/31416	. . .	Calculate effect of different actuators on optimal path sequence	2219/31457	. . .	Factory remote control, monitoring through internet
2219/31417	. . .	Calculate capacity by back propagating capacity, constraint from last to first module	2219/31458	. . .	Test workpiece during transport
2219/31418	. . .	NC program management, support, storage, distribution, version, update	2219/31459	. . .	Library with metrology plan for different type of workpieces
2219/31419	. . .	Select file from a list, directory	2219/31461	. . .	Use risk analysis to identify process parts that should be specially monitored
2219/31421	. . .	File with parameters for station and identification of station	2219/31462	. . .	Add time stamp to alarm message
2219/31422	. . .	Upload, download programs, parameters from, to station to, from server	2219/31463	. . .	Status of whole system calculated from status of its components
2219/31423	. . .	After cap, send resulting programs to different nc machines	2219/31464	. . .	Select between different models corresponding to diff process control configurations
2219/31424	. . .	Print label of finished part, with info, history, attach to part, docket	2219/31465	. . .	Determine which variables of the system to be monitored
2219/31425	. . .	Plan availability of operator for cell as function of time and operation calendar	2219/31466	. . .	Display position of different workpieces, tools in system
2219/31426	. . .	Real time database management for production control	2219/31467	. . .	Display of operating conditions of machines, workcells, selected programs
2219/31427	. . .	Production, CAPM computer aided production management	2219/31468	. . .	Display jig, pallet number, status and clamp jig number
2219/31428	. . .	Production management for lot production and for individual components of lot	2219/31469	. . .	Graphical display of process as function of detected alarm signals
2219/31429	. . .	Predict end of job execution, schedule new job beforehand	2219/31471	. . .	Operator can select a graphical screen at his will as help diagnostic
2219/31431	. . .	Identify and classify excess raw material; reuse	2219/31472	. . .	Graphical display of process
2219/31432	. . .	Keep track of conveyed workpiece, batch, tool, conditions of stations, cells	2219/31473	. . .	Fisheye view, sharp detailed view of main subject, rest much smaller, navigate
2219/31433	. . .	Diagnostic unit per zone of manufacturing	2219/31474	. . .	Icon display for quick access of detailed information
2219/31434	. . .	Zone supervisor, collects error signals from, and diagnoses different zone	2219/31475	. . .	Zoom or pan display for flexible access to information
2219/31435	. . .	Paging support with display board, status monitoring and report compiling	2219/31476	. . .	Display of several transactions, sub-displays for other transactions
2219/31436	. . .	Host monitors plc, control processor without interrupting its program	2219/31477	. . .	Display correlated data so as to represent the degree of correlation
2219/31437	. . .	Monitoring, global and local alarms	2219/31478	. . .	Display all processes together or select only one

2219/31479	. . .	Operator select part of process he wants to see, video image is displayed	2219/32028	. . .	Electronic catalog, to select material, resources, make lists with prices
2219/31481	. . .	Safety monitoring system, redundant display, print systems for process data	2219/32029	. . .	Enter also delivery location, transport means, kind of truck
2219/31482	. . .	Verify working state of printers, displays, switch over if defect	2219/32031	. . .	Use item and structure information
2219/31483	. . .	Verify monitored data if valid or not by comparing with reference value	2219/32032	. . .	Salesman creates order, system answers back with price, estimated date
2219/31484	. . .	Operator confirms data if verified data is correct, otherwise amends data	2219/32033	. . .	Send article design, needed material, packaging and shipping info to manufacturer
2219/31485	. . .	Verify and update all related data in relational database	2219/32034	. . .	Electronic market, network broker
2219/32	. .	Operator till task planning	2219/32035	. . .	Compose, configure article and order
2219/32001	. . .	Computer assisted machining, signals guide operator to manual machine object	2219/32036	. . .	Enter data, values for custom made articles
2219/32002	. . .	Operator interface, manual control at cell, if host fails or priority	2219/32037	. . .	Order picking
2219/32003	. . .	Manual control at central control to control workcell, select pallet	2219/32038	. . .	Client can develop programs, parts on remote server located by manufacturer
2219/32004	. . .	Graphical, textual instructions, sheet for operator to resume process	2219/32039	. . .	Send also testing program
2219/32005	. . .	Graphical, text operator instructions synchronous with product distribution	2219/32041	. . .	Combine orders from different customers
2219/32006	. . .	Operator addresses machines to give commands or retrieve data	2219/32042	. . .	Halting, initiating or resuming production of a product on order
2219/32007	. . .	Operator is assisted by expert system for advice and delegation of tasks	2219/32043	. . .	Program, information flow
2219/32008	. . .	Operator changes schedule, workload in allowed range by graphical interface	2219/32044	. . .	Shift workpiece and agv, carriage data in memory on advance to next station
2219/32009	. . .	Optimal task allocation between operator and machine	2219/32045	. . .	Each machine knows sequence of pallets, each pallet knows sequence of operations
2219/32011	. . .	Operator adapts manufacturing as function of sensed values	2219/32046	. . .	On detection workpiece code load program for workpiece from central
2219/32012	. . .	Operator must signify his continued attendance at the workstation	2219/32047	. . .	Workcell end instruction selects next workpiece with related program
2219/32013	. . .	Operator marks processes, scheduler detects marks, releases control to operator	2219/32048	. . .	Wait state between two successive machining steps
2219/32014	. . .	Augmented reality assists operator in maintenance, repair, programming, assembly, use of head mounted display with 2-D 3-D display and voice feedback, voice and gesture command	2219/32049	. . .	Store program data, manufacturing history on workpiece, shifts to next
2219/32015	. . .	Optimize, process management, optimize production line	2219/32051	. . .	Central control, modify program slave computers as function of production demand from host
2219/32016	. . .	Minimize setup time of machines	2219/32052	. . .	Lookup table, identify job to be executed by master or slave
2219/32017	. . .	Adapt real process as function of changing simulation model, changing for better results	2219/32053	. . .	Adjust work parameter as function of other cell
2219/32018	. . .	Adapt process as function of results of quality measuring until maximum quality	2219/32054	. . .	Send request for object carry out to other cell
2219/32019	. . .	Dynamic reconfiguration to maintain optimal design, fabrication, assembly	2219/32055	. . .	Identify workpiece, read status centrally, machine, adapt status centrally
2219/32021	. . .	Energy management, balance and limit power to tools	2219/32056	. . .	Balance load of workstations by grouping tasks
2219/32022	. . .	Ordering, remote ordering, enter article and operations needed, create jobfile	2219/32057	. . .	Control cell as function of correlation between stored and detected machine state
2219/32023	. . .	Print label, instructions for operator and job code for machining parameters	2219/32058	. . .	Execute program as function of deviation from predicted state, result
2219/32024	. . .	Remote ordering, electronic selection article and fitting to form of client	2219/32059	. . .	Send code, data for workpiece to each workstation to be used, update data
2219/32025	. . .	Automatic marking of article	2219/32061	. . .	Central controls modules grouped according to function
2219/32026	. . .	Order code follows article through all operations	2219/32062	. . .	Set machines to new lot work, send them operation schedule, nc and handling data
2219/32027	. . .	Order, plan, execute, confirm end order, if unfeasible execute exception operation	2219/32063	. . .	Adapt speed of tool as function of deviation from target rate of workpieces
			2219/32064	. . .	Production change over
			2219/32065	. . .	Synchronise set points of processes
			2219/32066	. . .	Central stores operation code in id and in concerned station
			2219/32067	. . .	Change combinations of operation codes in station, id for flexibility
			2219/32068	. . .	Execution at station only permitted if operation code of station and id equal

2219/32069	. . .	Use of multiple id to prepare program for station before pallet in station	2219/32111	. . .	PPS production planning system
2219/32071	. . .	Adaptive fuzzy controller, tunes itself as function of machine parameter variation	2219/32112	. . .	PPS and MS Office integrated
2219/32072	. . .	Distributed fuzzy controllers	2219/32113	. . .	Machine load and characteristic curves
2219/32073	. . .	If inspection needed, stop machining, execute separate inspection program	2219/32114	. . .	Part type selection, for simultaneous processing
2219/32074	. . .	History of operation of each machine	2219/32115	. . .	Machine grouping, each machine in each group performs same operations
2219/32075	. . .	Predict workpiece measurements from measurements of previous workpieces	2219/32116	. . .	Production ratio, proportion in which selected part types will be produced
2219/32076	. . .	Adjust feedback from previous processes as function of elapsed time	2219/32117	. . .	Resource allocation, of number of pallets, fixtures of each type to part type
2219/32077	. . .	Batch control system	2219/32118	. . .	Loading, allocates operations and tools to selected part type
2219/32078	. . .	Calculate process end time, form batch of workpieces and transport to process	2219/32119	. . .	Order handling and manufacturing module and offline monitoring
2219/32079	. . .	Use of common resources	2219/32121	. . .	Read identification of pallet, conveyor and enter data for manufacturing
2219/32081	. . .	Sub batch, machine, assemble only part of the whole batch	2219/32122	. . .	Documentation of programmable electronic system
2219/32082	. . .	Planing, material requiring planning MRP, request	2219/32123	. . .	Use of ms windows for automation, connected to mms manufacturing message system
2219/32083	. . .	Alternative, variant operation planning, revision specification of product	2219/32124	. . .	Program hybrid system, part sequence, part continuous
2219/32084	. . .	Planning of configuration of product, based on components	2219/32125	. . .	Maple manufacturing application programming environment
2219/32085	. . .	Layout of factory, facility, cell, production system planning	2219/32126	. . .	Hyperlink, access to program modules and to hardware modules in www, web server, browser
2219/32086	. . .	Integrate process planning and job shop scheduling	2219/32127	. . .	Read identification of part and generate automatically manufacturing conditions
2219/32087	. . .	Decentral planning, each plant involved takes part of global	2219/32128	. . .	Gui graphical user interface
2219/32088	. . .	Master production planning, highest level	2219/32129	. . .	Select program for specified machine from library, file server
2219/32089	. . .	Action and material and technology combined to manufacture product	2219/32131	. . .	Use job graph
2219/32091	. . .	Algorithm, genetic algorithm, evolution strategy	2219/32132	. . .	SFC shop floor control, to develop and build control system for factory
2219/32092	. . .	Heuristic algorithm, accept feasible solution and attempt to improve it	2219/32133	. . .	Commands from program of other controller cause recompilation of local program
2219/32093	. . .	Search, adaptive, after each iteration some search directions are forbidden	2219/32134	. . .	Dynamic generation of web pages from program code
2219/32094	. . .	Dedicated language for batch processing, enter number of workpieces	2219/32135	. . .	APC advanced process control applications
2219/32095	. . .	Text, menu driven editor for batch programming, phase sequence, parameters	2219/32136	. . .	Web service oriented architecture for manufacturing and automation
2219/32096	. . .	Batch, recipe configuration for flexible batch control	2219/32137	. . .	Configure, connect, combine different program modules
2219/32097	. . .	Recipe programming for flexible batch	2219/32138	. . .	Select hardware, devices at workstation, needed for, to be used at cell, node
2219/32098	. . .	Batch programming using oop	2219/32139	. . .	Select at workstation control parameters for cell, node
2219/32099	. . .	CAPP computer aided machining and process planning	2219/32141	. . .	Define type of I-O, analog, digital, pulse
2219/32101	. . .	CASE based process planning, using older, known case	2219/32142	. . .	Define device, module description using xml format file
2219/32102	. . .	Select machine type	2219/32143	. . .	Use css style sheets as control parameters
2219/32103	. . .	Select size of tool	2219/32144	. . .	Define device description using dd files
2219/32104	. . .	Data extraction from geometric models for process planning	2219/32145	. . .	Manual, enter identification, name workpiece and teach manufacturing data
2219/32105	. . .	Calculate machining axis, best feasible orientation for machining	2219/32146	. . .	Display parts, manufacturing conditions to enter conditions for selected part
2219/32106	. . .	Calculate machining volumes for turning operations	2219/32147	. . .	Edit taught data to change operation parameters of workstations
2219/32107	. . .	Operative process planning	2219/32148	. . .	Enter correction data at a station, also transmitted to all downstream stations
2219/32108	. . .	From order, production time divide into special and normal operations	2219/32149	. . .	Display working condition data, real measured data and tolerance
2219/32109	. . .	Divide process into machining methods			

2219/32151	. . .	Prepare teach data by selecting data from two tables as function of type of work	2219/32194	. . .	Quality prediction
2219/32152	. . .	Inhibit further editing of entered parameters	2219/32195	. . .	Feedforward quality control
2219/32153	. . .	Exchange data between user, cad, caq, nc, capp	2219/32196	. . .	Store audit, history of inspection, control and workpiece data into database
2219/32154	. . .	Object, attribute for geometry, technology, function oop	2219/32197	. . .	Inspection at different locations, stages of manufacturing
2219/32155	. . .	Editor and library for objects	2219/32198	. . .	Feedforward inspection data for calibration, manufacturing next stage
2219/32156	. . .	Each defined object has corresponding set of geometrical macros	2219/32199	. . .	If number of errors grow, augment sampling rate for testing
2219/32157	. . .	Create a new object by combining existing objects	2219/32201	. . .	Build statistical model of past normal proces, compare with actual process
2219/32158	. . .	Object groups, for object replication, naming, messaging and retrieving	2219/32202	. . .	Integration and cooperation between processes
2219/32159	. . .	Each hardware unit together with its software forms one object	2219/32203	. . .	Effect of material constituents, components on product manufactured
2219/32161	. . .	Object oriented control, programming	2219/32204	. . .	Performance assurance; assure certain level of non-defective products
2219/32162	. . .	Tasks or control icons are linked to form a job	2219/32205	. . .	Use model error adapted to type of workpiece
2219/32163	. . .	Indicate synchronisation tags on icons of tasks	2219/32206	. . .	Selection from a lot of workpieces to be inspected
2219/32164	. . .	Petrinet and procedural language combined	2219/32207	. . .	Action upon failure value, send warning, caution message to terminal
2219/32165	. . .	Petrinet	2219/32208	. . .	Rearrange production line
2219/32166	. . .	Convert petrinet to sequence program for cell and to control program for machine	2219/32209	. . .	Stop production line
2219/32167	. . .	Convert petrinet to ladder diagram	2219/32211	. . .	Outputs new workorders to operators
2219/32168	. . .	Generation and analysis of synthesis rules for petrinet	2219/32212	. . .	If parameter out of tolerance reject product
2219/32169	. . .	Stochastic pn, spn	2219/32213	. . .	If parameter out of tolerance during limited time, accept product on condition
2219/32171	. . .	Transform, convert operator goals and information into petri nets	2219/32214	. . .	Display on screen what fault and which tool and what order to repair fault
2219/32172	. . .	Control petri net together with modeling petri net, cascaded	2219/32215	. . .	If detected shape not correct, simulate new machine, tool and adapt path
2219/32173	. . .	Table, memory table with identification code for all parts to be used	2219/32216	. . .	If machining not optimized, simulate new parameters and correct machining
2219/32174	. . .	Memory table parts classification and working, manufacturing conditions	2219/32217	. . .	Finish defect surfaces on workpiece
2219/32175	. . .	Table with correlation between part codes and part classification	2219/32218	. . .	Sort workpieces as function of quality data
2219/32176	. . .	Correspondance between manufacturing part list and design part list	2219/32219	. . .	Slow down production after failure
2219/32177	. . .	Computer assisted quality surveyance, caq	2219/32221	. . .	Correlation between defect and measured parameters to find origin of defect
2219/32178	. . .	Normal and correction transferline, transfer workpiece if fault	2219/32222	. . .	Fault, defect detection of origin of fault, defect of product
2219/32179	. . .	Quality control, monitor production tool with multiple sensors	2219/32223	. . .	Fixture failure diagnosis, measure assembly, derive influence of fixture on error
2219/32181	. . .	Monitor production, assembly apparatus with multiple sensors	2219/32224	. . .	Identify parameters with highest probability of failure
2219/32182	. . .	If state of tool, product deviates from standard, adjust system, feedback	2219/32225	. . .	Randomize workpiece treatment order within lot to improve lot-to-lot comparisons
2219/32183	. . .	Test cell	2219/32226	. . .	Computer assisted repair, maintenance of system components
2219/32184	. . .	Compare time, quality, state of operators with threshold value	2219/32227	. . .	On error detected by zone supervisor, maintenance of particular zone
2219/32185	. . .	Calculate entropy, disorder	2219/32228	. . .	Repair, rework of manufactured article
2219/32186	. . .	Teaching inspection data, pictures and criteria and apply them for inspection	2219/32229	. . .	Repair fault product by replacing fault parts
2219/32187	. . .	Correlation between controlling parameters for influence on quality parameters	2219/32231	. . .	Inspection and correction, repair station in one unit, correction data in memory
2219/32188	. . .	Teaching relation between controlling parameters and quality parameters	2219/32232	. . .	Inspection and correction, repair station are separate, transmit correction data
2219/32189	. . .	Compare between original solid model and measured manufactured object	2219/32233	. . .	Scheduling repair
2219/32191	. . .	Real time statistical process monitoring	2219/32234	. . .	Maintenance planning
2219/32192	. . .	After inspection create correction table with position, correction data	2219/32235	. . .	Sharing of data between process control and maintenance management computers
2219/32193	. . .	Ann, neural base quality management	2219/32236	. . .	Automatic order of parts needed for maintenance schedule

- 2219/32237 . . . Repair and rework of defect, out of tolerance parts, reschedule
- 2219/32238 . . . Scheduler triggers generation of nc program for actual selected machine
- 2219/32239 . . . Avoid deadlock, lockup
- 2219/32241 . . . Resource editor
- 2219/32242 . . . Reschedule without propagation of interruptions to other cells
- 2219/32243 . . . Rerouting parts
- 2219/32244 . . . By using graphical display of array and selecting elements, rearrange them
- 2219/32245 . . . Reentrant scheduling, workpiece can return to same machine
- 2219/32246 . . . Virtual reality based interface scheduler
- 2219/32247 . . . Real time scheduler
- 2219/32248 . . . Create schedule from elementary operations from database
- 2219/32249 . . . Repair, rework of defect, out of tolerance part in next station by reconfiguring it
- 2219/32251 . . . Normal and special order production lines for different types of workpiece
- 2219/32252 . . . Scheduling production, machining, job shop
- 2219/32253 . . . As a function of, change of machine operation
- 2219/32254 . . . Work sequence, alternative sequence
- 2219/32255 . . . Required time for work temperature control
- 2219/32256 . . . Due dates, pieces must be ready, priority of dates, deadline
- 2219/32257 . . . Tool replacement minimization
- 2219/32258 . . . Resource, machine assignment preferences, actual and anticipated load
- 2219/32259 . . . Flexibility, polyvalent machine, large buffers, permutation operations, alternative
- 2219/32261 . . . Rearrange production line as function of operator rating
- 2219/32262 . . . Work manhours, number of operators and work place
- 2219/32263 . . . Afo products, their components to be manufactured, lot selective
- 2219/32264 . . . Setup time
- 2219/32265 . . . Waiting, queue time, buffer
- 2219/32266 . . . Priority orders
- 2219/32267 . . . Dynamic throughput maximization
- 2219/32268 . . . Available parts, available materials
- 2219/32269 . . . Decision, of job release, select job to be launched next in shop
- 2219/32271 . . . Decision of job dispatching, select job to process next on each machine
- 2219/32272 . . . Decision of next visiting machine selection, where job is to go
- 2219/32273 . . . Decision of job pulling, select job to put in input buffer of next machine if conflicts
- 2219/32274 . . . Event is triggered when first unit of first lot enters or last unit leaves processing
- 2219/32275 . . . Job, recipe cascading: no delay, next job is started immediatly when first is finished
- 2219/32276 . . . For tool feeding schedule
- 2219/32277 . . . Agv schedule integrated into cell schedule
- 2219/32278 . . . Schedule of overhead material handlers, robot gantry
- 2219/32279 . . . Operator scheduling for load, unload, walk and wait in a cell with plural machines
- 2219/32281 . . . Single machine scheduling, one machine, several jobs
- 2219/32282 . . . For a quick and slow production line
- 2219/32283 . . . Machine scheduling, several machines, several jobs
- 2219/32284 . . . Job shop, two, more operations may not occupy same machine simultaneously
- 2219/32285 . . . Multi manipulator assembly cell
- 2219/32286 . . . Monitoring items connected to certain different entities, activities
- 2219/32287 . . . Medical, chemical, biological laboratory
- 2219/32288 . . . Create daily or weekly production matrix
- 2219/32289 . . . Determine number of components, start of their production, allocate processor
- 2219/32291 . . . Task sequence optimization
- 2219/32292 . . . Large, medium and fine schedule, with feedback from fine to large
- 2219/32293 . . . Minimize work in progress, system at maximum productivity
- 2219/32294 . . . Maximize throughput of cell
- 2219/32295 . . . Production start time from order and production specification, satisfaction degree
- 2219/32296 . . . If error search in a repair library, trained by operator, to correct schedule
- 2219/32297 . . . Adaptive scheduling, feedback of actual proces progress to adapt schedule
- 2219/32298 . . . Designate at least two group of articles, first with priority, reschedule second
- 2219/32299 . . . Divide job shop into number of workcenters
- 2219/32301 . . . Simulate production, process stages, determine optimum scheduling rules
- 2219/32302 . . . Each pallet has working plan, information and machine selection data
- 2219/32303 . . . Convert program to fit rescheduled machine
- 2219/32304 . . . Minimize flow time, tact, shortest processing, machining time
- 2219/32305 . . . Fastest interrupt time, change jobs dynamically to fastest machine
- 2219/32306 . . . Rules to make scheduling decisions
- 2219/32307 . . . Last buffer first serve, lifo
- 2219/32308 . . . Shortest, narrowest non full queue
- 2219/32309 . . . Shortest remaining capacity
- 2219/32311 . . . Shortest queue next
- 2219/32312 . . . Largest imminent operation time
- 2219/32313 . . . Shortest remaining processing time
- 2219/32314 . . . Largest remaining processing time
- 2219/32315 . . . Machine with least work
- 2219/32316 . . . First buffer first serve, fifo
- 2219/32317 . . . Smallest ratio for imminent processing time divided by total processing time
- 2219/32318 . . . Smallest value of product of imminent processing time with total processing time
- 2219/32319 . . . Shortest imminent operation time, part of machining time
- 2219/32321 . . . Largest processing, machining time
- 2219/32322 . . . Machines with least frequency of errors
- 2219/32323 . . . Determine lot priority as function of sum of queue and processing time
- 2219/32324 . . . Quality data determines optimum machine sequence selection, queuing rules
- 2219/32325 . . . Object oriented scheduling, use machine, part, tool object and coordinator
- 2219/32326 . . . Local scheduler, each machine own scheduler, independent from defective machines
- 2219/32327 . . . Structure, fuzzy logic expert system scheduler

2219/32328	. . .	Dynamic scheduling, resource allocation, multi agent negotiation	2219/32375	. . .	Petrinet synthesis tool
2219/32329	. . .	Real time learning scheduler, uses ANN, fuzzy	2219/32376	. . .	Coloured petrinet
2219/32331	. . .	Network of coordinating planning systems for each cell, factory	2219/32377	. . .	Cbpn controlled batches petrinet, model influence control part on physical part
2219/32332	. . .	Expert scheduler	2219/32378	. . .	Fuzzy timed petrinet
2219/32333	. . .	Use of genetic algorithm	2219/32379	. . .	Object oriented petrinets
2219/32334	. . .	Use of reinforcement learning, agent acts, receives reward	2219/32381	. . .	Continuous petrinet, contrary of timed petrinet
2219/32335	. . .	Use of ann, neural network	2219/32382	. . .	Hybrid petrinet, comprises continuous and timed petrinet
2219/32336	. . .	Normal, special order lines share some common machines, part of production line	2219/32383	. . .	Controlled speed continuous petrinet, considers delays in execution and transport time
2219/32337	. . .	Simulation, statechart SC	2219/32384	. . .	Fuzzy petrinet fpn
2219/32338	. . .	Use new conditions for model, check, calculate if model meets objectives	2219/32385	. . .	What is simulated, manufacturing process and compare results with real process
2219/32339	. . .	Object oriented modeling, design, analysis, implementation, simulation language	2219/32386	. . .	Arm accurate robot motion time model, needed in scheduling
2219/32341	. . .	Grafcet model, graph based simulation	2219/32387	. . .	Effects of highspeed hardware operations on throughput, use scheduler
2219/32342	. . .	Real time simulation	2219/32388	. . .	Autonomous flexible system, cells and agv autonomous
2219/32343	. . .	Derive control behaviour, decisions from simulation, behaviour modelling	2219/32389	. . .	Reception, assembly, testing, management workorder, schedule, history, file, packing
2219/32344	. . .	Modular verification of real time systems	2219/32391	. . .	Machining center, pallet stocker, setup station, conveyor, control unit
2219/32345	. . .	Of interconnection of cells, subsystems, distributed simulation	2219/32392	. . .	Warehouse and loading, unloading station and shop and machining centers and in out buffer
2219/32346	. . .	Using acd, activity cycle diagram	2219/32393	. . .	Host and central distribution control between storage and cells
2219/32347	. . .	Knowledge based simulation engine, use answers from user, database	2219/32394	. . .	Fractal manufacturing system with autonomous agents: observer, analyser, organiser, resolver, reporter
2219/32348	. . .	Process reengineering, rethink manufacturing process, continuous improve	2219/32395	. . .	Manufacturing structure is flow shop, mass production
2219/32349	. . .	Simulate effect of stoppages of production facilities, operate as function of simulation	2219/32396	. . .	Job shop, batch production system
2219/32351	. . .	Visual, graphical animation of process	2219/32397	. . .	Machining cells
2219/32352	. . .	Modular modeling, decompose large system in smaller systems to simulate	2219/32398	. . .	Operator controls setting, changing of setting, of different machines
2219/32353	. . .	Use elementary control task, finite state machine and loop, inhibit, synchronisation connections	2219/32399	. . .	Select lan by switching bus connected to several lan
2219/32354	. . .	Divide, analyse process into subprocesses, until elementary unit operations	2219/32401	. . .	Select displays by switching bus connected to several displays
2219/32355	. . .	Simulate control process using virtual bus	2219/32402	. . .	Select one lan to be connected to one display by central control
2219/32356	. . .	For diagnostics	2219/32403	. . .	Supervisory control, monitor and control system, by operator or automatic
2219/32357	. . .	Simulation of material handling, flexible conveyor system fcs	2219/32404	. . .	Scada supervisory control and data acquisition
2219/32358	. . .	Strain, stress of manual work, operator strain	2219/32405	. . .	Hybrid supervisor control, des supervisor and diagnostic and alternate strategy route
2219/32359	. . .	Modeling, simulating assembly operations	2219/32406	. . .	Distributed scada
2219/32361	. . .	Master production scheduling	2219/32407	. . .	Real time processing of data
2219/32362	. . .	Bulk manufacturing, handling dry or fluid products	2219/32408	. . .	Case based diagnosis to assist decision maker, operator
2219/32363	. . .	Batch job routing in operation overlapping	2219/32409	. . .	Adaptive agent for diagnostic, helps operator to describe new cases
2219/32364	. . .	Simulate batch processing	2219/32411	. . .	Derive control data from displayed element, logic for it and feedback data
2219/32365	. . .	For resource planning	2219/32412	. . .	One engineering, workstation can supervise several processes
2219/32366	. . .	Line performance evaluation	2219/32413	. . .	Pc generates control strategy, download in plc to monitor and react to events
2219/32367	. . .	Parallel experimentation machines	2219/32414	. . .	Workstation has two displays, for process control and for general applications
2219/32368	. . .	Quality control	2219/32415	. . .	Select tools in next workcell during transport workpiece
2219/32369	. . .	Cape-mode computer aided plant enterprise modeling environment for plant life cycle modelisation & management			
2219/32371	. . .	Predict failure time by analysing history fault logs of same machines in databases			
2219/32372	. . .	Petrinet, coloured, inhibitor arc, timed, object token Petrinet			
2219/32373	. . .	Timed petrinet, timed event graph			
2219/32374	. . .	Display of petrinet, graph editing			

2219/32416	. . .	Tool information for program to use and needed timing, adapt timing	2219/33032	. . .	Learn by changing input weights as function of position error
2219/32417	. . .	Minimize number of tools, only a specific machine can process certain operations	2219/33033	. . .	Identification neural controller copies weight to system neural controller
2219/32418	. . .	Machine workload balance, same tools for pool of machines for same operations	2219/33034	. . .	Online learning, training
2219/32419	. . .	All tools available, each part can fully be processed on a single machine	2219/33035	. . .	Slow learning combined with fast learning artificial neural network, two time scale ann
2219/32421	. . .	Tool management incorporated in kernel of nc control	2219/33036	. . .	Error back propagation
2219/32422	. . .	Tool management and database management	2219/33037	. . .	Learn parameters of network offline, not while controlling system
2219/32423	. . .	Task planning	2219/33038	. . .	Real time online learning, training, dynamic network
2219/32424	. . .	Task flow editing	2219/33039	. . .	Learn for different measurement types, create for each a neural net
2219/33	. .	Director till display	2219/33041	. . .	Structure optimization and learning of artificial neural network by genetic algorithm
2219/33001	. . .	Director is the nc controller, computer	2219/33042	. . .	Non linear filtering, recursive least squares
2219/33002	. . .	Artificial intelligence AI, expert, knowledge, rule based system KBS	2219/33043	. . .	Extended kalman filter
2219/33003	. . .	Algorithm, hashing algorithm	2219/33044	. . .	Supervised learning with second artificial neural network
2219/33004	. . .	Manual control of manipulator, machine	2219/33045	. . .	Selforganizing network
2219/33005	. . .	Manually but assisted by using sensors	2219/33046	. . .	Forward propagation error
2219/33006	. . .	Ama allocation manual automatic work between machine, manipulator and man	2219/33047	. . .	Dynamic node creation, increase internal nodes if error too large
2219/33007	. . .	Automatically control, manually limited, operator can override control	2219/33048	. . .	By using kd tree data structure and delaunay linear interpolation, triangulation
2219/33008	. . .	Operate manually only in defined, limited zone area	2219/33049	. . .	Cooperative coaching, each controller has own minimum, switch to lowest
2219/33009	. . .	ART adaptive resonance theory, place input patterns in clusters during learning	2219/33051	. . .	BBC behavior based control, stand alone module, cognitive, independent agent
2219/33011	. . .	Link between hidden and input layer is sigmoid, and between output is linear	2219/33052	. . .	Subsumption architecture, behavioral modules in layers, override older ones
2219/33012	. . .	Kohonen network, single layer with neurodes, associated with codebook vector	2219/33053	. . .	Modular hardware, software, easy modification, expansion, generic, oop
2219/33013	. . .	Higher order multilayer artificial neural network ANN, input terms has square, cubic terms of input, output	2219/33054	. . .	Control agent, an active logical entity that can control logical objects
2219/33014	. . .	BAM bidirectional associative memory artificial neural network	2219/33055	. . .	Holon, agent executes task and cooperates with other, distributed control
2219/33015	. . .	Time delay artificial neural network	2219/33056	. . .	Reinforcement learning, agent acts, receives reward, emotion, action selective
2219/33016	. . .	Pi sigma network, summing in hidden layers, product in output layer	2219/33057	. . .	If no module available to execute task, adapt module and execute task
2219/33017	. . .	Local linear nested network, coarse at root, split up and build tree	2219/33058	. . .	Low level element designed for reliability, not for speed, only small task
2219/33018	. . .	Adaline network, n inputs with n weights, sum, one output	2219/33059	. . .	High level competence, system action module sam, configuration and task modules
2219/33019	. . .	Lapart, two art with lateral priming connection between output and vigilance nodes	2219/33061	. . .	Behaviour fusion, each layer can influence other by suppression or amplification
2219/33021	. . .	Connect plural macrocircuits, neural network modules in a larger network	2219/33062	. . .	Self repair
2219/33022	. . .	One network for learned signal values, one network for unknown signal values	2219/33063	. . .	Generic coordination, master agent to data manager agent to tasks to active agent
2219/33023	. . .	Ann with single, only one output	2219/33064	. . .	Manufacturing planning and control agent and domain blackboards
2219/33024	. . .	RAM artificial neural network, several lookup tables addressed by input section, output summed	2219/33065	. . .	Ontogenetic learning, agent learns and adapt its own behaviour
2219/33025	. . .	Recurrent artificial neural network	2219/33066	. . .	Phylogenetic learning, group agents learn and adapts their behaviour
2219/33026	. . .	Wavelet artificial neural network, wavelet orthogonal decomposition for artificial neural network approximation	2219/33067	. . .	HCP help based cooperation protocol, when to ask or give help from or to agent
2219/33027	. . .	Artificial neural network controller	2219/33068	. . .	CCP coordination cooperation protocol, make optimal decisions with other agents
2219/33028	. . .	Function, rbf radial basis function network, gaussian network	2219/33069	. . .	Immune algorithm, agent distinguishes self and foreign, lymphocyte, antibody agent
2219/33029	. . .	ANNS artificial neural network with sigmoid function			
2219/33031	. . .	Spline membership function			

2219/33071	. . .	Self sufficient, agent responsible for own energy, tools	2219/33111	. . .	Graphic configuration control, connect pictures, objects to each other
2219/33072	. . .	Two layer agent for execution of tasks and for communication, coordination	2219/33112	. . .	Configuration software for network
2219/33073	. . .	Ion control agent has communication, database, suggestion, decision, action, detect	2219/33113	. . .	Initialise each drive during start, load data to drive and image to controller
2219/33074	. . .	Calculation loop, first one slow changing value, then several quick varying values	2219/33114	. . .	Configure motion controller to drive any kind of motor type connected
2219/33075	. . .	Calculate only necessary, critical values, to speed up calculation	2219/33115	. . .	Group functions
2219/33076	. . .	Optimize time by parallel execution of independent blocks by two processors	2219/33116	. . .	Configuration of motion control
2219/33077	. . .	Calculation iterative, recursive	2219/33117	. . .	Define function by user programmable basic operations
2219/33078	. . .	Error table, interpolate between two stored values to correct error	2219/33118	. . .	Identify bus, interface select automatic adaption for bus, interface
2219/33079	. . .	Table with functional, weighting coefficients, function	2219/33119	. . .	Servo parameters in memory, configuration of control parameters
2219/33081	. . .	Parallel computing, pipeline	2219/33121	. . .	Host loads program from attached module to control that module
2219/33082	. . .	Data parallelism, one administrative process and many worker process	2219/33122	. . .	Adapt nc control to type of machine, read machine and measuring parameters
2219/33083	. . .	Clock for microprocessor synchronized with pulses from encoder	2219/33123	. . .	Identify kind of transducer, encoder used
2219/33084	. . .	Clock for microprocessor synchronized with multiplexer	2219/33124	. . .	Configuration of different kind of tool magazines, tool changers and buffers
2219/33085	. . .	Real time calendar clock	2219/33125	. . .	System configuration, reconfiguration, customization, automatic
2219/33086	. . .	Interrupt frequency as function of rating of servomotor or desired control frequency	2219/33126	. . .	Identification of address connected module, processor
2219/33087	. . .	Two clock, clock for software counter and calendar clock, synchronized	2219/33127	. . .	Display each control parameter by name and its value
2219/33088	. . .	Clock	2219/33128	. . .	Different spindles, axis controlled by configured paths, channel
2219/33089	. . .	Two clock, one for sequence control, one for motion control, pulses	2219/33129	. . .	Group spindles, axis into motion groups, nc channel structure
2219/33091	. . .	Two clock, one for controller and one for calibration	2219/33131	. . .	Synthesize programmable axis, to simulate a non existing, virtual axis
2219/33092	. . .	Using several selectable and settable dividers	2219/33132	. . .	Configured function disabled if concerned axis not referenced
2219/33093	. . .	Real time clock interface between serial I-O and processor	2219/33133	. . .	For each action define function for compensation, enter parameters
2219/33094	. . .	Send clock from pc board, via extension bus to PLL circuit on nc boards, to servo	2219/33134	. . .	Enter parameters for relationship between axis
2219/33095	. . .	External clock delivers interrupts for real time execution of programs	2219/33135	. . .	Data compression before sending data to allow control of more axis, spindles
2219/33096	. . .	Use clock to control main spindle rotational speed	2219/33136	. . .	Com: communication, inter processor communication, either local or network
2219/33097	. . .	Variable ticks, align clocks, to synchronise cycles with other machine, robot	2219/33137	. . .	Time left during polling used for other communication, priority for polling
2219/33098	. . .	Several nc machines, dnc, cnc	2219/33138	. . .	Control program and communication are totally separated
2219/33099	. . .	Computer numerical control [CNC]; Software control [SWC]	2219/33139	. . .	Design of industrial communication system with expert system
2219/33101	. . .	Dnc, direct numerical control	2219/33141	. . .	Communication system software module independent from medium, protocol, address
2219/33102	. . .	Dnc and cnc combined	2219/33142	. . .	Address switches on each controller, peripheral are set by operator
2219/33103	. . .	Object manager handles objects having own procedures, messages oop	2219/33143	. . .	Position of module in ring, loop determines address of module
2219/33104	. . .	Tasks, functions are distributed over different cpu	2219/33144	. . .	Module clock, synchronised by controller message, to send message in time slice
2219/33105	. . .	Identification of type of connected module, motor, panel	2219/33145	. . .	Count clock pulses to determine address of node, module
2219/33106	. . .	Configure I-O by using logical and physical address	2219/33146	. . .	Each node occupies in address space a length equal to number of bits to be exchanged
2219/33107	. . .	Designate each actuator by a name and corresponding operations	2219/33147	. . .	Address peripheral, controller
2219/33108	. . .	Exchange of type of controller is easy, before operation, adapt control to type	2219/33148	. . .	CLS client server architecture, client consumes, server provides services
2219/33109	. . .	Select out of plurality of alternative control parameters			

2219/33149	. . .	Publisher subscriber, publisher, master broadcasts data to slaves, subscriber	2219/33201	. . .	Twisted pair combined with optical fiber for critical emc zones
2219/33151	. . .	Distributed client server	2219/33202	. . .	Single serial line, virtual second line is earth
2219/33152	. . .	Server has organisation, tree data to access user data, client sends also both	2219/33203	. . .	Wireless transmission of power and data, inductively, rotary transformer
2219/33153	. . .	AR application relationship, cooperation through logical links	2219/33204	. . .	Optocoupler, galvanic separation, isolation
2219/33154	. . .	Data exchange between processors of different axis of same or different cnc	2219/33205	. . .	Coax or optical fiber or twisted pair
2219/33155	. . .	Communication between motor current controller and position controller	2219/33206	. . .	Ultrasonic
2219/33156	. . .	Communication between two processors over shared, dualport ram	2219/33207	. . .	Physical means, radio, infra red, ultrasonic, inductive link
2219/33157	. . .	Between processor and sensor, encoder	2219/33208	. . .	Superposition of control signals on supply lines
2219/33158	. . .	Remote procedure call to each other	2219/33209	. . .	Protocol, mailbox, email, mail system
2219/33159	. . .	Communication between acyclic and cyclic, loop programs	2219/33211	. . .	Polling
2219/33161	. . .	Data exchange between controller and processors	2219/33212	. . .	Processor for communication with, evaluation of signals form detector to pc
2219/33162	. . .	Two bus, high speed and low speed bus, linked or not	2219/33213	. . .	Communication cpu to synchronize axis between different machines
2219/33163	. . .	Multichannel master bus	2219/33214	. . .	Bus between different axis controllers and cpu
2219/33164	. . .	Bus timing adjustment by buffer with controller	2219/33215	. . .	Synchronization pulses on bus for axis controllers
2219/33165	. . .	Gpsc gpss general purpose serial channel, link	2219/33216	. . .	Operational, real time for system, and service for configuration is non real time
2219/33166	. . .	Rs485 bus to control several modules, motors	2219/33217	. . .	Continuity communication controlled by client
2219/33167	. . .	Bus arbitration, switch computer to different memory	2219/33218	. . .	Motor encoders, resolvers on common bus with drives, servo controllers
2219/33168	. . .	Two bus, master bus and local servo bus	2219/33219	. . .	Drives, servo units, main control on internal net, lan, ethernet, tcp-ip, wireless
2219/33169	. . .	Name of bus, vme-bus	2219/33221	. . .	Drives, servo units, sensors, motors, on local network, ethernet, tcp-ip, wireless
2219/33171	. . .	Std bus	2219/33222	. . .	High speed serial link combined with medium speed serial link
2219/33172	. . .	Multibus	2219/33223	. . .	Serial ring, loop pam programmable axis manager
2219/33173	. . .	Bitbus	2219/33224	. . .	Several serial channels, each provided with d-a to terminals of servomotor
2219/33174	. . .	Sds smart distributed system, honeywell	2219/33225	. . .	Interface nc machine to data server
2219/33175	. . .	Isa bus	2219/33226	. . .	Daisy chain
2219/33176	. . .	Rs485, mpi multipoint, multidrop interface	2219/33227	. . .	Safety, echo back to verify correctness message
2219/33177	. . .	Interface, scsi, parallel	2219/33228	. . .	Detection of line failure, breakage of transmission, failure of receiver
2219/33178	. . .	Centronics	2219/33229	. . .	Differential amplifier, xor to cancel noise, balanced rs422
2219/33179	. . .	Pcmcia	2219/33231	. . .	Decoupling, to avoid noise, crosstalk between wires of bus
2219/33181	. . .	Isdn	2219/33232	. . .	Detect, respond to lost message
2219/33182	. . .	Uart, serial datatransmission, modem	2219/33233	. . .	If servo data corrupt, use previous value, no repeat
2219/33183	. . .	IEEE-488, hp interface, instrumentation	2219/33234	. . .	Detect bad data transfer
2219/33184	. . .	Rs232c to rs485 converter	2219/33235	. . .	Redundant communication channels, processors and signal processing hardware
2219/33185	. . .	Rs232c switch box, break out box, to connect different devices	2219/33236	. . .	Add check data to message to check faulty communication
2219/33186	. . .	Circuit for signal adaption, voltage level shift, filter noise	2219/33237	. . .	Detect short circuit of bus
2219/33187	. . .	Serial transmission rs232c, rs422, rs485 communication link	2219/33238	. . .	Switch from differential to single line communication if short between two wires
2219/33188	. . .	Twisted pair	2219/33239	. . .	Switch off, stop, halt transmission on detection of fault
2219/33189	. . .	Optical, glass fiber	2219/33241	. . .	Compare results from two masters on two busses, if not equal shut down machines
2219/33191	. . .	Data exchange combined with inductively coupled power supply	2219/33242	. . .	Watchdog for datacommunication, on error switch off supply to bus modules
2219/33192	. . .	Radio link, wireless	2219/33243	. . .	Detect quality of received data, message
2219/33193	. . .	Inductive transmission of measured values	2219/33244	. . .	Packet information exchange
2219/33194	. . .	Data and power supplied over optical fiber			
2219/33195	. . .	Wave guide, also used as rails for movable station			
2219/33196	. . .	Data and power each on a different line to all peripheral, bus			
2219/33197	. . .	Current loop 4-20-mA milliampere			
2219/33198	. . .	Laser, light link, infrared			
2219/33199	. . .	Transponder			

2219/33245	. . .	Autosend, send information from cad station automatically to peripheral	2219/33288	. . .	Switch, select between normal and diagnostic control program
2219/33246	. . .	Timing of transmission data to peripheral	2219/33289	. . .	During diagnostic of servocontroller, motor is isolated
2219/33247	. . .	Synchronize transfer, take over, change of parameters and reference values	2219/33291	. . .	Logic analyser function of cnc
2219/33248	. . .	Time window for each controller or controlled function	2219/33292	. . .	Storage oscilloscope function of cnc to diagnose servo drive, axis oscilloscope
2219/33249	. . .	Compress, pack data before transmission	2219/33293	. . .	For each actuated axis, set a bit in a word in memory, state of axis in word
2219/33251	. . .	Schedule periodic and aperiodic traffic, real time, time critical	2219/33294	. . .	Nc in case of propagation error, search previous module, origin of error
2219/33252	. . .	Real time synchronous transmission, model	2219/33295	. . .	Fuzzy expert system for diagnostic, monitoring
2219/33253	. . .	Correction data transmission errors, protection against noise, twisted pair	2219/33296	. . .	ANN for diagnostic, monitoring
2219/33254	. . .	Serial position feedback, serial to parallel conversion and reverse	2219/33297	. . .	Diagnostic, test, debug
2219/33255	. . .	Transfer of data parallel	2219/33298	. . .	Remote videoconferencing
2219/33256	. . .	Resolver to digital conversion	2219/33299	. . .	Real time, online diagnostic, integrated in normal control system
2219/33257	. . .	Conversion of designed 3-D tolerance, allowance to real coordinates of machine	2219/33301	. . .	Simulation during machining
2219/33258	. . .	Common coordinate conversion for multiple heads, spindles	2219/33302	. . .	Different sets of monitoring parameters for each operation mode
2219/33259	. . .	Conversion of measuring robot coordinates to workpiece coordinates	2219/33303	. . .	Expert system for diagnostic, monitoring use of tree and probability
2219/33261	. . .	Conversion of detected pulses to voltage, frequency to voltage convertor	2219/33304	. . .	Display of diagnostic
2219/33262	. . .	Current to voltage conversion	2219/33305	. . .	Display of relevant errors together with time mark
2219/33263	. . .	Conversion, transformation of coordinates, cartesian or polar	2219/33306	. . .	Configuration file to set how data will be displayed
2219/33264	. . .	Conversion of angle between links to linear displacement of actuator	2219/33307	. . .	On error, failure, fault automatically search and dial maintenance person
2219/33265	. . .	Conversion of voltage, resistance to pulses	2219/33308	. . .	If error message not clear, search help by index of message vocabulary
2219/33266	. . .	Pulse to frequency conversion, frequency to pulse	2219/33309	. . .	Error recovery, automated error recovery
2219/33267	. . .	Pneumatic, air to hydraulic conversion	2219/33311	. . .	System code for error recovery
2219/33268	. . .	D-A, A-D	2219/33312	. . .	Operator selects action, system stores state, zero based error state
2219/33269	. . .	Convert cartesian to machine coordinates	2219/33313	. . .	Frames, database with environment and action, relate error to correction action
2219/33271	. . .	Convert workpiece to machine coordinates	2219/33314	. . .	Failure reason analysis, simple strategy or multiple outcome analysis
2219/33272	. . .	Conversion, transformation of data before and after interpolator	2219/33315	. . .	Failure detection and reconfiguration
2219/33273	. . .	DCS distributed, decentralised controlsystem, multiprocessor	2219/33316	. . .	On the fly software replacement on error
2219/33274	. . .	Integrated communication and control, transmission delay, sampling rate effect	2219/33317	. . .	Alternative strategy driver revises control behaviour
2219/33275	. . .	Distributed, decision made by negotiation among executive components, execute it	2219/33318	. . .	Knowledge acquisition
2219/33276	. . .	Decentralized, each component makes own decision, executes only own decision	2219/33319	. . .	Interference justification network
2219/33277	. . .	Distributed system with host as leader, host with multiple of agents	2219/33321	. . .	Observation learning
2219/33278	. . .	Cooperation between autonomous modules by receipts, messages, no synchronisation	2219/33322	. . .	Failure driven learning
2219/33279	. . .	Expansion by using secondary access to each module, extension module	2219/33323	. . .	Self diagnostic of boards, own test program
2219/33281	. . .	Architecture, nodes for communication and measuring on serial bus	2219/33324	. . .	What to diagnose, whole system, test, simulate
2219/33282	. . .	Node with communication, transducer, common core, application specific modules	2219/33325	. . .	Diagnostic of only machining, operation
2219/33283	. . .	Customized nodes for desired functionality	2219/33326	. . .	Analyzer, diagnostic for servovalve
2219/33284	. . .	Remote diagnostic	2219/33327	. . .	Self diagnostic of control system, servo system
2219/33285	. . .	Diagnostic	2219/33328	. . .	Diagnostic for bus system of computer
2219/33286	. . .	Test, simulation analysator	2219/33329	. . .	Measuring system, encoder
2219/33287	. . .	Program panel to program, enter data for diagnostic	2219/33331	. . .	Test, diagnostic of field device for correct device, correct parameters
			2219/33332	. . .	Each processor can execute all programs
			2219/33333	. . .	Network multiprocessing
			2219/33334	. . .	Load balancing, distribution between processors
			2219/33335	. . .	Microprocessor for max 3-D control otherwise host takes over for more axis

2219/33336	. . .	first dsp calculates commands for each motor, second dsp regulates position	2219/34037	. . .	Brm followed by postprocessor to smooth curve
2219/33337	. . .	For each axis a processor, microprocessor	2219/34038	. . .	Web, http, ftp, internet, intranet server
2219/33338	. . .	DNC distributed, decentralised nc, concurrent, multiprocessing	2219/34039	. . .	Access central database through internet
2219/33339	. . .	Controller with lowest operation rate is selected as master	2219/34041	. . .	Dda
2219/33341	. . .	Peer to peer, change master if overloaded	2219/34042	. . .	Filter
2219/33342	. . .	Master slave, supervisor, front end and slave processor, hierarchical structure	2219/34043	. . .	Delay line
2219/33343	. . .	Each slave stores communication program to be used by master, exchangeability	2219/34044	. . .	Mathematical coprocessor - processor
2219/33344	. . .	Each slave has several processors operating in parallel	2219/34045	. . .	Timer
2219/33345	. . .	Several master modules, connection modules and slave modules	2219/34046	. . .	Analog multiplier
2219/33346	. . .	Only memory of master module stores all position programs of slaves	2219/34047	. . .	Dsp digital signal processor
2219/33347	. . .	Master sends servo address, speed, kind of interpolation to slave	2219/34048	. . .	Fourier transformation, analysis, fft
2219/33348	. . .	Processor adapts signals to connected display	2219/34049	. . .	Adder
2219/34	. .	Director, elements to supervisory	2219/34051	. . .	Bcd
2219/34001	. . .	PLL phase locked loop	2219/34052	. . .	Software counter
2219/34002	. . .	Analog multiplexer	2219/34053	. . .	Counters, tellers
2219/34003	. . .	Tri state driver	2219/34054	. . .	Half serial half parallel
2219/34004	. . .	Shift register	2219/34055	. . .	Correction 3-excesscode
2219/34005	. . .	Motion control chip, contains digital filter as control compensator	2219/34056	. . .	Nine complement
2219/34006	. . .	Fifo	2219/34057	. . .	Complement
2219/34007	. . .	Neuromine, input pulse train, can be inhibited or excited, output TTL, neuron	2219/34058	. . .	Up-down
2219/34008	. . .	Asic application specific integrated circuit, single chip microcontroller	2219/34059	. . .	Preset counter
2219/34009	. . .	Coprocessor	2219/34061	. . .	One counter per axis to unload cpu
2219/34011	. . .	MMU	2219/34062	. . .	Comparator
2219/34012	. . .	Smart, intelligent I-O coprocessor, programmable sensor interface	2219/34063	. . .	Bcd
2219/34013	. . .	Servocontroller	2219/34064	. . .	N+1 comparator
2219/34014	. . .	Sample hold circuit	2219/34065	. . .	Fuzzy logic, controller
2219/34015	. . .	Axis controller	2219/34066	. . .	Fuzzy neural, neuro fuzzy network
2219/34016	. . .	Pulse processor	2219/34067	. . .	Multilayer fuzzy controller, execution and supervisor layer
2219/34017	. . .	Vector processor	2219/34068	. . .	Fuzzy neural petri controller
2219/34018	. . .	Forth controller	2219/34069	. . .	Shared memory
2219/34019	. . .	Array of processors, parallel computing	2219/34071	. . .	Content addressable memory
2219/34021	. . .	Dssp digital sensor signal processor	2219/34072	. . .	Non volatile memory, core memory
2219/34022	. . .	Dcasp digital controlled analog signal processor	2219/34073	. . .	Backup battery
2219/34023	. . .	Risc processor	2219/34074	. . .	Associative memory
2219/34024	. . .	Fpga fieldprogrammable gate arrays	2219/34075	. . .	Cognitive memory
2219/34025	. . .	Polynomial analysis	2219/34076	. . .	Shared, common or dual port memory, ram
2219/34026	. . .	Pga programmable gate array	2219/34077	. . .	Fuzzy, rules are function of material, tool used
2219/34027	. . .	Dual servo controller, for two motors	2219/34078	. . .	Membership functions as parameters for shape pattern
2219/34028	. . .	Hold relay	2219/34079	. . .	Extract only rules needed to obtain result
2219/34029	. . .	Pam programmable axis controller, to control large number of axis	2219/34081	. . .	Fuzzy art map neural network, one art for input map, lookup table, other for output
2219/34031	. . .	Synchronous detector	2219/34082	. . .	Learning, online reinforcement learning
2219/34032	. . .	Asic and microcontroller cooperate	2219/34083	. . .	Interpolation general
2219/34033	. . .	Control processor and signal processor cooperate	2219/34084	. . .	Software interpolator using microprocessor
2219/34034	. . .	Multiplier, prm, brm	2219/34085	. . .	Software interpolator
2219/34035	. . .	Time relay	2219/34086	. . .	At fixed periods pulses from table drive plural axis in unison
2219/34036	. . .	Saturable reactor	2219/34087	. . .	Enter at fixed periods distances in counter for each axis, pulse distribution
			2219/34088	. . .	Chamfer, corner shape calculation
			2219/34089	. . .	Parametric, polynomial representation of path per axis as function of time
			2219/34091	. . .	Interpolate backwards
			2219/34092	. . .	Polar interpolation
			2219/34093	. . .	Real time toolpath generation, no need for large memory to store values
			2219/34094	. . .	Library with different kind of interpolation curves
			2219/34095	. . .	Look ahead segment calculation

2219/34096	. . .	Approximate, replace curve, surface with circle, linear segments, least error	2219/34147	. . .	Epitrochoid
2219/34097	. . .	Calculate movement from part program offline, calculate axis references online	2219/34148	. . .	Coons interpolation, patch
2219/34098	. . .	Slope fitting, fairing contour, curve fitting, transition	2219/34149	. . .	Circular interpolation
2219/34099	. . .	Extrapolation	2219/34151	. . .	Analog
2219/34101	. . .	Data compression, look ahead segment calculation, max segment length	2219/34152	. . .	Circular interpolation in space, on arbitrary planes
2219/34102	. . .	OCI on line interpolation	2219/34153	. . .	Linear interpolation
2219/34103	. . .	Taking planar slices from a 3-D shape	2219/34154	. . .	Analog
2219/34104	. . .	Postprocessor coarse fine	2219/34155	. . .	Third degree
2219/34105	. . .	Area pocket machining, space filling curve, to cover whole surface	2219/34156	. . .	Slope control, delta x, y proportional to x, y
2219/34106	. . .	Using spiral collapsed boundary, contour parallel machining	2219/34157	. . .	Synchronize interpolation of different axis boards, simultaneous start
2219/34107	. . .	Zigzag workpiece parallel sweeps, direction parallel machining	2219/34158	. . .	Tangents form curve
2219/34108	. . .	Using zigzag isoparametric parallel sweeps	2219/34159	. . .	Delta theta
2219/34109	. . .	Using spiral scaled boundary	2219/34161	. . .	Superposition curves, combine xy slides with other xy or polar slides
2219/34111	. . .	Using hilbert curves, fractals, only visible points of patches taken	2219/34162	. . .	Linear in one axis, circular in other axis
2219/34112	. . .	TSP traveling sales problem, SOM self organizing map for tool path	2219/34163	. . .	Rotate a segment
2219/34113	. . .	Determine centerline, medial axis and branches in shape	2219/34164	. . .	Superposition manual control pulses on motion control pulses
2219/34114	. . .	Construct concentric polygons	2219/34165	. . .	4-D via 2-D+2-D
2219/34115	. . .	Area, pocket machining for area with partially open boundary	2219/34166	. . .	Select between rectangular and polar controller, interpolator
2219/34116	. . .	Machine workpiece along, parallel to smallest side, dimension	2219/34167	. . .	Coarse fine, macro microinterpolation, preprocessor
2219/34117	. . .	Machine workpiece along, parallel to largest dimension	2219/34168	. . .	External interpolation
2219/34118	. . .	Using a pseudo-random or random tool path	2219/34169	. . .	Coarse interpolator, path calculator delivers position, speed, acceleration blocks
2219/34119	. . .	Function generator, filter after interpolator to control position error	2219/34171	. . .	Generate polynomial fitting in tolerance zone around polygon
2219/34121	. . .	Edge generator	2219/34172	. . .	Of the two or three axis, only one or two are controlled as function of tangent to other axis, plane
2219/34122	. . .	Function, profile generator	2219/34173	. . .	Switch between involute, circular and linear interpolation
2219/34123	. . .	Sine cosine generator	2219/34174	. . .	Rotate segment over a certain angle
2219/34124	. . .	Cordic processing	2219/34175	. . .	Overlap, between two blocks, continuous, smooth speed change, movement
2219/34125	. . .	Sum squares	2219/34176	. . .	Block segments, find next point on next segment by cross point circle and segment
2219/34126	. . .	Overloop of counted axis pulses to servo	2219/34177	. . .	Calculate for different inclined segments stitch points evenly distributed
2219/34127	. . .	Brm followed by postprocessor to smooth curve	2219/34178	. . .	Simulated pulse for better resolution
2219/34128	. . .	General surface replaced by sphere, cylinder, toroid, calculate quickly	2219/34179	. . .	Variable interpolation speed or resolution
2219/34129	. . .	Approximation for calculation	2219/34181	. . .	Adapt resolution as function of machining load, in corner, to keep constant surface speed
2219/34131	. . .	Split in approximation and accurate calculation	2219/34182	. . .	Variable resolution
2219/34132	. . .	Choosing largest, major coordinate axis	2219/34183	. . .	Window path, contour of rectangle
2219/34133	. . .	Choosing slowest axis	2219/34184	. . .	Straight cut
2219/34134	. . .	Choose optimal coordinate system	2219/34185	. . .	Following line+circle
2219/34135	. . .	Spline	2219/34186	. . .	Degree line
2219/34136	. . .	Ellipse, hyperbola	2219/34187	. . .	Any angle, slope
2219/34137	. . .	Helicoidal	2219/34188	. . .	Safety, stop, slowdown interpolator if speed, position, torque error too large
2219/34138	. . .	Cubic interpolation	2219/34189	. . .	On each axis, for each block, a software limit switch, for safe slow down
2219/34139	. . .	Parabolic interpolation	2219/34191	. . .	Pneumatic
2219/34141	. . .	B-spline, NURBS non uniform rational b-spline	2219/34192	. . .	Memory management
2219/34142	. . .	Polynomial	2219/34193	. . .	Memory refresh
2219/34143	. . .	Approximate corner by polynomial	2219/34194	. . .	Bank switching, ping-pong memory for communication between processors
2219/34144	. . .	Involute, evolute	2219/34195	. . .	Part program in consecutive memory blocks, each with spare space for corrections
2219/34145	. . .	Bezier interpolation, spline			
2219/34146	. . .	Helical, spiral interpolation			

2219/34196	. . .	Memory management, dma direct memory access	2219/34243	. . .	Single feedback sensor, transducer for plurality, one at a time, driven tools
2219/34197	. . .	Search blank memory space to load program, storage, memory allocation	2219/34244	. . .	Multiplex for control only
2219/34198	. . .	Electric and fluidic modules integrated on one substrate	2219/34245	. . .	Address several motors, each with its own identification
2219/34199	. . .	Module with low maintenance connected to removable module with high maintenance	2219/34246	. . .	OOC object oriented control
2219/34201	. . .	Each module uses functions of a real time kernel	2219/34247	. . .	Machining objects are hierarchically organised
2219/34202	. . .	Reusable software, generic resource model library	2219/34248	. . .	Machining object comprises a slide, a palet, workpieces, machining, a contour
2219/34203	. . .	Module has a general, high level and a specific, proprietary part	2219/34249	. . .	Sub divide machining object in machining groups, geometry, start point, special
2219/34204	. . .	Independent units, stackthrough in cabinet, no backplane	2219/34251	. . .	Cnc works with different operating systems, windows, os-2, vms in parallel
2219/34205	. . .	Modular construction, plug-in module, lsi module	2219/34252	. . .	OSY operating system
2219/34206	. . .	Motion controller independent from nc, lmc local motor controller	2219/34253	. . .	Unix
2219/34207	. . .	Array vlsi processor	2219/34254	. . .	Operating system controls selection and execution of program modules
2219/34208	. . .	Motion controller	2219/34255	. . .	Msdos
2219/34209	. . .	Microprocessor only for display	2219/34256	. . .	Api application programming interface
2219/34211	. . .	Microprocessor only for hand control	2219/34257	. . .	OS-2
2219/34212	. . .	Microprocessor only for mdi, control panel	2219/34258	. . .	Real time system, qnx, works together with non real time system, windows nt
2219/34213	. . .	Same microprocessor for data input and for servocontrol	2219/34259	. . .	Common language run time CLR, MS-NET, DOTNET, java run time environment
2219/34214	. . .	I-apx-432 processor	2219/34261	. . .	Windows, microsoft windows
2219/34215	. . .	Microprocessor	2219/34262	. . .	DDE direct data exchange, DLL dynamic library linking
2219/34216	. . .	Programmable motion controller	2219/34263	. . .	OLE object linking and embedding, OPC ole for process control
2219/34217	. . .	Microprocessor with build in pwm	2219/34264	. . .	Odbc open database connectivity
2219/34218	. . .	Transputer	2219/34265	. . .	Windows nt, windows-2000
2219/34219	. . .	Special interface, peripheral to motor	2219/34266	. . .	Windows-95
2219/34221	. . .	Computer delivers control pulses from table directly to motors	2219/34267	. . .	Windows nt and cooperating real time extension
2219/34222	. . .	Computer sends displacement and selected device to output register	2219/34268	. . .	Cnc and pic controlled alternately by same processor, using timer
2219/34223	. . .	Combined input output module, single module	2219/34269	. . .	Programmable computer controller, plc implemented with pc
2219/34224	. . .	Select appropriate interface, according to kind of tool or other detection	2219/34271	. . .	Nc integrated into pic, plc, combination of commands
2219/34225	. . .	Interface board for measuring system, for resolver, encoder or interferometer	2219/34272	. . .	Communication pc and nc, pic over file system of pc, direct access pc to nc, pic
2219/34226	. . .	Select address of motor, control serial switches in power supply ring	2219/34273	. . .	Pc and plc and nc integrated, pcnc concept
2219/34227	. . .	Alterable connector board between controller and machine	2219/34274	. . .	Connect pc card to industrial bus, with additional timing and adapting logic
2219/34228	. . .	Counter takes over measuring and pwm task from microprocessor	2219/34275	. . .	Windows file server to control pc hosted boards under ms windows
2219/34229	. . .	SIU serial interface unit takes over communication task from microprocessor	2219/34276	. . .	Pc has priority over cnc controller
2219/34231	. . .	Interface controls either dc, ac or step motors	2219/34277	. . .	Pc bypasses robot controller processor, access directly encoders, amplifiers
2219/34232	. . .	Test with microcomputer self	2219/34278	. . .	Motion control board, card, in pc
2219/34233	. . .	Multiplexed subsystem stores state of controlling microprocessor on switch off	2219/34279	. . .	Pc, personal computer as controller
2219/34234	. . .	Each subsystem has own interrupt which is switched on during multiplex	2219/34281	. . .	Osaca open system architecture for control in automation, umc universal machine control
2219/34235	. . .	Control order of multiplexed axis	2219/34282	. . .	Using special api's allowing user access to control machine, motion, servo
2219/34236	. . .	Multiplex for servos, actuators	2219/34283	. . .	Using windows nt for general control and real time unix for motion, plc control
2219/34237	. . .	Multiplexed d-a a-d	2219/34284	. . .	Using an operator console and a motion chassis connected by network
2219/34238	. . .	Hydraulic multiplexer	2219/34285	. . .	Open system architecture, in general
2219/34239	. . .	Multiplex for whole system	2219/34286	. . .	Intelligent positioning I-O
2219/34241	. . .	For reading data only	2219/34287	. . .	Plc and motion controller combined
2219/34242	. . .	For measurement only			

2219/34288	. . .	Plc as main controller for cnc	2219/34332	. . .	Program execution as function of direction, forward or backward
2219/34289	. . .	Plc as motion controller combined and plc for work type dependant data, parameter	2219/34333	. . .	Multi threading
2219/34291	. . .	Programmable interface, pic, plc	2219/34334	. . .	Scalability
2219/34292	. . .	Filtering noise I-O	2219/34335	. . .	First look ahead for acyclic execution, followed by cyclic execution
2219/34293	. . .	Image table	2219/34336	. . .	Avoid deadlock, lock-up
2219/34294	. . .	Diagnostic, locate failures	2219/34337	. . .	Manual to automatic, tracer
2219/34295	. . .	System, logic analyser, simulation	2219/34338	. . .	Execute control tasks, programs as well as user, application programs
2219/34296	. . .	Level conversion	2219/34339	. . .	Single step execution of program
2219/34297	. . .	Analog input, comparator delivers interrupt	2219/34341	. . .	Choose between electronic cam or time-dependent as function of required machining accuracy
2219/34298	. . .	Custom window between pic, plc and nc, programmable adapter	2219/34342	. . .	Matching closest patterns stored in database with actual components
2219/34299	. . .	Memory with I-O and pointer, external I-O with map, edit map, pointer to adapt I-O	2219/34343	. . .	Generation of electronic cam data from nc program
2219/34301	. . .	Nc system has direct access to I-O of pic, plc	2219/34344	. . .	Standby commands, let proces wait while program controls other process
2219/34302	. . .	Plc controls movement via nc, no direct interface to servo	2219/34345	. . .	Database for sequential control of several machines by messages
2219/34303	. . .	PNC is plc, pic and nc cooperation	2219/34346	. . .	User program fetches part of system program when flags are set and detected
2219/34304	. . .	Pc as input, edit device for plc	2219/34347	. . .	Execute auxiliary function, tool change, while concurrent machining
2219/34305	. . .	Connect, disconnect host computer by sleep command from local pc	2219/34348	. . .	Coordination of operations, different machines, robots execute different tasks
2219/34306	. . .	Power down, energy saving	2219/34349	. . .	Proper allocation of control components to the required task
2219/34307	. . .	On nc power on or off, synchronize power on or off of displays with own supply	2219/34351	. . .	Knowledge acquisition of environment
2219/34308	. . .	Power supply sets relay switch, allows push button or automatic switch on off nc	2219/34352	. . .	Explore discrete event properties, reliability, parallelism, availability
2219/34309	. . .	Dual power supply, for digital circuit and for analog signals	2219/34353	. . .	Independent positioning motor controlled by microprocessor only if event, limit, pulse passed
2219/34311	. . .	Energy saving by recuperating braking, deceleration energy	2219/34354	. . .	DES discrete event system, deds discrete event dynamic system
2219/34312	. . .	Power supply for servo delivered by, derived from 4-20-mA current loop	2219/34355	. . .	List of failure events, list of actions, events, trigger actions
2219/34313	. . .	Power supply for communication delivered by, derived from 4-20-mA current loop	2219/34356	. . .	Compensation variable interrupt execution delay, interrupt jitter
2219/34314	. . .	Slow down, limit speed for energy saving	2219/34357	. . .	Interrupt driven message passing network
2219/34315	. . .	Power supply turning on or shutting off	2219/34358	. . .	Interrupt changed to uninterruptable interrupt
2219/34316	. . .	Install nc system, check voltages, power supply with incorporated a-d	2219/34359	. . .	Real time based interrupt to control axis, other function
2219/34317	. . .	Execute same program on different machines by differently addressing axis	2219/34361	. . .	Mask for interrupts, inhibit during more important tasks
2219/34318	. . .	Verify if workpiece is already machined, by its weight	2219/34362	. . .	Sampling interrupt is product of integer times scheduler interrupt
2219/34319	. . .	Sequence as function of nc controlled axis position, axis zone	2219/34363	. . .	Encoder generates interrupt to synchronize closed loop
2219/34321	. . .	Database for control of a single machine	2219/34364	. . .	Delay interpolation interrupt as function of machining rates and feeds of machine groups
2219/34322	. . .	Intitalize execution program at reference position on workpiece	2219/34365	. . .	After interrupt of operation, do other task and go on - resume operation
2219/34323	. . .	Commanding different axis in sequential order as function of direction of movement	2219/34366	. . .	Interpolation interrupt so as to avoid fractions of command pulses
2219/34324	. . .	Switch some axis over to manual control, while other stay automatic	2219/34367	. . .	Interrupts, different tasks foreground, midground, background
2219/34325	. . .	Speed up, optimize execution by combining instructions belonging together	2219/34368	. . .	Priority
2219/34326	. . .	Program controls two operations simultaneously in opposite directions	2219/34369	. . .	Cause of interrupt is sensor and actuator failure
2219/34327	. . .	Modify, adapt system response to signals from process	2219/34371	. . .	Abrupt change in system dynamics
2219/34328	. . .	Cueing commands table			
2219/34329	. . .	Generate extended plc program during machining, execution of nc program			
2219/34331	. . .	First processor filters instructions for indexing only, all other instructions for second controller			

2219/34372	. . .	Inability to process, execute assigned task within allocated time interval	2219/34414	. . .	Maximize utilisation workstation
2219/34373	. . .	Actuator overloading	2219/34415	. . .	Execute urgent jobs quickly
2219/34374	. . .	False alarm states	2219/34416	. . .	Examine, analyse sensor data for co-exclusion sets, memorize, correlate actions
2219/34375	. . .	Generate interrupt after a certain number of position, counter pulses	2219/34417	. . .	Multiprocessor scheduling
2219/34376	. . .	Management nc programs, files	2219/34418	. . .	Scheduler for sequential control, task planning, control sequence
2219/34377	. . .	Selection out of several databases according to workpiece or conditions	2219/34419	. . .	Structure of control system
2219/34378	. . .	Erase plural programs in a single operation	2219/34421	. . .	Termination for each device, enables easy insertion, connection or disconnection
2219/34379	. . .	Job management	2219/34422	. . .	SBC single board computer
2219/34381	. . .	Multitasking	2219/34423	. . .	Optical isolation, galvanic isolation
2219/34382	. . .	Preemptive multitasking, cpu decides upon priority scheme, which task to start	2219/34424	. . .	Data flow architecture
2219/34383	. . .	Dynamic preemptive, special event register manages time slices for applications	2219/34425	. . .	Same microprocessor for programming and for machine control
2219/34384	. . .	Execute next block after predetermined time	2219/34426	. . .	Same hardware, servo controller for different control modes
2219/34385	. . .	Execute next block if largest axis distance is reached	2219/34427	. . .	Diagnostic, monitoring incorporated in controller
2219/34386	. . .	Advance program without M function completion signal	2219/34428	. . .	LSI
2219/34387	. . .	Delay command as function of speed	2219/34429	. . .	Servo controller near main cpu but remote from servomotor, integrated in cnc
2219/34388	. . .	Detect correct moment, position, advanced, delayed, then next command	2219/34431	. . .	Main uninterruptable servo loop processor and interruptable servo event processor
2219/34389	. . .	After rough plunge grinding, initiate backoff grinding as function of delay wheel position	2219/34432	. . .	Speed and current control integrated into nc control system
2219/34391	. . .	Synchronize axis movement and tool action, delay action, simulation inertia	2219/34433	. . .	Multitask processor controls real time processor via communication memory
2219/34392	. . .	Stop program on detection of undefined variable, symbol, enter definition, continue	2219/34434	. . .	Separate power controller for drive, servodrive, one per axis, connected to cnc
2219/34393	. . .	Stop program if needed workpiece, tool or data lacks, misses	2219/34435	. . .	Position encoder and motor connection in one interface between motor and microprocessor
2219/34394	. . .	Execute a certain number of program blocks and stop	2219/34436	. . .	Interface circuit build into connector, dongle
2219/34395	. . .	Synchronize between panel and control	2219/34437	. . .	Parallel processing of functions, each layer has own sample rate
2219/34396	. . .	Control different groups of functions, commands simultaneously, synchronized	2219/34438	. . .	Panel connected to nc by means of switch matrixes
2219/34397	. . .	Synchronize manipulators and machine by using a reference clock for all	2219/34439	. . .	One cable between controller and amplifier, two between amplifier and motor
2219/34398	. . .	Channel stops and waits for marker until other channel puts that marker	2219/34441	. . .	Common communication interface for panel and remote I-O
2219/34399	. . .	Switch between synchronous and asynchronous mode of controllers	2219/34442	. . .	Control unit serves also to match drive motor to power supply
2219/34401	. . .	Synchronize position controller drive with interpolator	2219/34443	. . .	Sensors and actuator integrated into tool
2219/34402	. . .	Synchronize programs for machines, processes, tasks, if one stops other also	2219/34444	. . .	Web control system, with intelligent control components each with web server
2219/34403	. . .	RTI real time, kernel, processing	2219/34445	. . .	Several power modules for same actuator, motor
2219/34404	. . .	Allocate storage, memory in each processor for a copy of needed data	2219/34446	. . .	No change of operation mode when slave axis is out of synchronisation
2219/34405	. . .	Switch register banks, each storing process states, for quick real time execution	2219/34447	. . .	A microprocessor for programming and a microprocessor for control execution of program
2219/34406	. . .	Effect of computer, communication delay in real time control	2219/34448	. . .	Integrated servo control circuit fixed to housing, remote from cpu
2219/34407	. . .	Calculate elapsed time, store in counter, start task when time elapsed	2219/34449	. . .	Fault tolerant control, task from one microprocessor can be done by other
2219/34408	. . .	Design real time control system	2219/34451	. . .	False alarm states evaluation, threshold to verify correctness alarm
2219/34409	. . .	RNOS real time networked operating system	2219/34452	. . .	Synchronize control with pulse, if loss, excess, error, then stop
2219/34411	. . .	Handling time critical and time non critical program sequences	2219/34453	. . .	Stop spreading, propagation failure through system, inhibit drivers defect boards
2219/34412	. . .	Mark some sequences of time non critical sequences as locked, non interruptable	2219/34454	. . .	Check functioning controller, cpu or program
2219/34413	. . .	Add time stamp to command message			

2219/34455	. . .	Different parameters are evaluated to indicate different faults	2219/34494	. . .	Display machining time and real time clock to control machining time
2219/34456	. . .	Authorize control of machine, robot if control panel has been connected	2219/35	. .	Nc in input of data, input till input file format
2219/34457	. . .	Emit alarm signal	2219/35001	. . .	Data input, data handling, programming, monitoring of nc
2219/34458	. . .	Inhibit start or related control switches if path boundary is outside limits	2219/35002	. . .	Parametric machine control, direct control from cad data, no nc data
2219/34459	. . .	Plausibility check on connection of module, control unit to machine	2219/35003	. . .	Kad kam knowledge aided design, knowledge aided manufacturing
2219/34461	. . .	Inhibit access to area if dangerous, cover taken off	2219/35004	. . .	Mechanical design and electronic design integrated
2219/34462	. . .	Interlock, stop motor if microprocessor starts interrupt, because no watchdog pulse from microprocessor	2219/35005	. . .	Sheet metal cad
2219/34463	. . .	Alarm canceled automatically when program corrected	2219/35006	. . .	Object oriented design
2219/34464	. . .	Adaptive threshold, level for alarm, eliminate false alarm	2219/35007	. . .	Cad makes template of tool as function of spindle, machine tool and set on spindle
2219/34465	. . .	Safety, control of correct operation, abnormal states	2219/35008	. . .	Www cad, world wide design and manufacturing
2219/34466	. . .	Bad circuits, watchdog, alarm, indication	2219/35009	. . .	Dynamic simulation
2219/34467	. . .	Try again program	2219/35011	. . .	Use of spreadsheet
2219/34468	. . .	Check memory by storing beforehand complement of expected result	2219/35012	. . .	Cad cam
2219/34469	. . .	Normally messages over network, if failure, messages from operator over I-O	2219/35013	. . .	Define workpiece, dimension from characteristics, strength, performance
2219/34471	. . .	Program memory is inhibited, not accessible as long as power fails	2219/35014	. . .	From design, calculate additional parameters, for strength
2219/34472	. . .	Configure alterable memory as read only, to avoid erasing	2219/35015	. . .	Calculate production compensation, heat shrinkage, overetching
2219/34473	. . .	Inhibit control until control lever is first set to neutral position	2219/35016	. . .	Analyse model, decide on number of sections to take
2219/34474	. . .	Sense voltage drop of system, shut down servo	2219/35017	. . .	Finite elements analysis, finite elements method FEM
2219/34475	. . .	Detect abnormality of control system without inverted model, using input command	2219/35018	. . .	Determining bending die radius from part data, estimated radius and calculation
2219/34476	. . .	Local control predicts next command data from past stored data if host control fails	2219/35019	. . .	From product constraints select optimum process out of plurality of DTM means
2219/34477	. . .	Fault prediction, analyzing signal trends	2219/35021	. . .	Identify object characteristics, elasticity, density, hardness and select material
2219/34478	. . .	Urgent safety signals treated with hardware; others with software	2219/35022	. . .	Calculate gear dimensions, tooth surfaces for optimum contact
2219/34479	. . .	Flush enclosure of circuit with air, keep clean air over pressure	2219/35023	. . .	Constraint based modeling, keep relationships between elements
2219/34481	. . .	EFC explosion free control, intrinsically safe	2219/35024	. . .	Incremental constraint solving, constraints are handled in sequence
2219/34482	. . .	Redundancy, processors watch each other for correctness	2219/35025	. . .	Design and manufacture jig
2219/34483	. . .	Monitor absolute position independently by two processors, if out of range	2219/35026	. . .	Design of machine tool, of cnc machine
2219/34484	. . .	Use dual channels	2219/35027	. . .	Design for assembly DFA, ease of object assembly
2219/34485	. . .	Same functioncode, program is fully used in normal and abnormal case	2219/35028	. . .	Adapt design as function of manufacturing merits, features, for manufacturing, DFM
2219/34486	. . .	Monitor axis movement, speed, independently by two processors, if out of range	2219/35029	. . .	Design of modular control system
2219/34487	. . .	Redundant diagnostic controllers watch redundant process controllers	2219/35031	. . .	Redesign, use former design
2219/34488	. . .	One computer, controller replaces other, backup computer	2219/35032	. . .	Check correctness, violation of design, rule check
2219/34489	. . .	Watchdog with adaptive timeout as function of speed of motor	2219/35033	. . .	Reliability by design, error free object
2219/34491	. . .	Count certain number of faults before delivering alarm or stop	2219/35034	. . .	Adapt design to customer feedback
2219/34492	. . .	Time out, decide only after a lapse, period of time	2219/35035	. . .	Design gear, tooth surfaces
2219/34493	. . .	Supervision, display diagnostic, use or select between different stored screen	2219/35036	. . .	Correct model by comparing 3-D measured data of modified workpiece with original model
			2219/35037	. . .	Use medial axis transformation to decompose a domain, limits combinations
			2219/35038	. . .	Combine, superpose model, foot data with style data
			2219/35039	. . .	Model for analysis of workpiece displacement due to clamping, fixture

2219/35041	. . .	Genetic algorithm for selforganizing designs	2219/35083	. . .	Parametric design, parameters for geometric design and for process planning
2219/35042	. . .	Add finishing allowances to a cutter path	2219/35084	. . .	Geometric feature extraction, concave and convex regions, object recognition
2219/35043	. . .	Tool, fixture design	2219/35085	. . .	Incremental feature recognition, extraction, changes are added as new features
2219/35044	. . .	Tool, design of tool, mold, die tooling	2219/35086	. . .	Machining feature extraction, geometry and machining parameters
2219/35045	. . .	Design tool for minimal tool change	2219/35087	. . .	Hole extraction for sheet metal
2219/35046	. . .	Design tool to minimize manufacturing, machining time	2219/35088	. . .	Using graph grammars to describe parts
2219/35047	. . .	Design tools in pairs, to be used together	2219/35089	. . .	Feature definition language
2219/35048	. . .	Recognition of punch shapes provided in die component catalogue	2219/35091	. . .	Feature conversion, from design to process features or else
2219/35049	. . .	BCL binary cutter location, rs494 standard CL format	2219/35092	. . .	MBM modular boundary model, FFC face to face composition model
2219/35051	. . .	Data exchange between cad systems, cad and cam	2219/35093	. . .	Feature is stad single tool approach direction, or mtad multiple tool approach
2219/35052	. . .	High level language conversion program, DXF format to nc format	2219/35094	. . .	Object oriented feature finder
2219/35053	. . .	IGES initial graphics exchange specification	2219/35095	. . .	Features library
2219/35054	. . .	STEP or PDES, standard for exchange of product data, form or surface data	2219/35096	. . .	Kind of feature, rotational parts with machining features and relation
2219/35055	. . .	Data modeling language	2219/35097	. . .	Generation of cutter path, offset curve
2219/35056	. . .	Manual entry of source, destination, data, format to be used for transfer	2219/35098	. . .	Automatic coarse, rough and finish cutting path generation
2219/35057	. . .	Create also operation data concerning operating device	2219/35099	. . .	Generation of cutter path for only a designated part of surface
2219/35058	. . .	Block cyclus time, time to prepare a block of data to be sent to machine	2219/35101	. . .	CC cutter contact path
2219/35059	. . .	Convert pcb design data to control data for surface mounting machine	2219/35102	. . .	Isoparametric, contact points at intersection of parameter lines on surface
2219/35061	. . .	From cad make drawing with text for dimensions, scan it and read dimensions	2219/35103	. . .	Cl cartesian method, apt style, cutter tangent, parallel to drive planes
2219/35062	. . .	Derive mating, complementary, mirror part from computer model data	2219/35104	. . .	Steepest directed tree approach intelligent cutter path planning
2219/35063	. . .	Geometrical transformation of image	2219/35105	. . .	Polyhedral machining, cutter moved between centroids of adjacent surface triangles
2219/35064	. . .	Transform sketch by replacing free curves with mathematical curves, two display	2219/35106	. . .	Contour map, cutter moved along contour lines, terraces of part surface
2219/35065	. . .	Undo part of design	2219/35107	. . .	Generate planar section toolpath
2219/35066	. . .	Modify design, modify shape, stretch, scale, add, delete	2219/35108	. . .	Generate offset tool moving path in restrained curved plane
2219/35067	. . .	Parametric function, group of lines, curves, change one, all change	2219/35109	. . .	Clean up region, volume left uncut by too large tool pass after finishing
2219/35068	. . .	Command files, subroutines for drawing	2219/35111	. . .	Automatically search for clean up regions, generate clean up tool pass
2219/35069	. . .	Derive missing surface from mirror part of computer model	2219/35112	. . .	Define object with spline, convert to raster, mosaic of points to make object
2219/35071	. . .	Drawing function, rotate designed figure, rotation	2219/35113	. . .	Generation of compound, composite surface
2219/35072	. . .	Scale, zoom a designed figure	2219/35114	. . .	Generation of connection between two or more surfaces
2219/35073	. . .	Copy, duplicate a designed figure	2219/35115	. . .	Project 3-D surface on 2-D plane, define grid in plane
2219/35074	. . .	Display object, recognition of geometric forms	2219/35116	. . .	RFS rotation free surfaces, needs c x y z axis, non axis symmetrical surfaces
2219/35075	. . .	Display picture of scanned object together with picture of cad object, combine	2219/35117	. . .	Define surface by elements, meshes
2219/35076	. . .	Display from bottom or top side, adjust drawing lines, visible or not	2219/35118	. . .	Generate intersection of offset surfaces
2219/35077	. . .	Display part and patterns to be machined on part, make selection	2219/35119	. . .	Combine different forms, shapes
2219/35078	. . .	Do not load non necessary or obstructive parts of drawing, remove from screen	2219/35121	. . .	Generate connection between two paths
2219/35079	. . .	Features, functions like special relationship, assembly locations	2219/35122	. . .	Generate random paths along a raster path
2219/35081	. . .	Product design and process machining planning concurrently, machining as function of design	2219/35123	. . .	Calculate volume of object
2219/35082	. . .	Product, feature based modeling, geometric and engineering info	2219/35124	. . .	Calculate center of gravity of object
			2219/35125	. . .	Surface with changing cone angle, different upper and lower surface shape
			2219/35126	. . .	Bezier or Ferguson surface

2219/35127	. . .	Visibility maps, tool sees all points of interest on workpiece	2219/35168	. . .	Automatic selection of machining conditions, optimum cutting conditions
2219/35128	. . .	Propeller blade	2219/35169	. . .	Automatic generation of set up data as function of form to be machined, kind of operation
2219/35129	. . .	Generate composite surface by a single polynomial calculation	2219/35171	. . .	Automatic selection of machining conditions as function of controlled machine
2219/35131	. . .	Generate polynomial surface	2219/35172	. . .	Lookup tables for technology, machining parameters
2219/35132	. . .	Generate path as function of precision and surface finish of each portion	2219/35173	. . .	Automatic selection of machine type
2219/35133	. . .	B-spline surface fitting	2219/35174	. . .	Decide if blank has to be measured beforehand
2219/35134	. . .	3-D cad-cam	2219/35175	. . .	Select machining parameters with fuzzy logic
2219/35135	. . .	Predict surface machining precision	2219/35176	. . .	Constraint, machining constraint, process type like only milling possible
2219/35136	. . .	Determine offset using closed ball expansion, 2-D square, 3-D cubic approximation	2219/35177	. . .	Power constraint for horizontal and vertical cutting forces
2219/35137	. . .	Create part generic, derive from known part or combination of parts	2219/35178	. . .	Machining parameter constraint, feed, speed, dimension of part
2219/35138	. . .	Superpose part of 3-D model on a straight, curved wall	2219/35179	. . .	Tolerance constraints as function of process capability and manufacturing costs
2219/35139	. . .	Define surface by cyclides, circular sections with variable radius	2219/35181	. . .	Machining condition constraints, coolant, chip removal, previous forming
2219/35141	. . .	Specify side of zone, line, circle for allowed region	2219/35182	. . .	Scallop hull generation and its offset, interference free offset
2219/35142	. . .	Generate tile patterns, mosaic	2219/35183	. . .	Maximizing side step, constant CUSP, scallop height, smaller CL datafile for minimizing machining time
2219/35143	. . .	Reconstruct free form surfaces	2219/35184	. . .	Variable step over, from toolpath to toolpath
2219/35144	. . .	Egosphere: spherical shell 2-5-D around robot, objects are projected on it	2219/35185	. . .	Select optimum tool radius
2219/35145	. . .	Voxel map, 3-D grid map	2219/35186	. . .	Variable step forward on same toolpath
2219/35146	. . .	Enter data, calculate 3-D curve or surface, sculptured surface, okisurf	2219/35187	. . .	Surface ridges, cusps, scallops, distance of tool traverses as function of curvature
2219/35147	. . .	Generation of nice looking composite surface	2219/35188	. . .	Project workpiece and sheet on screen, position layout to be cut, store contour
2219/35148	. . .	Geometric modeling for swept volume of moving solids	2219/35189	. . .	Manufacturing function, derive gripper position on workpiece from cad data
2219/35149	. . .	Generate model with haptic interface, virtual sculpting	2219/35191	. . .	Project workpiece and gripper, control relative movement, store result
2219/35151	. . .	Modeling geometric, generation or forming of curved surface	2219/35192	. . .	From design derive sequence of bending so that bending is possible
2219/35152	. . .	Part coding, description from 3-D cad database	2219/35193	. . .	Manufacturability
2219/35153	. . .	Group and retrieve similar designs from cad data	2219/35194	. . .	From workpiece data derive tool data
2219/35154	. . .	Convert 2-D workpiece in rectilinear polygon, simplified skeleton	2219/35195	. . .	Design mosaic, cut tiles, paint tiles and pack mosaic
2219/35155	. . .	From parts catalog, database, define part relationships, product definitions, specifications	2219/35196	. . .	From workpiece data derive assembly tool data
2219/35156	. . .	Group technology, identify and group similar parts, tools and machines	2219/35197	. . .	Assemblability
2219/35157	. . .	Machinability, producibility, reject nc program if tool motion not possible	2219/35198	. . .	Combine component electronic catalog, cdrom with cad data to generate nc program
2219/35158	. . .	Calculation of contact point of tool on surface, curve	2219/35199	. . .	Processability
2219/35159	. . .	With nominal blank and model in memory define tool path and machine workpiece	2219/35201	. . .	Use cad data to test function of designed part, design for test DFT
2219/35161	. . .	Determine orientation of workpiece	2219/35202	. . .	Macroplanning, setup fixture capf, library machine tables, sequence
2219/35162	. . .	Determine workpiece placement, nesting in blank, optimize, minimize loss material	2219/35203	. . .	Parametric modelling, variant programming, process planning
2219/35163	. . .	Generation of inverse offset surface, tool center on surface, tip shows offset	2219/35204	. . .	Planning, generic process planning
2219/35164	. . .	Reverse engineering, camera and probe to inspect workpiece and machine are the same ones	2219/35205	. . .	Planning of toolstages, comprising selection tools, position and motion
2219/35165	. . .	Automatic cutter selection	2219/35206	. . .	Microplanning, specific machining operations and parameters
2219/35166	. . .	Virtual boundary method to plan coarse and then fine machining	2219/35207	. . .	Design agent selects planning agent, which selects fabrication agent
2219/35167	. . .	Automatic toolpath generation and tool selection	2219/35208	. . .	Object oriented planning

2219/35209	. . .	Modifying, adding machining features to elementary cad-parts as function of their assembling
2219/35211	. . .	Using a search tree
2219/35212	. . .	Estimating a cost associated with each operation, amount of time, target cost
2219/35213	. . .	Minimize number of setups
2219/35214	. . .	Setup planning, number of them, machines needed, part orientation, order
2219/35215	. . .	Generate optimal nc program variant as function of cost, time, surface, energy
2219/35216	. . .	Program, generate nc program, code from cad data
2219/35217	. . .	Cagd computer aided geometric design, sbgd scanning based geometric design
2219/35218	. . .	From cad data derive fixture configuration and assembly program
2219/35219	. . .	From cad data derive cutting, stacking, sorting program
2219/35221	. . .	Generate cutter path as function of speed, acceleration condition selected by operator
2219/35222	. . .	From cad derive data points for endball mill, grinder, then radius compensation
2219/35223	. . .	Tolerance, consider tolerance in design, design for assembly
2219/35224	. . .	Kinematic tolerance analysis, variation in kinematic function as function of tolerance
2219/35225	. . .	Tolerance in setup planning
2219/35226	. . .	Analysis of tolerance propagation
2219/35227	. . .	Use FMEA failure modes and effects analysis in tolerance assignment design
2219/35228	. . .	Automated tolerance chain generation
2219/35229	. . .	Code
2219/35231	. . .	Biquinary code, 2-of-7 symbols
2219/35232	. . .	Bcd
2219/35233	. . .	Octal
2219/35234	. . .	First column has 1-2-4, second column has 8-16-32
2219/35235	. . .	Decimal to binary
2219/35236	. . .	Excess-code
2219/35237	. . .	Under four is 0xxx, over four is 1xxx
2219/35238	. . .	Gray-code
2219/35239	. . .	Ternary code
2219/35241	. . .	End, stop code of program
2219/35242	. . .	To enable manual operation on detection of inserted code
2219/35243	. . .	Inserted code calls parallel execution of another program, synchronize
2219/35244	. . .	Select in corner different program according to inner, outer machining
2219/35245	. . .	Expansion of control words, code of standard language to increase functionality
2219/35246	. . .	Data handling for auxilliary functions as function of setting of switch, block delete
2219/35247	. . .	Mode selection between two machining modes, laser beam and laser shutter control
2219/35248	. . .	Pallet exchange code to get mating nc program
2219/35249	. . .	In corner change cutting command to piercing command, to keep angle point intact
2219/35251	. . .	Several M codes sent to several machines simultaneously
2219/35252	. . .	Function, machine codes G, M
2219/35253	. . .	To stop program until a cycle start key is pressed
2219/35254	. . .	GPF, G preparatory functions, G111 indicate switch to polar, absolute to reference
2219/35255	. . .	G112 switch to polar, relative to last polar coordinate
2219/35256	. . .	Assign a macro to a key
2219/35257	. . .	Macro, assign a name to macro
2219/35258	. . .	A named macro can be called from a program, a key, a menu
2219/35259	. . .	Divide program in machining division blocks, and name them
2219/35261	. . .	Use of mathematical expression, functional equation
2219/35262	. . .	Macro instruction, canned cycles, subroutines, subprogram
2219/35263	. . .	Using variables, parameters in program, macro, parametrized instruction
2219/35264	. . .	Reread same data
2219/35265	. . .	Check time differences of command signals
2219/35266	. . .	On error display code, message for recovery from fault
2219/35267	. . .	Compare ram data to rom data, verify correctness, validity data, tolerance
2219/35268	. . .	Detection of presence of rom cassette or similar, if coupled to internal memory
2219/35269	. . .	Checking data, parity, diagnostic
2219/35271	. . .	Checking electronics
2219/35272	. . .	Watchdog, count or integrate number of data errors before alarm
2219/35273	. . .	Sensor to detect functioning of signal conditioning elements
2219/35274	. . .	Parity
2219/35275	. . .	Excess in error
2219/35276	. . .	Two identical tapes
2219/35277	. . .	Double reader
2219/35278	. . .	Checksum CRC
2219/35279	. . .	Ignoring invalid program
2219/35281	. . .	Detect overlap of program, if new data is entered before old is handled, stop
2219/35282	. . .	Verify if loaded program into memory or stored into tape, cassette is correct
2219/35283	. . .	Plausibility check for function, program, inhibit dangerous, unallowed program
2219/35284	. . .	Programmed speed automatically limited to min and max transmission range speed
2219/35285	. . .	Plausibility check for data, within permissible range
2219/35286	. . .	Run tape without machining, tape proving, dry run, test run
2219/35287	. . .	Verify, check program by drawing, display part, testpiece
2219/35288	. . .	Verification of instructions on tape, direct or by comparing with reference
2219/35289	. . .	Display machining state and corresponding control program
2219/35291	. . .	Record history, log, journal, audit of machine operation
2219/35292	. . .	By making, plotting a drawing
2219/35293	. . .	Execute program and check block of data, on interrupt display block
2219/35294	. . .	Display concentric circles

2219/35295	. . .	Stop test run, correct instruction or block, restart test run	2219/35335	. . .	Update display image only if tool advanced over a defined distance
2219/35296	. . .	Inhibit operation if part shape not compatible with raw material shape	2219/35336	. . .	Display locus and corresponding actual block
2219/35297	. . .	Convert program to voice output to check program	2219/35337	. . .	Program has instruction to display specific information
2219/35298	. . .	Print screen display	2219/35338	. . .	Display virtual tool, locus, part to check possibility of execution next block
2219/35299	. . .	Verify if generalised data block has all words required	2219/35339	. . .	A mark for present position of tool, a mark for end point of block, colour
2219/35301	. . .	On error, push button to reverse execution mode of block, stop, correct	2219/35341	. . .	Display finishing, finishing margin, work, tool and chuck shape, different colours
2219/35302	. . .	Set and store command code together with display colour, detected on execution	2219/35342	. . .	Set colour change for a block, display locus for that block in different colour
2219/35303	. . .	Dry run, compare simulated output with desired finished profile, alarm, inhibit	2219/35343	. . .	Display path and coating thickness and painting time
2219/35304	. . .	Real time analysis, check of program, just before machining	2219/35344	. . .	Display part, programmed locus and not yet machined, uncompleted portions of part
2219/35305	. . .	Before machining, verify if all different machining start points are correct	2219/35345	. . .	Display entry of high level program together with corresponding nc program
2219/35306	. . .	Interference of all tools of turret, or part of tool base with chuck, workpiece	2219/35346	. . .	VMMC: virtual machining measuring cell simulate machining process with modeled errors, error prediction
2219/35307	. . .	Print out of program on paper, on screen	2219/35347	. . .	Replace tool by light emitter, operator checks light path on workpiece
2219/35308	. . .	Update simulator with actual machine, control parameters before start simulation	2219/35348	. . .	Different colour, texture as function of distance, direction between tool and workpiece
2219/35309	. . .	Actual execution times acquired during machining used in simulation	2219/35349	. . .	Display part, programmed locus and tool path, trajet, dynamic locus
2219/35311	. . .	Remote simulation of machining program	2219/35351	. . .	While machining probe model, sense drawing by same program, stop if deviation
2219/35312	. . .	Display working state, process	2219/35352	. . .	By making a testpiece
2219/35313	. . .	Display, validate tool path for boundary, surface interference	2219/35353	. . .	While machining compare real path with simulated, command path, contour display
2219/35314	. . .	Display workpiece and machine, chuck, jig, clamp, tool	2219/35354	. . .	Polar coordinates, turntable
2219/35315	. . .	Projection, two, three section views	2219/35355	. . .	Generate at jump a fictive instruction equal to sum of previous instructions
2219/35316	. . .	Interference checking between tool, machine, part, chuck, machining range	2219/35356	. . .	Data handling
2219/35317	. . .	Display tool shape, to select tool for program, or for interference	2219/35357	. . .	Setup data, includes scale, range, type, selected together with part program
2219/35318	. . .	3-D display of workpiece, workspace, tool track	2219/35358	. . .	If a pattern contains another pattern, separate date to avoid overlap
2219/35319	. . .	Show alternatively static and dynamic locus, during static update of dynamic	2219/35359	. . .	Discriminate between setup data and machining data
2219/35321	. . .	Display only tool locus, dynamic	2219/35361	. . .	Discriminate between data for servocontrol directly and nc processing data
2219/35322	. . .	Display dynamic tool locus from entered start point to present position	2219/35362	. . .	Group similar operations, to select correction, compensation values
2219/35323	. . .	Point to two points on tool locus, calculate and display value	2219/35363	. . .	Generate data on component arrangement
2219/35324	. . .	Two, more pictures separated on screen, display	2219/35364	. . .	Merge normal nc program with manual entered monitoring, diagnostic criteria
2219/35325	. . .	Display of locus with possible correction of machining	2219/35365	. . .	Configure buffer dynamically, store two 3-D blocks or one 6-D block
2219/35326	. . .	Scale image automatically to display whole tool locus or indicated area	2219/35366	. . .	Fill buffer dynamically, track read out and write in addresses, fifo
2219/35327	. . .	Display tool locus together with correlated machining parameter, load motor	2219/35367	. . .	Only read buffer, advance tape while machining with data from read buffer
2219/35328	. . .	Shift view as function of shift of tool with respect to workpiece	2219/35368	. . .	Read and work buffer, machine while read in, no switching between buffers
2219/35329	. . .	Display entire image within an enlarged image	2219/35369	. . .	Read and work buffer, machine while read in, buffers switched alternative
2219/35331	. . .	Display only machined part	2219/35371	. . .	Data from read instead of work buffer, load data directly to work buffer
2219/35332	. . .	Use solid and wire frame plotting to display tool locus, workpiece	2219/35372	. . .	Store variable block, word length into memory
2219/35333	. . .	Display raw material, blank, tool locus, workpiece, alarm if error	2219/35373	. . .	Data storage, buffer
2219/35334	. . .	Display entire part and zoom of detail			

2219/35374	. . .	First memory for independent axis, second memory for synchronized axis	2219/35415	. . .	3-D three dimension, space input, spaceball
2219/35375	. . .	Store command data into latch, buffer synchronized to clock	2219/35416	. . .	3-D joystick
2219/35376	. . .	Input program, analyze, store to buffer ready to control nc, no further data handling	2219/35417	. . .	Handle, joystick connected to n+1 wires for n degrees of freedom
2219/35377	. . .	Check for end of block	2219/35418	. . .	Bird, free flying hand controller, receives signals from transmitters in space
2219/35378	. . .	Detect if reference data is not changing anymore to decide a still stand, stop	2219/35419	. . .	Four and more-DOF hand controller, joystick, manipulandum
2219/35379	. . .	Conversion, normalize	2219/35421	. . .	3-D matrix to input a 3-D surface, position displaced elements read by computer
2219/35381	. . .	Convert in real time input peripheral data to processor data, output data format	2219/35422	. . .	Unit freely movable in space, detect its position, orientation by triangulation
2219/35382	. . .	Distribution	2219/35423	. . .	6-DOF force reflective hand controller frhc
2219/35383	. . .	Input serial or parallel	2219/35424	. . .	16-DOF glove attached to 6-DOF hand controller, superposition
2219/35384	. . .	Serial data handling	2219/35425	. . .	18-DOF glove with fifteen load detectors on each finger, eighty one in total
2219/35385	. . .	Decode several blocks at the same time, as a single block, simultaneous, parallel	2219/35426	. . .	Prepare, enter next program during execution of actual program, machining
2219/35386	. . .	Look ahead processing of plural block data from buffer	2219/35427	. . .	User controls machine with eye motion, activates icons on display
2219/35387	. . .	Transfer measured data first to fastest controller, processor then to slower	2219/35428	. . .	Block selection, search
2219/35388	. . .	Processors in parallel, second, third handle rest old block while first starts new block	2219/35429	. . .	Enter code number directly for function, no use of function keys
2219/35389	. . .	Different block length to select between panel and remote I-O	2219/35431	. . .	Interactive
2219/35391	. . .	Sort, order entered data hierarchical	2219/35432	. . .	Format guide to guide user during input of data
2219/35392	. . .	Set switches, load, cancel data for different axis, spindles simultaneous	2219/35433	. . .	During execution, display asks for parameters, operator answers, machine again
2219/35393	. . .	Coordinate selection switch	2219/35434	. . .	Enter part geometry and manually control path free, directly, real time, cutting
2219/35394	. . .	A separate processor for block, span	2219/35435	. . .	Display, if needed, tolerance memo data at place where real data must be input
2219/35395	. . .	Memory, ram table with waveform, no need to be loaded by nc program, quicker	2219/35436	. . .	Means, manual input, input reference, hand wheel
2219/35396	. . .	Table of contour for cyclic machining, only data for one cycle, derive other	2219/35437	. . .	Decimal
2219/35397	. . .	Cross bar switch	2219/35438	. . .	Joystick
2219/35398	. . .	Machining, change parameters as function of machining type	2219/35439	. . .	Keys or buttons
2219/35399	. . .	Split part program in elementary machining steps, executable by a single tool	2219/35441	. . .	Production design metaphore, tool, operation like input system
2219/35401	. . .	Tool edge, tool shape, dead corner because of tool shape	2219/35442	. . .	Hand wheel turns resolver to control movement slide
2219/35402	. . .	Calculate allowable machining capability from cutting conditions	2219/35443	. . .	Portable drill, screw driver to set position of axis instead of handwheel
2219/35403	. . .	Calculate midline of tapelike contour, as reference line for stitching	2219/35444	. . .	Gesture interface, controlled machine observes operator, executes commands
2219/35404	. . .	Divide scanned pattern in several closed area, store as intermediate data	2219/35445	. . .	Joystick for coarse and handwheel for fine movement
2219/35405	. . .	Prepare seam data for each pattern size as function of scale and intermediate data	2219/35446	. . .	Earprotection, earphone
2219/35406	. . .	Decompose axis movement, group components, interpolate separately, superpose pulses	2219/35447	. . .	Potentiometer
2219/35407	. . .	Position data, calculate data to project characters along curve	2219/35448	. . .	Datasuit, arm sleeve, actor, operator wears datasuit and generates motion
2219/35408	. . .	Calculate new position data from actual data to compensate for contour error	2219/35449	. . .	Joystick and buttons for menu and function selection, scrolling, +sign and -sign
2219/35409	. . .	DPC direct programming at the console	2219/35451	. . .	Mouse with additional wheel, switches for position control
2219/35411	. . .	Clamp detachable teaching box magnetically on housing	2219/35452	. . .	Two axis foot pedal
2219/35412	. . .	Special interface for manual input to pc	2219/35453	. . .	Voice announcement, oral, speech input
2219/35413	. . .	Manual device is automatically recognised and its interface selected	2219/35454	. . .	Switch between joystick and pedal control
2219/35414	. . .	Remote instruction to operate machine tool	2219/35455	. . .	Foot pedal
			2219/35456	. . .	Disk segments connected to different inputs of microprocessor, represent different positions
			2219/35457	. . .	Joystick for coarse, rotary encoder for fine movement

2219/35458	. . .	Control command embedded in video, audio stream, signal	2219/35501	. . .	Colour display
2219/35459	. . .	Knob, handle, handwheel delivers pulses, electronic handwheel, digipot	2219/35502	. . .	Display picture, image of place of error
2219/35461	. . .	Digitizing, menu tablet, pencil	2219/35503	. . .	Eye tracking associated with head mounted display to detect eye position
2219/35462	. . .	Mouse	2219/35504	. . .	Multilingual communication, messages in different languages
2219/35463	. . .	Trackball	2219/35505	. . .	Display two windows, one with nc-data, other with general application data
2219/35464	. . .	Glove, movement of fingers	2219/35506	. . .	Camera images overlayed with graphics, model
2219/35465	. . .	Hand wheel	2219/35507	. . .	Spider, radar, parallel axes, multivariate plot
2219/35466	. . .	Select with mouse button coarse or fine movement control	2219/35508	. . .	Operator chooses among different GUI formats
2219/35467	. . .	Select between control modes, jog, freeform, grid, corner, locate, contour, slot	2219/35509	. . .	Double large character on screen
2219/35468	. . .	Select between teaching, regulate position and direct control of position	2219/35511	. . .	Cursor on screen
2219/35469	. . .	Select with button specified picture, interrupt addresses selection table	2219/35512	. . .	Display entered, measured values with bargraph
2219/35471	. . .	Select between run and step command mode, step forward, reverse	2219/35513	. . .	Setting tool condition, tool set in tool exchanger, present or not
2219/35472	. . .	Mode selection	2219/35514	. . .	Display tool data
2219/35473	. . .	Input limit values of speed, position, acceleration or force	2219/35515	. . .	Workpiece set condition, workpiece present or not
2219/35474	. . .	Enter fuzzy command, instruction, like move closer	2219/35516	. . .	Three linear movements in a single plane for three actuators
2219/35475	. . .	Set tolerance values	2219/35517	. . .	Use same data, program for workpieces with different length, but same profile
2219/35476	. . .	Switch from auto to manual if operator moves feedback detector, to set parameter	2219/35518	. . .	Superposition data, three memories for 2-D projection and z profile and surface structure
2219/35477	. . .	Accelerate input data, exponent as function of pressure, time, turning speed	2219/35519	. . .	Machining data and tool data
2219/35478	. . .	Set flexibility of axis in working coordinates, to move real axis manually easily	2219/35521	. . .	Machining and parts on workpiece arrangement data, machine each, then cut out
2219/35479	. . .	Set values, speed of machine as function of force, pressure, duration on key	2219/35522	. . .	Database for standard machining data and for personal machining data
2219/35481	. . .	Display, panel	2219/35523	. . .	Data one bit better than measurement, rest accumulated in memory
2219/35482	. . .	Eyephone, head-mounted 2-D or 3-D display, also voice and other control	2219/35524	. . .	Approach data and machining data
2219/35483	. . .	Synoptic display for work shape during machining	2219/35525	. . .	Use same data for different operations, coarse and fine, cutting and grinding
2219/35484	. . .	Use two image memories, update second memory while display first memory	2219/35526	. . .	Number of workpieces to be machined, cut
2219/35485	. . .	Library of images, pictures, select and modify each, compose them	2219/35527	. . .	Range of number of workpieces to be machined, cut
2219/35486	. . .	Use of two cursors on screen	2219/35528	. . .	Create machining conditions database by analyzing actual machining nc program
2219/35487	. . .	Display and voice output incorporated in safety helmet of operator	2219/35529	. . .	Monitoring current machining, store information in database as a new working case
2219/35488	. . .	Graphical user interface, labview	2219/35531	. . .	Operator inputs manually evaluation of current machining
2219/35489	. . .	Discriminate, different colour, highlight between two states	2219/35532	. . .	Comment, work directive, message to operator and control signals together
2219/35491	. . .	Workpiece data display, position, height	2219/35533	. . .	Use, input 2-D data, sectional profile to machine 3-D surface
2219/35492	. . .	Display needed workpiece, tool or data to continue execution of program	2219/35534	. . .	Conversion input data
2219/35493	. . .	Display workpiece and tool data together	2219/35535	. . .	Decimal to binary
2219/35494	. . .	Online documentation, manual, procedures, operator, user guidance, assistance	2219/35536	. . .	Digital to analog
2219/35495	. . .	Messages to operator in multimedia, voice and image and text	2219/35537	. . .	Bcd to phase
2219/35496	. . .	Display cursor in changing colour to indicate that object can be selected	2219/35538	. . .	Bcd to decimal
2219/35497	. . .	Use colour tone, hue to indicate amount of processed quantity	2219/35539	. . .	Gray to frequency
2219/35498	. . .	Synoptic display of available, selectable control modules with their functions	2219/35541	. . .	Bcd to 5-2-1-1-code
2219/35499	. . .	Model of process, machine and parameters	2219/35542	. . .	Bcd to binary
			2219/35543	. . .	Cartesian to polar and <u>vice versa</u>
			2219/35544	. . .	Convert male to female form, die to stamp form
			2219/35545	. . .	Serial to parallel conversion
			2219/35546	. . .	Convert input data to execution data
			2219/35547	. . .	1-to-8-bit conversion
			2219/35548	. . .	1-to-16-bit conversion

2219/35549	. . .	Convert buffer content to executable data in case of short execution time	2219/36005	. . .	Same knob, different functions, turn for position, push and turn for speed
2219/35551	. . .	Convert and select between EIA and ISO code	2219/36006	. . .	A key delivers a series of key codes
2219/35552	. . .	ISO and EIA code detected by difference of parity bit	2219/36007	. . .	Special keys, automatic switch over x or y to numerical values
2219/35553	. . .	Convert ISO or EIA code to internal or standard code	2219/36008	. . .	Illuminated, lighting up keys, build in led, display, show sequence data entry
2219/35554	. . .	Mirror, other conversions	2219/36009	. . .	Keys with variable control code, multifunction keys
2219/35555	. . .	Turn figure over 90-degrees or 180-degrees, convert data for new state	2219/36011	. . .	Page key, go to next or previous page
2219/35556	. . .	Conversion inch to metric	2219/36012	. . .	Percentage keys, input percentage values
2219/35557	. . .	Workpiece related data to axis related data	2219/36013	. . .	Up-down keys for calling sequentially functions, parameters
2219/35558	. . .	Convert speed value into two signals sin, cos representing position	2219/36014	. . .	Overlay to indicate function of key
2219/35559	. . .	Convert 15-bit image into 20-bit image	2219/36015	. . .	Display areas, fields on screen correspond to position of keys on panel, matrix
2219/35561	. . .	Analog to digital	2219/36016	. . .	Unified language for machines and translation to each
2219/35562	. . .	Radius to diameter	2219/36017	. . .	Graphic assisted robot programming, display projection of surface
2219/35563	. . .	Use of conversion tables	2219/36018	. . .	Language for dimensional measuring, inspection
2219/35564	. . .	High speed data processor between host and nc for direct conversion of data	2219/36019	. . .	Using interpreted descriptive commands giving G-codes
2219/35565	. . .	Communications adapter converts program to machine or controls directly machine	2219/36021	. . .	Switch high level and assembly, machine language as function of capacity memory and speed
2219/35566	. . .	Use of only delta x values, no absolute values	2219/36022	. . .	Switch between machining language for execution and high level for editing
2219/35567	. . .	Each block contains connection, index to other blocks, to form patterns	2219/36023	. . .	Attribute programming
2219/35568	. . .	Array structure corresponding to display format	2219/36024	. . .	State language
2219/35569	. . .	Single block format indicates change of speed at start and end	2219/36025	. . .	Link, connect icons together to form program
2219/35571	. . .	Table with constant speed and corresponding distance for each segment	2219/36026	. . .	Combine general high level language and specialised plc language
2219/35572	. . .	Data contains header and type of data	2219/36027	. . .	Decompiler, translate machine code to hll, reverse processing, easy modification
2219/35573	. . .	Header has code to select proper load program	2219/36028	. . .	C++
2219/35574	. . .	Header with information for display position	2219/36029	. . .	Basic
2219/35575	. . .	Part program contains movement and condition statements	2219/36031	. . .	Programming in assembler, machine or high level language
2219/35576	. . .	Data divided in blocks to be covered by small movement, to origin by large movement	2219/36032	. . .	Script, interpreted language
2219/35577	. . .	Delta x, delta v and delta t	2219/36033	. . .	High level graphics language, gks
2219/35578	. . .	Gerber, hp format to drive plotter or similar xy device	2219/36034	. . .	APT
2219/35579	. . .	Store motion parameters as function of encoder position	2219/36035	. . .	Special language, task programming, oop object oriented programming
2219/35581	. . .	Position data for module and position data within module	2219/36036	. . .	Motion, graphical motion control language gmcl
2219/35582	. . .	Control format in browser, use of xml and xslt	2219/36037	. . .	Application programming interface associates component code with driver function
2219/35583	. . .	Difference between signals and sign of difference are the controlling signals	2219/36038	. . .	Ladder program for plc, using functions and motion data
2219/35584	. . .	Link geometry, workpiece data with machining data, select region	2219/36039	. . .	Learning task dynamics, process
2219/35585	. . .	Motion command profile	2219/36041	. . .	Edit program step by step
2219/35586	. . .	Position, time and slope, tangent of curve	2219/36042	. . .	Point to defect, faulty instruction or locus, call up corresponding command block
2219/35587	. . .	Store curves with packed code, indicating bezier curve parameters	2219/36043	. . .	Correction or modification of program
2219/35588	. . .	Pack, compress data efficiently in memory	2219/36044	. . .	Program modified after breakage, crash, jamming
2219/36	. . .	Nc in input of data, input key till input tape	2219/36045	. . .	Skip of program blocks, jump over certain blocks
2219/36001	. . .	File format, initial graphics exchange specification, iges standard	2219/36046	. . .	Adapt, modify program as function of configuration of machine
2219/36002	. . .	Dimensional measurement interface specification dmis standard			
2219/36003	. . .	Start key, switch to start performing program			
2219/36004	. . .	Program mask depends on physical position of panel			

2219/36047	. . .	Edit program, change or not header, starting code, output new program with header	2219/36084	. . .	Amend, modify program by inserting wait and wait dismiss command
2219/36048	. . .	Verify, probe workpiece, if position deviation edit, modify program	2219/36085	. . .	Replace faulty instructions from rom, tape by instructions from ram, error setting
2219/36049	. . .	Relational geometry, change one element, rest of part is adjusted according	2219/36086	. . .	Select, modify machining, cutting conditions
2219/36051	. . .	Store history of modified file, back-up, update, using different file extensions	2219/36087	. . .	Edit, modify program for position errors, moving path, use conversion matrix
2219/36052	. . .	Tape tuning with expert system, correction of tape as function of measured parameters	2219/36088	. . .	Machining parameters, override
2219/36053	. . .	Adapt, modify program in real time as function of workpiece configuration	2219/36089	. . .	Machining parameters, modification during operation
2219/36054	. . .	Modify offset for whole sections collectively, different offsets for sections	2219/36091	. . .	Modification, override as function of conditions, distance
2219/36055	. . .	Separate, temporary memory or special storage region for corrections only	2219/36092	. . .	Override limit contour
2219/36056	. . .	Modify program, machining order in real time, during operation, dynamically	2219/36093	. . .	Lookup table with override for each pattern, tool path
2219/36057	. . .	Select center of pattern for placement of new scaled pattern	2219/36094	. . .	Inhibit or permit override by separate manual switch
2219/36058	. . .	Modify workpiece part program without changing approach program	2219/36095	. . .	Inhibit or permit override by program instruction
2219/36059	. . .	Modify approach program as function of changed part program	2219/36096	. . .	Override program by selecting another font, size for letters
2219/36061	. . .	Storage, memory area to store history data for previous corrections, editable	2219/36097	. . .	Override program to scale workpiece
2219/36062	. . .	Verify if editing, modifying program is suitable for connected controller	2219/36098	. . .	Override program to execute a certain number of same blocks, repeat pattern
2219/36063	. . .	During machining, compare simulated with detected profile, correct, modify program	2219/36099	. . .	Stop machine and correct position manually
2219/36064	. . .	Modify data by using the four rules of arithmetic such as +sign, -sign, xsign, :sign	2219/36101	. . .	During machining keep override log, history, journal, kind of record playback
2219/36065	. . .	Modify data by entering a compensation rate value	2219/36102	. . .	Display override log and nc instructions, select nc block to modify permanent
2219/36066	. . .	Collectively modify data instead of each in particular	2219/36103	. . .	Adapt, update machining parameters automatically as function of state of processing
2219/36067	. . .	Altering working order of program blocks	2219/36104	. . .	IC card
2219/36068	. . .	Change program at allowed point of time or program step	2219/36105	. . .	Cd rom
2219/36069	. . .	Display, on machining error, display error message and correct program	2219/36106	. . .	Cassette
2219/36071	. . .	Simulate on screen, if operation value out of limits, edit program	2219/36107	. . .	Bubble memory
2219/36072	. . .	Select pattern, input modification of tolerance	2219/36108	. . .	Eprom, earom, eerom
2219/36073	. . .	Display original and modified part in different colour, highlight, shading, filling	2219/36109	. . .	Flash memory
2219/36074	. . .	Display part, select, mark element and edit corresponding block	2219/36111	. . .	Local memory instead of tape, or combined
2219/36075	. . .	Set certain command codes, discriminate codes and display in different colour	2219/36112	. . .	Floppy disk, diskette
2219/36076	. . .	Select icon and display corresponding instructions	2219/36113	. . .	Rom
2219/36077	. . .	Display and select, modify shape, pattern on screen	2219/36114	. . .	Eprom, prom
2219/36078	. . .	Insert, read in new command instruction to modify fixed program	2219/36115	. . .	Card
2219/36079	. . .	Replace faulty instructions and execute only that portion of the program	2219/36116	. . .	Harddisk
2219/36081	. . .	Merge, mix original program with taught program	2219/36117	. . .	Magnetic tape cassette
2219/36082	. . .	Delete a block by overwriting block with delete control character	2219/36118	. . .	Adapt interactive dialog, help to experience, short cut menu
2219/36083	. . .	Insert a block by using insert control character pointing to address in memory	2219/36119	. . .	Mouse with buttons to assist operator with selection of menu instead of pointing
			2219/36121	. . .	Tree oriented menu, go to root, scroll up down, select mode
			2219/36122	. . .	Operator menu with submenu for each item
			2219/36123	. . .	Store statistical history of selected menus, recall for quick data entry
			2219/36124	. . .	Screen with certain display menu called by pointer, number
			2219/36125	. . .	Select out of library, beforehand only functions needed for part program
			2219/36126	. . .	Programmable, configurable function keys, execute a programmed sequence
			2219/36127	. . .	Menu, help menu for operator, messages
			2219/36128	. . .	Function menu, switches, keys replaced by menu
			2219/36129	. . .	Menu keys, function of keys soft defined

2219/36131	. . .	Cyclic selection of functions or values by pushing a single key	2219/36172	. . .	Select block, item, highlight, colour this block with respect to rest
2219/36132	. . .	Selection of menu with lightpen on screen, display	2219/36173	. . .	Combine record play back, hand wheel with normal cnc programming, software
2219/36133	. . .	MMI, HMI: man machine interface, communication	2219/36174	. . .	Program divided into modules
2219/36134	. . .	Osf-motif standard	2219/36175	. . .	Capture image of part, create automatically geometry, sequence of machining
2219/36135	. . .	Link between sequence, motion or process and diagnostic control	2219/36176	. . .	Edit servo control parameters
2219/36136	. . .	User configurable graphics selected as function of kind of machining, display builder	2219/36177	. . .	Select block and display graphic representation associated with block type
2219/36137	. . .	Configuration of display device, operator panel	2219/36178	. . .	Derive finishing allowance, tolerance from shape and work information
2219/36138	. . .	Configuration of operator panel, using os-2 modular programs, masks	2219/36179	. . .	Combine nc programming with cad and order system
2219/36139	. . .	Edit templates for screen display, and use of keyboard	2219/36181	. . .	Input part data, dimensions, without graphical representation of part
2219/36141	. . .	Configuration with visual basic extension	2219/36182	. . .	First block contour then parameter input
2219/36142	. . .	Using window display, selection of function calls in a window	2219/36183	. . .	Offline teaching is sound assisted
2219/36143	. . .	Use of icon to represent a function, part of program	2219/36184	. . .	Record actions of human expert, teach by showing
2219/36144	. . .	Display of not allowed function in a different way, light	2219/36185	. . .	Application, for cylindrical groove shape
2219/36145	. . .	In case of alarm a window is maximised automatically	2219/36186	. . .	Programming languages for lathe, mill or general use mixed
2219/36146	. . .	Group windows into coherent sets to facilitate a task	2219/36187	. . .	End shape data input for end surface configuration
2219/36147	. . .	Limit number of windows displayed simultaneously	2219/36188	. . .	Deep drilling cycle
2219/36148	. . .	Main process, alarm window takes priority, always on top, safe view	2219/36189	. . .	Wheel dressing program
2219/36149	. . .	Window, X window	2219/36191	. . .	Prepare rough, coarse machining program
2219/36151	. . .	Display is a TV	2219/36192	. . .	End facing
2219/36152	. . .	Panel	2219/36193	. . .	Semi finish and finish machining
2219/36153	. . .	Two, several consoles, displays, panels, two different input, joystick	2219/36194	. . .	Taper angle machining
2219/36154	. . .	Two displays, for part shape and for corresponding instructions, block	2219/36195	. . .	Assembly, mount of electronic parts onto board
2219/36155	. . .	Plc switches functions of panel when changing kind of machining	2219/36196	. . .	Grinding cycle
2219/36156	. . .	Keyboard as a drawer	2219/36197	. . .	Non circular workpiece, radius and angle input
2219/36157	. . .	Pendant control box for handwheel control, mounted on controlled axis	2219/36198	. . .	Gear, thread cutting
2219/36158	. . .	Panel for disabled, scanned sequentially	2219/36199	. . .	Laser cutting
2219/36159	. . .	Detachable or portable programming unit, display, pc, pda	2219/36201	. . .	Hole machining
2219/36161	. . .	Common program panel for nc, pic, switch display diagnostic or part	2219/36202	. . .	Freeform surfaces
2219/36162	. . .	Pendant control box	2219/36203	. . .	Bending of workpiece, also for long slender workpiece
2219/36163	. . .	Local as well as remote control panel	2219/36204	. . .	Lathe, turning
2219/36164	. . .	Common CRT for two input devices	2219/36205	. . .	For aspheric non symmetrical mirrors
2219/36165	. . .	Common program panel for host and cnc, at cnc place, for data from host, cnc	2219/36206	. . .	Embroidery
2219/36166	. . .	Several panels can be selected by rotation, limited space needed	2219/36207	. . .	Involute curve, compressor
2219/36167	. . .	Use camera of handheld device, pda, pendant, head mounted display	2219/36208	. . .	Roll grinding
2219/36168	. . .	Touchscreen	2219/36209	. . .	Specify hole shape pattern for boring and store in hole file
2219/36169	. . .	Remote, host controlled, operated manual data input, keyboard	2219/36211	. . .	Using different cutter sizes, largest as possible for minimizing machining time
2219/36171	. . .	Edit velocity, motion profile, graphic plot of speed as function of time, position	2219/36212	. . .	Using generic virtual pocket, having virtual boundary, arbitrarily shaped
			2219/36213	. . .	Grouping of decomposed volumes with similar features
			2219/36214	. . .	Pocket machining, area clearance, contained cutting, axis milling
			2219/36215	. . .	Insert automatically program sequence, for corner execution, avoid machining error
			2219/36216	. . .	Replace entered position data with previous if difference less than tolerance
			2219/36217	. . .	Commands trigger programming functions
			2219/36218	. . .	Reuse stored data as programming data after confirmation

2219/36219	. . .	Calculate machining information, like time, surface to be machined from program	2219/36254	. . .	Generate machining program from history of similar tools
2219/36221	. . .	Entry of chamfer, beveling, rounding of corner shape	2219/36255	. . .	Machining condition, parameter is workpiece conicity, inclination between surfaces
2219/36222	. . .	Indicate entered element on top, next element below, after input, update top	2219/36256	. . .	Define upper lower limit of reciprocating machining, chopping
2219/36223	. . .	Enter machining conditions, determine automatically machining data	2219/36257	. . .	Indicate region and kind of machining on shape of part
2219/36224	. . .	Enter machining and positioning elements, derive order of execution in real time	2219/36258	. . .	Machining planning, indicate kind of operation
2219/36225	. . .	Select and insert program from library, select case, variant	2219/36259	. . .	Indicate primary and secondary operations on shape, deliver nc data for each
2219/36226	. . .	Global selection of grid or circle of points by number, distance, angle	2219/36261	. . .	Program with subroutines for machining process
2219/36227	. . .	Assist operator to calculate unknown points, contours	2219/36262	. . .	Input workpiece mounting position, setup
2219/36228	. . .	Combine two programs to obtain new shifted positions and new processing data	2219/36263	. . .	Select cutting direction
2219/36229	. . .	Generate missed line when last end point is different from next start point	2219/36264	. . .	Program movement from first to second machining area
2219/36231	. . .	Translate, convert program independent to machine dependent program	2219/36265	. . .	Set machining start point from tool, machining data avoiding interference
2219/36232	. . .	Before machining, convert, adapt program to specific possibilities of machine	2219/36266	. . .	Tool path editor, for offset, multi-passes
2219/36233	. . .	Convert program so that it can be executed in reverse order	2219/36267	. . .	Process planning editor
2219/36234	. . .	Convert program for a 2-axis machine into program for 4-axis machine	2219/36268	. . .	From blank and finished entered shape, derive machining features
2219/36235	. . .	Convert grinding machine oriented language to nc machine oriented	2219/36269	. . .	Separate machining data as function of dependance or independence of material
2219/36236	. . .	Convert character, ascii, text code to internal code and vice versa	2219/36271	. . .	Enter, edit workpiece data
2219/36237	. . .	Prepare nc program for selected, distinct nc machines	2219/36272	. . .	Enter start position, program number for each workpiece
2219/36238	. . .	Derive marking from punching program, secondary from principal program	2219/36273	. . .	Use general and tool data to select available tool and machining operation
2219/36239	. . .	Determine automatic, manual machining of workpiece as function of specific possibilities of machine tool	2219/36274	. . .	Automatic calculation cutting conditions, but operator can enter them also
2219/36241	. . .	Convert, translate milling to laser machining program	2219/36275	. . .	Select automatically transmission ratio as function of programmed speed
2219/36242	. . .	Convert program for different machines with different M-code, G-code, header	2219/36276	. . .	Program virtual, logical tools, select tool from tables
2219/36243	. . .	Convert source, high level code to machine, object code	2219/36277	. . .	Flexible fixturing, clamp workpiece, mark clamp regions and store them
2219/36244	. . .	Means, use of tables, correlating functions to instructions	2219/36278	. . .	Topological classification of forming, machining process
2219/36245	. . .	Use of tables to store order of execution of functions	2219/36279	. . .	Machining parameter is strategy for making corners
2219/36246	. . .	Comments, messages displayed with program instructions, explain process	2219/36281	. . .	Machining parameter is technology: surface roughness, corner, contour tolerance
2219/36247	. . .	Remarks, comments as hierarchical structure, indented, corresponds to instructions	2219/36282	. . .	Divide complex sculptured surface into smaller, easier to machine areas
2219/36248	. . .	Generate automatically machining, stitching points from scanned contour	2219/36283	. . .	Select, enter machining, cutting conditions, material file, tool file
2219/36249	. . .	Generate automatically a balance program for workpiece, dynamic balance	2219/36284	. . .	Use of database for machining parameters, material, cutting method, tools
2219/36251	. . .	Superpose scanned or finished object image on workpiece model for best fitting	2219/36285	. . .	Display symbol pattern for kind of machining performed
2219/36252	. . .	Generate machining program based on a simulation to optimize a machine parameter	2219/36286	. . .	Show shape of workpiece, point to coordinates to enter machining parameters
2219/36253	. . .	Generate machining program from previous test run	2219/36287	. . .	Selection of speed as function of tool diameter
			2219/36288	. . .	Select machining method, parameters as function of dimensions of workpiece
			2219/36289	. . .	Cutting, machining conditions by optimisation of time, cost, accuracy
			2219/36291	. . .	Cutting, machining conditions by empirical equation, like tool life
			2219/36292	. . .	Method to drill, machine based on ratio bore depth, diameter, select tools

2219/36293	. . .	Set feed and speed for specified tool, workpiece as function of ratio cutting force, speed	2219/36333	. . .	Selection from standard forms, shapes, partprograms, enter value for variable
2219/36294	. . .	Stored coefficients, standard cutting conditions, calculate for entered material	2219/36334	. . .	Select a shape, select a point or line and enter data
2219/36295	. . .	Select optimum process for manufacturing articles with longer life	2219/36335	. . .	Select and show already defined lines, circles to define from them new element
2219/36296	. . .	Order, select, determine, change machining sequence, order	2219/36336	. . .	Select a shape and use it to create a similar shape
2219/36297	. . .	Machining plan, indicate order of machining as function of presence of operator	2219/36337	. . .	Select similar shape and derive motion defining sentences from original shape
2219/36298	. . .	Enter, change order of different programs to be executed	2219/36338	. . .	Create program for parallel, simultaneous operated slides, timing
2219/36299	. . .	Generate sequences of operations starting from finished product, end with raw	2219/36339	. . .	Time necessary for one slide equals time for second slide
2219/36301	. . .	Optimisation of sequence of operations	2219/36341	. . .	Prepare program to control multiple slides at the same time
2219/36302	. . .	Determine several machining processes and order as function of available tools	2219/36342	. . .	Tool path processing, sequence to cut paths
2219/36303	. . .	Determine several machining processes and order as function of number of mountable tools	2219/36343	. . .	Select machining method as function of selected tool
2219/36304	. . .	Divide into several machining processes, divide each also in several sub processes	2219/36344	. . .	Display different tools in different colours
2219/36305	. . .	Table, correlation tool type and machining category, process	2219/36345	. . .	Prepare program for minimal idle strokes with multitool turret
2219/36306	. . .	Table correlation different turrets, slides and possible simultaneous operations	2219/36346	. . .	Display feed quantity and cutting speed as function of material to help user
2219/36307	. . .	Table with workpiece features and corresponding machining parameters, methods	2219/36347	. . .	Select tool if tool life duration is sufficient for operation
2219/36308	. . .	Table for cutting conditions	2219/36348	. . .	Enter, edit tool, cutter data
2219/36309	. . .	Program has different modules, each with own load program	2219/36349	. . .	Compensation part program with form of tool, in memory
2219/36311	. . .	Machining mode selection, pocket, grooving, raster, area, profile	2219/36351	. . .	Display tool shapes to select tool and enter tool dimensions
2219/36312	. . .	Enter shape with cursor, joystick directions up, down, left, right, slash	2219/36352	. . .	Select tool as function of part shape, number of grooves and groove width
2219/36313	. . .	If elements cannot be combined, show error	2219/36353	. . .	Display different offset surfaces in different colours to select right tool
2219/36314	. . .	Superpose and combine shapes	2219/36354	. . .	Select from table with machining type and corresponding tools
2219/36315	. . .	Library for shapes of tool holders, fixtures, chucks	2219/36355	. . .	Select tool with fuzzy logic
2219/36316	. . .	Define profile from elements, show only selectable elements	2219/36356	. . .	Select tool as function of collision avoidance
2219/36317	. . .	Input symbol for element, search in library and display	2219/36357	. . .	Tool line up, select right order of tool, optimal tool order loading, tool file
2219/36318	. . .	Enter start, begin and stop, end point	2219/36358	. . .	Use of cd rom with catalog of tools
2219/36319	. . .	Simplify display, calculation of shapes by deleting holes, grooves	2219/36359	. . .	As function of tool location
2219/36321	. . .	Program only shape, add approach path and machining conditions automatically	2219/36361	. . .	Tool change time, program for optimal tool change time
2219/36322	. . .	Program shape interactively and tool change position manually by teaching	2219/36362	. . .	Tool change time as function of location in tool magazine, index
2219/36323	. . .	Shape is alphabetical character	2219/36363	. . .	Tool change time as function of cutter trajectory, spindle and slide times
2219/36324	. . .	Scan drawing, sketch of part, enter on screen coordinates, lines, circles	2219/36364	. . .	Tool change time as function of tool switch time, to replace tool with another
2219/36325	. . .	Enter shape with mouse, tablet, enter on screen coordinates, lines, circles	2219/36365	. . .	Program so that minimal tool changes are needed
2219/36326	. . .	Define blank, part, area	2219/36366	. . .	Data, read in, distribution
2219/36327	. . .	Define shape of part	2219/36367	. . .	A tape reader for each axis
2219/36328	. . .	Display closed shape	2219/36368	. . .	Tape reader
2219/36329	. . .	Display path on cylinder by developing cylinder into a plane	2219/36369	. . .	Measuring object, spectacle glass, to derive position data
2219/36331	. . .	Display block with cursor or highlight actual contour element	2219/36371	. . .	Barcode reader
2219/36332	. . .	Display different faces of work in different colour	2219/36372	. . .	Light, magnetic pen
			2219/36373	. . .	Common tape reader for two controllers
			2219/36374	. . .	Dual, multiple tape reader

2219/36375	. . .	Combination of two devices, floppy disk and tape reader	2219/36414	. . .	Compare image detected path with stored reference, difference corrects position
2219/36376	. . .	Read out of memory synchronized with machine driven axis	2219/36415	. . .	Adjust path and attitude tool by detecting path, line with a photosensor, laser
2219/36377	. . .	Read of several jobs	2219/36416	. . .	Adapt taught position as function of deviation 3-D, 2-D position of end effector, tool
2219/36378	. . .	Either from tape or other source, using same electronics	2219/36417	. . .	Programmed coarse position, fine position by alignment, follow line, path adaptive
2219/36379	. . .	Read in	2219/36418	. . .	Modify trajectory by operator gesture, gesture force sensed by end effector
2219/36381	. . .	Timing, synchronization, start of reader	2219/36419	. . .	Compare modified, corrected path with stored reference, difference too large alarm
2219/36382	. . .	Speed of read in of data as function of available power for driving servo, safety	2219/36421	. . .	Assist in correction of position to form a circle or line
2219/36383	. . .	Manual input combined with input from computer or tape	2219/36422	. . .	During teaching shut off, disable motor to move arm easy
2219/36384	. . .	Load machining program and workpiece delivery program together	2219/36423	. . .	During teaching release brake or decouple clutch from motor
2219/36385	. . .	Transfer, load data from rom, bubble memory into ram	2219/36424	. . .	Balance mechanically arm to be moved
2219/36386	. . .	Bootstrap loader	2219/36425	. . .	Move manually, touch surface, record position
2219/36387	. . .	Interface between reader and nc	2219/36426	. . .	Pilot lamp on end effector to guide operator
2219/36388	. . .	Simulate reader to input data direct to nc, behind tape reader BTR	2219/36427	. . .	Jog feed to a command position, if close enough robot takes over positioning
2219/36389	. . .	Switch between input from internal manual thumbwheel and external input	2219/36428	. . .	During teaching set torque instruction for motor to zero
2219/36391	. . .	Keep subsystem stopped while load of program	2219/36429	. . .	Power assisted positioning
2219/36392	. . .	Rewrite data if power loss, check flag area, marked at start, end of writing	2219/36431	. . .	Tv camera in place of tool, on display operator marks points, crosshair
2219/36393	. . .	Variable read in speed, from max to zero, controls execution speed of program	2219/36432	. . .	By putting some constraints on some DOF, move within limited volumes, areas, planes, limits motion in x, y or z planes, virtual reality constraints
2219/36394	. . .	Read in data from connected pc instead of nc control panel	2219/36433	. . .	Position assisted teaching
2219/36395	. . .	Load local computer program from host, data transfer ram to rom, BTR	2219/36434	. . .	During teaching direct control signal to power servo for quick response
2219/36396	. . .	Load also function code needed to execute part program, compact controller	2219/36435	. . .	Electromyographical, myoelectric control signal
2219/36397	. . .	Read reference data only after certain delay, to be sure data will not change	2219/36436	. . .	Arm follows movement of handheld device, camera detects, analyses motion
2219/36398	. . .	Read of handwritten text	2219/36437	. . .	Follow coarse programmed surface, detect contact feeler or no force, record point
2219/36399	. . .	On excess error or on release joystick stop movement, dead man, shut off motors	2219/36438	. . .	Manually selection of points on surface to select area to scan automatically
2219/36401	. . .	Record play back, teach position and record it then play back	2219/36439	. . .	Guide arm in path by slaving arm to projected path, beam riding
2219/36402	. . .	Use rope, wire, cable, chain to record position and for playback	2219/36441	. . .	Follow contour, line with sensor and record points
2219/36403	. . .	Incremental detector of position deviation attached to tool for correction	2219/36442	. . .	Automatically teaching, teach by showing
2219/36404	. . .	Adapt taught position as function of deviation 3-D, 2-D position workpiece	2219/36443	. . .	Auto follow coarse contour, operator can correct contour before recording
2219/36405	. . .	Adjust path by detecting path, line with a photosensor	2219/36444	. . .	Contour, teach contour of sawblade
2219/36406	. . .	Use a spring or gas pressure to keep tool on desired path	2219/36445	. . .	Mode selection between large displacement and precision work
2219/36407	. . .	Follow path with probe, store deviations for correction during normal operation	2219/36446	. . .	Keep tool stationary, move workpiece
2219/36408	. . .	During machining, store begin and end of region not finished during first pass	2219/36447	. . .	Project light on path to be followed, keep also distance constant
2219/36409	. . .	Geometric adaptation by sensing force on surface of workpiece, object	2219/36448	. . .	Teaching, consider workpoint on workpiece temporarily as tip of end effector
2219/36411	. . .	By coarse model of robot to modify commands, learned by feedforward controller	2219/36449	. . .	During teaching use standard subroutines, assemble them to macro sequences
2219/36412	. . .	Fine, autonomous movement of end effector by using camera	2219/36451	. . .	Handheld toollike probe, work instructor, lightweighted, connected to recorder
2219/36413	. . .	Adapt playback as function of hardness material, time comparison to reach start point	2219/36452	. . .	Touch points with handheld probe, camera detects position and orientation probe

2219/36453	. . .	Handheld tool like probe	2219/36492	. . .	Record position and orientation, posture of probe, tool
2219/36454	. . .	Master slave, director agent, operator replication	2219/36493	. . .	Position of stillstand if no reverse and acceleration only, data compression
2219/36455	. . .	Sensor, tactile feedback, operator feels forces of tool on workpiece	2219/36494	. . .	Record position and inclination of tool, wrist
2219/36456	. . .	Learning tool holding dynamics	2219/36495	. . .	Recording position and other parameters, current, tool diameter, voltage
2219/36457	. . .	During teaching, force set point is automatically adapted to circumstances	2219/36496	. . .	Memorize open, closed state of hand and corresponding motion parameters such as open, close and move, no move
2219/36458	. . .	Teach only some points, for playback interpolation between points	2219/36497	. . .	Select program, main and secondary program
2219/36459	. . .	offline program for plural robots, send data to corresponding robots	2219/36498	. . .	Main and secondary program for repeating same operations
2219/36461	. . .	Teach for each next similar fixture, piece only some reference points	2219/36499	. . .	Part program, workpiece, geometry and environment, machining dependant, combine
2219/36462	. . .	Minimize teach time, compress data, many points in curve, few in line	2219/36501	. . .	For each contour a tape, a program
2219/36463	. . .	Manual switch to drive motor to wanted position, store, memorize position	2219/36502	. . .	Ram for variable servo data, rom for fixed servo routine
2219/36464	. . .	Position, teach, store extreme, full open, closed positions	2219/36503	. . .	Adapt program to real coordinates, software orientation
2219/36465	. . .	Teach and store also intermediate, between full open and closed positions, areas	2219/36504	. . .	Adapt program to real coordinates, shape, dimension of tool, offset path
2219/36466	. . .	Teach motion profile in both directions, between full closed and open position	2219/36505	. . .	Compare stored conditions to actual, adapt program
2219/36467	. . .	Teach and store time needed from open to closed and closed to open position	2219/36506	. . .	Store in Rom and Ram
2219/36468	. . .	Teach and store intermediate stop position in moving route to avoid collision	2219/36507	. . .	Select program or execute command, control instructions as function of axis position
2219/36469	. . .	Separate axis movement with higher acceleration replaces simultaneous movement	2219/36508	. . .	Each pallet, workpiece, tool holder, selects corresponding tape reader, program
2219/36471	. . .	Recording speed different from playback speed	2219/36509	. . .	Select as function of shape, dimension of workpiece
2219/36472	. . .	During teaching low servo power, during playback high servo power	2219/36511	. . .	Select by a detector
2219/36473	. . .	Prohibit teaching if force, speed, acceleration of end effector is out of safe range	2219/36512	. . .	Select by a selector, dip switch
2219/36474	. . .	Prohibit normal manipulator control during teaching	2219/36513	. . .	Select out of a plurality of programs, patterns
2219/36475	. . .	When operator near robot, local pendant is enabled otherwise select local remote	2219/36514	. . .	Select by force, height or other detection
2219/36476	. . .	Record points if sufficient difference with previous position exists	2219/36515	. . .	As function of material or pattern direction, nerves of wood for optimal cutting
2219/36477	. . .	Timing record position according to pulses coding wheel	2219/36516	. . .	Select acceleration deceleration profile as function of kind of machine
2219/36478	. . .	Record on predetermined time, read in position, measured data	2219/36517	. . .	Selecting nc program points to mated manipulator, robot program
2219/36479	. . .	Record position on trigger of touch probe	2219/36518	. . .	Selection of calibration program as function of parameter to be calibrated
2219/36481	. . .	Record at predetermined distances, read in position, measured data	2219/36519	. . .	After sporadic change of program, return to program in use before
2219/36482	. . .	Recording of position and of command instructions	2219/36521	. . .	Select by combination of detected force, acceleration, speed, work rate
2219/36483	. . .	Recording mechanical properties, tonal quality by force detection	2219/36522	. . .	Select program using a management, workpiece number
2219/36484	. . .	Each taught point has a correlated amount of shift data, independently modified	2219/36523	. . .	Select with code on workpiece, fixture, clamp, object
2219/36485	. . .	Memorize open and closed state, motion parameters at each start up	2219/36524	. . .	Selection of Rom and ram
2219/36486	. . .	Memorize workpiece deviations as function of angle, compensate, extra feed	2219/36525	. . .	On bad data block, reverse motion, correct and execute block
2219/36487	. . .	Record position, motion and sound	2219/36526	. . .	Regenerate, hold reference previous block for bad actual value, block
2219/36488	. . .	Record motion and emotion, mimics	2219/36527	. . .	Separate input for machine data from operator and for program from programmer
2219/36489	. . .	Position and force	2219/36528	. . .	Interlock, inhibit nc control while transferring data from host
2219/36491	. . .	Contour of workpiece where other workpiece is to be installed	2219/36529	. . .	Warn, alert, notify operator to confirm a preset override value, command
			2219/36531	. . .	Inhibit, ignore or postpone new command if previous is still in execution

2219/36532	. . .	Detect overflow of buffer	2219/36578	. . .	Tracks for x, two for delta x, one for sign, three for y
2219/36533	. . .	Writing critical contour data as a whole, inhibit read out during writing	2219/36579	. . .	Only true dimension is recorded, no tool offset
2219/36534	. . .	Manual input overrides automatic control	2219/36581	. . .	X, Y, Vx, Vy
2219/36535	. . .	Check if instruction is executable, if not message to operator	2219/36582	. . .	Special order
2219/36536	. . .	Inhibit, forbid, prevent execution of program if no tool or workpiece data	2219/36583	. . .	Each punched hole is one pulse, increment
2219/36537	. . .	On error acoustic signal	2219/36584	. . .	X, Y, Z and tool offset or corrections
2219/36538	. . .	Different tunes, melodies, voice patterns for different error indication	2219/36585	. . .	Speed and acceleration, rate of change of speed
2219/36539	. . .	Different colours for program and machine error, failure display	2219/36586	. . .	Word address format
2219/36541	. . .	Operation command stored in register, on completion also in other register	2219/36587	. . .	Binary format
2219/36542	. . .	Cryptography, encrypt, access, authorize with key, code, password	2219/36588	. . .	Endless loop
2219/36543	. . .	Input a standard value automatically on power up or after power loss	2219/36589	. . .	Making control tape
2219/36544	. . .	Inhibiting manual control while under automatic, other control <i>vice versa</i>	2219/36591	. . .	Tape moves synchronized with machine driven axis
2219/36545	. . .	Safety, save data at power loss	2219/36592	. . .	Each track controls an axis
2219/36546	. . .	Memory protection, protected fields	2219/37	. .	Measurements
2219/36547	. . .	Use binary code to avoid program tampering	2219/37001	. . .	Measuring problems
2219/36548	. . .	Save data if trigger signal received	2219/37002	. . .	Absence, detect absence, presence or correct position of workpiece
2219/36549	. . .	Regenerate faulty program block from previous and next block	2219/37003	. . .	Detect if no workpiece in holder
2219/36551	. . .	Inhibiting control after detecting data error	2219/37004	. . .	Detect absence of tool
2219/36552	. . .	Inhibiting simultaneous input from local and remote keyboard	2219/37005	. . .	Absence of tool accessories, material, like nails, staples, glue
2219/36553	. . .	Track, channel on tape for each direction of movement	2219/37006	. . .	Measuring bars
2219/36554	. . .	Copy modified, corrected program to another tape, keep original intact	2219/37007	. . .	Join bars or cylinders binary
2219/36555	. . .	Two tapes, programs one for position data, one for commands	2219/37008	. . .	Calibration of measuring system, probe, sensor
2219/36556	. . .	Compare, check original tape with converted, copy tape	2219/37009	. . .	Calibration of vision system, camera, adapt light level
2219/36557	. . .	Copy entered program in memory to tape	2219/37011	. . .	Set absolute marks on disk as exact position or address to position memory
2219/36558	. . .	Forward and backward reading of tape, reverse execution program	2219/37012	. . .	Adjust angular position of transducer
2219/36559	. . .	Copy one tape to another, transfer program from tape to tape, back-up	2219/37013	. . .	Faulty number of total scale increments corrected evenly over scale
2219/36561	. . .	Tape, band	2219/37014	. . .	Use of calibration bar, bar with cams
2219/36562	. . .	One tape, copy feeler controls several machines	2219/37015	. . .	Adaptive online camera, vision calibration
2219/36563	. . .	Two tapes	2219/37016	. . .	Calibrate dc offset, measure offset and maintain fixed level
2219/36564	. . .	Position of hole in tape corresponds with position of hole on workpiece	2219/37017	. . .	Calibration of vision system, set correct attitude of sensor to workpiece
2219/36565	. . .	Cartesian and polar data mixed	2219/37018	. . .	Make measuring scale machine tool
2219/36566	. . .	Mix polar data with cartesian data	2219/37019	. . .	Position detection integrated in actuator, lvdv integrated linear actuator
2219/36567	. . .	On tape also commands for equipment attached to machine	2219/37021	. . .	Robot controls position of touch probe
2219/36568	. . .	Control data is sequence of position, axis indication, time delay for speed	2219/37022	. . .	Detector, measuring device incorporated within workpiece holder
2219/36569	. . .	Enter, punch only different, changed data, same not repeated in next block	2219/37023	. . .	Step motor used as measuring device and as drive motor
2219/36571	. . .	Coarse and fine dimensions	2219/37024	. . .	Measure single value, parameter with two detectors
2219/36572	. . .	Macro data or coarse dimension on tape	2219/37025	. . .	Retract, swing out of the way, measuring device during normal machining for protection
2219/36573	. . .	X, y, z and tooloffset values or direction values	2219/37026	. . .	Adjust sensor radially
2219/36574	. . .	Absolute x or delta x values	2219/37027	. . .	Sensor integrated with tool or machine
2219/36575	. . .	On tape reference and command signals	2219/37028	. . .	Detail, extended range, discrimination, switch from one range to other
2219/36576	. . .	Relative phase of signals is variable	2219/37029	. . .	Power supply position detector in common with drive motor
2219/36577	. . .	Signals have a position dependant frequency	2219/37031	. . .	Lvdv for x and y in a plane, center lines intersect at locating point
			2219/37032	. . .	Generate vibrations, ultrasound
			2219/37033	. . .	Energy saving by powering feedback device, potentiometer only during measuring
			2219/37034	. . .	Actuator coil is also used as measuring coil

2219/37035	. . .	Sensor in air gap of drive, detect directly speed or position	2219/37075	. . .	Print out of document measured results or record on tape
2219/37036	. . .	Position normally, stop, measure position tool with second independent sensor	2219/37076	. . .	Display load on tool, motor graphically on screen
2219/37037	. . .	Remeasure workpiece regularly for deformation	2219/37077	. . .	Relative movement
2219/37038	. . .	Protection cover over measuring device, probe, feeler opened when measuring	2219/37078	. . .	Display machining, processing parameters with curves, pictograms
2219/37039	. . .	Digitize position with flexible feeler, correction of position as function of flexion	2219/37079	. . .	Display probing result on drawing taken from cad data
2219/37041	. . .	Digitize, electric wires form grid on surface	2219/37081	. . .	Display machining parameters
2219/37042	. . .	Photographic, picture on film, photogrammetry	2219/37082	. . .	Indicate, point region on path, locus, display path and machining parameters
2219/37043	. . .	Touch probe, store position of touch point on surface	2219/37083	. . .	Switch display from normal mode to inspection mode, to monitor conditions
2219/37044	. . .	Ultrasound transmitters on surface, touch probe detects ultrasound, triangulation	2219/37084	. . .	Display tool parameters
2219/37045	. . .	Probe detects electromagnetic fields from grid, antenna like digitizing tablet	2219/37085	. . .	Display in real time of state variables of control system
2219/37046	. . .	Use simultaneous several pairs of stereo cameras, synchronized	2219/37086	. . .	Display real, measured machining load
2219/37047	. . .	After digitizing, edit graphically data	2219/37087	. . .	Cutting forces
2219/37048	. . .	Split beam, stripe projection on object, lines detected with cameras	2219/37088	. . .	Indicate service condition, status
2219/37049	. . .	First a rasterscan, then align workpiece as function of height average, scan again	2219/37089	. . .	Speed error
2219/37051	. . .	First coarse measurement, around each point a fine measurement of surface	2219/37091	. . .	Motion and force
2219/37052	. . .	Sense surface, mean value used as reference surface	2219/37092	. . .	Display position actual and or target
2219/37053	. . .	Optical triangulation	2219/37093	. . .	Display speed
2219/37054	. . .	Digitize every grid point of a raster	2219/37094	. . .	Hall sensor
2219/37055	. . .	Project stripes having a regular sine wave	2219/37095	. . .	Digital handheld device with data interface
2219/37056	. . .	Mark point to be digitized graphically on screen	2219/37096	. . .	Invar scale, low temperature coefficient
2219/37057	. . .	Several feelers, probes touch model in rasterpoints	2219/37097	. . .	Marker on workpiece to detect reference position
2219/37058	. . .	Digitize not only position but also colour	2219/37098	. . .	X y scale plate instead of two ruler scale, two dimensional scale
2219/37059	. . .	Probe connected to three pair of wires of which the length is measured	2219/37099	. . .	One detector for coarse and fine target location, variable resolution
2219/37061	. . .	Use matrix of optical sensors to detect form, edges of object	2219/37101	. . .	Vector gauge, telescopic ballbar
2219/37062	. . .	Regulated scanning, the head deflection is controlled by a regulation circuit	2219/37102	. . .	Single detector for whole range, both x and y axis
2219/37063	. . .	Controlled scanning, the head is moved along a given path	2219/37103	. . .	Limit, proximity switch
2219/37064	. . .	After digitizing, reconstruct surface by interpolating the initial mesh points	2219/37104	. . .	Absolute encoder
2219/37065	. . .	Map of stiffness, compliance of object	2219/37105	. . .	Soft limit, store limits in counters, use content of counters as limit
2219/37066	. . .	Image from object together with references on background	2219/37106	. . .	Inductive, differential transformer, pins
2219/37067	. . .	Calibrate work surface, reference markings on object, work surface	2219/37107	. . .	Acupin
2219/37068	. . .	Setting reference coordinate frame	2219/37108	. . .	Rasters, grid on xy-plane
2219/37069	. . .	Calibrate probe, imitated tool, repeated measurements for different orientations	2219/37109	. . .	Photoelectric scanned raster, rule and photocell, microscope
2219/37071	. . .	Measurement program is created, executed on object data, no real object, no CMM is present	2219/37111	. . .	Rule and photocell, microscope
2219/37072	. . .	Surface covered with grid of electric wires, of coloured tape on object	2219/37112	. . .	Several scales with one device
2219/37073	. . .	Workpiece surface covered with shielding coating, against disturbing fields	2219/37113	. . .	Psd position sensitive detector, light spot on surface gives x, y position
2219/37074	. . .	Projection device, monitor, track tool, workpiece form, process on display	2219/37114	. . .	Precision screw
			2219/37115	. . .	Photogrammetric position detection
			2219/37116	. . .	Shape sensor leads tool, in front of tool
			2219/37117	. . .	Optical sensor, delivers analog signal as function of displacement
			2219/37118	. . .	Inductive, coil moves over conical, tapered core
			2219/37119	. . .	Atomic force probe
			2219/37121	. . .	Linear transducer
			2219/37122	. . .	Signal analyser
			2219/37123	. . .	Extensible ball bar with potentiometer, lvdt
			2219/37124	. . .	Magnetic sensor
			2219/37125	. . .	Photosensor, as contactless analog position sensor, signal as function of position

2219/37126	. . .	Wire, tape around cylinder measures displacement, string encoder	2219/37168	. . .	Inductive sensor senses fluctuations, spikes in motor current
2219/37127	. . .	Spm scanning probe microscopy, stm scanning tunneling microscopy	2219/37169	. . .	Derive incremental pulse from motor current deviation
2219/37128	. . .	Tool itself emits vibrations to be detected to build an image of surface	2219/37171	. . .	Commutation brushes, sensors deliver increment
2219/37129	. . .	Mark, engrave workpiece at specific surface point for measurement, calibration	2219/37172	. . .	Encoder with hall effect and reed relays, and decoder gives absolute position
2219/37131	. . .	Moire pattern, diffraction grating, fringe	2219/37173	. . .	Encapsulate electronics of encoder in resin, electronics and encoder integrated
2219/37132	. . .	Polyhedral prism	2219/37174	. . .	Encoder with infrared
2219/37133	. . .	Linear, rotary variable differential transformer, lvd, rvd	2219/37175	. . .	Normal encoder, disk for pulses, incremental
2219/37134	. . .	Gyroscope	2219/37176	. . .	Disk emits phase shifted pulses, special convertor
2219/37135	. . .	Two counters receiving pulses from two encoders, one for speed, one for position	2219/37177	. . .	Linear encoder
2219/37136	. . .	Control resolution of encoder	2219/37178	. . .	Magnetic marks on screw
2219/37137	. . .	Encoder combined with barcode label, reader	2219/37179	. . .	Coarse encoder combined with fine grid ccd detector
2219/37138	. . .	Encoder and gear and absolute coder, give together absolute position of rotation	2219/37181	. . .	Encoder delivers sinusoidal signals
2219/37139	. . .	Sampling output of encoder at precisely defined intervals	2219/37182	. . .	Slit plate encoder
2219/37141	. . .	Programmable divider for counter as buffer for microprocessor, read on interrupt	2219/37183	. . .	Marker or index or coded information as well as position pulses
2219/37142	. . .	Center position between two pulses, in the middle of a bit	2219/37184	. . .	Hall generator cooperates with magnetic ring, gives signal with dc offset
2219/37143	. . .	Divide feedback pulses to make feedback independent from resolution encoder	2219/37185	. . .	Magnetic ring and sensor
2219/37144	. . .	Delay marker to synchronize motions	2219/37186	. . .	Camera reads large number of marks, derive frequency of dark-light
2219/37145	. . .	Multiturn fine counter counts total pulses, index counter counts turns	2219/37187	. . .	Disk with magnetic, inductive sensors
2219/37146	. . .	Second counter reset to zero on marker, to detect counting errors	2219/37188	. . .	Encoder pulses reset high resolution clock, get position from counting clock pulses
2219/37147	. . .	Sampling rate low during power loss	2219/37189	. . .	Camera with image processing emulates encoder output
2219/37148	. . .	Switch between rise, fall of pulses of one phase and of both phases, coarse fine	2219/37191	. . .	General problems for standing waves, torque, surface inspection
2219/37149	. . .	Multiplexer to send encoder and rotor pole position to same output lines	2219/37192	. . .	Problems
2219/37151	. . .	Handling encoder signal, compensation for light variation, stray light	2219/37193	. . .	Multicoordinate measuring system, machine, cmm
2219/37152	. . .	Combination 00-01-10-11, previous, actual pulses, or two series of pulses, and rom	2219/37194	. . .	Probe work, calculate shape independent of position, orientation, best fit
2219/37153	. . .	Encoder delivers only one channel of pulses, using only one detector	2219/37195	. . .	Measuring dimension independent from accuracy of nc, machine tool
2219/37154	. . .	Encoder and absolute position counter	2219/37196	. . .	Measuring station, flexible, integrated cmm
2219/37155	. . .	Encoder and delta position counter	2219/37197	. . .	From measured data derive form, roundness, orientation, parallel, straightness
2219/37156	. . .	Pulse derived from belt driving drum	2219/37198	. . .	Machine as measuring station, use tool or probe, in process incycle
2219/37157	. . .	Pulses derived from brake disk having north and south poles	2219/37199	. . .	Hole location
2219/37158	. . .	Pulse derived from perforated belt along track	2219/37201	. . .	Measuring several points at the same time
2219/37159	. . .	Source of pulse, pulse derived from gear, plate teeth	2219/37202	. . .	Footprint, probe piece on machine, then on cmm to avoid errors of machine
2219/37161	. . .	Motor rotor has a normal magnetised ring and a second ring, magnetic decoder	2219/37203	. . .	Compensate probed values as function of reference plane of fixture, clamp
2219/37162	. . .	Marker, reflector mounted on chuck, workpiece holder	2219/37204	. . .	Move synchronously associated sensor elements independently at both sides
2219/37163	. . .	Marker derived from phase of motor	2219/37205	. . .	Compare measured, vision data with computer model, cad data
2219/37164	. . .	Pulse derived from encoder built into ball bearing	2219/37206	. . .	Inspection of surface
2219/37165	. . .	Derive pulse from commutation position, build into brushless motor	2219/37207	. . .	Verify, probe, workpiece
2219/37166	. . .	Rotating magnets shunt motor over resistance, cause current variations	2219/37208	. . .	Vision, visual inspection of workpiece
2219/37167	. . .	Count number of periods of voltage supply	2219/37209	. . .	Estimate life of gear, drive
			2219/37211	. . .	Measure temperature, compensate cmm program for temperature
			2219/37212	. . .	Visual inspection of workpiece and tool

2219/37213	. . .	Inhibit measuring if one of the joints is near endstop	2219/37258	. . .	Calculate wear from workpiece and tool material, machining operations
2219/37214	. . .	Detect failed machine component, machine performance degradation	2219/37259	. . .	Resolver for coarse, photo cell for fine position on grid crossing
2219/37215	. . .	Inspect application of solder paste, glue to workpiece	2219/37261	. . .	Encoder and potentiometer to detect fault measurement
2219/37216	. . .	Inspect component placement	2219/37262	. . .	Mixing pins and fine positioning
2219/37217	. . .	Inspect solder joint, machined part, workpiece, welding result	2219/37263	. . .	Absolute and incremental encoder, detector combined
2219/37218	. . .	Compensate for offset due to probe diameter, detect exact contact point	2219/37264	. . .	Cam for absolute positions, encoder for incremental position
2219/37219	. . .	Predict next probed point from previous probed points	2219/37265	. . .	Rotary potentiometer and incremental counter for each maximum
2219/37221	. . .	Probe fixture to know datum points	2219/37266	. . .	Infrared
2219/37222	. . .	Probe workpiece for correct setup	2219/37267	. . .	Thermocouple
2219/37223	. . .	Identify minimum number of appropriate measuring points	2219/37268	. . .	Tool workpiece junction, thermoelectric interface
2219/37224	. . .	Inspect wafer	2219/37269	. . .	Ultrasonic, ultrasound, sonar
2219/37225	. . .	Tool holder, measure forces in chuck, tool holder	2219/37271	. . .	Using standing waves
2219/37226	. . .	Monitor condition of spindle, tool holder, transmit to nc controller	2219/37272	. . .	Capacitive
2219/37227	. . .	Probing tool for its geometry	2219/37273	. . .	Wheatstone bridge
2219/37228	. . .	Tool inspection, condition, dull tool	2219/37274	. . .	Strain gauge
2219/37229	. . .	Test quality tool by measuring time needed for machining	2219/37275	. . .	Laser, interferometer
2219/37231	. . .	Tool used as touch probe, sensor	2219/37276	. . .	Position changes frequency
2219/37232	. . .	Wear, breakage detection derived from tailstock, headstock or rest	2219/37277	. . .	Inductive proximity sensor
2219/37233	. . .	Breakage, wear of rotating tool with multident saw, mill, drill	2219/37278	. . .	Optical waveguide, fiberoptic sensor
2219/37234	. . .	Monitor tool before, after and during machining	2219/37279	. . .	Fiber optic proximity sensor
2219/37235	. . .	Detect bad tool by relative movement of tool with respect to tool holder	2219/37281	. . .	Laser range finder
2219/37236	. . .	Tool serves, acts also as measuring device	2219/37282	. . .	Current transformer
2219/37237	. . .	Tool collision, interference	2219/37283	. . .	Photoelectric sensor
2219/37238	. . .	Missing tool	2219/37284	. . .	Capacitive 3-D proximity sensor
2219/37239	. . .	Plastic deformation of tool	2219/37285	. . .	Load, current taken by motor
2219/37241	. . .	Displacement of tool, miss inserted	2219/37286	. . .	Photoelectric sensor with reflection, emits and receives modulated light
2219/37242	. . .	Tool signature, compare pattern with detected signal	2219/37287	. . .	Fiber optic interferometer
2219/37243	. . .	Tool breakage by comparing tool image, length before and after machining	2219/37288	. . .	Tracking lasers follow object, reflection gives 3-D position
2219/37244	. . .	Detect tool breakage already in tool magazine	2219/37289	. . .	Inductive
2219/37245	. . .	Breakage tool, failure	2219/37291	. . .	Electro acoustic
2219/37246	. . .	Compare estimated torques of different axis with reference for breakage	2219/37292	. . .	Eddy current
2219/37247	. . .	By electrical contact, disappears when breakage	2219/37293	. . .	Magnetostrictive effect on ferrous rod, ultrasonic wave, time delay measured
2219/37248	. . .	By monitoring changes in capacitive circuit	2219/37294	. . .	Coarse digitized position combined with fine digitized analog position signal
2219/37249	. . .	Correction coefficient of life time as function of kind of machining	2219/37295	. . .	Measure workpiece while machining other workpiece
2219/37251	. . .	Selfcorrecting, counter for tool life adapts correction	2219/37296	. . .	Electronic graduation, scale expansion, interpolation
2219/37252	. . .	Life of tool, service life, decay, wear estimation	2219/37297	. . .	Two measurements, on driving motor and on slide or on both sides of motor
2219/37253	. . .	Fail estimation as function of lapsed time of use	2219/37298	. . .	Two measurements, position of slide and position of tool
2219/37254	. . .	Estimate wear of subsystem of machine with measures from other subsystems	2219/37299	. . .	Measure same parameter from three different space directions
2219/37255	. . .	Using fuzzy logic techniques	2219/37301	. . .	Two measurements, speed with tachometer and speed with encoder
2219/37256	. . .	Wear, tool wear	2219/37302	. . .	Measure tool length, workpiece configuration without stopping movement
2219/37257	. . .	Crater wear of tool	2219/37303	. . .	Two measurements, speed of motor and speed of load
			2219/37304	. . .	Combined position measurement, encoder and separate laser, two different sensors

2219/37305	. . .	Drive step motor with pulses, at stop with dc current to avoid emi when measuring	2219/37357	. . .	Force, pressure, weight or deflection
2219/37306	. . .	Two sensors and two scales for same measurement of relative movement between x y	2219/37358	. . .	Depth of cut
2219/37307	. . .	Detector in line, in plane of tool to avoid parallax	2219/37359	. . .	Contour, to sense corners, edges of surface
2219/37308	. . .	Measure workpiece relieved from stress, redrawn, disengaged tool	2219/37361	. . .	acoustic feedback, for speed, if speed very low hearing is better than seeing
2219/37309	. . .	Selecting a desired sensor structure	2219/37362	. . .	Hardness
2219/37311	. . .	Derive speed from current, use of lookup table	2219/37363	. . .	Texture
2219/37312	. . .	Derive speed from motor current	2219/37364	. . .	Thermal conductivity
2219/37313	. . .	Derive speed from position	2219/37365	. . .	Surface shape, gradient
2219/37314	. . .	Derive position from speed	2219/37366	. . .	Colour, surface colour
2219/37315	. . .	High speed and low speed signals are derived in a different way	2219/37367	. . .	Grinding rate
2219/37316	. . .	Derive speed from two phased position signals, with high range and resolution	2219/37368	. . .	Displacement perpendicular to probe movement
2219/37317	. . .	Derive position from current, voltage, back electromotive force bemf	2219/37369	. . .	Measure tool length and diameter together with single sensor
2219/37318	. . .	Derive speed from back electromotive force, bemf	2219/37371	. . .	Flow
2219/37319	. . .	Derive acceleration, force, torque from current	2219/37372	. . .	Position and speed
2219/37321	. . .	Derive acceleration from net driving force	2219/37373	. . .	Friction
2219/37322	. . .	Derive position from frequency power supply	2219/37374	. . .	Deflection
2219/37323	. . .	Derive acceleration from position or speed	2219/37375	. . .	Climate, temperature and humidity
2219/37324	. . .	Derive position, speed from acceleration	2219/37376	. . .	Inclination, gradient of machine base
2219/37325	. . .	Multisensor integration, fusion, redundant	2219/37377	. . .	Roundness of workpiece
2219/37326	. . .	Automatic configuration of multisensor, adaptive, active sensing	2219/37378	. . .	Balance of workpiece from vibration sensor and angle sensor
2219/37327	. . .	Select lookup table corresponding to sensor	2219/37379	. . .	Profile, diameter along workpiece
2219/37328	. . .	Decentralised data fusion	2219/37381	. . .	Force in steady rest
2219/37329	. . .	Far away and near by sensor groups	2219/37382	. . .	Voltage over or short circuit between tool and workpiece
2219/37331	. . .	Sensor fusion using extended kalman filter	2219/37383	. . .	Tool length
2219/37332	. . .	Detect power of noise source using sound and visual sensors	2219/37384	. . .	Change of actuator current
2219/37333	. . .	Position of control valve and position of controlled actuator	2219/37385	. . .	Peripheral speed
2219/37334	. . .	Diameter of tool with teeth	2219/37386	. . .	Lateral movement of tool
2219/37335	. . .	Diameter tool	2219/37387	. . .	Nanometer position
2219/37336	. . .	Cutting, machining time	2219/37388	. . .	Acceleration or deceleration, inertial measurement
2219/37337	. . .	Noise, acoustic emission, sound	2219/37389	. . .	Magnetic flux
2219/37338	. . .	Magnetic or electric property of tool to control feed	2219/37391	. . .	Null, initial load, no load torque detection or other parameter at no load
2219/37339	. . .	Eccentricity, cylindricity, circularity	2219/37392	. . .	Motion
2219/37341	. . .	Sectional distortion of machining face of workpiece	2219/37393	. . .	acoustic feedback varies as function of positional error
2219/37342	. . .	Overload of motor, tool	2219/37394	. . .	Measuring diameter of workpieces with longitudinal grooves
2219/37343	. . .	Load, vectorial components of load	2219/37395	. . .	Detection sparks during machining
2219/37344	. . .	Torque, thrust, twist, machining force measurement	2219/37396	. . .	Tactile feedback, operator feels reaction, force reflection
2219/37345	. . .	Dimension of workpiece, diameter	2219/37397	. . .	Measuring gap between tool and workpiece
2219/37346	. . .	Cutting, chip quality	2219/37398	. . .	Thickness
2219/37347	. . .	Speed, velocity	2219/37399	. . .	Pressure
2219/37348	. . .	Power, wattmeter voltage times current	2219/37401	. . .	Differential pressure
2219/37349	. . .	Unbalance of tool or tool holder	2219/37402	. . .	Flatness, roughness of surface
2219/37351	. . .	Detect vibration, ultrasound	2219/37403	. . .	Bending, springback angle
2219/37352	. . .	Frequency	2219/37404	. . .	Orientation of workpiece or tool, surface sensor
2219/37353	. . .	Amplitude	2219/37405	. . .	Contact detection between workpiece and tool, probe, feeler
2219/37354	. . .	Powerfactor, phase between voltage and current	2219/37406	. . .	Detect position of detector contact point relative to reference on tool slide
2219/37355	. . .	Cutting, milling, machining force	2219/37407	. . .	Detect position of detector contact point relative to reference on tool
2219/37356	. . .	Torsion, twist	2219/37408	. . .	Combination of contact and contactless detection to avoid tool contact with workpiece
			2219/37409	. . .	Measure different pressure of fluid flow on contacting surface

2219/37411	. . .	Measure contact from force and velocity detection	2219/37458	. . .	Reference on machine, on workpiece and on tool
2219/37412	. . .	acoustical detection of contact	2219/37459	. . .	Reference on workpiece, moving workpiece moves reference point
2219/37413	. . .	By conductivity, short circuit between tool, probe and metallic surface	2219/37461	. . .	Two rotary potentiometers, only one used, switch over to other on ambiguity
2219/37414	. . .	By microswitch	2219/37462	. . .	Resistor, potentiometers
2219/37415	. . .	By cutting light beam	2219/37463	. . .	Tapped resistors, not continuous
2219/37416	. . .	By measuring phase shift between voltage and current of feedmotor	2219/37464	. . .	Potentiometer with dual wiper
2219/37417	. . .	By linear varying electrical signal	2219/37465	. . .	Magnetic resistor
2219/37418	. . .	By capacitive means	2219/37466	. . .	Dual potentiometers with sin and cos output
2219/37419	. . .	Measuring rotation of non driven axis after being touched by driven axis	2219/37467	. . .	Continuous rotary potentiometer, no end
2219/37421	. . .	Measure braking, slower rotation of driven axis, tool upon contact	2219/37468	. . .	Magnetic resistor sensors used as incremental encoder
2219/37422	. . .	Distance and attitude detector	2219/37469	. . .	Two, more slides use resolver with common secondary, different primary frequency
2219/37423	. . .	Distance, gap between tool and surface sensor	2219/37471	. . .	Resolver, synchro
2219/37424	. . .	Calculate distance from known inner diameter of coil, bobbin and detected image	2219/37472	. . .	Synchro
2219/37425	. . .	Distance, range	2219/37473	. . .	Resolver
2219/37426	. . .	Detected with infrared sensor	2219/37474	. . .	Resolver with several phases
2219/37427	. . .	Detected with thermocouple	2219/37475	. . .	Resolver emits two redundant signals for safety
2219/37428	. . .	Temperature of tool	2219/37476	. . .	Single resolver for speed, rotor and absolute position, IMAS
2219/37429	. . .	Temperature of motor	2219/37477	. . .	Inductosyn
2219/37431	. . .	Temperature	2219/37478	. . .	Excitation of resolver by pulses instead of continuous wave, to save energy
2219/37432	. . .	Detected by accelerometer, piezo electric	2219/37479	. . .	Excitation as function of speed of rotor, to get always stable detection waves
2219/37433	. . .	Detected by acoustic emission, microphone	2219/37481	. . .	Sampling rate for output of resolver as function of pulse rate of excitation
2219/37434	. . .	Measuring vibration of machine or workpiece or tool	2219/37482	. . .	Control amplitude of excitation of resolver
2219/37435	. . .	Vibration of machine	2219/37483	. . .	Synchronize resolver reference frequency with clock of position control
2219/37436	. . .	Prediction of displacement, relative or absolute, motion	2219/37484	. . .	Differential resolver
2219/37437	. . .	Prediction of cutting force with flexible ball end milling model	2219/37485	. . .	Phaseshift to reference counted
2219/37438	. . .	Prediction of machining error with flexible ball end milling model	2219/37486	. . .	Resolver emits pulses at zerocrossings, counter
2219/37439	. . .	Computer assisted inspection, cad interactive with manual commands	2219/37487	. . .	Counter combined with angle to digital convertor
2219/37441	. . .	Use nc machining program, cad data for measuring, inspection	2219/37488	. . .	Angle to digital conversion
2219/37442	. . .	Cad and cap for cmm	2219/37489	. . .	Emit binary code at quadrant 00+01+10+11, count pulse for 11-to-000 and 00-to-11
2219/37443	. . .	Program cmm, coordinate measuring machine, use cad data	2219/37491	. . .	Compensate non linearity of transducer by lookup table
2219/37444	. . .	Program cmm by using a stylus to detect points on a real workpiece	2219/37492	. . .	Store measured value in memory, to be used afterwards
2219/37445	. . .	Load teaching program from file server, enter teaching data at pendant	2219/37493	. . .	Use of different frequency band pass filters to separate different signals
2219/37446	. . .	Select measuring program together with control parameters	2219/37494	. . .	Intelligent sensor, data handling incorporated in sensor
2219/37447	. . .	Path planning using ann, for measurement task pattern, optimal path, dummy points	2219/37495	. . .	Correction of measured value as function of given, reference surface
2219/37448	. . .	Inspection process planner	2219/37496	. . .	Root mean square
2219/37449	. . .	Inspection path planner	2219/37497	. . .	Summing, integration of signal
2219/37451	. . .	Plan sensor placement for optimal inspection	2219/37498	. . .	Variable amplification, gain for detected signal, select correct level range
2219/37452	. . .	Generate nc program from metrology program, defining cmm probe path	2219/37499	. . .	Determine cumulative deviation, difference
2219/37453	. . .	Simulate measuring program, graphical interactive generation of program	2219/37501	. . .	Delay detected signal avoids transients, start up noise
2219/37454	. . .	Interactive, enter also tolerance	2219/37502	. . .	Input signal converted to logarithmic value
2219/37455	. . .	After entering one measuring cycle, display in separate window instruction list	2219/37503	. . .	Set integrator of acceleration detector to zero at velocity zero, avoids drift
2219/37456	. . .	Program proposes measuring points	2219/37504	. . .	Differential use of sensors, to double precision
2219/37457	. . .	On machine, on workpiece			

- 2219/37505 . . . Debounce contact signal from absolute reference position cam
- 2219/37506 . . . Correction of position error
- 2219/37507 . . . Spectral density analysis
- 2219/37508 . . . Cross correlation
- 2219/37509 . . . Intelligent sensor, incorporation temperature compensation
- 2219/37511 . . . Select and process only those detected signals needed for a certain purpose
- 2219/37512 . . . Correction for detection delay
- 2219/37513 . . . Convert time domain signal to frequency domain signal
- 2219/37514 . . . Detect normality, novelty in time series for online monitoring
- 2219/37515 . . . Error separation, eliminate eccentricity
- 2219/37516 . . . Combine results, opinions of multiple but same sensors, fuzzy logic
- 2219/37517 . . . Compensation of position for vibration of probe, calibration x-y lookup table
- 2219/37518 . . . Prediction, estimation of machining parameters from cutting data
- 2219/37519 . . . From machining parameters classify different fault cases
- 2219/37521 . . . Ann to map sensor signals to decision signals
- 2219/37522 . . . Determine validity of measured signals
- 2219/37523 . . . Reduce noise by combination of digital filter and estimator
- 2219/37524 . . . Sampling of forces and signal analysis are triggered as function of rotation angle
- 2219/37525 . . . Mean, average values, statistical derived values
- 2219/37526 . . . Determine time or position to take a measurement
- 2219/37527 . . . Frequency filtering and amplitude qualification
- 2219/37528 . . . Separate force signal into static and dynamic component
- 2219/37529 . . . Synchronous demodulation
- 2219/37531 . . . Superpose modulated measuring signal on servo command reference
- 2219/37532 . . . Synchronized data acquisition
- 2219/37533 . . . Real time processing of data acquisition, monitoring
- 2219/37534 . . . Frequency analysis
- 2219/37535 . . . Signal processing, ratio of signals against fluctuation of signals
- 2219/37536 . . . Rate of change, derivative
- 2219/37537 . . . Virtual sensor
- 2219/37538 . . . Window for signal, to detect signal at peak or zero values
- 2219/37539 . . . Read values twice, for correctness
- 2219/37541 . . . Switch off measuring, control system during test of encoder, resolver
- 2219/37542 . . . Curve fitting measured points, predict, extrapolate dimension in time
- 2219/37543 . . . Set, compare to maximum, peak, minimum value
- 2219/37544 . . . Compare detected signal to several references to derive several control actions
- 2219/37545 . . . References to be compared vary with evolution of measured signals, auto-calibrate
- 2219/37546 . . . Compare two positions measured with different methods, alarm if difference too high
- 2219/37547 . . . Ignore position information from detector during invalid intervals
- 2219/37548 . . . Avoid false motion condition, jitter, compare three recent values with possible values
- 2219/37549 . . . Limit switch protected against overload
- 2219/37551 . . . Select for each detector type corresponding signal processor
- 2219/37552 . . . Detect loss of correct excitation moment of step motor, correct excitation
- 2219/37553 . . . Two cameras one for coarse scanning, other for fine scanning
- 2219/37554 . . . Two camera, or tiltable camera to detect different surfaces of the object
- 2219/37555 . . . Camera detects orientation, position workpiece, points of workpiece
- 2219/37556 . . . Camera detects fictive contour of workpiece, by reflection
- 2219/37557 . . . Camera for coarse, acoustic array for fine vision
- 2219/37558 . . . Optical sensor, scanner
- 2219/37559 . . . Camera, vision of tool, compute tool center, detect tool wear
- 2219/37561 . . . Move camera until image corresponds to stored image of same workpiece
- 2219/37562 . . . Scan mark at certain angle, to avoid glare noise
- 2219/37563 . . . Ccd, tv camera
- 2219/37564 . . . Center of camera vision aligned with axis of drill
- 2219/37565 . . . Camera to detect precisely, crosshair, positions on workpiece by operator
- 2219/37566 . . . Explore autonomous, explore surface until useful measurement possible
- 2219/37567 . . . 3-D vision, stereo vision, with two cameras
- 2219/37568 . . . 3-D spectacles, glasses, left and right synchronised with images on screen
- 2219/37569 . . . Radiography in x and y, x-ray images
- 2219/37571 . . . Camera detecting reflected light from laser
- 2219/37572 . . . Camera, tv, vision
- 2219/37573 . . . In-cycle, insitu, during machining workpiece is measured continuously
- 2219/37574 . . . In-process, in cycle, machine part, measure part, machine same part
- 2219/37575 . . . Pre-process, measure workpiece before machining
- 2219/37576 . . . Post-process, measure workpiece after machining, use results for new or same
- 2219/37577 . . . In-process and post-process measurement combined
- 2219/37578 . . . Compare images of workpiece before and after machining
- 2219/37579 . . . Run away measured value by differentiating measured signal, rate of change
- 2219/37581 . . . Measuring errors
- 2219/37582 . . . Position, angle of workpiece surface
- 2219/37583 . . . Detect separation, cutting, penetration, piercing, break through material
- 2219/37584 . . . Deformation of machined material
- 2219/37585 . . . Start, begin and end, halt, stop of machining
- 2219/37586 . . . Detect, discriminate cutting or non cutting machining state
- 2219/37587 . . . Count number of machining cycles, frequency use of tool
- 2219/37588 . . . Detect swarf, building up of swarf
- 2219/37589 . . . Measure drift of servo during positioning, not disturbing actual position

2219/37591	. . .	Plant characteristics	2219/39004	. . .	Assisted by automatic control system for certain functions
2219/37592	. . .	Detect machine, workpiece noise by operator with headphone, directional	2219/39005	. . .	Feedback for stability of manipulator, felt as force reflection
2219/37593	. . .	Measure correct setting of workpiece	2219/39006	. . .	Move end effector in a plane, describing a raster, meander
2219/37594	. . .	Detect discharge state between electrode and workpiece	2219/39007	. . .	Calibrate by switching links to mirror position, tip remains on reference point
2219/37595	. . .	Detect if drill bit is in peck cycle	2219/39008	. . .	Fixed camera detects reference pattern held by end effector
2219/37596	. . .	Surface layer to be machined away, lowest point, minimum material to be cut	2219/39009	. . .	Using fixture with potentiometer, wire to end effector, estimate length of wire
2219/37597	. . .	Spectrum analyser	2219/39011	. . .	Fixed camera detects deviation end effector from reference on workpiece, object
2219/37598	. . .	Chip length	2219/39012	. . .	Calibrate arm during scanning operation for identification of object
2219/37599	. . .	Presence of metal	2219/39013	. . .	Locate movable manipulator relative to object, compare to stored gridpoints
2219/37601	. . .	Count number of times tool is overloaded, derived from mean and limit	2219/39014	. . .	Match virtual world with real world
2219/37602	. . .	Material removal rate	2219/39015	. . .	With different manipulator configurations, contact known sphere, ballbar
2219/37603	. . .	System time constant	2219/39016	. . .	Simultaneous calibration of manipulator and camera
2219/37604	. . .	Hysteresis of actuator, servo	2219/39017	. . .	Forward calibration, find actual pose world space for given joint configuration
2219/37605	. . .	Accuracy, repeatability of machine, robot	2219/39018	. . .	Inverse calibration, find exact joint angles for given location in world space
2219/37606	. . .	Thread form, parameters	2219/39019	. . .	Calibration by cmm coordinate measuring machine over a certain volume
2219/37607	. . .	Circular form	2219/39021	. . .	With probe, touch reference positions
2219/37608	. . .	Center and diameter of hole, wafer, object	2219/39022	. . .	Transform between measuring and manipulator coordinate system
2219/37609	. . .	Over-travel	2219/39023	. . .	Shut off, disable motor and rotate arm to reference pin
2219/37611	. . .	Relative movement between tool and workpiece carriage	2219/39024	. . .	Calibration of manipulator
2219/37612	. . .	Transfer function, kinematic identification, parameter estimation, response	2219/39025	. . .	Spheric tool interrupts transmitted calibration beam, in different configurations
2219/37613	. . .	Cutter axis tilt of end mill	2219/39026	. . .	Calibration of manipulator while tool is mounted
2219/37614	. . .	Number of workpieces, counter	2219/39027	. . .	Calibrate only some links, part of dofs, lock some links, ref pins on links
2219/37615	. . .	Dead time, between detecting finished workpieces and feedback measured value	2219/39028	. . .	Relative to base calibrated 6-DOF device, cmm connected between wrist and base
2219/37616	. . .	Use same monitoring tools to monitor tool and workpiece	2219/39029	. . .	Verify if calibration position is a correct, by comparing with range in rom
2219/37617	. . .	Tolerance of form, shape or position	2219/39031	. . .	Use of model for robot and for measuring device
2219/37618	. . .	Observe, monitor position, posture of tool	2219/39032	. . .	Touch probe senses constraint known plane, derive kinematic calibration
2219/37619	. . .	Characteristics of machine, deviation of movement, gauge,	2219/39033	. . .	Laser tracking of end effector, measure orientation of rotatable mirror
2219/37621	. . .	Inertia, mass of rotating, moving tool, workpiece, element	2219/39034	. . .	Use of telescopic ballbar
2219/37622	. . .	Detect collision, blocking, stall by change, lag in position	2219/39035	. . .	Screw axis measurement, each joint moved in circle, cpa circle point analysis
2219/37623	. . .	Detect collision, blocking by use of integrated load between two limits	2219/39036	. . .	Screw axis measurement, jacobian estimation from wrist and joint torques, no motion
2219/37624	. . .	Detect collision, blocking by measuring change of velocity or torque	2219/39037	. . .	Screw axis measurement, jacobian estimation from end effector and joint speeds
2219/37625	. . .	By measuring changing forces in a time window	2219/39038	. . .	Determine position of two cameras by using a common reference grid
2219/37626	. . .	By measuring changing forces in different position zones	2219/39039	. . .	Two cameras detect same reference on workpiece to define its position in space
2219/37627	. . .	Measure elapsed time needed for positioning	2219/39041	. . .	Calibrate only for end position
2219/37628	. . .	Use of special detector the output of which changes if object detected			
2219/37629	. . .	Detect sudden change of direction due to collision			
2219/37631	. . .	Means detecting object in forbidden zone			
2219/37632	. . .	By measuring current, load of motor			
2219/37633	. . .	Output modulated signal on detection of blocking instead of flat signal			
2219/37634	. . .	By measuring vibration			
2219/39	. .	Robotics, robotics to robotics hand			
2219/39001	. . .	Robot, manipulator control			
2219/39002	. . .	Move tip of arm on straight line			
2219/39003	. . .	Move end effector on ellipse, circle, sphere			

- 2219/39042 . . . Interchange robot and reference pattern, measure by camera at same location
- 2219/39043 . . . Self calibration using ANN to map robot poses to the commands, only distortions
- 2219/39044 . . . Estimate error model from error at different attitudes and points
- 2219/39045 . . . Camera on end effector detects reference pattern
- 2219/39046 . . . Compare image of plate on robot with reference, move till coincidence, camera
- 2219/39047 . . . Calibration plate mounted on robot, plate comprises sensors for measuring target
- 2219/39048 . . . Closed loop kinematic self calibration, grip part of robot with hand
- 2219/39049 . . . Calibration cooperating manipulators, closed kinematic chain by bolting
- 2219/39051 . . . Calibration cooperating manipulators, closed kinematic chain by alignment
- 2219/39052 . . . Self calibration of parallel manipulators
- 2219/39053 . . . Probe, camera on hand scans many points on own robot body, no extra jig
- 2219/39054 . . . From teached different attitudes for same point calculate tool tip position
- 2219/39055 . . . Correction of end effector attachment, calculated from model and real position
- 2219/39056 . . . On line relative position error and orientation error calibration
- 2219/39057 . . . Hand eye calibration, eye, camera on hand, end effector
- 2219/39058 . . . Sensor, calibration of sensor, potentiometer
- 2219/39059 . . . Sensor adaptation for robots by software
- 2219/39061 . . . Calculation direct dynamics
- 2219/39062 . . . Calculate, jacobian matrix estimator
- 2219/39063 . . . Quick calculation of coordinates by using precalculated, stored matrixes, inverses
- 2219/39064 . . . Learn kinematics by ann mapping, map spatial directions to joint rotations
- 2219/39065 . . . Calculate workspace for end effector, manipulator
- 2219/39066 . . . Two stage inverse kinematics algorithm, first inner joint variables, then outer
- 2219/39067 . . . Calculate max load a manipulator can repeatedly lift
- 2219/39068 . . . Time needed to execute an instruction
- 2219/39069 . . . Inverse kinematics by arm splitting, divide six link arm into two three link arms
- 2219/39071 . . . Solve inverse kinematics by ann learning nonlinear mappings, consider smoothness
- 2219/39072 . . . Solve inverse kinematics by linear hopfield network
- 2219/39073 . . . Solve inverse kinematics by fuzzy algorithm
- 2219/39074 . . . By formal substitution of two consecutive joints by a spherical joint
- 2219/39075 . . . Solve inverse kinematics by error back propagation ebp
- 2219/39076 . . . Learn by function division, change only one variable at a time, combine shapes
- 2219/39077 . . . Solve inverse geometric model by iteration, no matrixes inversion
- 2219/39078 . . . Divide workspace in sectors, lookup table for sector joint angle
- 2219/39079 . . . Solve inverse differential kinematics in closed, feedback loop, iterate
- 2219/39081 . . . Inexact solution for orientation or other DOF with relation to type of task
- 2219/39082 . . . Collision, real time collision avoidance
- 2219/39083 . . . Robot interference, between two robot arms
- 2219/39084 . . . Parts handling, during assembly
- 2219/39085 . . . Use of two dimensional maps and feedback of external and joint sensors
- 2219/39086 . . . Reduce impact effect by impact configuration of redundant manipulator
- 2219/39087 . . . Artificial field potential algorithm, force repulsion from obstacle
- 2219/39088 . . . Inhibit movement in one axis if collision danger
- 2219/39089 . . . On collision, lead arm around obstacle manually
- 2219/39091 . . . Avoid collision with moving obstacles
- 2219/39092 . . . Treat interference in hardware, circuit and also in software
- 2219/39093 . . . On collision, ann, bam, learns path on line, used next time for same command
- 2219/39094 . . . Interference checking between robot and fixture
- 2219/39095 . . . Use neural geometric modeler, overlapping spheres
- 2219/39096 . . . Self-collision, internal collision, collision between links of one robot
- 2219/39097 . . . Estimate own stop, brake time, then verify if in safe distance
- 2219/39098 . . . Estimate stop, brake distance in predef time, then verify if in safe distance
- 2219/39099 . . . Interlocks inserted in movement process if necessary to avoid collision
- 2219/39101 . . . Cooperation with one or more rotating workpiece holders, manipulators
- 2219/39102 . . . Manipulator cooperating with conveyor
- 2219/39103 . . . Multicooperating sensing modules
- 2219/39104 . . . Manipulator control orders conveyor to stop, to visualize, pick up
- 2219/39105 . . . Manipulator cooperates with moving machine, like press brake
- 2219/39106 . . . Conveyor, pick up article, object from conveyor, bring to test unit, place it
- 2219/39107 . . . Pick up article, object, measure, test it during motion path, place it
- 2219/39108 . . . Regrasp object as function of impact
- 2219/39109 . . . Dual arm, multiarm manipulation, object handled in cooperation
- 2219/39111 . . . Use of flexibility or free joint in manipulator to avoid large forces
- 2219/39112 . . . Force, load distribution
- 2219/39113 . . . Select grasp pattern based on motion oriented coordinability
- 2219/39114 . . . Hand eye cooperation, active camera on first arm follows movement of second arm
- 2219/39115 . . . Optimal hold and moving force, torque
- 2219/39116 . . . Constraint object handled in cooperation
- 2219/39117 . . . Task distribution between involved manipulators
- 2219/39118 . . . Cooperation between manipulator and vehicle with manipulator
- 2219/39119 . . . Path constraint handling of object
- 2219/39121 . . . Two manipulators operate on same object
- 2219/39122 . . . Follower, slave mirrors leader, master

2219/39123	. . .	Manipulate, handle flexible object	2219/39163	. . .	Formation control, robots form a rigid formation, fixed relationship
2219/39124	. . .	Grasp common rigid object, no movement end effectors relative to object	2219/39164	. . .	Embodied evolution, evolutionary robots with basic ann learn by interactions with each other
2219/39125	. . .	Task is grasp object with movable parts, like pliers	2219/39165	. . .	Evolution, best performing control strategy is transmitted to other robots
2219/39126	. . .	Manipulate very large objects, not possible to grasp, open palm and use of links	2219/39166	. . .	Coordinate activity by sending pheromone messages between robots, no central control
2219/39127	. . .	Roll object on base by link control	2219/39167	. . .	Resources scheduling and balancing
2219/39128	. . .	Grasp tool with two manipulators, rigidity, and use tool	2219/39168	. . .	Multiple robots searching an object
2219/39129	. . .	One manipulator holds one piece, other inserts, screws other piece, dexterity	2219/39169	. . .	Redundant communication channels with central control
2219/39131	. . .	Each of the manipulators holds one of the pieces to be welded together	2219/39171	. . .	Vehicle moves towards arm if stretched arm, away from it if folded, singular point
2219/39132	. . .	Robot welds, operates on moving workpiece, moved by other robot	2219/39172	. . .	Vehicle, coordination between manipulator arm and its moving vehicle
2219/39133	. . .	Convert taught program for fixed workpiece to program for moving workpiece	2219/39173	. . .	Dynamic interaction between vehicle and manipulator
2219/39134	. . .	Teach point, move workpiece, follow point with tip, place tip on next point	2219/39174	. . .	Add DOFs of mobility to DOFs of manipulator to add user defined tasks to motion
2219/39135	. . .	For multiple manipulators operating at same time, avoid collision	2219/39175	. . .	Cooperation between fixed manipulator and manipulator on vehicle
2219/39136	. . .	Teach each manipulator independently or dependently from each other	2219/39176	. . .	Compensation deflection arm
2219/39137	. . .	Manual teaching, set next point when tool touches other tool, workpiece	2219/39177	. . .	Compensation position working point as function of inclination tool, hand
2219/39138	. . .	Calculate path of robots from path of point on gripped object	2219/39178	. . .	Compensation inertia arms
2219/39139	. . .	Produce program of slave from path of master and desired relative position	2219/39179	. . .	Of movement after lock stop by small movement against load, stop again
2219/39141	. . .	Slave program has no taught positions, receives position from master, convert from master	2219/39181	. . .	Compensation of coulomb friction in joint
2219/39142	. . .	Moving time between positions in slave program coordinated online with master	2219/39182	. . .	Compensation for base, floor deformation
2219/39143	. . .	One program in robot controller for both robot and machine, press, mold	2219/39183	. . .	Compliance compensation
2219/39144	. . .	Scale moving time of all robots, machines to match slowest, no waiting	2219/39184	. . .	Forward compensation in robot world space, inverse in joint space
2219/39145	. . .	Slave path is the same as master path and superposed desired relative movement	2219/39185	. . .	ANN as compensator
2219/39146	. . .	Swarm, multiagent, distributed multitask fusion, cooperation multi robots	2219/39186	. . .	Flexible joint
2219/39147	. . .	Group transport, transfer object, ant problem	2219/39187	. . .	Coriolis and centripetal compensation
2219/39148	. . .	To push or pull on objects, boxes	2219/39188	. . .	Torque compensation
2219/39149	. . .	To assemble two objects, objects manipulation	2219/39189	. . .	Compensate for dead weight of tool as function of inclination tool
2219/39151	. . .	Use intention inference, observe behaviour of other robots for their intention	2219/39191	. . .	Compensation for errors in mechanical components
2219/39152	. . .	Basic behaviour, avoid, follow, aggregate, disperse, home, wander, grasp, drop	2219/39192	. . .	Compensate thermal effects, expansion of links
2219/39153	. . .	Human supervisory control of swarm	2219/39193	. . .	Compensate movement before lock stop, by small movement against load, gravity
2219/39154	. . .	Each robot can pick up an information carrier, read and write it, exchange it	2219/39194	. . .	Compensation gravity
2219/39155	. . .	Motion skill, relate sensor data to certain situation and motion	2219/39195	. . .	Control, avoid oscillation, vibration due to low rigidity
2219/39156	. . .	To machine together workpiece, desktop flexible manufacturing	2219/39196	. . .	Use of passive joint, no actuator but brake, brake on or off
2219/39157	. . .	Collectively grasping object to be transported	2219/39197	. . .	Passive compliance, no input of force reference, mechanical resilience, spring
2219/39158	. . .	Configuration description language, to define behaviour of system	2219/39198	. . .	Manipulator used as workpiece handler and for machining operation
2219/39159	. . .	Task modelling	2219/39199	. . .	Active vibration absorber
2219/39161	. . .	Search, grip object and bring to a home area, gather object, object placement	2219/39201	. . .	Control of joint stiffness
2219/39162	. . .	Learn social rules, greedy robots become non-greedy, adapt to other robots	2219/39202	. . .	Invariant inertia, constant inertia matrix independent of joint positions
			2219/39203	. . .	Fuzzy petrinet controller
			2219/39204	. . .	Petrinet controller
			2219/39205	. . .	Markov model
			2219/39206	. . .	Joint space position control
			2219/39207	. . .	Manipulator is passive, gives operator only feedback of what is currently done

2219/39208	. . .	Robot is active, realizes planned trajectory by itself	2219/39249	. . .	Computed torque controller combined with ann compensating switch type controller
2219/39209	. . .	Switch over from free space motion to constraint motion	2219/39251	. . .	Autonomous distributed control, joint and link is a subsystem, communication intensive
2219/39211	. . .	If operator on platform moves in certain direction, arm will follow	2219/39252	. . .	Autonomous distributed control, task distributed into each subsystem, task space
2219/39212	. . .	Select between autonomous or teleoperation control	2219/39253	. . .	Virtual arm, has end effector on any joint of real manipulator
2219/39213	. . .	Distributed tasks, space motion, contact, kinematic conditioning tasks	2219/39254	. . .	Behaviour controller, robot have feelings, learns behaviour
2219/39214	. . .	Compensate tracking error by using model, polynomial network	2219/39255	. . .	Penalty invariance:distribute disturbance equally over all joints, nodes
2219/39215	. . .	Adaptive control with stabilizing compensation	2219/39256	. . .	Task space controller
2219/39216	. . .	Motion scaling	2219/39257	. . .	Switch from task space to joint space controller when close to singularity
2219/39217	. . .	Keep constant orientation of handled object while moving manipulator	2219/39258	. . .	Three objective attitude control
2219/39218	. . .	Force tracking	2219/39259	. . .	GPS to control robotic arm
2219/39219	. . .	Trajectory tracking	2219/39261	. . .	Calculate driving torque from dynamic model, computed torque method variant
2219/39221	. . .	Control angular position of joint by length of linear actuator	2219/39262	. . .	Position joint to minimize energy in previous joints, equilibrium point, attractor
2219/39222	. . .	Disturbance rejection, suppression	2219/39263	. . .	Normal and overload operation modes, robot speed or torque higher than nominal
2219/39223	. . .	Resonance ratio control, between arm and motor	2219/39264	. . .	Torque control using hardware designed for position control
2219/39224	. . .	Jacobian transpose control of force vector in configuration and cartesian space	2219/39265	. . .	Cutting force disturbances compensated by accelerating a mass within tool head
2219/39225	. . .	Rmfc resolved motion force control, apply known acceleration to payload mass	2219/39266	. . .	Algorithm for control
2219/39226	. . .	Operational space formulation, project model into cartesian coordinates	2219/39267	. . .	Uncertainty estimation by the bounds
2219/39227	. . .	Configuration control, generate end effector forces to compensate dynamics	2219/39268	. . .	Layer perceptron, drive torque from state variables
2219/39228	. . .	Computed torque method and H-compensation	2219/39269	. . .	Neural adaptation followed by fuzzy correction
2219/39229	. . .	Linear parameterization of robot dynamics	2219/39271	. . .	Ann artificial neural network, ffw-nn, feedforward neural network
2219/39231	. . .	Parameterization of inertia, coriolis and centrifugal matrix	2219/39272	. . .	Course by expert rule based system to correct fine fuzzy system
2219/39232	. . .	Fuzzy adaptation of sliding mode controller	2219/39273	. . .	Neural oscillator
2219/39233	. . .	Adaptive switching of multiple models, same model but different initial estimates, different robot model for different areas	2219/39274	. . .	CMAC cerebellar model articulation controller network
2219/39234	. . .	Constraint accelerated feedback, distance dependant sampling rate	2219/39275	. . .	Ann in parallel to known dynamics model to correct for unknown dynamics
2219/39235	. . .	Track surface without knowing surface geometry	2219/39276	. . .	FFW and PD and ANN for compensation position error
2219/39236	. . .	Hybrid integrator back-stepping control, cascaded motor and manipulator subsystems	2219/39277	. . .	Segmented tree ANN
2219/39237	. . .	Torque disturbance control	2219/39278	. . .	Ann with pd in parallel, pd corrects response of ANN
2219/39238	. . .	Trajectory feedforward and feedback to input ann, output a control function	2219/39279	. . .	Ann parallel with p controller
2219/39239	. . .	Control additional actuator in each flexible link	2219/39281	. . .	Ann for compensation torque
2219/39241	. . .	Force and vibration control	2219/39282	. . .	FFW ann for torque command, adapt as function of speed and detected speed
2219/39242	. . .	Velocity blending, change in a certain time from first to second velocity	2219/39283	. . .	Ffw ann to compensate torque or speed
2219/39243	. . .	Adaptive trajectory tracking	2219/39284	. . .	NSC neural servo controller
2219/39244	. . .	Generic motion control operations, primitive skills each for special task	2219/39285	. . .	From database find strategy and select corresponding neural servo controller
2219/39245	. . .	Computed torque fuzzy controller	2219/39286	. . .	Forward inverse, dynamics model, relaxation neural network model firm
2219/39246	. . .	Control position and orientation of handled object	2219/39287	. . .	Position and speed error to fuzzy input, output corrected by ann as function of position
2219/39247	. . .	Control speed, acceleration as function of load and rate of fatigue	2219/39288	. . .	Track control with ann
2219/39248	. . .	Visual servoing combined with inertial measurements	2219/39289	. . .	Adaptive ann controller
			2219/39291	. . .	Fuzzy neural for adaptive force control
			2219/39292	. . .	Neural brain based controller based on simplified model of vertebrate nervous system

2219/39293	. . .	Ann parallel to pd, learn inverse dynamics and feedforward of torque signal	2219/39334	. . .	Fuzzy reinforcement compliance control
2219/39294	. . .	Learn inverse dynamics, ffw decomposed ann adapted by pid	2219/39335	. . .	Independent joint control, decentralised
2219/39295	. . .	Learn position correction values to be added to reference values	2219/39336	. . .	Pd controller combined with disturbance rejection at joint
2219/39296	. . .	Learn inverse and forward model together	2219/39337	. . .	Pd controller combined with joint energy based controller
2219/39297	. . .	First learn inverse model, then fine tune with ffw error learning	2219/39338	. . .	Impedance control, also mechanical
2219/39298	. . .	Trajectory learning	2219/39339	. . .	Admittance control, admittance is tip speed-force
2219/39299	. . .	Learn forward dynamics	2219/39341	. . .	Sliding mode based impedance control
2219/39301	. . .	Learn feedforward control	2219/39342	. . .	Adaptive impedance control
2219/39302	. . .	Backpropagation end effector location error through the link equations	2219/39343	. . .	Force based impedance control
2219/39303	. . .	Feedback error learn inverse dynamics, felc use position reference and error	2219/39344	. . .	Cooperative impedance control, between fingers or arms
2219/39304	. . .	Feedback error learn inverse dynamics, use actual position and error	2219/39345	. . .	Active compliance control, control tension of spring with dc motor
2219/39305	. . .	Learn, detect kinematic constraints in a plane from displacement and force	2219/39346	. . .	Workspace impedance control
2219/39306	. . .	Three networks, data to cartesian, cartesian to joint angle, joint angle to control	2219/39347	. . .	Joint space impedance control
2219/39307	. . .	Multiple ann, trajectory control net and force control net	2219/39348	. . .	Generalized impedance control
2219/39308	. . .	Position control net, pcn combined with velocity control net, vcn	2219/39349	. . .	RCC remote center compliance device inserted between wrist and gripper
2219/39309	. . .	Inverse dynamic network combined with time scaling network for trajectory plan	2219/39351	. . .	Compensation ann for uncertain trajectory in impedance control
2219/39311	. . .	Multilayer, MNN, four layer perceptron, sigmoidal neural network	2219/39352	. . .	Feedback error learning, ffw ann compensates torque, feedback from pd to ann
2219/39312	. . .	Double neural network for tracking, slave microprocessor for servo control	2219/39353	. . .	Joint space observer
2219/39313	. . .	Ann for joint control, ann for trajectory optimization	2219/39354	. . .	Operation, work space observer
2219/39314	. . .	Ann for identification, ann for convergence, ann for tracking control	2219/39355	. . .	Observer, disturbance observer
2219/39315	. . .	Art ann classifier and input selector, bam ann to retrieve collision free path	2219/39356	. . .	Fuzzy logic velocity observer, to estimate velocity in joints
2219/39316	. . .	Two ann, second ann trained with calibration data to learn error first ann	2219/39357	. . .	Execute motion of path in minimum of time
2219/39317	. . .	Adapt weights MNN online, MNN as feedforward, maps inputs to joint torques	2219/39358	. . .	Time optimal control along path for singular points, having velocity constraints
2219/39318	. . .	Position loop ann and velocity loop ann and force loop ann	2219/39359	. . .	Tracking path, priority control for component perpendicular to path
2219/39319	. . .	Force control, force as reference, active compliance	2219/39361	. . .	Minimize time-energy cost
2219/39321	. . .	Force control as function of position of tool	2219/39362	. . .	Adapth path of gripping point as function of position of cooperating machine
2219/39322	. . .	Force and position control	2219/39363	. . .	Track circular path on inclined surface
2219/39323	. . .	Force and motion control	2219/39364	. . .	Path, correction of path in function of load
2219/39324	. . .	Force as function of distance from boundary, border of grinding area	2219/39365	. . .	By using a cue, part of a stimulus to prompt an adapted reaction pattern
2219/39325	. . .	External force control, additional loop comparing forces corrects position	2219/39366	. . .	SMC sensory motor coordination
2219/39326	. . .	Model compensates positions as function of position to compensate force deformations	2219/39367	. . .	Using a motion map, association between visual position and joint position
2219/39327	. . .	Fuzzy adaptive force control	2219/39368	. . .	Sensorimotor command layer, between task space and sensor, motor space
2219/39328	. . .	Fuzzy pi force control	2219/39369	. . .	Host and robot controller and vision processing
2219/39329	. . .	Adaptive force and position control	2219/39371	. . .	Host and robot controller
2219/39331	. . .	Switch between position and force control by fuzzy logic	2219/39372	. . .	Expert rule based system to correct parameters impedance controller
2219/39332	. . .	Adaptive force control	2219/39373	. . .	Fuzzy for planning, fuzzy neural for adaptive force control
2219/39333	. . .	Fuzzy adaptive force and position control, hybrid	2219/39374	. . .	Ffw and ann combined to compensate torque
			2219/39375	. . .	MMI to path planner to servo controller
			2219/39376	. . .	Hierarchical, learning, recognition and skill level and adaptation servo level
			2219/39377	. . .	Task level supervisor and planner, organizer and execution and path tracking
			2219/39378	. . .	Control panel separated from power control of articulations
			2219/39379	. . .	Open architecture such as nasrem, ngc, dicam, saridis, chimera, gisc, utap, nomad, roblene

- 2219/39381 . . . Map task, application to behaviour, force tracking, singularity to motion to actuator
- 2219/39382 . . . Level, organization and coordination or distribution of tasks and execution level
- 2219/39383 . . . Supervisor communicates with several ion control agents
- 2219/39384 . . . Control unit near robot, control and teaching panel in safe zone
- 2219/39385 . . . Hybrid control system with neural brain based controller and classical ctrlr
- 2219/39386 . . . Cell configuration, selection and connection of cell combinations
- 2219/39387 . . . Reflex control, follow movement, track face, work, hand, visual servoing
- 2219/39388 . . . Visual compliance, xy constraint is 2-D image, z position controlled
- 2219/39389 . . . Laparoscopic surgery, camera on center of operated part, view around, scale
- 2219/39391 . . . Visual servoing, track end effector with camera image feedback
- 2219/39392 . . . Dynamic pyramiding, change vision field to small area if high tracking speed, zoom
- 2219/39393 . . . Camera detects projected image, compare with reference image, position end effector
- 2219/39394 . . . Compensate hand position with camera detected deviation, new end effector attitude
- 2219/39395 . . . Expectation based visual servoing, use of model
- 2219/39396 . . . Manipulator action on screen depends from displayed position on screen
- 2219/39397 . . . Map image error directly to robot movement, position with relation to world, base not needed, image based visual servoing
- 2219/39398 . . . Convert hand to tool coordinates, derive transform matrix
- 2219/39399 . . . Convert position of old, teach to new, changed, actual tool by transform matrix
- 2219/39401 . . . Machine tool coordinates to manipulator coordinates
- 2219/39402 . . . Transfer matrix for moving object and robot to absolute space, motion independent
- 2219/39403 . . . Method, axial rotation of tool to make tool and base coordinates parallel
- 2219/39404 . . . Design of manipulator
- 2219/39405 . . . Develop inverse model of system with ann
- 2219/39406 . . . Obtain optimal parameters of model of system
- 2219/39407 . . . Power metrics, energy efficiency
- 2219/39408 . . . Integrated structure and control design
- 2219/39409 . . . Design of gripper, hand
- 2219/39411 . . . Effect of scaling drive arms
- 2219/39412 . . . Diagnostic of robot, estimation of parameters
- 2219/39413 . . . Robot self diagnostics
- 2219/39414 . . . 7-DOF
- 2219/39415 . . . Hyper redundant, infinite number of DOFs
- 2219/39416 . . . 12-DOF
- 2219/39417 . . . 6-DOF
- 2219/39418 . . . 3-DOF
- 2219/39419 . . . 4-DOF
- 2219/39421 . . . DOF is degree of freedom, 2-DOF
- 2219/39422 . . . 7-DOF for arm and 6-DOF for end effector
- 2219/39423 . . . 5-DOF
- 2219/39424 . . . 16-DOF
- 2219/39425 . . . 9-DOF
- 2219/39426 . . . 10-DOF
- 2219/39427 . . . Panel on arm, hand of robot, controlled axis
- 2219/39428 . . . Panel with special keys for robot programming, like gripper, hand, wrist
- 2219/39429 . . . Using graphic kinematic perspective entered and represented by keys
- 2219/39431 . . . Keys represent function of gripper, open, close
- 2219/39432 . . . Direct robot control, click on mouse on variety of display command buttons
- 2219/39433 . . . Enter a move file, robot will follow a series of instructions
- 2219/39434 . . . Each function key of pc corresponds to a motor, jog each motor
- 2219/39435 . . . Free movable unit has push buttons for other than position, orientation control
- 2219/39436 . . . Joystick mimics manipulator to provide spatial correspondance
- 2219/39437 . . . Joystick with additional handle for wrist and gripper control
- 2219/39438 . . . Direct programming at the console
- 2219/39439 . . . Joystick, handle, lever controls manipulator directly, manually by operator
- 2219/39441 . . . Voice command, camera detects object, grasp, move
- 2219/39442 . . . Set manual a coordinate system by jog feed operation
- 2219/39443 . . . Portable, adapted to handpalm, with joystick, function keys, display
- 2219/39444 . . . Display of position, of shape of robot and tool
- 2219/39445 . . . Select between jog modes, user, robot coordinates, tool, system feed, joint feed
- 2219/39446 . . . Display of manipulator and workpiece and jog directions
- 2219/39447 . . . Dead man switch
- 2219/39448 . . . Same teach pendant connects to many robot controllers over network
- 2219/39449 . . . Pendant, pda displaying camera images overlayed with graphics, augmented reality
- 2219/39451 . . . Augmented reality for robot programming
- 2219/39452 . . . Select with mouse button a coordinate plane for micromanipulation
- 2219/39453 . . . Select program as function of location of mobile manipulator
- 2219/39454 . . . Rubber actuator, two muscle drive, one for extension other for traction
- 2219/39455 . . . Flexible microactuator, fluidic controlled fibre reinforced rubber, three tubes
- 2219/39456 . . . Direct drive
- 2219/39457 . . . Tendon drive
- 2219/39458 . . . Vehicle levitated, arm pushes to position vehicle
- 2219/39459 . . . Finger actuator, ac motor and harmonic gear and encoder
- 2219/39461 . . . Rotate arm in one direction, forearm in other direction but double speed
- 2219/39462 . . . Pneumatic actuator, imitates human muscle
- 2219/39463 . . . Exercise treatment end effector, dexter cube with various switches for tasks
- 2219/39464 . . . Estimation of human hand impedance in multijoint arm movements
- 2219/39465 . . . Two fingers each with 2-DOF
- 2219/39466 . . . Hand, gripper, end effector of manipulator

- 2219/39467 . . . Select hand as function of geometric form of hand
- 2219/39468 . . . Changeable hand, tool, code carrier, detector
- 2219/39469 . . . Grip flexible, deformable plate, object and manipulate it
- 2219/39471 . . . Push workpiece in order to grip it correctly
- 2219/39472 . . . Braced manipulator, for fine positioning hand is resting on table
- 2219/39473 . . . Autonomous grasping, find, approach, grasp object, sensory motor coordination
- 2219/39474 . . . Coordination of reaching and grasping
- 2219/39475 . . . Grasp slightly, rotate object between two fingers by action of gravity
- 2219/39476 . . . Orient hand relative to object
- 2219/39477 . . . Finger tracks moving light spot on object
- 2219/39478 . . . Control force and posture of hand
- 2219/39479 . . . Grip, release again to put object in correct position in tray, regrip and move
- 2219/39481 . . . Control distance finger from center, radius
- 2219/39482 . . . Control position of center of grip
- 2219/39483 . . . Control angle of rotation
- 2219/39484 . . . Locate, reach and grasp, visual guided grasping
- 2219/39485 . . . Lift workpiece with two fingers, then grasp it with two additional fingers
- 2219/39486 . . . Fingered hand, multifingered hand
- 2219/39487 . . . Parallel jaws, two fingered hand
- 2219/39488 . . . Each finger gets 1-DOF, one more movement, translation or rotation
- 2219/39489 . . . Soft fingertip, electro rheological controlled fluid
- 2219/39491 . . . Each finger controlled by a controller
- 2219/39492 . . . Finger impedance control
- 2219/39493 . . . Passive compliant finger, array of resilient rods in tip
- 2219/39494 . . . Each finger has 4-DOF
- 2219/39495 . . . Active electromechanical compliance for each finger
- 2219/39496 . . . 3-Fingered hand
- 2219/39497 . . . Each finger can be controlled independently
- 2219/39498 . . . Each finger has force torque sensor in tip of finger
- 2219/39499 . . . 4-Fingers with each 6-DOF
- 2219/39501 . . . 5-Fingers with each 4-DOF
- 2219/39502 . . . 4-Fingers with each 3-DOF
- 2219/39503 . . . 4-Fingers with each 4-DOF
- 2219/39504 . . . Grip object in gravity center
- 2219/39505 . . . Control of gripping, grasping, contacting force, force distribution
- 2219/39506 . . . Grip flexible wire at fixed base, move gripper to top of wire and grip
- 2219/39507 . . . Control of slip motion
- 2219/39508 . . . Reorientation of object, orient, regrip object
- 2219/39509 . . . Gripping, grasping, links embrace, encircle, envelop object to grasp
- 2219/39511 . . . Reorient, rotate object in hand between fingers by action of fingers
- 2219/39512 . . . Whole hand manipulation, use of fingertips and hand surface
- 2219/39513 . . . Tip prehension grasp, grasp with tip of fingers
- 2219/39514 . . . Stability of grasped objects
- 2219/39515 . . . Grapple object, grip in compliant mode, self alignment of fingers and object
- 2219/39516 . . . Push align object against wall, detect each time distance from grip point to wall
- 2219/39517 . . . Control orientation and position of object in hand, roll between plates
- 2219/39518 . . . Rolling contact between fingers, robot arms and object
- 2219/39519 . . . Concurrent grasp, all forces converge in one point
- 2219/39521 . . . Pencil grasp, forces act in two points, along line of intersection of two planes
- 2219/39522 . . . Regulus grasp, forces do not intersect at all
- 2219/39523 . . . Set holding force as function of dimension, weight, shape, hardness, surface
- 2219/39524 . . . Power grasp, between thumb and four fingers, acting as a virtual middle finger
- 2219/39525 . . . Lateral grasp, between thumb and four fingers, acting as virtual index finger
- 2219/39526 . . . Three fingers used, thumb, index, middle finger for lateral precision
- 2219/39527 . . . Workpiece detector, sensor mounted in, near hand, gripper
- 2219/39528 . . . Measuring, gripping force sensor build into hand
- 2219/39529 . . . Force, torque sensor in wrist, end effector
- 2219/39531 . . . Several different sensors integrated into hand
- 2219/39532 . . . Gripping force sensor build into finger
- 2219/39533 . . . Measure grasping posture and pressure distribution
- 2219/39534 . . . By positioning fingers, dimension of object can be measured
- 2219/39535 . . . Measuring, test unit build into hand, end effector
- 2219/39536 . . . Planning of hand motion, grasping
- 2219/39537 . . . First slide object on table in order to be able to grasp it, grasp it
- 2219/39538 . . . Rotate object with one or more fingers, while sliding on table
- 2219/39539 . . . Plan hand shape
- 2219/39541 . . . Place fingers to reorient object while grasping
- 2219/39542 . . . Plan grasp points, grip matrix and initial grasp force
- 2219/39543 . . . Recognize object and plan hand shapes in grasping movements
- 2219/39544 . . . Fuzzy dynamic programming, generate trajectory of finger during tracking
- 2219/39545 . . . Trajectory generation for smoothly grasping moving object
- 2219/39546 . . . Map human grasps to manipulator grasps
- 2219/39547 . . . Program, plan gripping force, range and speed
- 2219/39548 . . . Enter interactively parameter for gripper, then teach movement
- 2219/39549 . . . Structure, hand has connector for power supply and control signals
- 2219/39551 . . . Pivoting gripper, so part takes always vertical orientation
- 2219/39552 . . . Stewart platform hand, parallel structured hand
- 2219/39553 . . . Dual gripper, two heads to pick up different objects
- 2219/39554 . . . Gripper is formed by flexible tube, embraces object like a finger
- 2219/39555 . . . Revolver with several grippers, hands
- 2219/39556 . . . Control system build into hand itself

2219/39557	. . .	Vacuum gripper using mask with pattern corresponding to workpiece to be lifted	2219/40023	. . .	Dynamic closure, remain contact by acceleration forces
2219/39558	. . .	Vacuum hand has selective gripper area	2219/40024	. . .	Catching
2219/39559	. . .	Polyvalent gripper, to grip, assemble, manipulate	2219/40025	. . .	Dynamic manipulation, throwing
2219/39561	. . .	Gripper with build in positioning device to align handled object	2219/40026	. . .	Juggling, tennis playing, throw and catch
2219/39562	. . .	Dual end effector, one as tool, the other as workhandler, revolver	2219/40027	. . .	Preying, object capture, interception, mouse-buster
2219/39563	. . .	Hand has a center pin to pick up coils	2219/40028	. . .	Insert flexible rod, beam into hole
2219/39564	. . .	Spoon and fork, fork slides back if food delivered in mouth	2219/40029	. . .	Mount elastic ring on a cylinder
2219/39565	. . .	Two fingered microhand, each finger is a parallel, stewart platform	2219/40031	. . .	Dual peg in hole
2219/39566	. . .	Transparent gripper, object can always be seen by camera	2219/40032	. . .	Peg and hole insertion, mating and joining, remote center compliance
2219/39567	. . .	Use electromagnetic attraction to bring robot hand in contact with workpiece	2219/40033	. . .	Assembly, microassembly
2219/39568	. . .	Extract, insert objects by controlling fingers, dexterous	2219/40034	. . .	Disassembly, for recycling
2219/39569	. . .	Twirl baton, rotate cylinder through center perpendicular to length	2219/40035	. . .	Shake grasped parts for dropping excess entangled parts back into pin
2219/39571	. . .	Grip, grasp non rigid material, piece of cloth	2219/40036	. . .	Transport plates or sheets between two locations without motion inversion
2219/39572	. . .	Task, tool manipulation	2219/40037	. . .	No incomplete containers allowed to exit on output conveyor
2219/39573	. . .	Tool guidance along path	2219/40038	. . .	Black list, exclude operation on workpiece when not possible, collision, error
2219/39574	. . .	Passive compliant hand, wrist	2219/40039	. . .	Robot mounted or sliding inside vehicle, on assembly line or for test, service
2219/39575	. . .	Wrist, flexible wrist	2219/40041	. . .	Robot operates panel like car radio by pushing, turning buttons, knobs
2219/39576	. . .	Magnetically levitated wrist	2219/40042	. . .	Control tilting angle of surface carried by robot
2219/39577	. . .	Active electromechanical compliance for wrist	2219/40043	. . .	Move object without swinging, no pendulum or swing motion at stop point
2219/39578	. . .	Axis wrist	2219/40044	. . .	Unfold flexible material
2219/40	. . .	Robotics, robotics mapping to robotics vision	2219/40045	. . .	Fill bucket, if hard rock, follow contour rock
2219/40001	. . .	Laser color indicates type of machining	2219/40046	. . .	Fill bucket with sand, move horizontally, if resistance move up, move horizontally
2219/40002	. . .	Camera, robot follows direction movement of operator head, helmet, headstick	2219/40047	. . .	Machine overhanging sculptured surfaces
2219/40003	. . .	Move end effector so that image center is shifted to desired position	2219/40048	. . .	Transport bar by two mobile robots on wavy road
2219/40004	. . .	Window function, only a specific region is analyzed	2219/40049	. . .	Cut material with scissors
2219/40005	. . .	Vision, analyse image at one station during manipulation at next station	2219/40051	. . .	Manipulate flexible material fixed with one end to a wall
2219/40006	. . .	Placing, palletize, un palletize, paper roll placing, box stacking	2219/40052	. . .	Deform, bend flexible material
2219/40007	. . .	Optimize sequence of pick and place operations upon arrival of workpiece on conveyor	2219/40053	. . .	Pick 3-D object from pile of objects
2219/40008	. . .	Place a box, block in a corner	2219/40054	. . .	Supply sheet to bending machine
2219/40009	. . .	Remove and replace machine part, module	2219/40055	. . .	Wire stripping
2219/40011	. . .	Lay down, laying non rigid material, handle flat textile material	2219/40056	. . .	Slide an edge over an edge
2219/40012	. . .	Pick and place by chain of three manipulators, handling part to each other	2219/40057	. . .	Contour tracking, edge following
2219/40013	. . .	Kitting, place parts from belt into tray, place tray on conveyor belt	2219/40058	. . .	Align box, block with a surface
2219/40014	. . .	Gripping workpiece to place it in another place	2219/40059	. . .	Mount, couple and demount, decouple exchangeable mechanical modules
2219/40015	. . .	Soccer playing	2219/40061	. . .	Disconnect cable
2219/40016	. . .	Kick a ball, leg and foot movement simulator	2219/40062	. . .	Door opening
2219/40017	. . .	Hockey playing, puck and paddle	2219/40063	. . .	Transport dish pile and dispense material in each dish of pile
2219/40018	. . .	Ball in cup	2219/40064	. . .	Pierce, penetrate soft tissue
2219/40019	. . .	Placing and assembly, throw object correctly on table	2219/40065	. . .	Approach, touch and then push object
2219/40021	. . .	Batting, to redirect a projectile	2219/40066	. . .	Stack and align identical layers, laminates, electronic substrate layers
2219/40022	. . .	Snatching, dynamic pick, effector contacts object, moves with object	2219/40067	. . .	Stack irregular packages
			2219/40068	. . .	Collective, group transport
			2219/40069	. . .	Flattening, sweeping non rigid material, take out wrinkles
			2219/40071	. . .	Relative positioning, grinding and polishing against rotating belt
			2219/40072	. . .	Exert a screwing motion

2219/40073	. . .	Carry container with liquid, compensate liquid vibration, swinging effect	2219/40115	. . .	Translate goal to task program, use of expert system
2219/40074	. . .	Move tip of arm or carried object on surface, wall, constraint	2219/40116	. . .	Learn by operator observation, symbiosis, show, watch
2219/40075	. . .	Turn crank, handle, link around fixed point	2219/40117	. . .	Virtual mechanism, like slider to constraint movement in task space
2219/40076	. . .	Fold flexible plate, non rigid material	2219/40118	. . .	Task oriented virtual tool, developed for task, assists operator in task
2219/40077	. . .	Posicast, inverted pendulum, acrobat, balance rod	2219/40119	. . .	Virtual internal model, derive from forces on object, motion of end effector
2219/40078	. . .	Sort objects, workpieces	2219/40121	. . .	Trajectory planning in virtual space
2219/40079	. . .	Grasp parts from first bin, put them in reverse order in second bin	2219/40122	. . .	Manipulate virtual object, for trajectory planning of real object, haptic display
2219/40081	. . .	Grasp part, object through hole in wall	2219/40123	. . .	Indicate, select features on display, remote manipulator will execute
2219/40082	. . .	Docking, align object on end effector with target	2219/40124	. . .	During manipulator motion, sensor feedback to adapt model in memory
2219/40083	. . .	Pick up pen and robot hand writing	2219/40125	. . .	Overlay real time stereo image of object on existing, stored memory image argos
2219/40084	. . .	Posicast, inverted pendulum, acrobat, balance rod, control unactuated joint, dof	2219/40126	. . .	Virtual landmarks, reference points for operator
2219/40085	. . .	Point with tip always to same remote target point	2219/40127	. . .	Virtual tape measure, indicate distance between end effector and destination
2219/40086	. . .	Slide, tumble, pivot object on surface with fingers of manipulator, grasplless	2219/40128	. . .	Virtual tether, line on display connects end effector to destination point
2219/40087	. . .	Align hand on workpiece to pick up workpiece, peg and hole	2219/40129	. . .	Virtual graphic 3-D pointer, manipulator commands real manipulator
2219/40088	. . .	Task is push, slide box	2219/40131	. . .	Virtual reality control, programming of manipulator
2219/40089	. . .	Tele-programming, transmit task as a program, plus extra info needed by robot	2219/40132	. . .	Haptic joystick with force feedback based on accelerometer included in joystick
2219/40091	. . .	Tele-programming by graphical simulation	2219/40133	. . .	Force sensation of slave converted to movement of chair for operator
2219/40092	. . .	Tele-programming by direct instruction on new object, using vision and force sensors	2219/40134	. . .	Force sensation of slave converted to vibration for operator
2219/40093	. . .	Use known task for similar, like object, inform system of that likeness	2219/40135	. . .	Slave force converted to shape display, actuated by fingers, surface is force image
2219/40094	. . .	By changing knowledge base directly	2219/40136	. . .	Stereo audio and vision
2219/40095	. . .	Modify tasks due to modular tooling, other fixture configuration, environment	2219/40137	. . .	Force sensation feedback from simulated tool
2219/40096	. . .	Modify tasks due to use of different manipulator	2219/40138	. . .	Scaled feedback of forces from slave to master and master to slave
2219/40097	. . .	Select stations with mouse to create process steps	2219/40139	. . .	Force from slave converted to a digital display like fingers and object
2219/40098	. . .	Show grid locations with symbols of workstations	2219/40141	. . .	Pain sensation feedback, impinge air on, squeeze, vibrate, stimulate fingers
2219/40099	. . .	Graphical user interface for robotics, visual robot user interface	2219/40142	. . .	Temperature sensation, thermal feedback to operator fingers
2219/40101	. . .	Generate concurrent tasks	2219/40143	. . .	Slip, texture sensation feedback, by vibration stimulation of fingers
2219/40102	. . .	Tasks are classified in types of unit motions	2219/40144	. . .	Force sensation feedback from slave
2219/40103	. . .	Show object with laser pointer, give oral command for action on, with object	2219/40145	. . .	Force sensation of slave converted to audio signal for operator
2219/40104	. . .	Reactive planner, user is integral component of planner, interactive	2219/40146	. . .	Telepresence, teletaction, sensor feedback from slave to operator
2219/40105	. . .	Oop task planning, use three knowledge bases, world-, domain- for vision, plan base	2219/40147	. . .	Variable time delay, through internet
2219/40106	. . .	Feedback of online failures to offline learned knowledge base	2219/40148	. . .	Predict locally machining forces from model to control remote machine
2219/40107	. . .	Offline task learning knowledge base, static planner controls dynamic online	2219/40149	. . .	Local intelligence for global planning, remote intelligence for tuning
2219/40108	. . .	Generating possible sequence of steps as function of timing and conflicts	2219/40151	. . .	Time delay, problems caused by time delay between local and remote
2219/40109	. . .	Consider each part to be assembled as an agent, behaving autonomously	2219/40152	. . .	Deictic, using a sign language, point finger to reach, close hand to grasp
2219/40111	. . .	For assembly	2219/40153	. . .	Teleassistance, operator assists, controls autonomous robot
2219/40112	. . .	Using graph grammars and fuzzy logic			
2219/40113	. . .	Task planning			
2219/40114	. . .	From vision detected initial and user given final state, generate tasks			

2219/40154	. . .	Moving of objects	2219/40196	. . .	Projecting light on floor to delimit danger zone around robot
2219/40155	. . .	Purpose is grasping objects	2219/40197	. . .	Suppress, execute command depending on physical position of control panel
2219/40156	. . .	Input work program as well as timing schedule	2219/40198	. . .	Contact with human allowed if under pain tolerance limit
2219/40157	. . .	Planning, event based planning, operator changes plans during execution	2219/40199	. . .	Soft material covers links, arms for shock and pain attenuation
2219/40158	. . .	Correlate actual image at angle with image presented to operator without angle	2219/40201	. . .	Detect contact, collision with human
2219/40159	. . .	Between operator and sensor a world modeler, local intelligence	2219/40202	. . .	Human robot coexistence
2219/40161	. . .	Visual display of machining, operation, remote viewing	2219/40203	. . .	Detect position of operator, create non material barrier to protect operator
2219/40162	. . .	Sound display of machining operation	2219/40204	. . .	Each fault condition has a different recovery procedure
2219/40163	. . .	Measuring, predictive information feedback to operator	2219/40205	. . .	Multiple arm systems
2219/40164	. . .	Fault recovery from task execution errors	2219/40206	. . .	Redundant serial manipulators, kinematic fault tolerance
2219/40165	. . .	Sensor data to display depends on robot status	2219/40207	. . .	Parallel structured modules, more joints than DOF
2219/40166	. . .	Surface display, virtual object translated into real surface, movable rods	2219/40208	. . .	Dual redundant actuators
2219/40167	. . .	Switch between simulated display of remote site, and actual display	2219/40209	. . .	If speed is important processors execute each different code, otherwise same code
2219/40168	. . .	Simulated display of remote site, driven by operator interaction	2219/40211	. . .	Fault tolerant, if one joint, actuator fails, others take over, reconfiguration
2219/40169	. . .	Display of actual situation at the remote site	2219/40212	. . .	Two-way clutch for joint, prevents movement in unallowable direction
2219/40171	. . .	Set a common coordinate system for all remotely controlled robots	2219/40213	. . .	Record history, log of instructions sent from task planner to path planner
2219/40172	. . .	Stop command transmission if no feedback signal received at remote site	2219/40214	. . .	Command rejection module
2219/40173	. . .	Stop robot if no command received within interval	2219/40215	. . .	Limit link kinetic energy to amount another element can dissipate upon impact
2219/40174	. . .	Robot teleoperation through internet	2219/40216	. . .	Record image of working robot; display to detect errors
2219/40175	. . .	Inclination, tilt of operator seat, chair serves as control command, like handle	2219/40217	. . .	Individual emergency stop lines for each part of system
2219/40176	. . .	Encode operator actions into symbolic commands for transmission to remote	2219/40218	. . .	Check conditions before allowing unlocking of joint brake
2219/40177	. . .	Nanomanipulation	2219/40219	. . .	Detect contact, proximity of other manipulators
2219/40178	. . .	Distributed top, resource availability in network	2219/40221	. . .	Individual and common power cutoff switch for several robots
2219/40179	. . .	Design of controller	2219/40222	. . .	Lock arm if somebody is looking into the hand
2219/40181	. . .	Operator can fine position in small area, free, but if contact, force feedback	2219/40223	. . .	If insertion force to high, alarm, stop for operator assistance
2219/40182	. . .	Master has different configuration than slave manipulator	2219/40224	. . .	If robot gets a return signal, go to initial condition position
2219/40183	. . .	Tele-machining	2219/40225	. . .	During start up, control robot with low speed, after a while gradually higher
2219/40184	. . .	Compliant teleoperation, operator controls motion, system controls contact, force	2219/40226	. . .	Input control signals to control system and to model, compare their outputs
2219/40185	. . .	Decoupled coarse fine motion coordination	2219/40227	. . .	If one access robot fails, other pushes it out of the way
2219/40186	. . .	Reachability control, permits slave to reach commanded position	2219/40228	. . .	If deviation of compliant tool is too large, stop and alarm
2219/40187	. . .	Indexed position control, master controls only small part of slave space	2219/40229	. . .	Analytical redundancy, use available functional redundancy of model
2219/40188	. . .	Position control with scaling, master small movement, slave large movement	2219/40231	. . .	Safety, dual clutched freewheel for joint, if error no movement possible
2219/40189	. . .	Modes, coarse by rate controller, fine by position controller	2219/40232	. . .	Lock mechanical arm if servo, cpu error, other arms remain free
2219/40191	. . .	Autonomous manipulation, computer assists operator during manipulation	2219/40233	. . .	Portable robot
2219/40192	. . .	Control modes, velocity for coarse, position for fine, hand for gripper	2219/40234	. . .	Snake arm, flexi-digit robotic manipulator, a hand at each end
2219/40193	. . .	Micromanipulation	2219/40235	. . .	Parallel robot, structure
2219/40194	. . .	Force reflective, impedance shaping tele operation			
2219/40195	. . .	Tele-operation, computer assisted manual operation			

2219/40236	. . .	With opposing actuators on same joint, agonist, flexor, muscle	2219/40279	. . .	Flexible arm, link
2219/40237	. . .	Bus for communication with sensors	2219/40281	. . .	Closed kinematic loop, chain mechanisms, closed linkage systems
2219/40238	. . .	Dual arm robot, one picks up one part from conveyor as other places other part in machine	2219/40282	. . .	Vehicle supports manipulator and other controlled devices
2219/40239	. . .	Common control box for several robot control boards and additional control boards	2219/40283	. . .	Reservoir with additional material on vehicle with manipulator
2219/40241	. . .	Underactuated robot, has less actuators than number of DOF	2219/40284	. . .	Toolrack on vehicle with manipulator, toolchanger
2219/40242	. . .	End effector with motor to provide a yaw, roll and pitch motion	2219/40285	. . .	Variable geometry manipulator, camlock
2219/40243	. . .	Global positioning robot	2219/40286	. . .	End effector with offset arm, to carry hose to feed material
2219/40244	. . .	Walking manipulator with integrated stewart, parallel arm	2219/40287	. . .	Workpiece manipulator and tool manipulator cooperate
2219/40245	. . .	Gripper on crawling device, smaller than two cm	2219/40288	. . .	Integrate sensor, actuator units into a virtual manipulator
2219/40246	. . .	6-DOF 3-ppsp parallel manipulator	2219/40289	. . .	Scara for coarse movement, xy table for fine movement
2219/40247	. . .	Series manipulator mounted on parallel manipulator	2219/40291	. . .	Instead of two links, two eccentrically rotating disks for full circle working
2219/40248	. . .	Manipulator on slide	2219/40292	. . .	Manipulator is positioned by a crane to cover a large workpiece, extended range
2219/40249	. . .	Whole arm manipulator, grip object not with end effector but with all links	2219/40293	. . .	Gantry, portal
2219/40251	. . .	Ghdrs generalized high dimensional robotic system, virtual decomposition	2219/40294	. . .	Portable robot can be fixed, attached to different workplaces, stations
2219/40252	. . .	Robot on track, rail moves only back and forth	2219/40295	. . .	Sensors at the elbow to detect obstacles
2219/40253	. . .	Soft arm robot, light, rubber, very compliant	2219/40296	. . .	Second arm can be attached to first arm, modular
2219/40254	. . .	Serial to parallel, branching manipulator, one macro and several parallel arms	2219/40297	. . .	Macro manipulator and microhand, distributed positioning
2219/40255	. . .	End effector attached to cable for gravity balance suspension	2219/40298	. . .	Manipulator on vehicle, wheels, mobile
2219/40256	. . .	Large, heavy manipulator	2219/40299	. . .	Holonic, made of similar modules, truss manipulator
2219/40257	. . .	Flexible macro manipulator with rigid attached micromanipulator	2219/40301	. . .	Scara, selective compliance assembly robot arm, links, arms in a plane
2219/40258	. . .	Robot can be fixed in orientation and height to ground, plurality of such points	2219/40302	. . .	Dynamically reconfigurable robot, adapt structure to tasks, cellular robot, cebot
2219/40259	. . .	Set friction in each joint to optimal value	2219/40303	. . .	Arm somersaults over grid, place one hand on grid point, release other hand
2219/40261	. . .	Self reproducing, replicating fabrication machine, tools, structure, info for this	2219/40304	. . .	Modular structure
2219/40262	. . .	Two link arm with a free, attached to base, and an active joint between links	2219/40305	. . .	Exoskeleton, human robot interaction, extenders
2219/40263	. . .	Dual use mobile detachable manipulator	2219/40306	. . .	Two or more independent robots
2219/40264	. . .	Human like, type robot arm	2219/40307	. . .	Two, dual arm robot, arm used synchronously, or each separately, asynchronously
2219/40265	. . .	Use of inflatable links, can easily be folded, compressed air for stiffness	2219/40308	. . .	Machine, conveyor model in library contains coop robot path
2219/40266	. . .	Resonant manipulator, springs cooperate with latches, motor only for lost energy	2219/40309	. . .	Simulation of human hand motion
2219/40267	. . .	Parallel manipulator, end effector connected to at least two independent links	2219/40311	. . .	Real time simulation
2219/40268	. . .	Master attached to tip of macro manipulator, controls slave micromanipulator	2219/40312	. . .	OOP object oriented programming for simulation
2219/40269	. . .	Naturally compliant robot arm	2219/40313	. . .	Graphic motion simulation for ergonomic analysis
2219/40271	. . .	Underwater, submarine movable manipulator	2219/40314	. . .	Simulation of program locally before remote operation
2219/40272	. . .	Manipulator on slide, track	2219/40315	. . .	Simulation with boundary graphs
2219/40273	. . .	Wire manipulator, crane type manipulator with three wires	2219/40316	. . .	Simulation of human-like robot joint, restricted 3-D motion
2219/40274	. . .	Cebot segments are mobile manipulators, connected by manipulator arm self	2219/40317	. . .	For collision avoidance and detection
2219/40275	. . .	Manipulator mounted on satellite, space manipulator	2219/40318	. . .	Simulation of reaction force and moment, force simulation
2219/40276	. . .	Aqua robot manipulator	2219/40319	. . .	Simulate contact of object and obstacle, reduce to pairs with only one contact
2219/40277	. . .	Hybrid, connect parallel manipulators in series, Stewart truss			
2219/40278	. . .	Compact, foldable manipulator			

2219/40321	. . .	Simulation of human arm trajectories	2219/40369	. . .	Generate all possible arm postures associated with end effector position
2219/40322	. . .	Simulation with des, discrete event system	2219/40371	. . .	Control trajectory to avoid joint limit as well as obstacle collision
2219/40323	. . .	Modeling robot environment for sensor based robot system	2219/40372	. . .	Control end effector impedance
2219/40324	. . .	Simulation, modeling of muscle, musculoskeletal dynamical system	2219/40373	. . .	Control of trajectory in case of a limb, joint disturbance, failure
2219/40325	. . .	Learn inverse kinematic model by variation, perturbation	2219/40374	. . .	Control trajectory in case of distortion of visual input
2219/40326	. . .	Singular value decomposition	2219/40375	. . .	Control trajectory in case of changed tool length
2219/40327	. . .	Calculation, inverse kinematics solution using damped least squares method	2219/40376	. . .	Moving center of mass and end effector for dynamic task of lifting heavy weight
2219/40328	. . .	If joint near singularity, restore angle to start values, adapt other joints	2219/40377	. . .	Impact force on stationary end effector, move center of mass, no reaction to base
2219/40329	. . .	Semi-singularity, movement in one direction not possible, in opposite direction is possible	2219/40378	. . .	Keep center of mass fixed, no counterweight, no reaction on base
2219/40331	. . .	Joint angle change constraint, singularity between elbow up and down	2219/40379	. . .	Manipulability
2219/40332	. . .	Identify degenerated directions, eliminate velocity component in that direction	2219/40381	. . .	Control trajectory in case of joint limit, clamping of joint
2219/40333	. . .	Singularity, at least one movement not possible, kinematic redundancy	2219/40382	. . .	Limit allowable area where robot can be taught
2219/40334	. . .	By fuzzy logic supervisor	2219/40383	. . .	Correction, modification program by detection type workpiece
2219/40335	. . .	By probability distribution functions pdf	2219/40384	. . .	Optimize taught path by data acquisition followed by genetic algorithm
2219/40336	. . .	Optimize multiple constraints or subtasks	2219/40385	. . .	Compare offline taught point with online taught point, modify rest as function of error
2219/40337	. . .	Maximum distance criterium	2219/40386	. . .	Search around taught point until operation has succes, correct program
2219/40338	. . .	Task priority redundancy	2219/40387	. . .	Modify without repeating teaching operation
2219/40339	. . .	Avoid collision	2219/40388	. . .	Two channels between robot and teaching panel, rs232c and video
2219/40341	. . .	Minimize energy	2219/40389	. . .	Use robot control language also to write non robotic user, application programs
2219/40342	. . .	Minimize sum of gravitational torques of some joints	2219/40391	. . .	Human to robot skill transfer
2219/40343	. . .	Optimize local torque	2219/40392	. . .	Programming, visual robot programming language
2219/40344	. . .	Configuration index, control, limits of joint movement	2219/40393	. . .	Learn natural high level command, associate its template with a plan, sequence
2219/40345	. . .	Minor measure	2219/40394	. . .	Combine offline with online information to generate robot actions
2219/40346	. . .	Compatibility index	2219/40395	. . .	Compose movement with primitive movement segments from database
2219/40347	. . .	Optimize manipulator velocity ratio function	2219/40396	. . .	Intermediate code for robots, bridge, conversion to controller
2219/40348	. . .	Optimize condition number	2219/40397	. . .	Programming language for robots, universal, user oriented
2219/40349	. . .	Optimize manipulability measure function	2219/40398	. . .	Opto-electronic follow-up of movement of head, eyelids, finger to control robot
2219/40351	. . .	Cooperation of hand arm, break down into two subsystems	2219/40399	. . .	Selection of master-slave operation mode
2219/40352	. . .	Combination of priority, basic task, tip position, and task for link movement	2219/40401	. . .	Convert workspace of master to workspace of slave
2219/40353	. . .	Split robot into two virtual robot, origin of second equals tip of first	2219/40402	. . .	Control button on master for quick movement, for fine slow movement
2219/40354	. . .	Singularity detection	2219/40403	. . .	Master for walk through, slave uses data for motion control and simulation
2219/40355	. . .	Geometric, task independent	2219/40404	. . .	Separate master controls macro and microslave manipulator
2219/40356	. . .	Kinetic energy, content and distribution	2219/40405	. . .	Master slave position control
2219/40357	. . .	Compliance, design and operational issues	2219/40406	. . .	Master slave rate control
2219/40358	. . .	Inertial, from dynamic models	2219/40407	. . .	Master slave, master is replica of slave
2219/40359	. . .	Constraint, physical limitations	2219/40408	. . .	Intention learning
2219/40361	. . .	Category of performance criteria			
2219/40362	. . .	Elbow high or low, avoid obstacle collision with redundancy control			
2219/40363	. . .	Two independent paths planned, interpolations for same robot, e.g. wrist and TCP			
2219/40364	. . .	Position of robot platform as additional task			
2219/40365	. . .	Configuration control, select other tasks by configuration of link positions			
2219/40366	. . .	Elbow reaches its target position before the end effector			
2219/40367	. . .	Redundant manipulator			
2219/40368	. . .	Multipoint impedance control, redundant manipulator can touch several obstacles			

2219/40409	. . .	Robot brings object near operator, operator places object in correct position	2219/40452	. . .	Evaluation function derived from skilled, experimented operator data
2219/40411	. . .	Robot assists human in non-industrial environment like home or office	2219/40453	. . .	Maximum torque for each axis
2219/40412	. . .	Sensor knowledge command fusion network, data and feature and action and constraint	2219/40454	. . .	Max velocity, acceleration limit for workpiece and arm jerk rate as constraints
2219/40413	. . .	Robot has multisensors surrounding operator, to understand intention of operator	2219/40455	. . .	Proximity of obstacles
2219/40414	. . .	Man robot interface, exchange of information between operator and robot	2219/40456	. . .	End effector orientation error
2219/40415	. . .	Semi active robot, cobot, guides surgeon, operator to planned trajectory, constraint	2219/40457	. . .	End effector position error
2219/40416	. . .	Planning for variable length tool, laser beam as tool	2219/40458	. . .	Grid adaptive optimization
2219/40417	. . .	For cooperating manipulators	2219/40459	. . .	Minimum torque change model
2219/40418	. . .	Presurgical planning, on screen indicate regions to be operated on	2219/40461	. . .	Plan for even distribution of motor load of joints
2219/40419	. . .	Task, motion planning of objects in contact, task level programming, not robot level	2219/40462	. . .	Constant consumed energy, regenerate acceleration energy during deceleration
2219/40421	. . .	Motion planning for manipulator handling sheet metal profiles	2219/40463	. . .	Shortest distance in time, or metric, time optimal
2219/40422	. . .	Force controlled velocity motion planning, adaptive	2219/40464	. . .	Minimum relative velocities
2219/40423	. . .	Map task space to sensor space	2219/40465	. . .	Criteria is lowest cost function, minimum work path
2219/40424	. . .	Online motion planning, in real time, use vision to detect workspace changes	2219/40466	. . .	Plan for minimum time trajectory, at least one joint maximum torque
2219/40425	. . .	Sensing, vision based motion planning	2219/40467	. . .	Virtual springs, impedance method
2219/40426	. . .	Adaptive trajectory planning as function of force on end effector, bucket	2219/40468	. . .	Using polytree intersection method
2219/40427	. . .	Integrate sensing and action in planning	2219/40469	. . .	Using fuzzy logic performance, distances are fuzzy, very close to very far
2219/40428	. . .	Using rapidly exploring random trees algorithm RRT-algorithm	2219/40471	. . .	Using gradient method
2219/40429	. . .	Stochastic, probabilistic generation of intermediate points	2219/40472	. . .	Using exact cell decomposition
2219/40431	. . .	Grid of preoptimised paths as function of target position, choose closest, fine adapt	2219/40473	. . .	Using genetic algorithm GA
2219/40432	. . .	Pass states by weighted transitions	2219/40474	. . .	Using potential fields
2219/40433	. . .	Distributed, trajectory planning for each virtual arm	2219/40475	. . .	In presence of moving obstacles, dynamic environment
2219/40434	. . .	Decompose in motion planning for swarm of robots and motion planning for object to be transported	2219/40476	. . .	Collision, planning for collision free path
2219/40435	. . .	Extract minimum number of via points from a trajectory	2219/40477	. . .	Plan path independent from obstacles, then correction for obstacles
2219/40436	. . .	Distributed search of attainable positions, parallel computed	2219/40478	. . .	Graphic display of work area of robot, forbidden, permitted zone
2219/40437	. . .	Local, directly search robot workspace	2219/40479	. . .	Use graphic display, layout of robot path, obstacles to indicate interference
2219/40438	. . .	Global, compute free configuration space, connectivity graph is then searched	2219/40481	. . .	Search pattern according to type of assembly to be performed
2219/40439	. . .	Feasible map algorithm	2219/40482	. . .	Before assembly arrange parts
2219/40441	. . .	Probabilistic backprojection	2219/40483	. . .	Find possible contacts
2219/40442	. . .	Voxel map, 3-D grid map	2219/40484	. . .	Using several tethered motors, attached to powersupply cable, move over surface
2219/40443	. . .	Conditional and iterative planning	2219/40485	. . .	Generate goal regions in presence of uncertainty, interference
2219/40444	. . .	Hierarchical planning, in levels	2219/40486	. . .	If physical limitation, execute regrasping steps
2219/40445	. . .	Decompose n-dimension with n-links into smaller m-dimension with m-1-links	2219/40487	. . .	Sensing to task planning to assembly execution, integration, automatic
2219/40446	. . .	Graph based	2219/40488	. . .	Coarse and fine motion planning combined
2219/40447	. . .	Bitmap based	2219/40489	. . .	Assembly, polyhedra in contact
2219/40448	. . .	Preprocess nodes with arm configurations, c-space and planning by connecting nodes	2219/40491	. . .	Gravity stable assembly, upper part cannot fall apart
2219/40449	. . .	Continuous, smooth robot motion	2219/40492	. . .	Model manipulator by spheres for collision avoidance
2219/40451	. . .	Closest, nearest arm, robot executes task, minimum travel time	2219/40493	. . .	Task to parameter designer, adapts parameters of impedance model as function of sensors
			2219/40494	. . .	Neural network for object trajectory prediction, fuzzy for robot path
			2219/40495	. . .	Inverse kinematics model controls trajectory planning and servo system
			2219/40496	. . .	Hierarchical, learning, recognition level controls adaptation, servo level

2219/40497	. . .	Collision monitor controls planner in real time to replan if collision	2219/40544	. . .	Detect proximity of object
2219/40498	. . .	Architecture, integration of planner and motion controller	2219/40545	. . .	Relative position of wrist with respect to end effector spatial configuration
2219/40499	. . .	Reinforcement learning algorithm	2219/40546	. . .	Motion of object
2219/40501	. . .	Using sub goal method of options for semi optimal path planning	2219/40547	. . .	End effector position using accelerometers in tip
2219/40502	. . .	Configuration metrics	2219/40548	. . .	Compare measured distances to obstacle with model of environment
2219/40503	. . .	Input design parameters of workpiece into path, trajectory planner	2219/40549	. . .	Acceleration of end effector
2219/40504	. . .	Simultaneous trajectory and camera planning	2219/40551	. . .	Friction estimation for grasp
2219/40505	. . .	Adaptive posture planning as function of large forces	2219/40552	. . .	Joint limit
2219/40506	. . .	Self motion topology knowledge, configuration mapping	2219/40553	. . .	Haptic object recognition
2219/40507	. . .	Distributed planning, offline trajectory, online motion, avoid collision	2219/40554	. . .	Object recognition to track object on conveyor
2219/40508	. . .	Fuzzy identification of motion plans executed by operator	2219/40555	. . .	Orientation and distance
2219/40509	. . .	Piano moving model	2219/40556	. . .	Multisensor to detect contact errors in assembly
2219/40511	. . .	Trajectory optimization, coarse for arm, medium for wrist, fine for finger	2219/40557	. . .	Tracking a tool, compute 3-D position relative to camera
2219/40512	. . .	Real time path planning, trajectory generation	2219/40558	. . .	Derive hand position angle from sensed process variable, like waveform
2219/40513	. . .	Planning of vehicle and of its manipulator arm	2219/40559	. . .	Collision between hand and workpiece, operator
2219/40514	. . .	Computed robot optimized configurations to train ann, output path in real time	2219/40561	. . .	Contactpoint between sensor surface and the normal, geometric probing
2219/40515	. . .	Integration of simulation and planning	2219/40562	. . .	Position and orientation of end effector, teach probe, track them
2219/40516	. . .	Replanning	2219/40563	. . .	Object detection
2219/40517	. . .	Constraint motion planning, variational dynamic programming	2219/40564	. . .	Recognize shape, contour of object, extract position and orientation
2219/40518	. . .	Motion and task planning	2219/40565	. . .	Detect features of object, not position or orientation
2219/40519	. . .	Motion, trajectory planning	2219/40566	. . .	Measuring, determine axis of revolution surface by tactile sensing, orientation
2219/40521	. . .	Alternative, allowable path substitution if arm movements not possible	2219/40567	. . .	Purpose, workpiece slip sensing
2219/40522	. . .	Display of workpiece, workspace, locus of robot tip in different planes, xy xz yz	2219/40568	. . .	Position and force and skin acceleration and stress rate sensors
2219/40523	. . .	Path motion planning, path in space followed by tip of robot	2219/40569	. . .	Force and tactile and proximity sensor
2219/40524	. . .	Replace link, joint, structure by stewart platform to model flexibility	2219/40571	. . .	Camera, vision combined with force sensor
2219/40525	. . .	Modeling only part of links or modules	2219/40572	. . .	Camera combined with position sensor
2219/40526	. . .	Modeling of links for each possible error or only certain error	2219/40573	. . .	Isee integrated sensor, end effector, camera, proximity, gas, temperature, force
2219/40527	. . .	Modeling, identification of link parameters	2219/40574	. . .	Laserscanner combined with tactile sensors
2219/40528	. . .	Ann for learning robot contact surface shape	2219/40575	. . .	Camera combined with tactile sensors, for 3-D
2219/40529	. . .	Neural network based on distance between patterns	2219/40576	. . .	Multisensory object recognition, surface reconstruction
2219/40531	. . .	Ann for voice recognition	2219/40577	. . .	Multisensor object recognition
2219/40532	. . .	Ann for vision processing	2219/40578	. . .	Impedance, mechanical impedance measurement
2219/40533	. . .	Generate derivative, change of vibration error	2219/40579	. . .	Mechanical impedance, from motor current and estimated velocity
2219/40534	. . .	Generate derivative, change of position error	2219/40581	. . .	Touch sensing, arc sensing
2219/40535	. . .	Selective perception, retain only information needed for special task	2219/40582	. . .	Force sensor in robot fixture, base
2219/40536	. . .	Signal processing for sensors	2219/40583	. . .	Detect relative position or orientation between gripper and currently handled object
2219/40537	. . .	Detect if robot has picked up more than one piece from bin; interlocked parts	2219/40584	. . .	Camera, non-contact sensor mounted on wrist, indep from gripper
2219/40538	. . .	Barcode reader to detect position	2219/40585	. . .	Chemical, biological sensors
2219/40539	. . .	Edge detection from tactile information	2219/40586	. . .	6-DOF force sensor
2219/40541	. . .	Identification of contact formation, state from several force measurements	2219/40587	. . .	Measure force indirectly by using deviation in position
2219/40542	. . .	Object dimension	2219/40588	. . .	Three laser scanners project beam on photodiodes on end effector
2219/40543	. . .	Identification and location, position of components, objects	2219/40589	. . .	Recognize shape, contour of tool

2219/40591	. . .	At least three cameras, for tracking, general overview and underview	2219/41005	. . .	Update servo gain not for each microprocessor cycle, but after a certain displacement
2219/40592	. . .	Two virtual infrared range sensors	2219/41006	. . .	Change gain as function of speed and position
2219/40593	. . .	Push object and hold, detect moved distance	2219/41007	. . .	Select gain as function of gear ratio
2219/40594	. . .	Two range sensors for recognizing 3-D objects	2219/41008	. . .	Speed gain high, position gain low in speed mode and inverse in position mode
2219/40595	. . .	Camera to monitor deviation of each joint, due to bending of link	2219/41009	. . .	Sum output of amplifiers with different gains
2219/40596	. . .	Encoder in each joint	2219/41011	. . .	Adapt gain as function of followup error, model can be used
2219/40597	. . .	Measure, calculate angular momentum, gyro of rotating body at end effector	2219/41012	. . .	Adjust feedforward gain
2219/40598	. . .	Measure velocity, speed of end effector	2219/41013	. . .	Lower gain in high frequency region
2219/40599	. . .	Force, torque sensor integrated in joint	2219/41014	. . .	Cubic raise of gain until friction overcome, then linear raise
2219/40601	. . .	Reference sensors	2219/41015	. . .	Adjust position and speed gain of different axis
2219/40602	. . .	Robot control test platform	2219/41016	. . .	Adjust gain to maintain operating bandwidth for guaranteed servo performance
2219/40603	. . .	Infrared stimulated ultrasonic button on end effector, two fixed receivers	2219/41017	. . .	High gain in narrow band of frequencies centered around frequency of rotation
2219/40604	. . .	Two camera, global vision camera, end effector neighbourhood vision camera	2219/41018	. . .	High gain for motor control during acceleration, low during deceleration
2219/40605	. . .	Two cameras, each on a different end effector to measure relative position	2219/41019	. . .	Measure time needed from first to second speed, to adapt gain to aging condition
2219/40606	. . .	Force, torque sensor in finger	2219/41021	. . .	Variable gain
2219/40607	. . .	Fixed camera to observe workspace, object, workpiece, global	2219/41022	. . .	Small gain for small movements, large gain for large movements
2219/40608	. . .	Camera rotates around end effector, no calibration needed	2219/41023	. . .	Large pd gain initially switched to smaller pd gain afterwards
2219/40609	. . .	Camera to monitor end effector as well as object to be handled	2219/41024	. . .	High gain for low command speed, torque or position error equals or near zero
2219/40611	. . .	Camera to monitor endpoint, end effector position	2219/41025	. . .	Detect oscillation, unstability of servo and change gain to stabilize again
2219/40612	. . .	6-DOF ultrasonic or infrared external measurement	2219/41026	. . .	Change gain as function of speed
2219/40613	. . .	Camera, laser scanner on end effector, hand eye manipulator, local	2219/41027	. . .	Control signal exponentially to error
2219/40614	. . .	Whole arm proximity sensor WHAP	2219/41028	. . .	Select gain with memory, rom table
2219/40615	. . .	Integrate sensor placement, configuration with vision tracking	2219/41029	. . .	Adjust gain as function of position error and position
2219/40616	. . .	Sensor planning, sensor configuration, parameters as function of task	2219/41031	. . .	Raise gain at zero speed until position error or speed is zero, then normal gain
2219/40617	. . .	Agile eye, control position of camera, active vision, pan-tilt camera, follow object	2219/41032	. . .	Backlash
2219/40618	. . .	Measure gripping force offline, calibrate gripper for gripping force	2219/41033	. . .	Constant counter torque
2219/40619	. . .	Haptic, combination of tactile and proprioceptive sensing	2219/41034	. . .	Two motors driven in opposite direction to take up backlash
2219/40621	. . .	Triangulation sensor	2219/41035	. . .	Voltage injection
2219/40622	. . .	Detect orientation of workpiece during movement of end effector	2219/41036	. . .	Position error in memory, lookup table for correction actual position
2219/40623	. . .	Track position of end effector by laser beam	2219/41037	. . .	With computer
2219/40624	. . .	Optical beam area sensor	2219/41038	. . .	Compensation pulses
2219/40625	. . .	Tactile sensor	2219/41039	. . .	Change compensation slowly, gradually, smooth error with filter
2219/40626	. . .	Proprioceptive, detect relative link position, form object from hand contact	2219/41041	. . .	Compensation pulses as function of direction movement
2219/40627	. . .	Tactile image sensor, matrix, array of tactile elements, tixels	2219/41042	. . .	Switch between rapid, quick feed and cut, slow workspeed feed backlash
2219/40628	. . .	Progressive constraints	2219/41043	. . .	Memory table with motor current and corresponding correction for lost motion
2219/40629	. . .	Manipulation planning, consider manipulation task, path, grasping	2219/41044	. . .	For several transducers a table, select table as function of transducer
2219/41	. . .	Servomotor, servo controller till figures	2219/41045	. . .	For several modes and feed speeds, a table, registers for several backlash
2219/41001	. . .	Servo problems	2219/41046	. . .	Ffw compensation using adaptive inverse backlash model
2219/41002	. . .	Servo amplifier	2219/41047	. . .	Recirculating ballnut, ballscrew, preloaded bearing
2219/41003	. . .	Control power amplifier with data on data bus			
2219/41004	. . .	Selection gain according to selection of speed or positioning mode			

2219/41048	. . .	Relieve backlash by stepping back a little and verify position	2219/41094	. . .	Removable interferometer, store exact position, needed drive current, temperature
2219/41049	. . .	Block position pulses until movement detected, automatic compensation	2219/41095	. . .	References, calibration positions to adapt gain of servo
2219/41051	. . .	Detect end of lost motion by detecting changing current	2219/41096	. . .	For several positions store dead zone in memory
2219/41052	. . .	By detecting change of velocity	2219/41097	. . .	Align stepping motor with driven valve
2219/41053	. . .	How to integrate position error, add to speed loop	2219/41098	. . .	Automatic recalibration
2219/41054	. . .	Using neural network techniques	2219/41099	. . .	Calibration by going to two extremes, limits, counting pulses, storing values
2219/41055	. . .	Kind of compensation such as pitch error compensation	2219/41101	. . .	Stop, halt step, ac motor on certain excitation phase, after sensing a reference
2219/41056	. . .	Compensation for changing stiffness, deformation of workpiece	2219/41102	. . .	Analog comparator
2219/41057	. . .	Stiffness, deformation of slide, drive	2219/41103	. . .	One comparator for both speed and position feedback
2219/41058	. . .	For deformation of screw	2219/41104	. . .	Start fine position after coarse position stopped
2219/41059	. . .	Play in gear, screw backlash, lost motion	2219/41105	. . .	Coarse fine
2219/41061	. . .	Backlash for linear deviations	2219/41106	. . .	Coarse fine take over, transition, switch over
2219/41062	. . .	Compensation for two, three axis at the same time, crosscoupling	2219/41107	. . .	Coarse by hydraulic cylinder, fine by step motor superposed on piston
2219/41063	. . .	Lineary distributing pitch error over interpolated distance, add pulses, smoothing	2219/41108	. . .	Controlled parameter such as gas mass flow rate
2219/41064	. . .	Reference screw, simulation axis, electronic simulated axis	2219/41109	. . .	Drilling rate, feed rate
2219/41065	. . .	Resolver or inductosyn correction	2219/41111	. . .	Vertical position and orientation with respect to vertical
2219/41066	. . .	Keep nut at constant distance from screw	2219/41112	. . .	Control parameter such as motor controlled by a torque signal
2219/41067	. . .	Correction screw	2219/41113	. . .	Compensation for path radius
2219/41068	. . .	Measuring and feedback	2219/41114	. . .	Compensation for gravity, counter balance gravity
2219/41069	. . .	With cam	2219/41115	. . .	Compensation periodical disturbance, like chatter, non-circular workpiece
2219/41071	. . .	Backlash for non orthogonal axis	2219/41116	. . .	Compensation for instability
2219/41072	. . .	Cam transmits movement to resolver	2219/41117	. . .	Cancel vibration during positioning of slide
2219/41073	. . .	Tuning potentiometers and programming them	2219/41118	. . .	Drift-compensation for servo, anti-hunt
2219/41074	. . .	Learn, calibrate at start for indetermined position, drive until movement	2219/41119	. . .	Servo error compensation
2219/41075	. . .	Calibrate at start if new screw or slide has been installed, new lookup table	2219/41121	. . .	Eliminating oscillations, hunting motor, actuator
2219/41076	. . .	For each replacement of a movable part, reload pitch error correction	2219/41122	. . .	Mechanical vibrations in servo, antihunt also safety, stray pulses, jitter
2219/41077	. . .	Self tuning, test run, detect, compute optimal backlash, deformation compensation	2219/41123	. . .	Correction inertia of servo
2219/41078	. . .	Backlash acceleration compensation when inverting, reversing direction	2219/41124	. . .	Nonlinear compensation
2219/41079	. . .	Cross coupled backlash for two other axis on reversing third axis	2219/41125	. . .	Compensate position as function of phase lag of drive motor
2219/41081	. . .	Approach position from same direction	2219/41126	. . .	Compensation for current ripple of drive or transducer
2219/41082	. . .	Timer, speed integration to control duration of backlash correction	2219/41127	. . .	Compensation for temperature variations of servo
2219/41083	. . .	Upon reversing direction, lower, change gain	2219/41128	. . .	Compensate vibration beam, gantry, feedback of speed of non driven end
2219/41084	. . .	Compensation speed axis with changing, reversing direction, quadrant circle	2219/41129	. . .	Force compensation for non linearity of system
2219/41085	. . .	Compensation pulses on inversion of direction of rotation, movement	2219/41131	. . .	Enter manually a compensation, correction for a better positioning
2219/41086	. . .	Bang bang control	2219/41132	. . .	Motor ripple compensation
2219/41087	. . .	Determine switch point	2219/41133	. . .	Compensation non linear transfer function
2219/41088	. . .	If error too large, switch over to signal identification and servo correction	2219/41134	. . .	Ann compensates output of pd controller
2219/41089	. . .	Align, calibrate control so that one pulse or signal represents certain movement	2219/41135	. . .	Avoid stray pulses, jitter, use two d-flipflops, or integrate pulse duration
2219/41091	. . .	Alignment, zeroing, nulling, set parallel to axis	2219/41136	. . .	Compensation of position for slip of ac motor
2219/41092	. . .	References, calibration positions for correction of value position counter	2219/41137	. . .	Torque compensation for levitation effect of motor
2219/41093	. . .	By injection of sinusoidal signal, superposed on reference	2219/41138	. . .	Torque compensation

2219/41139	. . .	Compensate dynamic deflection of slide, calculated with position, speed, torque deflection values	2219/41184	. . .	Compensation of lag during constant speed movement
2219/41141	. . .	Position error compensation as function of speed to compensate detection delay	2219/41185	. . .	Send reference data in inverse order to model, filter to get inverted phase
2219/41142	. . .	Compensation of servocontrol signals as function of changing supply voltage	2219/41186	. . .	Lag
2219/41143	. . .	Compensation of dynamic characteristic of actuator	2219/41187	. . .	Inverse, reciprocal filter, transfer function, reduce lag in contouring
2219/41144	. . .	Element used such as low pass filter to cut resonance at non needed regions	2219/41188	. . .	Compensate position error between two different axis as function of type of transducer
2219/41145	. . .	Digital filter for compensation of servo loop	2219/41189	. . .	Several axis, compensation for load for several axis at the same time
2219/41146	. . .	Kalman filter	2219/41191	. . .	Cancel vibration by positioning two slides, opposite acceleration
2219/41147	. . .	Exponential filter	2219/41192	. . .	Compensation for different response times, delay of axis
2219/41148	. . .	Model, from position, speed, acceleration derive compensation	2219/41193	. . .	Active damping of tool vibrations by cross coupling
2219/41149	. . .	Zero phase filter	2219/41194	. . .	Axis error, one axis is corrected on other axis
2219/41151	. . .	Finite impulse response filter	2219/41195	. . .	Cross coupled feedback, position change one axis effects control of other
2219/41152	. . .	Adaptive filter	2219/41196	. . .	Adaptive prefiltering
2219/41153	. . .	Infinite impulse response filter	2219/41197	. . .	Adaptive postfiltering
2219/41154	. . .	Friction, compensation for friction	2219/41198	. . .	Fuzzy precompensation of pid, pd
2219/41155	. . .	During reversing, inverting rotation, movement	2219/41199	. . .	Feedforward compensation of pid
2219/41156	. . .	Injection of vibration anti-stick, against static friction, dither, stiction	2219/41201	. . .	Fuzzy compensation of statecontroller
2219/41157	. . .	Compensation as function of speed and acceleration	2219/41202	. . .	Structure, compensation circuit after comparator in loop
2219/41158	. . .	Use of pwm signal against friction	2219/41203	. . .	Lead-phase compensation, lag-phase compensation servo
2219/41159	. . .	Two step command, reference and dead zone value forward, then dead zone reverse	2219/41204	. . .	Compensation circuit for input, reference, before comparator
2219/41161	. . .	Adaptive friction compensation	2219/41205	. . .	Compensation circuit in speed feedback loop
2219/41162	. . .	Large gain at start to overcome friction, then low gain	2219/41206	. . .	Lookup table, memory with certain relationships
2219/41163	. . .	Adapt gain to friction, weight, inertia	2219/41207	. . .	Lookup table with position command, deviation and correction value
2219/41164	. . .	How to compensate, for example by injecting compensation signal in comparator of normal loop	2219/41208	. . .	Lookup table for load, motor torque as function of actual position error
2219/41165	. . .	Compensation corrected by second servo independent from main servo	2219/41209	. . .	Lookup table with compensation as function of reference and feedback value
2219/41166	. . .	Adaptive filter frequency as function of oscillation, rigidity, inertia load	2219/41211	. . .	For surface deviations from reference surface
2219/41167	. . .	Control path independent of load	2219/41212	. . .	Gains for pid compensator as function of xy position
2219/41168	. . .	Compensate position error by shifting projected image electronically	2219/41213	. . .	Lookup table for load, motor torque as function of actual position
2219/41169	. . .	Parallel compensation	2219/41214	. . .	Lookup table for current as function of actual position
2219/41171	. . .	Different compensation for left and right movement	2219/41215	. . .	Lookup table for speed as function of actual position error
2219/41172	. . .	Adapt coefficients of compensator to bring system into phase margin	2219/41216	. . .	Two lookup tables, for forward and reverse movement
2219/41173	. . .	Delay of compensation output signal as function of sampling and computation time	2219/41217	. . .	Command preshape, guidance, reference for better dynamic response, forcing feedforward
2219/41174	. . .	Compensator in feedback loop	2219/41218	. . .	Posicast, break reference into two parts, better settling time
2219/41175	. . .	Derivative compensation for speed loop, added or subtracted to speed reference	2219/41219	. . .	To compensate path, track error, calculate, use compensated reference
2219/41176	. . .	Compensation control, position error with data from lookup memory	2219/41221	. . .	Fuzzy shaping
2219/41177	. . .	Repetitive control, adaptive, previous error during actual positioning	2219/41222	. . .	Modified command filtering
2219/41178	. . .	Serial precompensation	2219/41223	. . .	Ann shaping, objective position, trajectory is shaped by ann
2219/41179	. . .	PI precompensation for speed loop	2219/41224	. . .	Shaping a bang-bang input
2219/41181	. . .	PID precompensation for position loop			
2219/41182	. . .	PI precompensation for position loop			
2219/41183	. . .	Compensation of lag during standstill			

- 2219/41225 . . . Profile generator for reference and for feedforward torque
- 2219/41226 . . . Zero vibration and zero derivative input shaper ZVD
- 2219/41227 . . . Extra insensitive input shaper, some vibration allowed
- 2219/41228 . . . Frequency of commutation updates depends on motor speed
- 2219/41229 . . . Adding a vibration, noise signal to reference signal of position, speed or acceleration
- 2219/41231 . . . Using impulse shaping filter
- 2219/41232 . . . Notch filter
- 2219/41233 . . . Feedforward simulation filter, with model
- 2219/41234 . . . Design, modeling of position controller
- 2219/41235 . . . Design, modeling of motion controller
- 2219/41236 . . . Use of sfc sequential function charts for specification
- 2219/41237 . . . Use of petrinets for verification, simulation
- 2219/41238 . . . Design with control bandwidth beyond lowest natural frequency
- 2219/41239 . . . Lyapunov direct controller design
- 2219/41241 . . . Anti-coincidence, synchronizer
- 2219/41242 . . . Pulse height modulation PHM
- 2219/41243 . . . Prevent, detect overflow of counter
- 2219/41244 . . . Dead band, zone
- 2219/41245 . . . Discrimination of direction
- 2219/41246 . . . Modulate command according to hysteresis so that ideal curve is followed
- 2219/41247 . . . Servo lock
- 2219/41248 . . . Adapting characteristics of servo
- 2219/41249 . . . Several slides along one axis
- 2219/41251 . . . Servo with spring, resilient, elastic element, twist
- 2219/41252 . . . Avoid housing vibration, slide and auxiliary slide controlled with opposite phase
- 2219/41253 . . . From measured signature, select in database corresponding servo valve type
- 2219/41254 . . . Avoid cumulative measuring, calculation errors, sum remainder
- 2219/41255 . . . Mode switch, select independent or dependent control of axis
- 2219/41256 . . . Chattering control
- 2219/41257 . . . Display of gain
- 2219/41258 . . . Single position detector for plural motors driving a single load
- 2219/41259 . . . Coupling, clutch
- 2219/41261 . . . Flexible coupling between carriage, slide and actuator, motor
- 2219/41262 . . . Binary summing of motions, by stacking or using levers
- 2219/41263 . . . Switch control mode of spindle drive as function of contouring, spindle orientation
- 2219/41264 . . . Driven by two motors
- 2219/41265 . . . To avoid backlash
- 2219/41266 . . . Coupling, clutch and brake unit
- 2219/41267 . . . Servo loop with stepping motor, see figure SE-twelve
- 2219/41268 . . . Two cascade slides controlled in opposite direction to avoid local wear
- 2219/41269 . . . Ballscrew and ball spline nut driven synchronously or independently
- 2219/41271 . . . Drive in two directions
- 2219/41272 . . . Driven by two steppermotors with different resonance frequency
- 2219/41273 . . . Hydraulic
- 2219/41274 . . . Flywheel as power buffer
- 2219/41275 . . . Two axis, x y motors controlled simultaneous, no contouring, quick move at 45-degrees
- 2219/41276 . . . Displacement as function of width, amplitude pulse to motor
- 2219/41277 . . . Separation of position drive controller and motor amplifiers
- 2219/41278 . . . Two current amplifiers, pumps for each direction of displacement, pushpull
- 2219/41279 . . . Brake
- 2219/41281 . . . Hydraulic actuated brake
- 2219/41282 . . . Magnetic brake
- 2219/41283 . . . Brake force does not load index axis, better positioning
- 2219/41284 . . . Brake by applying dc to ac motor
- 2219/41285 . . . Dynamic brake of ac, dc motor
- 2219/41286 . . . Brake motor before reversing motor
- 2219/41287 . . . Mechanical self braking
- 2219/41288 . . . Two brakes, one on motor axis, other on drive axis
- 2219/41289 . . . Motor direction controlled by relays
- 2219/41291 . . . Before switching relay, series semiconductor diminishes current to zero
- 2219/41292 . . . H-bridge, diagonal pairs of semiconductors
- 2219/41293 . . . Inverter, dc-to-ac
- 2219/41294 . . . Dc-to-ac converter
- 2219/41295 . . . Ac-to-ac converter frequency controlled
- 2219/41296 . . . Two data lines; one for drive controllers, other to communicate with central unit
- 2219/41297 . . . For cancelling magnetic field leakage generated by, e.g. voice coil motor
- 2219/41298 . . . Stepping motor and control valve and power cylinder and mechanical feedback
- 2219/41299 . . . Pneumatic drive, pressure controlled bellow extension
- 2219/41301 . . . Pilot valve, linear fluid control valve and power cylinder
- 2219/41302 . . . On off fluid valve and power cylinder
- 2219/41303 . . . Flow rate valve controls speed
- 2219/41304 . . . Pneumatic
- 2219/41305 . . . Bypass fluid flow, block it from motor
- 2219/41306 . . . Control valve with counteracting control pulses
- 2219/41307 . . . Motor drives hydraulic pump in direction needed for power cylinder
- 2219/41308 . . . Bellow formed by for linear actuators, each pressure controlled by motor
- 2219/41309 . . . Hydraulic or pneumatic drive
- 2219/41311 . . . Pilot valve with feedback of position
- 2219/41312 . . . Metering piston between switch to fluid supply and switch to power cylinder
- 2219/41313 . . . Electro rheological fluid actuator
- 2219/41314 . . . Electro rheological valve controls cylinder
- 2219/41315 . . . Feedback of position of pilot valve and of power cylinder
- 2219/41316 . . . Piezo valve
- 2219/41317 . . . Stepping motor and control valve and power cylinder
- 2219/41318 . . . Electro hydraulic drive, electric motor drives hydraulic actuator
- 2219/41319 . . . Ac, induction motor

2219/41321	. . .	Brushless dc motor	2219/41374	. . .	Observe position and driving signal, predict, estimate disturbance signal
2219/41322	. . .	Vector, field oriented controlled motor	2219/41375	. . .	Observe speed and select torque as function of position reference, to compensate torque
2219/41323	. . .	Permanent magnetic synchronous actuator, motor	2219/41376	. . .	Tool wear, flank and crater, estimation from cutting force
2219/41324	. . .	Modular servo drive, simo drive	2219/41377	. . .	Estimate cutting torque in real time
2219/41325	. . .	Linear electric actuator for position combined with pneumatic actuator for force	2219/41378	. . .	Estimate torque as function of speed, voltage and current
2219/41326	. . .	Step motor	2219/41379	. . .	Estimate torque from command torque and measured speed
2219/41327	. . .	Linear induction motor	2219/41381	. . .	Torque disturbance observer to estimate inertia
2219/41328	. . .	Direct motor drive	2219/41382	. . .	Observe position from encoder, estimate speed with ann
2219/41329	. . .	Dc motor	2219/41383	. . .	Observe current, voltage, derive position
2219/41331	. . .	Galvano driver	2219/41384	. . .	Force estimation using position observer
2219/41332	. . .	Electromagnet driven core, position of core controlled	2219/41385	. . .	Observe position from encoder, estimate speed, position with kalman filter
2219/41333	. . .	Non linear solenoid actuator	2219/41386	. . .	System identifier adapts coefficients tables for state and observer controller
2219/41334	. . .	Electrostatic levitator	2219/41387	. . .	Observe reference torque, position and feedback position, estimate contact force
2219/41335	. . .	Reluctance motor	2219/41388	. . .	Observe input torque and feedback position, estimate reaction torque
2219/41336	. . .	Voltage and frequency controlled ac motor	2219/41389	. . .	Estimate torque from command torque and feedback acceleration
2219/41337	. . .	Linear drive motor, voice coil	2219/41391	. . .	Flux observer, flux estimated from current and voltage
2219/41338	. . .	High torque, low inertia motor, printed circuit motor	2219/41392	. . .	Observer for each axis, link, freedom, gives greater speed
2219/41339	. . .	Using, switch reluctance or asynchronous motor in, to stepping mode motor	2219/41393	. . .	Synchronize observer with pulse from encoder
2219/41341	. . .	Ultrasonic motor	2219/41394	. . .	Estimate speed and position error from motor current, torque
2219/41342	. . .	Shape memory metal actuator	2219/41395	. . .	Observe actual position to estimate compensation torque
2219/41343	. . .	Magnetostrictive motor	2219/41396	. . .	Estimate acceleration from three phase current values
2219/41344	. . .	Piezo, electrostrictive linear drive	2219/41397	. . .	Estimate voltage control signal as function of voltage control signal and position error
2219/41345	. . .	Micropositioner	2219/41398	. . .	Estimate twist between motor and load, observe motor position and speed
2219/41346	. . .	Micropositioner in x, y and theta	2219/41399	. . .	Reduced order estimator
2219/41347	. . .	Piezo cycloid motor	2219/41401	. . .	Estimate position from max and min speeds in open loop
2219/41348	. . .	Hydraulic pressure block	2219/41402	. . .	Observe speed and driving signal, estimate speed
2219/41349	. . .	6-Dof combined magnetic fluidic floating motion stage 100-micrometer cube range	2219/41403	. . .	Machine deformation estimator as function of commanded position
2219/41351	. . .	Piezo impact force, rapid extension of small mass moves object a bit	2219/41404	. . .	Hysteresis, bang bang feedback of velocity
2219/41352	. . .	Alternative clamping dilation of piezo, caterpillar motion, inchworm	2219/41405	. . .	Inverse kinematic, dynamic
2219/41353	. . .	Optical piezo electric element, light converted in movement	2219/41406	. . .	LQR linear quadratic regulator to calculate gain for several known variables
2219/41354	. . .	Magnetic, thermal, bimetal peltier effect displacement, positioning	2219/41407	. . .	Master changes resistor, slave restores value in order to follow master
2219/41355	. . .	Electro magnetic coil actuator, voice coil	2219/41408	. . .	Control of jerk, change of acceleration
2219/41356	. . .	Variable speed transmission, Van Doorne, Reeves	2219/41409	. . .	Update position feedback during speed control
2219/41357	. . .	Belt	2219/41411	. . .	Avoid integrator wind-up, saturation actuator by dead zone feedback for integral
2219/41358	. . .	Transmission, variable gear ratio	2219/41412	. . .	Bandwidth of velocity loop is just below natural frequency of drive support
2219/41359	. . .	Gearbox	2219/41413	. . .	Forward kinematics
2219/41361	. . .	Differential	2219/41414	. . .	Time delay control, estimate non linear dynamics, correct with time delayed input
2219/41362	. . .	Registration, display of servo error			
2219/41363	. . .	Excess in error, error too large, follow up error			
2219/41364	. . .	Excess in error for speed, follow up error for speed			
2219/41365	. . .	Servo error converted to frequency			
2219/41366	. . .	Linearization of embedded position signals			
2219/41367	. . .	Estimator, state observer, space state controller			
2219/41368	. . .	Disturbance observer, inject disturbance, adapt controller to resulting effect			
2219/41369	. . .	Two estimators			
2219/41371	. . .	Force estimation using velocity observer			
2219/41372	. . .	Force estimator using disturbance estimator observer			
2219/41373	. . .	Observe position and driving signal, estimate disturbance and speed			

- 2219/41415 . . . Lookup table for nonlinear function synthesis
- 2219/41416 . . . Feedback signal is doubled, reference signal is doubled plus one
- 2219/41417 . . . Correction signal is different as function of sign of error
- 2219/41418 . . . Select feedback signal between detected position of motor and of driven load
- 2219/41419 . . . Resolution of feedback of incremental position decreases with velocity speed
- 2219/41421 . . . Eliminate, diminish delay in feedback speed
- 2219/41422 . . . Correction stored position while motor, power off, drive - encoder not connected
- 2219/41423 . . . Noise filter as function of rate of displacement, speed, for stabilisation
- 2219/41424 . . . Select a controller as function of large or small error
- 2219/41425 . . . Feedforward of acceleration
- 2219/41426 . . . Feedforward of torque
- 2219/41427 . . . Feedforward of position
- 2219/41428 . . . Feedforward of position and speed
- 2219/41429 . . . Mean value of previous feedforward values
- 2219/41431 . . . Delay position command as function of calculation time for feedforward, or order of system
- 2219/41432 . . . Feedforward of current
- 2219/41433 . . . Advance feedforward as function of delay rising torque, for large acceleration changes
- 2219/41434 . . . Feedforward FFW
- 2219/41435 . . . Adapt coefficients, parameters of feedforward
- 2219/41436 . . . Feedforward of speed and acceleration
- 2219/41437 . . . Feedforward of speed
- 2219/41438 . . . Feedforward of speed only during deceleration
- 2219/41439 . . . Position error ffw for compensation of speed
- 2219/41441 . . . Position reference ffw for compensation speed reference and speed error
- 2219/41442 . . . Position reference ffw for compensation speed reference
- 2219/41443 . . . Position reference ffw for compensation of position
- 2219/41444 . . . Speed reference ffw for compensation of speed error
- 2219/41445 . . . Ffw of position and speed error to compensate torque
- 2219/41446 . . . Position reference acceleration ffw for torque compensation
- 2219/41447 . . . Position generates force ffw combined with position error
- 2219/41448 . . . Ffw friction compensation for speed error, derived from position reference
- 2219/41449 . . . Speed reference and derived position ffw to compensate delay of position control
- 2219/41451 . . . Ffw tracking controller
- 2219/41452 . . . Position reference ffw for speed error compensation
- 2219/41453 . . . Inverse, feedforward controller is inverse of closed loop system
- 2219/41454 . . . Zero phase error tracking controller zpec
- 2219/41455 . . . Servo loop with absolute digital comparator, see figure SE-one
- 2219/41456 . . . Servo loop with switch between difference of counter OR absolute digital comparator, see figure SE-two
- 2219/41457 . . . Superposition of movement
- 2219/41458 . . . Servo loop with phase counter and phase discriminator, see figure SE-four
- 2219/41459 . . . Time counter and phase discriminator
- 2219/41461 . . . Phase counter and phase discriminator, phase locked motion
- 2219/41462 . . . Servo loop with position and reference counter, see figure SE-seven
- 2219/41463 . . . Servo loop with angle comparator and angle comparator predictor, see figure SE-eight
- 2219/41464 . . . Servo loop with position decoder, see figure SE-nine
- 2219/41465 . . . Servo loop with phase comparator, see figure SE-ten
- 2219/41466 . . . Servo loop with oscillator, see figure SE-eleven
- 2219/41467 . . . Servo loop with coincidence detector, see figure SE-thirteen
- 2219/41468 . . . Servo loop with adder, see figure SE-fourteen
- 2219/41469 . . . Servo loop with counter, see figure SE-fifteen
- 2219/41471 . . . Servo loop with u-down counter, see figure SE-sixteen
- 2219/41472 . . . Servo loop with position error indicates speed step value
- 2219/41473 . . . Servo loop with position and speed loop, problems of speed loop
- 2219/41474 . . . Servo loop with absolute digital position sensor
- 2219/41475 . . . Servo loop with absolute digital position sensor for continuous path control
- 2219/41476 . . . Servo loop with analog position sensor
- 2219/41477 . . . Servo loop with analog position sensor for continuous path control
- 2219/41478 . . . Servo loop with combination of analog and digital sensor
- 2219/41479 . . . Servo loop with position loop
- 2219/41481 . . . Divide command, block in subcommands, subblocks
- 2219/42 . . . Servomotor, servo controller kind till VSS
- 2219/42001 . . . Statistical process control spc
- 2219/42002 . . . Proportional
- 2219/42003 . . . Three point, hysteresis comparator, controller
- 2219/42004 . . . PD proportional derivative
- 2219/42005 . . . Disturbance decoupling, rejection, suppression
- 2219/42006 . . . Digital event dynamic system control
- 2219/42007 . . . Nonlinear PD
- 2219/42008 . . . P regulator for position loop
- 2219/42009 . . . I regulator for speed loop
- 2219/42011 . . . PI regulator for speed loop
- 2219/42012 . . . H-infinite controller
- 2219/42013 . . . Two pd controllers, one for coarse, one for fine motion
- 2219/42014 . . . Pseudo derivative control with feedforward of gain
- 2219/42015 . . . P integrator, look at past periodic errors, fading memory, repetitive controller
- 2219/42016 . . . Dynamic impedance control, load does not influence speed, force, position
- 2219/42017 . . . MIMO controller with many inputs and outputs
- 2219/42018 . . . Pid learning controller, gains adapted as function of previous error
- 2219/42019 . . . Pi for position controller
- 2219/42021 . . . Pi for current loop
- 2219/42022 . . . Three point, hysteresis controller with variable hysteresis as function of error
- 2219/42023 . . . Non linear pi

2219/42024	. . .	Stage controller, zpec and fuzzy smc and compensation controller	2219/42074	. . .	Position feedback and speed feedback, speed measured with tachometer
2219/42025	. . .	Pidaf, pid with acceleration and friction compensation	2219/42075	. . .	Two position loops
2219/42026	. . .	Pi position controller and fuzzy logic speed controller	2219/42076	. . .	Hybrid, digital control sets reference, coefficients for quick analog, pid, control
2219/42027	. . .	Flsps frequency locked steeping position control servo	2219/42077	. . .	Position, speed or current, combined with vibration feedback
2219/42028	. . .	Five point, hysteresis controller	2219/42078	. . .	Observer combined with pd
2219/42029	. . .	Crone controller, fractional or fractal or non integer order robust controller	2219/42079	. . .	P position loop, fuzzy speed loop
2219/42031	. . .	All denominator model, the model form is expanded in denominator taylor series	2219/42081	. . .	Fuzzy position controller and smc for motor voltage control
2219/42032	. . .	Differential feedback pd	2219/42082	. . .	Force control in one axis, velocity control in other axis
2219/42033	. . .	Kind of servo controller	2219/42083	. . .	Position, speed and force feedback
2219/42034	. . .	Pi regulator	2219/42084	. . .	Hybrid, analog loop, reference compensated by digital loop
2219/42035	. . .	I regulator	2219/42085	. . .	Error between reference model and controller compensated with fuzzy controller
2219/42036	. . .	Adaptive control, adaptive nonlinear control	2219/42086	. . .	Position, speed and deflection feedback
2219/42037	. . .	Adaptive pi	2219/42087	. . .	Speed and force loop
2219/42038	. . .	Real time adaptive control	2219/42088	. . .	I parallel to non linear controller
2219/42039	. . .	Select servo parameter set from table for fixed linear working points	2219/42089	. . .	Quick but coarse loop and slow but fine loop, dexterity
2219/42041	. . .	Adaptive pd	2219/42091	. . .	Loop combinations, add a second loop, cascade control
2219/42042	. . .	Adaptive robust controller	2219/42092	. . .	Position and force control loop together
2219/42043	. . .	Adapt regulator as function of its output	2219/42093	. . .	Position and current, torque control loop
2219/42044	. . .	Adapt model as function of difference between real and calculated position	2219/42094	. . .	Speed then pressure or force loop
2219/42045	. . .	Ann, error to pd, output pd to plant and also sets weights in ann	2219/42095	. . .	First closed loop, then open loop
2219/42046	. . .	Fuzzy pd controller, with position and velocity inputs	2219/42096	. . .	Add, subtract i part of speed feedback as function of sign speed error
2219/42047	. . .	Pid like fuzzy controller with position and velocity inputs	2219/42097	. . .	Dual mode servo, slow and precise, quick and coarse movement
2219/42048	. . .	Fuzzy pi control	2219/42098	. . .	First open, then closed loop to correct setpoint of open loop
2219/42049	. . .	Fuzzy p	2219/42099	. . .	Slow coarse loop followed by fine quick loop
2219/42051	. . .	Fuzzy position controller	2219/42101	. . .	Coarse position with microprocessor, fine with hardware centering, tracking
2219/42052	. . .	Fuzzy pi and d control	2219/42102	. . .	Coarse 8-bit positioning in closed loop, fine 10-bit in open loop
2219/42053	. . .	Dynamic fuzzy position controller	2219/42103	. . .	Switch from pi, if large error to disturbance mode control if small error
2219/42054	. . .	Loop, p control for position loop	2219/42104	. . .	Loop switch, speed loop then position loop, mode switch
2219/42055	. . .	Pi control for speed	2219/42105	. . .	Switch from pid to bang-bang to energy dissipation as function of speed, error
2219/42056	. . .	Pi current controller	2219/42106	. . .	Speed regulation starts only in braking range, less processor time needed
2219/42057	. . .	Predictive fuzzy controller	2219/42107	. . .	Always position loop, first open loop for speed, then also closed loop speed
2219/42058	. . .	General predictive controller GPC	2219/42108	. . .	Open loop for positioning, closed loop for calibration
2219/42059	. . .	Delta gpc, using derivative in time, predict over finite horizon	2219/42109	. . .	Coarse is speed loop, fine is position loop
2219/42061	. . .	Stochastic predictive controller spc	2219/42111	. . .	Change from pd, if small error, to bangbang if large error
2219/42062	. . .	Position and speed and current	2219/42112	. . .	Switch between motion and stall mode, if speed is below certain value
2219/42063	. . .	Position and speed and current and force, moment, torque	2219/42113	. . .	Position closed loop or open loop pressure control
2219/42064	. . .	Position, speed and acceleration	2219/42114	. . .	Loop mode, dual mode incremental coarse, analog fine
2219/42065	. . .	Feedforward combined with pid feedback	2219/42115	. . .	Switch from continuous drive to pwm, near stop or out of acceleration period
2219/42066	. . .	Position and speed and acceleration and current feedback			
2219/42067	. . .	Position and current			
2219/42068	. . .	Quasi smc, smc combined with other regulators			
2219/42069	. . .	Observer combined with pd and zero phase error tracking ffw controller			
2219/42071	. . .	Two clocks for each of the two loops			
2219/42072	. . .	Position feedback and speed feedforward, speed from data of tape			
2219/42073	. . .	Position and speed feedback, speed derived from position reference			

2219/42116	. . .	Switch from pid to pd or pd to pid	2219/42158	. . .	Fuzzy model of cutting process of milling machine
2219/42117	. . .	Speed mode then stepping mode	2219/42159	. . .	ARMA, AR autoregressive for poles, MA moving average model for zeros, in combination
2219/42118	. . .	Breaking of control loop, closing open control loop	2219/42161	. . .	One model for load, one model for motor inertia
2219/42119	. . .	Switch between motion and stall mode if actuator voltage current below limit	2219/42162	. . .	Model reference adaptive control MRAC, correction fictive-real error, position
2219/42121	. . .	Switch from bang-bang control to dead beat, finite time settling control	2219/42163	. . .	Simulator
2219/42122	. . .	First open loop, then closed loop	2219/42164	. . .	Compensation of integration time of model
2219/42123	. . .	Position loop then force, current loop	2219/42165	. . .	Compensation of gain of speed control circuit for model
2219/42124	. . .	Change over between two controllers, transfer error signal	2219/42166	. . .	Criterion is minimum jerk
2219/42125	. . .	Switch from pi to p or to pd-controller	2219/42167	. . .	Minimum torque change
2219/42126	. . .	Bumpless, smooth transfer between two control modes	2219/42168	. . .	Measuring of needed force for servo
2219/42127	. . .	Timing, switch over on detection of marker on spindle	2219/42169	. . .	Decoder
2219/42128	. . .	Servo characteristics, drive parameters, during test move	2219/42171	. . .	Velocity profile, variable gain, multiplication factors, rom ram
2219/42129	. . .	Teach, learn position table, model, for each reference a motor control output	2219/42172	. . .	Special code
2219/42131	. . .	Speed model created by entering estimated speed at references	2219/42173	. . .	Acceleration deceleration
2219/42132	. . .	Correct, modify position table, model if detected error too large	2219/42174	. . .	Memory with position profile and force limits
2219/42133	. . .	Position references as function of time, correlated speed, acceleration in memory, signature	2219/42175	. . .	Velocity, speed points, profile and corresponding acceleration, delta v
2219/42134	. . .	Fuzzy logic tuning of controller as function of error	2219/42176	. . .	Motion profile
2219/42135	. . .	Fuzzy model reference learning controller, synthesis, tune rule base automatically	2219/42177	. . .	Configuration memory for step motor
2219/42136	. . .	Fuzzy feedback adapts parameters model	2219/42178	. . .	Reduce cable connection by pre-memorized positions
2219/42137	. . .	Automatic tune fuzzy controller	2219/42179	. . .	Normalize velocity profile, calculate real velocity from additional parameters
2219/42138	. . .	Network tunes controller	2219/42181	. . .	Rom contains sin and cos table to drive step motor
2219/42139	. . .	Tune fuzzy controller by three attributes: rise time, overshoot, settling time	2219/42182	. . .	Memory is Rom for servo control
2219/42141	. . .	Filter error learning	2219/42183	. . .	Memory is Ram
2219/42142	. . .	Fuzzy control learning of starting friction coefficient	2219/42184	. . .	Master slave with feedforward for compensation of contour error
2219/42143	. . .	offline optimization of fuzzy controller	2219/42185	. . .	Master slave with contour controller
2219/42144	. . .	Online tuning of fuzzy controller by ann	2219/42186	. . .	Master slave, motion proportional to axis
2219/42145	. . .	Coarse tune with genetic algorithm, fine with gradient descent, hill climbing	2219/42187	. . .	Position mirror, axis, display, back of seat as function of position of seat, other axis
2219/42146	. . .	In each position, upper, lower drive current needed to move more, less, store mean	2219/42188	. . .	Slave controlled as function of reference and actual position and derived speed of master
2219/42147	. . .	Tune with genetic algorithm	2219/42189	. . .	Motion look up table as function of cam angle
2219/42148	. . .	Position references as function of time, correlated noise, temperature in memory	2219/42191	. . .	Adjust proportionality factor to optimize slave axis movement
2219/42149	. . .	During learning relation between control and controlled signal, open loop	2219/42192	. . .	Each axis drive has own queue of commands, executed in synchronism
2219/42151	. . .	Learn dynamics of servomotor system by ann	2219/42193	. . .	Select between limit switches as function of current position and destination
2219/42152	. . .	Learn, self, auto tuning, calibrating, environment adaptation, repetition	2219/42194	. . .	Derive position from command speed, integrate speed
2219/42153	. . .	Inverse dynamics model idm, computed torque method	2219/42195	. . .	Position a stop, move workpiece against stop to cut stock, bar
2219/42154	. . .	Model itself controlled by position and speed loop	2219/42196	. . .	Follow dynamically contour warped surface with tool
2219/42155	. . .	Model	2219/42197	. . .	Brake as function of machining load, to keep total load on tool constant, avoid oscillation
2219/42156	. . .	Forward dynamics model fdm	2219/42198	. . .	Step motor driven by step size and step duration data
2219/42157	. . .	Reference model uses only output and input measurements	2219/42199	. . .	Fine position with gauge, coarse with limit switch, transducer
			2219/42201	. . .	Deriving speed from commanded position
			2219/42202	. . .	Square of distance

2219/42203	. . .	Using a counter and a limit switch	2219/42245	. . .	Reference generates upper and lower range value at both sides of reference
2219/42204	. . .	Absolute positions	2219/42246	. . .	Add compensation to reference value
2219/42205	. . .	With potentiometer	2219/42247	. . .	Remote reference transmitted to servo
2219/42206	. . .	Block, stop pulses in one axis, not in other axis	2219/42248	. . .	Command reference limited, clipped, only between upper and lower values
2219/42207	. . .	Generate points between start and end position, linear interpolation	2219/42249	. . .	Relative positioning
2219/42208	. . .	Set position of proximity switch	2219/42251	. . .	Control position of beam in coordination with xy slide
2219/42209	. . .	Two slides, fine and quick, coarse and slow, piggyback, multirate positioner	2219/42252	. . .	Position beam to keep centerline
2219/42211	. . .	Command position by time value, proportional to total displacement	2219/42253	. . .	Double resolution for one pulse of computer
2219/42212	. . .	Rotation over, selection of smallest, shortest angle, distance	2219/42254	. . .	Resolution one axis different from resolution other axis
2219/42213	. . .	Position overshoot, axis still moves after stop	2219/42255	. . .	Acceleration, deceleration time is a multiple of sampling time
2219/42214	. . .	Near desired position, control actuator by pulse in each clock, otherwise continuously	2219/42256	. . .	Sampling the signal
2219/42215	. . .	Stop machine in a predetermined position	2219/42257	. . .	Sampling time in fixed relation to timer interrupt
2219/42216	. . .	Changing position range, stroke, between closed and fully open	2219/42258	. . .	Two sampling frequencies, for online measurements, for offline calculations
2219/42217	. . .	Time optimal position control	2219/42259	. . .	Variable sampling rate as function of thermal displacement
2219/42218	. . .	Coarse and fine position control combined, each by ann	2219/42261	. . .	Two sampling frequencies, one for motion, one for stillstand
2219/42219	. . .	Slow positioning with low pass, concurrent quick with high pass part of command	2219/42262	. . .	Variable sampling rate as function of position error
2219/42221	. . .	Control position by equilibrium between spring and actuator force	2219/42263	. . .	Different sample rates, multiple sample rates for the different loops
2219/42222	. . .	Compare reflected image from object with reference image, adjust object	2219/42264	. . .	Slow down sampling if power down is detected
2219/42223	. . .	Number and frequency of pwm signals define mean position in time	2219/42265	. . .	Sampling rate for sending reference values equals interpolation rate
2219/42224	. . .	Process received reference to adapt it to range of servo	2219/42266	. . .	Variable sampling rate, slow at low velocity
2219/42225	. . .	Coarse and fine position control combined, added, superposed	2219/42267	. . .	Stability analysis
2219/42226	. . .	If deviation, return to desired position after a delay if within position range	2219/42268	. . .	Safety, excess in error
2219/42227	. . .	Using incremental control actuator	2219/42269	. . .	Inject, superpose test signal on reference, monitor functionality servo
2219/42228	. . .	Stop motor where torque will be maximum	2219/42271	. . .	Monitor parameters, conditions servo for maintenance, lubrication, repair purposes
2219/42229	. . .	Shut off control, system, power on detection of zero or neutral position	2219/42272	. . .	Total movement is divided in several zones with different protection parameters
2219/42231	. . .	Detent, stop lock, current through motor in stop, locked, hold, blocked position	2219/42273	. . .	On restart, power up, overload replace reference with feedback signal, free rotate
2219/42232	. . .	Select, switch between long, extended and short range to position	2219/42274	. . .	On power failure keep last servoposition by cutting off air supply
2219/42233	. . .	Pwm signal to low pass filter, compared to feedback position, if equal stop motor	2219/42275	. . .	Alarm if working cycle fraction with values exceeding nominal exceeds threshold
2219/42234	. . .	Regression ann to map position error to pulse width	2219/42276	. . .	Action, on power failure, close pilot valve entirely by return spring
2219/42235	. . .	Adaptive pulsing, augment time duration until movement detected	2219/42277	. . .	If no position command in a period, servo to rest position, shut off power
2219/42236	. . .	Use of a certain number of ac periods	2219/42278	. . .	If direction bad, change direction sign or phase sequence automatically
2219/42237	. . .	Pwm pulse width modulation, pulse to position modulation ppm	2219/42279	. . .	Allow temporary motor overload if temperature still under maximum, heat inertia
2219/42238	. . .	Control motor position with direction signal and pwm signal for position	2219/42281	. . .	If estimated temperature rise of motor is too high, inhibit motor
2219/42239	. . .	Adaptive pulsing, take into account next cycle, command	2219/42282	. . .	If displacement rate of actuator exceeds limit, lower it
2219/42241	. . .	Select minimum value of two reference values	2219/42283	. . .	Motor only actuated if hardware and software permission and control signal together
2219/42242	. . .	Reference generator for position	2219/42284	. . .	Stop and brake motor
2219/42243	. . .	Enter velocity in reference generator, delivers position signals	2219/42285	. . .	Stop axis contour controlled
2219/42244	. . .	Enter acceleration, jerk, generator outputs acceleration, speed, position by integration	2219/42286	. . .	Speed, ramp controlled slow down of motor

2219/42287	. . .	On feedback failure, use profile stored in memory during learning	2219/42331	. . .	Bad parameter configuration for spindle, gear ratio, encoder resolution
2219/42288	. . .	Limit, stop drive current if axis obstructed, blocked, force against stop	2219/42332	. . .	Detect failure of servo controller
2219/42289	. . .	Avoid overload servo motor, actuator limit servo torque	2219/42333	. . .	Synchronization by opposite correction for both axis
2219/42291	. . .	Regenerate faulty feedback by last measurement after detection excess error	2219/42334	. . .	Synchronous tracking servo for biaxial positioning tables, contouring
2219/42292	. . .	If speed detection fails, regenerate speed from position signal	2219/42335	. . .	If one slave axis out of synchronisation, synchronise all other axes to that one
2219/42293	. . .	Regenerate faulty feedback by using previous value, substitute	2219/42336	. . .	To synchronize axis, adapt gain of each axis as function of max, min, average gain
2219/42294	. . .	Software monitoring of time delay of feedback pulses, feedback failure	2219/42337	. . .	Tracking control
2219/42295	. . .	Detect augmenting torque of drive motor	2219/42338	. . .	Position tracking control
2219/42296	. . .	Detect diminishing torque of drive motor, below low limit	2219/42339	. . .	Speed tracking control
2219/42297	. . .	Detect phase lag of driving motor	2219/42341	. . .	Force tracking control
2219/42298	. . .	Measure backlash, time difference between point A to point B and from B to A, if too large	2219/42342	. . .	Path, trajectory tracking control
2219/42299	. . .	Measure current during first acceleration command	2219/42343	. . .	Optimum, adaptive sliding mode controller
2219/42301	. . .	Detect correct connection of servomotor to powersupply	2219/42344	. . .	Chattering alleviation control, chattering about switching surface
2219/42302	. . .	Detect insufficient acceleration, diminishing speed	2219/42345	. . .	VSTC variable structure tracking control
2219/42303	. . .	Detect no speeding up of motor	2219/42346	. . .	Fuzzy sliding mode control fsmc
2219/42304	. . .	Load, torque threshold as function of speed	2219/42347	. . .	Switch to a saturation control signal if deviation from switch line is too large
2219/42305	. . .	Detect loss of pulse step motor	2219/42348	. . .	Slimsoc sliding mode self organizing controller
2219/42306	. . .	Excess in error, compare reference with feedback	2219/42349	. . .	Sliding mode control with perturbation estimation smcpe
2219/42307	. . .	Compare actual feedback with predicted, simulated value to detect run away	2219/42351	. . .	PIVSC proportional integral compensated vsc
2219/42308	. . .	Watchdog or integrator to detect no change or excess in feedback	2219/42352	. . .	Sliding mode controller SMC, select other gain
2219/42309	. . .	Excess in speed	2219/42353	. . .	Variable structure system, control VSS VSC
2219/42311	. . .	Store working torque profiles as function of time, position, compare with real torque	2219/43	. . .	Speed, acceleration, deceleration control ADC
2219/42312	. . .	Compare feedback with upper and lower limit, store result as 0-1 if in tolerance	2219/43001	. . .	Speed, feed, infeed, acceleration, stopping problems
2219/42313	. . .	Excess in error for speed and different sign of position and speed feedback	2219/43002	. . .	Acceleration, deceleration for forward, backward reciprocating movement
2219/42314	. . .	Warning signals are send when excess in error for speed, acceleration, amplitude	2219/43003	. . .	Acceleration deceleration in presence of backlash, dynamic backlash
2219/42315	. . .	Two, double counter to check measurement	2219/43004	. . .	Decelerate to follow desired velocity
2219/42316	. . .	Additional hardware to detect which part of feedback is defect, failed	2219/43005	. . .	Corner distance variables to keep path when programmed speed changes
2219/42317	. . .	Redundant, two actuators	2219/43006	. . .	Acceleration, deceleration control
2219/42318	. . .	Using two, more, redundant measurements or scales to detect bad function	2219/43007	. . .	Acceleration from rest
2219/42319	. . .	What kind of actuator failure	2219/43008	. . .	Deceleration and stopping
2219/42321	. . .	Wrong direction or sign of measured value, eventually stop	2219/43009	. . .	Acceleration deceleration for each block of data, segment
2219/42322	. . .	Emit dummy pulses, detect loss of pulses, feedback failure, wire brake, short	2219/43011	. . .	Shorter time by adjusting corner speed, avoid zero speed when engage corner
2219/42323	. . .	Detect wire break, short circuit of feedback	2219/43012	. . .	Profile is defined by series of bits, for each actuator, sensor
2219/42324	. . .	Axis breaking, between motor and slide, table	2219/43013	. . .	Ramp signal from division of sum of registers
2219/42325	. . .	Stalling of drive motor, overload	2219/43014	. . .	Calculate inertia ratio from full acceleration and full deceleration trial
2219/42326	. . .	Protection servo for saturation of amplifier	2219/43015	. . .	Calculate square root x
2219/42327	. . .	Detect ballscrew wear	2219/43016	. . .	Acceleration, deceleration as function of feed rate override
2219/42328	. . .	Detect bearing, clamp wear	2219/43017	. . .	Acceleration is larger than deceleration to compensate for friction
2219/42329	. . .	Defective measurement, sensor failure	2219/43018	. . .	Compensation, correction of acceleration, deceleration time
			2219/43019	. . .	Compensate acceleration for sudden change in load, shockless
			2219/43021	. . .	At several positions detect acceleration error, compensate for it
			2219/43022	. . .	Compensate for friction as function of position

2219/43023	. . .	Switch from acceleration to deceleration if mid stroke speed not reached	2219/43063	. . .	Acceleration deceleration as function of maximum allowable speed
2219/43024	. . .	Parabolic velocity profile, linear acceleration, keep energy dissipation minimal	2219/43064	. . .	Brake, decelerate at least one axis at maximum
2219/43025	. . .	Acceleration, deceleration is polynomial, derivative is zero on stop position	2219/43065	. . .	Limitation of jerk
2219/43026	. . .	Predict deceleration start from measured characteristics and actual performance	2219/43066	. . .	Max centrifugal acceleration, especially for cmm
2219/43027	. . .	Parabolic acceleration, deceleration trajectory at start, stop	2219/43067	. . .	Reach maximum speed at zero acceleration
2219/43028	. . .	Switching points for trapezoidal form are stored in memory	2219/43068	. . .	Adapt acceleration as function of load, developed heat in motor
2219/43029	. . .	Acceleration larger than deceleration for safe stopping at slow speed	2219/43069	. . .	Measure acceleration, derive limit torque, adapt acceleration
2219/43031	. . .	Feed speed reduction dependent on tool surface	2219/43071	. . .	Open closing acceleration deceleration control
2219/43032	. . .	Non symmetric acceleration profile	2219/43072	. . .	Position controlled opening profile
2219/43033	. . .	Sinusoidal acceleration profile	2219/43073	. . .	Time controlled opening profile
2219/43034	. . .	Form of profile, ramp, trapezoid, S-curve, exponential	2219/43074	. . .	Control speed, acceleration so as to follow desired speed profile
2219/43035	. . .	Vertical start and stop phase	2219/43075	. . .	Two modes, one normal and one for obstruction by objects
2219/43036	. . .	Velocity profile with given starting and stopping speed vector	2219/43076	. . .	Switch from acceleration to constant speed as function of detected speed limit
2219/43037	. . .	Position, speed as function of position is trapezoid	2219/43077	. . .	Limit switch starts braking, stop, no braking, low torque movement until end
2219/43038	. . .	Parabolic acceleration, constant speed, parabolic deceleration as function of position	2219/43078	. . .	Near end position limit switch, brake by reversing, then slow until end limit
2219/43039	. . .	Time, exponential acceleration, constant speed, exponential deceleration as function of time	2219/43079	. . .	Acceleration, deceleration controlled by switches along path
2219/43041	. . .	Prediction, look ahead deceleration control, calculate start deceleration	2219/43081	. . .	Set parameters of profile generator, creep distance and speed, flight time
2219/43042	. . .	Convolution of speed curve with torque curve	2219/43082	. . .	Near end position limit switch, lower speed and brake
2219/43043	. . .	Normal and maximum deceleration mode, switch as function of position deviation, error	2219/43083	. . .	Structure, step motor
2219/43044	. . .	Drive and brake alternative to decelerate and stop	2219/43084	. . .	Acceleration deceleration circuit implemented in software, algorithm
2219/43045	. . .	Max torque, acceleration, then variable, then reverse, variable then max deceleration	2219/43085	. . .	Acceleration-deceleration circuit before interpolator
2219/43046	. . .	Determine time constant from command speed and needed max acceleration torque	2219/43086	. . .	Acceleration-deceleration circuit after interpolator
2219/43047	. . .	If speed below reference, small acceleration, if above, large deceleration	2219/43087	. . .	Stop valves to stop fluid flow of hydraulic drive cylinder
2219/43048	. . .	Step change in reference, soft start, smoothing reference	2219/43088	. . .	Select out of plurality of acceleration profiles
2219/43049	. . .	Digital convolution for velocity profile, also successive convolution	2219/43089	. . .	Rom, ram with speed and acceleration
2219/43051	. . .	Translate generic motion description into acceleration profiles	2219/43091	. . .	Ram with optimum motion curve
2219/43052	. . .	Set for each block time constant and speed target	2219/43092	. . .	Torque curve, wave stored in rom, ram
2219/43053	. . .	Slow acceleration, rapid deceleration	2219/43093	. . .	Speed pattern, table together with timing data in ram
2219/43054	. . .	Take up gear backlash during deceleration	2219/43094	. . .	Acceleration and deceleration together with their respective time
2219/43055	. . .	Same acceleration deceleration pattern for position and velocity loop	2219/43095	. . .	Maximum speed and acceleration deceleration time constant as function of position
2219/43056	. . .	Asynchronous acceleration between slow, fast axes, rotational, linear axes	2219/43096	. . .	Position, trajectory and speed stored in ram
2219/43057	. . .	Adjust acceleration, speed until maximum allowable moment for axis	2219/43097	. . .	Table, rom, ram speed table
2219/43058	. . .	Limitation of acceleration, permissible, tolerable acceleration	2219/43098	. . .	Change ADC time constant during start and end of interpolation
2219/43059	. . .	Accelerate, decelerate all axis as function of max, min, average speed axis	2219/43099	. . .	Select acceleration deceleration time constants as function of weight, load, position
2219/43061	. . .	Maximum acceleration deceleration lookup table as function of distance	2219/43101	. . .	Change time constants acceleration, deceleration as function of feed rate override
2219/43062	. . .	Maximum acceleration, limit	2219/43102	. . .	Time constant acceleration, deceleration as function of machining conditions
			2219/43103	. . .	Switch adc time constants as function of type of axis, spindle feed or position axis
			2219/43104	. . .	Minimize time constant based on operation program

2219/43105	. . .	ADC time constants as function of type of axis rotational or linear	2219/43144	. . .	Accelerate one slide and decelerate other slide to keep speed constant
2219/43106	. . .	Time constant acceleration, deceleration as function of temperature of motor	2219/43145	. . .	Machine first with low spindle speed, then with high speed, avoid chatter
2219/43107	. . .	Correction acceleration and deceleration as function of speed, time constants in rom	2219/43146	. . .	Control of speed, velocity of movement of tool as function of power of tool
2219/43108	. . .	Delay stop command as function of error between reference and multiple of increments	2219/43147	. . .	Control power of tool as function of speed, velocity of movement
2219/43109	. . .	Adaptive stopping with correction for both directions	2219/43148	. . .	Rapid return, retract stroke
2219/43111	. . .	Measure time needed from first to second speed, to adapt position command	2219/43149	. . .	Rapid approach, then slow, then pressure for clamping, bonding
2219/43112	. . .	Using feedforward prediction of position	2219/43151	. . .	Rapid feed in, slow workspeed during entering material, then high work speed
2219/43113	. . .	Give stop order a certain number of motor rotations before end stop	2219/43152	. . .	Feed in, transfer line, rapid traverse to work, grip speed
2219/43114	. . .	Detect position, speed or time of object between begin and end, adapt motion	2219/43153	. . .	Control depth of feed in by timer
2219/43115	. . .	Adaptive stopping	2219/43154	. . .	Quick feed in to workpiece without gauging, then normal feed with gauging
2219/43116	. . .	Calculate overshoot from supply voltage change, adapt motion	2219/43155	. . .	Rapid speed for approach then slow speed for working
2219/43117	. . .	Torque compensation as function of position reference, feedback of speed and position	2219/43156	. . .	Feed rate
2219/43118	. . .	Adjust position reference as function of position reference, feedback of speed and position	2219/43157	. . .	Feed rate
2219/43119	. . .	Adapt robot motion to machine speed as function of error from programmed speed	2219/43158	. . .	Feedrate override
2219/43121	. . .	Axis speed as function of probing signal during probing of workpiece	2219/43159	. . .	Feedrate override only for x y, not for z or only for z and not for x y
2219/43122	. . .	Adapt speed, feed as function of duration of transmission of instruction	2219/43161	. . .	Second, independent feedrate override
2219/43123	. . .	Speed of cutter as function of position of feeler, probe	2219/43162	. . .	Motion control, movement speed combined with position
2219/43124	. . .	Adapt speed as function of material, thickness, depth, volume, width, uniform surface quality	2219/43163	. . .	Based on unit motions, primitive b-spline motions, time shifted and weighted
2219/43125	. . .	Speed as function of size of chuck, diameter tool	2219/43164	. . .	Independent, uncoordinated motion control of several motors to initialise
2219/43126	. . .	Pivoting speed of workpiece as function of inverse of work, machining time needed	2219/43165	. . .	Superposition of special effects motion on normal motion
2219/43127	. . .	As a function of, select reference velocity as function of gear ratio	2219/43166	. . .	Simulation of mechanical gear
2219/43128	. . .	Feed as function of number of press operations	2219/43167	. . .	Distributed motion control
2219/43129	. . .	Speed as function of curvature, in curves, corners smaller than in straight line	2219/43168	. . .	Motion profile planning for point to point control
2219/43131	. . .	Adapt speed as function of lag, follow up error	2219/43169	. . .	Motor drives a mechanical cam
2219/43132	. . .	Rotation speed as function of minimum wave energy, toolwear, first learn for different speeds	2219/43171	. . .	Correction servo and constant velocity motor as input to differential, sum motion
2219/43133	. . .	Delay movement start as function of lag, follow up error	2219/43172	. . .	Change velocities on the fly during a motion
2219/43134	. . .	Feed or speed as function of magnetic characteristic, code, form of tool	2219/43173	. . .	Synchronize motion with scenery, sound
2219/43135	. . .	Reduce path speed near centre of axis	2219/43174	. . .	Simulating cam motion mechanism
2219/43136	. . .	Lower speed of indexing motor if door to turret lathe is open	2219/43175	. . .	Motion in several blocks, for each part in open and part in closed loop
2219/43137	. . .	Constant path speed for combined rotational and linear movement	2219/43176	. . .	Scale velocity profile
2219/43138	. . .	Set speed by controlling position of pulley of variable transmission	2219/43177	. . .	Single cycle positioning, start, move, stop for single rotation
2219/43139	. . .	VCO variable frequency oscillator or two oscillators with different frequency	2219/43178	. . .	Filter resonance frequency from acceleration pattern, derive new speed pattern
2219/43141	. . .	Surface, path, tangential speed	2219/43179	. . .	Speed changes gradually from constant value to zero
2219/43142	. . .	Control relative speed between two spindles	2219/43181	. . .	Reaching reference position by spiraling speed reference
2219/43143	. . .	ADC ramp and velocities are set by potentiometers which control digital valve	2219/43182	. . .	Speed control with feedback and as reference the programmed value
			2219/43183	. . .	Speed control, input is the reference, but no feedback
			2219/43184	. . .	From desired speed, derive delta positions during equal intervals
			2219/43185	. . .	Speed invariant motions, path accuracy independent of speed

2219/43186	. . .	Pulses from handle, knob, hand wheel control speed	2219/45036	. . .	Waterjet cutting
2219/43187	. . .	Vector speed, ratio between axis, without feedback	2219/45037	. . .	Veneer cutting
2219/43188	. . .	Vector speed with feedback	2219/45038	. . .	Cutting plotter
2219/43189	. . .	Sum of squares	2219/45039	. . .	Slitter, scoring
2219/43191	. . .	Approximation	2219/45041	. . .	Laser cutting
2219/43192	. . .	Brake while driving to obtain very low speed, step wise movement, then stop	2219/45042	. . .	Hot wire cutting, use of polystyrene or similar material
2219/43193	. . .	Variable slope speed steps as function of position, pulse pump controller	2219/45043	. . .	EDM machine, wire cutting
2219/43194	. . .	Speed steps, switch over as function of position	2219/45044	. . .	Cutting
2219/43195	. . .	Using a tri-phase motor and a step motor	2219/45045	. . .	Maintenance, automatic storage and retrieval system
2219/43196	. . .	Using two motors	2219/45046	. . .	Crane
2219/43197	. . .	Two axis at the same time	2219/45047	. . .	Sorting
2219/43198	. . .	Coupling and step motor	2219/45048	. . .	Packaging
2219/43199	. . .	Safety, limitation of feedrate	2219/45049	. . .	Forklift
2219/43201	. . .	Limit speed to allowable speed for all axis	2219/45051	. . .	Transfer line
2219/43202	. . .	If collision danger, speed is low, slow motion	2219/45052	. . .	Filling vehicle with material
2219/43203	. . .	Limitation of speed, permissible, allowable, maximum speed	2219/45053	. . .	Coil, bobbin handling
2219/43204	. . .	Different, dynamic current limits as function of speed	2219/45054	. . .	Handling, conveyor
2219/43205	. . .	General tape speed controls speed of axis	2219/45055	. . .	Assembly
2219/43206	. . .	Tape speed controls speed of axis	2219/45056	. . .	Handling cases, boxes
2219/45	. . .	Nc applications	2219/45057	. . .	Storage handling for disks or material
2219/45001	. . .	Antenna orientation	2219/45058	. . .	Grinding, polishing robot
2219/45002	. . .	To application field of control	2219/45059	. . .	Drilling robot
2219/45003	. . .	Harvester	2219/45061	. . .	Measuring robot
2219/45004	. . .	Mining	2219/45062	. . .	Surface finishing robot
2219/45005	. . .	Registration machine, chart recorder	2219/45063	. . .	Pick and place manipulator
2219/45006	. . .	Valves	2219/45064	. . .	Assembly robot
2219/45007	. . .	Toy	2219/45065	. . .	Sealing, painting robot
2219/45008	. . .	Theatre	2219/45066	. . .	Inspection robot
2219/45009	. . .	Glassforming	2219/45067	. . .	Assembly
2219/45011	. . .	To be assigned	2219/45068	. . .	Cutting robot
2219/45012	. . .	Excavator	2219/45069	. . .	Computer controlled automata, doll
2219/45013	. . .	Spraying, coating, painting	2219/45071	. . .	Aircraft, airplane, ship cleaning manipulator, paint stripping
2219/45014	. . .	Elevator, lift	2219/45072	. . .	Sewer cleaning manipulator
2219/45015	. . .	Roller blind, shutter	2219/45073	. . .	Microrobot
2219/45016	. . .	Radar	2219/45074	. . .	Edge treating robot, machine
2219/45017	. . .	Agriculture machine, tractor	2219/45075	. . .	Sewer repair
2219/45018	. . .	Car, auto, vehicle	2219/45076	. . .	Gas, fuel refilling
2219/45019	. . .	Balancing wheels	2219/45077	. . .	Sculpturing manipulator
2219/45021	. . .	Wheel mounting	2219/45078	. . .	Window cleaning, end effector contains detection and cleaning means
2219/45022	. . .	Auto seat, dentist chair, roll wheel chair	2219/45079	. . .	Stripping robot, strip pieces of garments from table
2219/45023	. . .	Align head lamps of car	2219/45081	. . .	Tuning robot for amplifiers
2219/45024	. . .	Simulation car ride	2219/45082	. . .	Sanding robot, to clean surfaces
2219/45025	. . .	Position, mount glass window, sunroof in car-body	2219/45083	. . .	Manipulators, robot
2219/45026	. . .	Circuit board, pcb	2219/45084	. . .	Service robot
2219/45027	. . .	Masking, project image on wafer semiconductor, photo tracer	2219/45085	. . .	Space robot
2219/45028	. . .	Lithography	2219/45086	. . .	Brick laying, masonry robot
2219/45029	. . .	Mount and solder parts on board	2219/45087	. . .	Gymnast robot, acrobat
2219/45031	. . .	Manufacturing semiconductor wafers	2219/45088	. . .	Riveting robot
2219/45032	. . .	Wafer manufacture; interlock, load-lock module	2219/45089	. . .	Testing robot
2219/45033	. . .	Wire bonding, wire wrap	2219/45091	. . .	Screwing robot, tighten or loose bolt
2219/45034	. . .	Adjusting, trimming circuits on printed boards	2219/45092	. . .	Analysing or chemical synthesis robot, moving samples from station to station
2219/45035	. . .	Printed circuit boards, also holes to be drilled in a plate	2219/45093	. . .	Tacker robot, to join panels with nails, staples
			2219/45094	. . .	Milling robot
			2219/45095	. . .	Office messenger
			2219/45096	. . .	Polishing manipulator
			2219/45097	. . .	Cable harnessing robot

2219/45098	. . .	Vacuum cleaning robot	2219/45156	. . .	Grind on lathe
2219/45099	. . .	Filament, tape winding robot	2219/45157	. . .	Grind optical lens
2219/45101	. . .	Hot line work robot, to handle high voltage lines	2219/45158	. . .	Grind sawteeth
2219/45102	. . .	Concrete delivering manipulator with several links	2219/45159	. . .	Dressing, sharpening, trueing tool
2219/45103	. . .	Security, surveillance applications	2219/45161	. . .	Grinding machine
2219/45104	. . .	Lasrobot, welding robot	2219/45162	. . .	Chamfer grinding
2219/45105	. . .	Fruit picker, pruner, end effector is a platform for an operator	2219/45163	. . .	Laser erosion, take away layer of material by burning, use oxygen, engrave
2219/45106	. . .	Used in agriculture, tree trimmer, pruner	2219/45164	. . .	Laser refurbish with laser beam and metal powder
2219/45107	. . .	Weed robot	2219/45165	. . .	Laser machining
2219/45108	. . .	Aid, robot for aid to, assist human disabled	2219/45166	. . .	Tomography
2219/45109	. . .	Excercise, coordination, therapy, rehabilitation robot for disabled patients	2219/45167	. . .	Dentist, dental manufacture
2219/45111	. . .	Meal, food assistance	2219/45168	. . .	Bone prosthesis
2219/45112	. . .	Arm movement aid	2219/45169	. . .	Medical, rontgen, x ray
2219/45113	. . .	Animal handling, milking robot	2219/45171	. . .	Surgery drill
2219/45114	. . .	Fisher line robot	2219/45172	. . .	Prosthesis
2219/45115	. . .	Evisceration robot, remove intestines of animal	2219/45173	. . .	Object making, golf ball
2219/45116	. . .	Tapping human shoulder with hammer	2219/45174	. . .	Making panels
2219/45117	. . .	Medical, radio surgery manipulator	2219/45175	. . .	Glasses, spectacles
2219/45118	. . .	Endoscopic, laparoscopic manipulator	2219/45176	. . .	Animation for film scenes, show
2219/45119	. . .	Telesurgery with local assistant, voice communication	2219/45177	. . .	Data disk drive
2219/45121	. . .	Operating microscope, mounted on manipulator arm	2219/45178	. . .	Zoom, focus lens
2219/45122	. . .	Laser skin treatment	2219/45179	. . .	Optical, telescope
2219/45123	. . .	Electrogoniometer, neuronavigator, medical robot used by surgeon to operate	2219/45181	. . .	Optical multiplexer
2219/45124	. . .	Two spindle lathe	2219/45182	. . .	Microscope, micromanipulator for microscope
2219/45125	. . .	Four axis, spindle lathe	2219/45183	. . .	Photocopying, image scanning
2219/45126	. . .	Riveting machine	2219/45184	. . .	Filming, photography, camera
2219/45127	. . .	Portable, hand drill	2219/45185	. . .	Auto mirror
2219/45128	. . .	Nibble machines	2219/45186	. . .	Print on workpieces
2219/45129	. . .	Boring, drilling	2219/45187	. . .	Printer
2219/45131	. . .	Turret punch press	2219/45188	. . .	Laserjet printer
2219/45132	. . .	Forging press, combined with furnace	2219/45189	. . .	Plotter
2219/45133	. . .	Lapping	2219/45191	. . .	Spinning, web spinning
2219/45134	. . .	Marking	2219/45192	. . .	Weaving
2219/45135	. . .	Welding	2219/45193	. . .	Yarn manufacturing
2219/45136	. . .	Turning, lathe	2219/45194	. . .	Lace, braid, knitting
2219/45137	. . .	Punch, stamp, also with use die, mould	2219/45195	. . .	Sewing machines
2219/45138	. . .	Laser welding	2219/45196	. . .	Textile, embroidery, stitching machine
2219/45139	. . .	Laser drilling	2219/45197	. . .	Prepare and machine parts, assemble parts
2219/45141	. . .	Turret lathe	2219/45198	. . .	Coiling, making springs
2219/45142	. . .	Press-line	2219/45199	. . .	Polish
2219/45143	. . .	Press-brake, bending machine	2219/45201	. . .	Crowned roll machining
2219/45144	. . .	Saw	2219/45202	. . .	Edge finishing
2219/45145	. . .	Milling	2219/45203	. . .	Screwing
2219/45146	. . .	Inertia friction welding	2219/45204	. . .	Die, mould making
2219/45147	. . .	Machining blade, airfoil	2219/45205	. . .	Assembly of woodframe
2219/45148	. . .	Boring	2219/45206	. . .	Ultrasonic drill, mill, machining
2219/45149	. . .	Micromachining to micrometer precision	2219/45207	. . .	Actuator to regulate position, flow, speed, process variable
2219/45151	. . .	Deburring	2219/45208	. . .	Long, deep drill, with drill, bore diameter small relative to length, in pipes
2219/45152	. . .	Forming workpiece by pressing tool against metal on model	2219/45209	. . .	Measuring, indicating device having a needle
2219/45153	. . .	Carton forming	2219/45211	. . .	Making, assembling truss structures
2219/45154	. . .	Forming workpiece by using thermal energy, laser forming	2219/45212	. . .	Etching, engraving, sculpturing, carving
2219/45155	. . .	Electroforming, original form is covered with metal	2219/45213	. . .	Integrated manufacturing system ims, transfer line, machining center
			2219/45214	. . .	Gear cutting
			2219/45215	. . .	Thread cutting
			2219/45216	. . .	Tapping
			2219/45217	. . .	Notching
			2219/45218	. . .	Making cams, cones

2219/45219	. . .	Making intermeshing helical rotors, for pump, compressor	2219/49001	. . .	Machine tool problems
2219/45221	. . .	Edm, electrical discharge machining, electroerosion, ecm, chemical	2219/49002	. . .	Map unfolded surface on flat surface to make dies, composite objects, free form
2219/45222	. . .	Cloth making	2219/49003	. . .	Make two halves of tool, model at the same time
2219/45223	. . .	Making mirror, mirror segment	2219/49004	. . .	Modeling, making, manufacturing model to control machine, cmm
2219/45224	. . .	Electrode making	2219/49005	. . .	Map 2-D pattern on 3-D
2219/45225	. . .	Making impellers, propellers	2219/49006	. . .	Nc machine makes cams, model to control, or make a copy, on other machines
2219/45226	. . .	Process control	2219/49007	. . .	Making, forming 3-D object, model, surface
2219/45227	. . .	Stamp making	2219/49008	. . .	Making 3-D object with model in computer memory
2219/45228	. . .	Making spheres	2219/49009	. . .	Model stored in a memory of a prototype
2219/45229	. . .	Woodworking	2219/49011	. . .	Machine 2-D slices, build 3-D model, laminated object manufacturing LOM
2219/45231	. . .	Stoneworking	2219/49012	. . .	Remove material by laser beam, air, water jet to form 3-D object
2219/45232	. . .	CMP chemical mechanical polishing of wafer	2219/49013	. . .	Deposit layers, cured by scanning laser, stereo lithography SLA, prototyping
2219/45233	. . .	Repairing pipelines, tubes	2219/49014	. . .	Calculate number and form of 2-D slices automatically from volume on screen
2219/45234	. . .	Thin flat workpiece, sheet metal machining	2219/49015	. . .	Wire, strang laying, deposit fluid, welding, adhesive, hardening, solidification, fuse
2219/45235	. . .	Dispensing adhesive, solder paste, for pcb	2219/49016	. . .	Desktop manufacturing [DTM]; Solid freeform machining [SFM]; Solid freeform fabrication [SFF]
2219/45236	. . .	Facing, polygon working, polyhedron machining	2219/49017	. . .	DTM desktop manufacturing, prototyping
2219/45237	. . .	Honing machine	2219/49018	. . .	Laser sintering of powder in layers, selective laser sintering SLS
2219/45238	. . .	Tape, fiber, glue, material dispensing in layers, beads, filling, sealing	2219/49019	. . .	Machine 3-D slices, to build 3-D model, stratified object manufacturing SOM
2219/45239	. . .	Filament, coil winding	2219/49021	. . .	Deposit layer, machine, mill layer, then new layer, SDM solid deposit manufacturing
2219/45241	. . .	Coke oven	2219/49022	. . .	Photo masking, mask cures whole layer at one time, add wax, mill, new layer
2219/45242	. . .	Door, panel, window operation, opening, closing	2219/49023	. . .	3-D printing, layer of powder, add drops of binder in layer, new powder
2219/45243	. . .	Shoe, footwear making	2219/49024	. . .	LEM laminated engineering materials, like lom but first cut, then stack
2219/45244	. . .	Injection molding	2219/49025	. . .	By positioning plurality of rods, pins to form together a mold, maquette
2219/45245	. . .	Making key	2219/49026	. . .	SDM shape deposition manufacturing for multimaterial layers
2219/45246	. . .	Turn cylindrical workpiece, crowned	2219/49027	. . .	SALD selective area laser deposition, vapor solidifies on surface
2219/45247	. . .	Diamond turning, tool is diamond point	2219/49028	. . .	Rapid freeze prototyping, selectively deposit and rapidly freeze water layer by layer
2219/45248	. . .	Turning	2219/49029	. . .	Virtual rapid prototyping, create a virtual prototype, simulate rapid prototyping process
2219/47	. . .	Tracing, tracking	2219/49031	. . .	Project particles, laser beam to point using two, more jets, beams, ballistic particle
2219/4701	. . .	Edge detector, project line, inclined camera detects discontinuity	2219/49032	. . .	Bond layers with glue, solder, welding, brazing in LOM
2219/4702	. . .	Project several lines on surface, to detect discontinuity by camera	2219/49033	. . .	Blanks or taken from roll of metal sheet
2219/4703	. . .	View whole surface before edge detection, coarse scan then fine tracking	2219/49034	. . .	Changing design, use same prototype, add reinforcements where needed
2219/4704	. . .	Store actual edge, seam in memory before machining, compare with detected	2219/49035	. . .	Reconstruct boundary volume from stack of layer contours, sections
2219/4705	. . .	Detect edge during machining, welding, sewing	2219/49036	. . .	Use quality measures, build time, strength of material, surface approximation
2219/4706	. . .	Edge detector is incorporated into machine	2219/49037	. . .	Electro rheological fluid to build support for overhanging parts, particle jet
2219/4707	. . .	Trace groove always at bottom of groove			
2219/4708	. . .	Command codes, marks along line to control operation, velocity			
2219/4709	. . .	Command code in form of a sticker			
2219/4711	. . .	Using a pantograph			
2219/4712	. . .	Using photocell sensible to different colours			
2219/4713	. . .	Limit scanning surface by marks, stored limit, limit switches			
2219/4714	. . .	Use of help paths to go to different workpiece paths to be followed			
2219/4715	. . .	Second photocell in advance of first, to control speed or other operation			
2219/4716	. . .	Trace electric potential lines to control z motion			
2219/4717	. . .	Machine 3-D model by tracing two 2-D models			
2219/4718	. . .	Two mode switch over tracking as function of predetermined cmm probe angle			
2219/4719	. . .	Line detector with laser beam, adjustable optical axis			
2219/49	. . .	Nc machine tool, till multiple			

2219/49038	. . .	Support help, grid between support and prototype, separate easily	2219/49085	. . .	CMP end point analysis, measure parameters on points to detect end of polishing process
2219/49039	. . .	Build layer of different, weaker material between support and prototype	2219/49086	. . .	Adjust feeding speed or rotational speed of main spindle when load out of range
2219/49041	. . .	Workpiece is surrounded by softer support material during machining	2219/49087	. . .	Adjust parameter to compensate path deviation
2219/49042	. . .	Remove chips from probe, tool by blowing them away	2219/49088	. . .	As a function of, regulate feed as function of material, tool
2219/49043	. . .	Control of lubrication	2219/49089	. . .	Control feed as function of detected number of tools engaging simultaneously workpiece
2219/49044	. . .	Control preload of spindle bearing	2219/49091	. . .	Control feed as function of detected diameter, cross section of workpiece
2219/49045	. . .	Relieve stress of workpiece after machining by vibration table	2219/49092	. . .	Vary, change controlled parameter as function of detected power
2219/49046	. . .	Control flatness of deformable workpiece table	2219/49093	. . .	Adapt cutting speed as function of depth of cutting
2219/49047	. . .	Remove chips by tool up down movement, pecking	2219/49094	. . .	Feed as function of deviation of real from programmed position at fixed time intervals
2219/49048	. . .	Control of damping of vibration of machine base	2219/49095	. . .	Of rigidity of workpiece
2219/49049	. . .	Coolant serves as lubrication and also to take away swarf, chips	2219/49096	. . .	Deviation of compliant mounted tool
2219/49051	. . .	Heat treatment of workpiece, tempering	2219/49097	. . .	Material type of each layer to be drilled, to be joined
2219/49052	. . .	Accessory, coolant	2219/49098	. . .	As a function of machine operating speed and tool
2219/49053	. . .	Break chips, spiral chips, interrupt momentarily in feed during two or more rotations	2219/49099	. . .	Cutting force, torque
2219/49054	. . .	Active damping of tool vibration	2219/49101	. . .	As function of tool speed
2219/49055	. . .	Remove chips from probe, tool by vibration	2219/49102	. . .	Tool temperature
2219/49056	. . .	Control of flow of fluid or temperature as function of speed for uniform coating	2219/49103	. . .	Speed and feed
2219/49057	. . .	Controlling temperature of workpiece, tool, probe holder	2219/49104	. . .	Chip thickness
2219/49058	. . .	Division algorithm, calculate inverse ratio of cutting process from parameters	2219/49105	. . .	Emitted noise of tool
2219/49059	. . .	Machine with constant volume in time	2219/49106	. . .	Feed as function of lateral movement of saw blade
2219/49061	. . .	Calculate optimum operating, machining conditions and adjust, adapt them	2219/49107	. . .	Optimize spindle speed as function of calculated motion error
2219/49062	. . .	Adaptive control AC	2219/49108	. . .	Spindle speed
2219/49063	. . .	Adaptive control constraint ACC	2219/49109	. . .	Control cutting speed as function of tool wire wear, measure diameter of wire
2219/49064	. . .	Fuzzy adaptive control	2219/49111	. . .	Cutting speed as function of contour, path, curve
2219/49065	. . .	Execute learning mode first for determining adaptive control parameters	2219/49112	. . .	Compensation alignment of cylindrical workpiece
2219/49066	. . .	Geometric adaptive control	2219/49113	. . .	Align elements like hole and drill, centering tool, probe, workpiece
2219/49067	. . .	Find optimum between production rate and quality, number of points and speed	2219/49114	. . .	Go to coarse programmed reference, detector for fine alignment
2219/49068	. . .	Minimum cost adaptive	2219/49115	. . .	Alignment by taking into account asymmetries in signal, for small offsets
2219/49069	. . .	Adaptive control optimisation ACO	2219/49116	. . .	Align tool head with fixed line by actuating actuators along tool head slideways
2219/49071	. . .	Cycle time reduction	2219/49117	. . .	Alignment of surfaces to get them parallel
2219/49072	. . .	Action, withdraw, stop feed tool to prevent breakage or lower load	2219/49118	. . .	Machine end face, control C-axis and X-axis
2219/49073	. . .	Adapt machining parameters so as to keep temperature constant	2219/49119	. . .	Machine arc of circumference, as groove, cylindrical interpolation
2219/49074	. . .	Control cutting speed	2219/49121	. . .	C-axis for turning, fifth axis for milling
2219/49075	. . .	Control depth of cut	2219/49122	. . .	Multiclamping, to reduce dead times
2219/49076	. . .	Reduce cutting speed if feed force below minimum level	2219/49123	. . .	Simulation of clamping workpiece, modeling fixture and workpiece
2219/49077	. . .	Control of feed and spindle, cutting speed	2219/49124	. . .	Determine clamping position from equipment specification and machining shape
2219/49078	. . .	Control of feed only	2219/49125	. . .	Open clamp if tool approaches clamp zone, close again afterwards
2219/49079	. . .	Control cutting torque, force	2219/49126	. . .	Clamp piece to pallet using connectable power source
2219/49081	. . .	If obstruction, bad joint, move head aside and retry operation			
2219/49082	. . .	Maintain constant material removal rate			
2219/49083	. . .	If number of feed retractions exceeds a limit, repeat same instruction block			
2219/49084	. . .	Control roughness of surface			

2219/49127	. . .	Variable clamping force as function of movement, force on workpiece	2219/49168	. . .	Compensate feed as function of measured values and manual introduced values
2219/49128	. . .	Determine maximum clamping force as function of allowable displacement workpiece	2219/49169	. . .	Compensation for temperature, bending of tool
2219/49129	. . .	Clamps are movable along rod to desired positions	2219/49171	. . .	Compensate for dressing amount
2219/49131	. . .	High force clamping along periphery	2219/49172	. . .	Compensate slide position as function of indexed workpiece spindle position error
2219/49132	. . .	Control fixed clamping force	2219/49173	. . .	Compensation for sideways deviation of machined workpiece
2219/49133	. . .	Variable chuck clamping force as function of spindle speed	2219/49174	. . .	Compensate position by use of separate cmm
2219/49134	. . .	Clamp, keep positioned slide, workpiece stationary during machining	2219/49175	. . .	Compensate for errors in cmm, especially mirror errors, not flat enough
2219/49135	. . .	Active clamping, use servo to keep in position	2219/49176	. . .	Compensation of vibration of machine base due to slide movement
2219/49136	. . .	Vacuum pads hold workpiece during machining	2219/49177	. . .	Runout, eccentricity, unbalance of tool or workpiece
2219/49137	. . .	Store working envelop, limit, allowed zone	2219/49178	. . .	Compensation of tool position as function of square of rotating speed of spindle
2219/49138	. . .	Adapt working envelop, limit, allowed zone to speed of tool	2219/49179	. . .	Compensation for reluctance of axis motors causing surface undulation
2219/49139	. . .	Alarm if outside zone	2219/49181	. . .	Calculation, estimation, creation of error model using measured error values
2219/49141	. . .	Detect near collision and slow, stop, inhibit movement tool	2219/49182	. . .	Tapping, overshoot after reversal, elasticity compensation
2219/49142	. . .	Shut off power, stop if outside working zone	2219/49183	. . .	Compensation height of tool as function of horizontal position of spindle head, bending
2219/49143	. . .	Obstacle, collision avoiding control, move so that no collision occurs	2219/49184	. . .	Compensation for bending of workpiece, flexible workpiece
2219/49144	. . .	Limit movement on an axis by setting limits	2219/49185	. . .	Position error compensation as function of position of slide, control bearing pressure
2219/49145	. . .	Spheres replace object, check first collision for large spheres, then small	2219/49186	. . .	Deflection, bending of tool
2219/49146	. . .	Tool changing registers geometry of tool to avoid collision	2219/49187	. . .	Control position of steady rest to compensate bending
2219/49147	. . .	Retract on collision with moving object, tool follows, yields to object	2219/49188	. . .	Proportional compensation from middle to end of elongated workpiece
2219/49148	. . .	Adapt working envelop, limit to size workpiece	2219/49189	. . .	Bending of driven table, lag between real and commanded position
2219/49149	. . .	Ball end cutter interference, caused by tool shape, overcut part surface	2219/49191	. . .	Bending, tilt spindle in bearings to compensate for bending
2219/49151	. . .	Axis related interference, remove hidden surfaces	2219/49192	. . .	Create optical reference axis always kept parallel to reference optical block
2219/49152	. . .	Feedhold, stop motion if machine door is open, if operator in forbidden zone	2219/49193	. . .	Orthogonality of axis, deviation from 90-degree correction
2219/49153	. . .	Avoid collision, interference between tools moving along same axis	2219/49194	. . .	Structure error, in slide or screw
2219/49154	. . .	Detect position of slide to change hover height of tool to avoid collision	2219/49195	. . .	Slide, guideway, robot arm deviation
2219/49155	. . .	On collision, reverse motor over certain angle, then stop to avoid bending	2219/49196	. . .	Screw
2219/49156	. . .	On collision, cut off motor, delay, again motor on, repeat to avoid bending	2219/49197	. . .	Gear
2219/49157	. . .	Limitation, collision, interference, forbidden zones, avoid obstacles	2219/49198	. . .	Using lookup table, map, position and corresponding quasi static error
2219/49158	. . .	On near collision reduce speed	2219/49199	. . .	For non linear interpolation movement
2219/49159	. . .	Avoid pinching of persons between moving and fixed part	2219/49201	. . .	Variable load, slide friction, irregular machine guides
2219/49161	. . .	Near end of position, lower power or speed of motor to safe value, at end normal	2219/49202	. . .	For point to point positioning
2219/49162	. . .	On collision, obstruction reverse drive, accelerate, cancel inertia	2219/49203	. . .	For linear movement
2219/49163	. . .	Stop, dwell in corner edge, allow for cooling, go on machining, better surface	2219/49204	. . .	Control of heat to compensate for dilatation, thermal displacement
2219/49164	. . .	Corner, making corner	2219/49205	. . .	Compensate with stored values as function of machining time
2219/49165	. . .	Compensation relative movement between two commonly driven slides	2219/49206	. . .	Compensation temperature, thermal displacement, use measured temperature
2219/49166	. . .	Compensation for measured deviation of tool path, as function of length of path	2219/49207	. . .	Compensate thermal displacement using measured distance
2219/49167	. . .	Execute compensation only if workhead, module is connected	2219/49208	. . .	Preheat spindle by powering polyphase motor with monophase

2219/49209	. . .	Compensation by using temperature feelers on slide, base, workhead	2219/49255	. . .	Gear meshing, synchronize both with relative phase, then shift
2219/49211	. . .	Compensation dilatation using calculated temperature from velocity	2219/49256	. . .	Epicyclic movement of tool
2219/49212	. . .	Using lookup table, map, position error, temperature and position	2219/49257	. . .	Six or more linear drives to position x y z table
2219/49213	. . .	Active thermal preload regulation for spindle	2219/49258	. . .	Two y axis to control also rotation
2219/49214	. . .	Estimate error from heat distribution model and drive current, correct error	2219/49259	. . .	Endless belt with coupling, position tools simultaneously in both directions
2219/49215	. . .	Regulate temperature of coolant	2219/49261	. . .	Direct drive, without gear
2219/49216	. . .	Control of temperature of processor	2219/49262	. . .	Two drives at both sides of long tool
2219/49217	. . .	Compensation of temperature increase by the measurement	2219/49263	. . .	Separate, auxiliary indexing motor
2219/49218	. . .	Compensation of workpiece dilatation	2219/49264	. . .	Several x-y slides on single surface
2219/49219	. . .	Compensation temperature, thermal displacement	2219/49265	. . .	X motor moves x and y axis, y motor only y axis
2219/49221	. . .	Control of scale	2219/49266	. . .	Two xy tables, on top and below workpiece, in between a cutting wire
2219/49222	. . .	Rough cut at high speed	2219/49267	. . .	Three linear actuators to position vertically and rotate horizontally
2219/49223	. . .	Remove workpiece portions left uncut, unmachined by tool with suitable shape	2219/49268	. . .	Four bar mechanism
2219/49224	. . .	Identify and calculate uncut portions	2219/49269	. . .	Single motor for different drives, switch, change gears
2219/49225	. . .	Adapt machining conditions as function of workpiece cutting resistance	2219/49271	. . .	Air bearing slide, hydraulic, electromagnetic bearing
2219/49226	. . .	Cut, up or down cutting, cutting direction right, left	2219/49272	. . .	Electromagnetic bearing also used as feed in one axis or positioning in two axis
2219/49227	. . .	Cutting with trailing or leading edge of tool	2219/49273	. . .	Switch between continuous drive and index or stop mode
2219/49228	. . .	Unidirectional or multidirectional cutting	2219/49274	. . .	Four linear actuators to position x y table
2219/49229	. . .	Cutter, axis change over	2219/49275	. . .	Linear actuators on x y to position x y table, ballscrew drive on y to rotate
2219/49231	. . .	Keep tool, probe at constant distance from workpiece surface	2219/49276	. . .	Floating, air, magnetic suspension xy table, sawyer motor, xenetics
2219/49232	. . .	Limit penetration of drill into backup material, support	2219/49277	. . .	Oscillating, swinging feed drive, for grinding
2219/49233	. . .	Machining depth relative to surface, constant depth	2219/49278	. . .	Parallel link mechanism
2219/49234	. . .	Keep constant distance even if hole present, avoid collision tool with hole	2219/49279	. . .	Nanometric xy table
2219/49235	. . .	Control depth as function of grey level of scanned object, map of thickness	2219/49281	. . .	X y table positioned by vibration
2219/49236	. . .	Translate thickness to be removed in dwell delay, then to corresponding speed	2219/49282	. . .	Same control for double drive or slide
2219/49237	. . .	Depth, tool depth control	2219/49283	. . .	Frictionless rolling element
2219/49238	. . .	Surface tracking, following	2219/49284	. . .	Two cascaded slides, large range sits on small range, piggyback
2219/49239	. . .	Dimensions	2219/49285	. . .	Linear control rotating movement kept constant
2219/49241	. . .	2-5-D lace cutting, work in xy and increment in z, repeat	2219/49286	. . .	Two rotations gives cartesian coordinates, compact construction
2219/49242	. . .	4-D	2219/49287	. . .	Motor drives cam for very fine linear displacement, movement
2219/49243	. . .	5-D	2219/49288	. . .	Three linear actuators to position x y table
2219/49244	. . .	6-D	2219/49289	. . .	Large transmission ratio
2219/49245	. . .	2-5-D pocket machining	2219/49291	. . .	Torque, moment, drive power amplifier, movement follower
2219/49246	. . .	3-D printing, layer of powder, add drops of binder in layer, new powder	2219/49292	. . .	Harmonic gear, transmission, strain wave gear
2219/49247	. . .	Dressing started after number of workpieces machined	2219/49293	. . .	Switch between dual, double slide or double spindle mode
2219/49248	. . .	Dressing started if sparking out time to get correct surface is too long	2219/49294	. . .	Motor and brake actuated together
2219/49249	. . .	Dressing as function of load of grinding wheel	2219/49295	. . .	Drive spindle motor at maximum, limit torque for rapid machining time
2219/49251	. . .	Dress by conductive fluid between conductive grindstone and electrode	2219/49296	. . .	Identification workpiece by dimension, height, resistance value, but no code
2219/49252	. . .	Two spindle drives for common workpiece	2219/49297	. . .	Spindle identification in multispindle station
2219/49253	. . .	Position in space by controlling length of two, more cables, wires	2219/49298	. . .	Probe identification
2219/49254	. . .	High speed AC, induction spindle motor	2219/49299	. . .	Identify workpiece and align, center workpiece at the same time
			2219/49301	. . .	Identify material to be used, select between several
			2219/49302	. . .	Part, workpiece, code, tool identification

2219/49303	. . .	Tool identification and tool offset, compensation data together	2219/49347	. . .	Machine cover, first scan surface on which cover is to be placed
2219/49304	. . .	Tool identification, code	2219/49348	. . .	Mill surface from underneath workpiece, easy chips, cutout material evacuation
2219/49305	. . .	Store, memory on tool with control and maintenance data	2219/49349	. . .	Drill both sides of workpiece at the same time, under and over workpiece
2219/49306	. . .	Derive kind of cutter from null load	2219/49351	. . .	4-Axis surface machining
2219/49307	. . .	Learn, learn operational zone, feed, speed to avoid tool breakage	2219/49352	. . .	7-Axis surface machining
2219/49308	. . .	Fuzzy classification of tool wear states	2219/49353	. . .	Control of output power of tool, laser beam
2219/49309	. . .	Main and secondary machining area, main spindle and satellite spindle	2219/49354	. . .	High speed cutting
2219/49311	. . .	Select machining portion of workpiece, pivoting workpiece as function of correction needed	2219/49355	. . .	Machine flat surface on rotating workpiece, rotate tool inverse direction
2219/49312	. . .	Fixture free machining	2219/49356	. . .	Tool with constant force against workpiece during machining
2219/49313	. . .	Machining about eccentric center different from rotational center of workpiece	2219/49357	. . .	Tool perpendicular to surface with varying force
2219/49314	. . .	Machine with oscillating workpiece, no full rotation	2219/49358	. . .	Facing milling, tool perpendicular to surface
2219/49315	. . .	Machine first contour slowly, then remaining surface quickly, fast	2219/49359	. . .	Cylindrical or side milling, tool tangential to surface
2219/49316	. . .	Back-off grinding, during wheel retract, by deflection workpiece, after plunge	2219/49361	. . .	Workpiece and tool have each own rotation speed
2219/49317	. . .	Traverse grinding, move along workpiece	2219/49362	. . .	Tool, probe at constant height to surface during machining
2219/49318	. . .	Grind and simultaneous gauging, dwell, measure and final feed without gauging	2219/49363	. . .	Minimalize time for tool movement between different positions, holes
2219/49319	. . .	Centerless machining, grinding, cutting	2219/49364	. . .	Minimize number of punch strokes
2219/49321	. . .	Reverse movement of tool to deburr	2219/49365	. . .	Minimise noncutting area, tool travel, eliminate air cutting
2219/49322	. . .	Cool to solidify material before machining it	2219/49366	. . .	Machine several small pieces on one sheet, break off pieces
2219/49323	. . .	Machine long, slender workpiece	2219/49367	. . .	Group machines into cells to minimise intercellular travel
2219/49324	. . .	Different starting point for each machining pass, to prevent dent formation	2219/49368	. . .	Vision calculates errors while table already moves, result corrects movement
2219/49325	. . .	Combine punching and laser machining	2219/49369	. . .	Minimize machining time by maximizing feed, speed
2219/49326	. . .	Drill on laser machine, transfer to edm for operation on hole, adjust position	2219/49371	. . .	Variable laser spot width, small for boundary, large for rest
2219/49327	. . .	Combine punch and marker, engraving for workpiece	2219/49372	. . .	Optimize toolpath pattern for a given cutting layer, mounting sequence
2219/49328	. . .	Laser machining and milling combined	2219/49373	. . .	Flying operation, while tool and workpiece have same speed
2219/49329	. . .	Combine edm and milling	2219/49374	. . .	Speed up each conveyor between two stations, at stations synchronize in phase
2219/49331	. . .	Laser drilling followed by laser cutting	2219/49375	. . .	Minimalizing machine time, number of tool change
2219/49332	. . .	First saw rough contours in workpiece then mill rest	2219/49376	. . .	Select two machining types, milling or turning, complete machining with one tool
2219/49333	. . .	Drilling and thread cutting by same machine	2219/49377	. . .	Eliminate double cutting
2219/49334	. . .	Combine turning, milling, grinding or other in one setup	2219/49378	. . .	Tool path finding, select minimal distance
2219/49335	. . .	Part, workpiece, inner, internal outer, external machining	2219/49379	. . .	Key input path, move one axis manually, other axis slave controlled by program
2219/49336	. . .	Machine two mating, matching parts, at opposite ends of spindle, simultaneously	2219/49381	. . .	Raster, line servo, area machining, cutting, facing
2219/49337	. . .	Machine holes in spherical nodes	2219/49382	. . .	Movement reciprocating
2219/49338	. . .	Micromachining, workpieces small, around 1-mm or less	2219/49383	. . .	Using pick feed with non reciprocating machining direction
2219/49339	. . .	Machine simultaneous left and right, mirror part	2219/49384	. . .	Control of oscillatory movement like filling a weld, weaving
2219/49341	. . .	Manual pocket machining, multipasses	2219/49385	. . .	Using pick feed when machining a surface
2219/49342	. . .	Select between concentric and eccentric regions of a workpiece	2219/49386	. . .	Automatic seam, weld line, finding
2219/49343	. . .	Machining point symmetrical surfaces, revolving surfaces	2219/49387	. . .	Limiting scanning region
2219/49344	. . .	Surface, 5-axis surface machining			
2219/49345	. . .	Smooth and polish surface at the same time			
2219/49346	. . .	3-Axis surface machining			

2219/49388	. . .	Computer controlled movement of plotter is transferred to tool by pantograph	2219/50028	. . .	Beam detects x, y deviation on surface, compensates beam of position scanner
2219/49389	. . .	Machine alternative both sides of rib, net machining, against deformation	2219/50029	. . .	Go to pivotable, rotatable reference plane
2219/49391	. . .	Adapt number of passes as function of tool wear	2219/50031	. . .	Zero setting, go to reference with gauge
2219/49392	. . .	Multipasses, segmentation of cut, paraxial cutting	2219/50032	. . .	On one axis only, derive from inclined surface offsets for other axis
2219/49393	. . .	Machining step, fixing smallest step nibble machine, planer	2219/50033	. . .	Align tool, tip with a calibration mask
2219/49394	. . .	Stop in one point, execute other operation and return back to first point	2219/50034	. . .	Set search range about origin, select between different overlapping ranges
2219/49395	. . .	Repeating same operations for other coordinates	2219/50035	. . .	Go to reference point and measure a preset force, pressure, store position
2219/49396	. . .	Stepwise milling, mill by advancing larger step then retract smaller step, repeat	2219/50036	. . .	Find center of circular mark, groove
2219/49397	. . .	Control of dwell time	2219/50037	. . .	Use either upper or lower limit for home control
2219/49398	. . .	Repeat same operations on machined part until machining reaches its finishing	2219/50038	. . .	Go to mechanical limit with low speed, until blocking of drive
2219/50	. .	Machine tool, machine tool null till machine tool work handling	2219/50039	. . .	Two probe, one on turret, serves also to calibrate second probe on bed
2219/50001	. . .	Multislides, multispindles with multitool turret for each	2219/50041	. . .	Measuring intensity of tool vibration
2219/50002	. . .	Drill more holes simultaneously, adapt distance tools as function of detected image	2219/50042	. . .	Return to origin, reference point, zero point, homing
2219/50003	. . .	Machine simultaneously two workpieces	2219/50043	. . .	Near zero detection
2219/50004	. . .	Multitool at the same time, priority for one tool as function of machining parameter	2219/50044	. . .	For speed
2219/50005	. . .	Multiple chuck machining, chuck position change after each partial machining	2219/50045	. . .	Combined axis jogging, following programmed shape instead of single axis
2219/50006	. . .	Two parallel spindles, bi-spindle and two tool blocks sliding on same axis	2219/50046	. . .	Control of level, horizontal, inclination of workholder, slide
2219/50007	. . .	Multiple polishing heads, oscillating and rotating	2219/50047	. . .	Positioning, indexing
2219/50008	. . .	Multiple, multi tool head, parallel machining	2219/50048	. . .	Jogging
2219/50009	. . .	Revolver head	2219/50049	. . .	Control machine as function of position, angle of workpiece
2219/50011	. . .	Two spindles drive single large tool, cooperation of spindles	2219/50051	. . .	Turn workpiece axis perpendicular to turn axis of lathe
2219/50012	. . .	Multi slide and indexable multi workpiece spindles	2219/50052	. . .	Orienting workpiece relative to tool
2219/50013	. . .	Two spindles on same line, one for workpiece, other for tool, second tool on slide	2219/50053	. . .	Machine non circular, non-round cross section, hexagonal, rectangular
2219/50014	. . .	Several, multi workpieces	2219/50054	. . .	Drill on skew surface
2219/50015	. . .	Multi cutting, twin tools contact at same time workpiece, balance cutting	2219/50055	. . .	Make hollow workpiece with uniform wall thickness
2219/50016	. . .	Turret with multiple workpiece holders, spindles, multiple fixed tools around it	2219/50056	. . .	Profile, for operation on I-, T-profiles or other elongated profiles
2219/50017	. . .	Two programs, two slides, data second slide related to moving origin of first	2219/50057	. . .	Compensation error by probing test, machined piece, post or pre process
2219/50018	. . .	Zero point floating	2219/50058	. . .	During machining, measure previous part to compensate errors
2219/50019	. . .	Zero, null offset	2219/50059	. . .	Record profile error, used for next machining pass
2219/50021	. . .	Configuration, null point on tool relative to null point on workpiece	2219/50061	. . .	Compensation of measuring errors due to machine with footprint
2219/50022	. . .	Null point on tool relative to null point of toolholder, rotationcenter	2219/50062	. . .	Measure deviation of workpiece under working conditions, machine correction
2219/50023	. . .	Measure different null points, references of tool and store in memory	2219/50063	. . .	Probe, measure, verify workpiece, feedback measured values
2219/50024	. . .	Go to reference, switches and dog to decelerate and to detect origin	2219/50064	. . .	Camera inspects workpiece for errors, correction of workpiece at desired position
2219/50025	. . .	Go to reference, switches and dog detect origin, combine with pulse from encoder	2219/50065	. . .	Estimate trends from past measured values, correct before really out of tolerance
2219/50026	. . .	Go to reference plane, cube	2219/50066	. . .	Fit base pattern into detected geometrical workpiece data, create whole program
2219/50027	. . .	Go to workpiece surface plane and store position	2219/50067	. . .	Measure surface for thickness and store map in memory, machine surface
			2219/50068	. . .	Test valve, object, store parameters, machine object to get wanted performance

2219/50069	. . .	Reject workpiece if not machinable, material to be machined too large	2219/50108	. . .	Retract tool stepwise, same path, until safe boundary reached, then quick retract
2219/50071	. . .	Store actual surface in memory before machining, compare with reference surface	2219/50109	. . .	Soft approach, engage, retract, escape, withdraw path for tool to workpiece
2219/50072	. . .	Machine workpiece again to correct previous errors	2219/50111	. . .	Retract tool along path, reengage along same path
2219/50073	. . .	Signature analysis, store forces during test, compare with real ones during assembly	2219/50112	. . .	Retract tool to a point
2219/50074	. . .	Purpose, workpiece measurement to control, adapt feed of tool	2219/50113	. . .	Short stroke, retract tool, safe distance from workpiece surface, hover height
2219/50075	. . .	To adapt, control force level at which machining will be considered as finished	2219/50114	. . .	Select approach path as function of zone for tool slide
2219/50076	. . .	To derive from state of surface, the need to change used, worn tool	2219/50115	. . .	Select complicated, combined approach path
2219/50077	. . .	Keep position by switching over to auxiliary power supply for resolver, encoder	2219/50116	. . .	Select approach path out of plurality
2219/50078	. . .	Single battery backup for all axis, encoders, resolvers	2219/50117	. . .	Select approach path as function of machining time
2219/50079	. . .	Battery backup supply switched over data, signal lines, to save cable	2219/50118	. . .	Select as function of position of tool during cycle, optimum path
2219/50081	. . .	On power loss, shut down axis using generated power from one braked axis	2219/50119	. . .	Select between set of paths as function of interrupt nature
2219/50082	. . .	UPS, no break to power actuator and move into safe condition	2219/50121	. . .	Machining several workpieces with one or more tools in one setup
2219/50083	. . .	Power loss, measures again loss of power	2219/50122	. . .	Workpiece holder, chuck jaws, fixture setup
2219/50084	. . .	Keep position, setup parameters in memory	2219/50123	. . .	Setup, automatic setup
2219/50085	. . .	Realignment, search reference to reestablish position	2219/50124	. . .	Automatic new setup when new program selected
2219/50086	. . .	Microprocessor	2219/50125	. . .	Configurable fixture, jig
2219/50087	. . .	Rough, coarse and finish, fine machining	2219/50126	. . .	Position clamp, fixture by machining head itself
2219/50088	. . .	Rough and finish machining simultaneously	2219/50127	. . .	Modular fixture, use of clamps and locators, the latter also for positioning
2219/50089	. . .	Finish allowance equals offset rough finish tool and bending work under rough	2219/50128	. . .	Reference free part encapsulation, fixture using molten filler and cube
2219/50091	. . .	Rough machining	2219/50129	. . .	Setup machines as function of process model, control strategy for optimum use of machines
2219/50092	. . .	Sculptured part rough machining with the offset approach	2219/50131	. . .	Setup as function of tool position in manufacturing center
2219/50093	. . .	Sculptured rough machining with the contour map approach, make slices	2219/50132	. . .	Jig, fixture
2219/50094	. . .	Optimize number of layers to be cut for contour map approach	2219/50133	. . .	With optical beam, tool crosses beam
2219/50095	. . .	On tool breakage return to a reference then follow already machined path	2219/50134	. . .	Tool pushes reference plane, or <i>vice versa</i> , reverse motion until again zero
2219/50096	. . .	After interrupt, use tool path display to bring tool back on path	2219/50135	. . .	Tool touches box, sensor to give a contact signal
2219/50097	. . .	After repair, dry run program until block before restart is detected	2219/50136	. . .	With sensor, potentiometer to measure relative displacement
2219/50098	. . .	After interrupt, interpolate with suitable startpoint different from stoppoint	2219/50137	. . .	Contact in probe, touch probe to detect contact, touch trigger
2219/50099	. . .	Before restart change jig, fixture with workpieces	2219/50138	. . .	During setup display is red, after setup display is green colour
2219/50101	. . .	For fine machining, select tool and offset, block and restart midway	2219/50139	. . .	Calibration, setting tool after measurement on tool
2219/50102	. . .	Store history of operation, after power failure, restart from history, journal	2219/50141	. . .	Setup tool, preset
2219/50103	. . .	Restart, reverse, return along machined path, stop	2219/50142	. . .	Measure parallelism of tool with respect to plane and correct
2219/50104	. . .	Before restarting program, restore machine status existing at stop time	2219/50143	. . .	Tool set up integrated, automatically transferred into control system
2219/50105	. . .	Display instructions to operator on how to restart machine	2219/50144	. . .	offline setup by simulation of process, during machining, forming of other piece
2219/50106	. . .	Before allowing restart, check that machine condition is optimal	2219/50145	. . .	Tool setup manual, preset of the machine
2219/50107	. . .	Retract tool if end of drilling is detected	2219/50146	. . .	Machine construction error compensation using ann
			2219/50147	. . .	Calibrate tool heads based on calibration of first tool head
			2219/50148	. . .	Workpiece, setup of component, workpiece

2219/50149	. . .	Find orientation workpiece which maximizes number of faces machined in one setup	2219/50194	. . .	Before restarting machine, enter allowable, maximum speed corresponding to tool
2219/50151	. . .	Orient, translate, align workpiece to fit position assumed in program	2219/50195	. . .	Emergency stop stops drives and spindle, stored program remains in memory
2219/50152	. . .	Align axis cylinder, tube with rotation axis machine	2219/50196	. . .	Monitor clutch or belt drive
2219/50153	. . .	Mount machining unit on workpiece, move unit on it	2219/50197	. . .	Signature analysis, store working conditions, compare with actual
2219/50154	. . .	Milling center	2219/50198	. . .	Emergency stop
2219/50155	. . .	Swivel spindle head horizontally	2219/50199	. . .	Tool, nozzle is covered for protection in home position, if needed also heated
2219/50156	. . .	Tiltable rotary table	2219/50201	. . .	Tool loses contact with workpiece, alarm if no cut through operation
2219/50157	. . .	Universal swivel spindle head, swivel in all directions	2219/50202	. . .	During movement of tool towards workpiece, shut down rotation, welding gun
2219/50158	. . .	Modular structure	2219/50203	. . .	Tool, monitor condition tool
2219/50159	. . .	Steady rest	2219/50204	. . .	Tool replacement point, tool change position without damage, clearance plane
2219/50161	. . .	Reverse engineering, cloning	2219/50205	. . .	On tool breakage stop machine
2219/50162	. . .	Stewart platform, hexapod construction	2219/50206	. . .	Tool monitoring integrated in nc control
2219/50163	. . .	Machine stations and control modules build as a unity to be connected in line	2219/50207	. . .	Surface finish
2219/50164	. . .	Select a structure to make programming of free curved surface easier	2219/50208	. . .	Retrace, remachine portion of path, locus to remove start discontinuities
2219/50165	. . .	Axis nc machine cooperates with two axis rotary table	2219/50209	. . .	Surface treatment, roughing surface
2219/50166	. . .	Extended range, machine a workpiece over a long distance	2219/50211	. . .	Finish machining, spark out, rough out
2219/50167	. . .	Adapting to copying	2219/50212	. . .	Giving a texture, structure to surface, like leather, wood appearance
2219/50168	. . .	Retrofitting	2219/50213	. . .	Grooving of different forms or parallel to each other, grooving cycle
2219/50169	. . .	Double stewart platform	2219/50214	. . .	Refurbish, refinish, reprofile, recondition, restore, rebuild profile
2219/50171	. . .	Machine, machining centre, center	2219/50215	. . .	Move synchronously tool and anvil at both sides of plate
2219/50172	. . .	Tool holder is transparent	2219/50216	. . .	Synchronize speed and position of several axis, spindles
2219/50173	. . .	Machine tool hang and move on rail above workpiece	2219/50217	. . .	Synchronize, control phase angle of two spindles by auxiliary index motor
2219/50174	. . .	Machine tool y-1, y-2, z, A-axis, table x, c-axis	2219/50218	. . .	Synchronize groups of axis, spindles
2219/50175	. . .	6-Dof manipulator associated with 1-DOF workpiece holder	2219/50219	. . .	Slave spindle is driven at half the torque of main spindle for synchronism
2219/50176	. . .	Table, general, for machine tool	2219/50221	. . .	Switch speed reference from speed to position loop of both spindles to synchronize
2219/50177	. . .	Protection for operator during operation, machining	2219/50222	. . .	Stop machines, actuators until others reach common synchronization point
2219/50178	. . .	Clamp, brake gravity axis on power loss to clamp tool in position	2219/50223	. . .	Loose synchronisation, can shift within time interval
2219/50179	. . .	Dynamic tolerance, limit values as function of speed, type of command	2219/50224	. . .	Synchronize feed and spindle speed during slow down, stopping
2219/50181	. . .	After stopping apply additionally a brake	2219/50225	. . .	Synchronize feed and spindle speed as function of pitch of screw, thread
2219/50182	. . .	Skip over pieces between machining and measuring station, on tool changing	2219/50226	. . .	Synchronize feed and spindle speed in forward and reverse feed
2219/50183	. . .	Detect correct clamping of workpiece, chucks grip properly workpiece	2219/50227	. . .	Synchronize two axis by correcting for measured pitch errors
2219/50184	. . .	Stop feed if relative movement between drive and tool	2219/50228	. . .	Synchronize two slides, portal gantry, raising, moving
2219/50185	. . .	Monitoring, detect failures, control of efficiency of machine, tool life	2219/50229	. . .	Synchronize axis by simulating several virtual axis to control real axis
2219/50186	. . .	Diagnostic of spindle bearing	2219/50231	. . .	Synchronize engage, disengage groups of axis as function of position of simulate
2219/50187	. . .	Stop drive motor if clutch refuses, remains active, if emergency	2219/50232	. . .	Synchronize change of feed and spindle speed when overriding feed speed
2219/50188	. . .	If operation, feed movement not done after maximum allowable time, emergency stop	2219/50233	. . .	Synchronize time-dependent with electronic cam data
2219/50189	. . .	Compare position of slide with positioning, tape data			
2219/50191	. . .	Against noise			
2219/50192	. . .	If braking fails due to controller or amplifier fault, separate delayed braking			
2219/50193	. . .	Safety in general			

2219/50234	. . .	Synchronize two spindles, axis, electronic transmission, line shafting	2219/50275	. . .	Safety, verify correct code of chosen tool, probe
2219/50235	. . .	Select tools, slides, spindles to work synchronized, independent	2219/50276	. . .	Detect wear or defect tool, breakage and change tool
2219/50236	. . .	Tool editor for actual used tools and needed next, missing, unused tools	2219/50277	. . .	Detection tool presence in tool holder, spindle before starting motor
2219/50237	. . .	Detect wear by comparing coded value on tool with real value, grind tool	2219/50278	. . .	Send offset values from tool changer before machining
2219/50238	. . .	Search empty place in changer to place tool	2219/50279	. . .	Adjust displacement amount of tracer as function of rough, finish machining
2219/50239	. . .	Select tool manual from tool store, with permission from NC to deblock tool	2219/50281	. . .	Adjust tool for tool offset by using an axis parallel to feed axis
2219/50241	. . .	Chuck, gripper, spindle changer	2219/50282	. . .	Tool offset as function of cutting depth
2219/50242	. . .	Tool changer and revolver fixed on spindle	2219/50283	. . .	Tool offset for two different diameters, smoothing
2219/50243	. . .	Small buffer tool magazine, ordered tools, filled from large magazine, change time	2219/50284	. . .	Tool nose correction
2219/50244	. . .	Machine integrated tool cassette	2219/50285	. . .	Tool geometry compensation, keep contact of tool on desired curve
2219/50245	. . .	Change tools, like laser head and drill having different driving needs	2219/50286	. . .	Fine adjustment tool head, adjustment with respect to toolholder
2219/50246	. . .	Workpiece exchange	2219/50287	. . .	Tool offset as function of diameter of saw, for begin and end point of path
2219/50247	. . .	Change to finer, more adapted tools to machine complex surface	2219/50288	. . .	Compensate tool offset as function of speed, needed when tool is not mounted correctly in spindle
2219/50248	. . .	Control position of coolant nozzle as function of selected tool	2219/50289	. . .	Tool offset general
2219/50249	. . .	Tool, probe, pen changer	2219/50291	. . .	Multi-tool, several tools
2219/50251	. . .	Mobile tool magazine to replace spare or rarely used tool	2219/50292	. . .	Tool offset based on two cutter contact points, admitting some overcut
2219/50252	. . .	Replace, change tool with tracer head, probe, feeler	2219/50293	. . .	Radial setting of tool
2219/50253	. . .	Selection tool	2219/50294	. . .	Tool offset length by going to a reference and recording distance
2219/50254	. . .	Change feeler or tool on different curvature of workpiece, model	2219/50295	. . .	Tool offset by manual input by switches
2219/50255	. . .	Tool selection sets speed machining, kind of cooling, other parameter	2219/50296	. . .	Tool offset by verifying piece and registering errors
2219/50256	. . .	Orienting selected tool with respect to workpiece	2219/50297	. . .	Compensation of positioning error due to a-axis, b-axis tool rotation
2219/50257	. . .	Kind of revolver magazine	2219/50298	. . .	Trace with feelers of different diameter, from the two loci calculate offset
2219/50258	. . .	Chain magazine	2219/50299	. . .	Correction data stored in memory attached to tool or tool holder
2219/50259	. . .	Flat bed magazine	2219/50301	. . .	Correction stored on tape, together with tool identification
2219/50261	. . .	Two tool holders to eliminate tool change time, replace and search simultaneously	2219/50302	. . .	Remachine same workpiece with same tool but diminished tool offset
2219/50262	. . .	Change tool at minimum distance from workpiece	2219/50303	. . .	Resolver
2219/50263	. . .	Standby tool, tool ready for next machining step, change tool while machining	2219/50304	. . .	Correction from tape, file
2219/50264	. . .	Change tool during positioning movement	2219/50305	. . .	For every diameter a tape
2219/50265	. . .	If tool life over, continue machining only actual block, workability, then stop	2219/50306	. . .	Tool height, axial displacement from center of circular workpiece, surface
2219/50266	. . .	During tool change, workpiece immobile, then execute backward operation sequence	2219/50307	. . .	Correction by probing dimension of machined workpiece
2219/50267	. . .	Change tool and workpiece simultaneously, except if collision possible	2219/50308	. . .	Estimate wear from machining data and conditions
2219/50268	. . .	Measure diameter only if new tool has been inserted	2219/50309	. . .	Correction of wear as function of dressing
2219/50269	. . .	Minimize tool change by selecting appropriate fixture	2219/50311	. . .	Compensate tool wear by grinding tool to a known position
2219/50271	. . .	Select second tool if first tool cannot machine workpiece without moving it	2219/50312	. . .	Compensation of tool wear by adapting program to profile of tool
2219/50272	. . .	Change spare, used tool during machining, minimize machining time	2219/50313	. . .	Tool offset, tool wear
2219/50273	. . .	Before motor start of spindle with new tool, detect if old tool back in storage	2219/50314	. . .	Search for reference, go to reference
2219/50274	. . .	Measure new tool inserted by operator, compare with diameter needed to accept	2219/50315	. . .	Selfcorrecting by measurement during machining

2219/50316	. . .	Calculate as function of empirical calculated values from used tools	2219/50364	. . .	Buffer for workpieces, pallets, trays with articles
2219/50317	. . .	As function of number of workpieces	2219/50365	. . .	Convey workpiece downwards on pallet, to machine rotate upwards
2219/50318	. . .	As function of number of cutting edges of saw, mill	2219/50366	. . .	Work handling with changeable hands
2219/50319	. . .	As function of tool geometry and machining data	2219/50367	. . .	Several workpiece holders in a single cell
2219/50321	. . .	As function of machined volume per time unit	2219/50368	. . .	Pallet with autonomous control unit
2219/50322	. . .	As function of effective machining time	2219/50369	. . .	Display empty supply or discharge pallet
2219/50323	. . .	As function of tool type	2219/50371	. . .	Index table holds same number of load and unload cups, alternative
2219/50324	. . .	As function of coolant	2219/50372	. . .	Load pallets manually, with visual instruction assistance
2219/50325	. . .	As function of measured vibrations	2219/50373	. . .	If pallet is not loaded conforming to instruction, warning
2219/50326	. . .	As function of feed forces	2219/50374	. . .	Cylindrical workpiece holder, for each workpiece a separate tool slide
2219/50327	. . .	As function of cutting forces	2219/50375	. . .	Reject or reload workpiece if misaligned, excessive error in location
2219/50328	. . .	As function of motor spindle load, current	2219/50376	. . .	Workholder receives also parts to be assembled with work
2219/50329	. . .	Tool offset for pockets, area machining avoiding interference with wall	2219/50377	. . .	Two robots with common workbase slides in unison along pallets
2219/50331	. . .	Electrode, wire gap compensation in edm, wire cutting	2219/50378	. . .	Control height gripper as function of thickness of workpiece and height of pallet
2219/50332	. . .	Tool offset for 3-D surfaces normal to surface	2219/50379	. . .	Workpiece detector, sensor
2219/50333	. . .	Temperature	2219/50381	. . .	Load, unload workpiece while machining other one, dual table machine
2219/50334	. . .	Tool offset, diameter correction	2219/50382	. . .	Position claws of first chuck relative to second chuck, to grip small workpiece
2219/50335	. . .	Tool offset for straight lines	2219/50383	. . .	Bar feeder applies torque to compensate bending of workpiece during machining
2219/50336	. . .	Tool, probe offset for curves, surfaces, contouring	2219/50384	. . .	Modular, exchangeable parts feeder
2219/50337	. . .	Tool offset for point	2219/50385	. . .	Fast forward in idle time
2219/50338	. . .	Tool with rom chip	2219/50386	. . .	Feeder, feeding of workpiece, bar
2219/50339	. . .	Select machining portion of tool according to surface of work	2219/50387	. . .	Two chucks, grippers, feeder bar, transfer workpiece from one to other
2219/50341	. . .	Tool with right and left nose value, different radius	2219/50388	. . .	Integrated loader, shuttle transfer
2219/50342	. . .	Use two tools with different diameter	2219/50389	. . .	Gantry loader
2219/50343	. . .	Ball end tool, end is spherical	2219/50391	. . .	Robot
2219/50344	. . .	Flat end tool, end is flat	2219/50392	. . .	Overhead conveyor
2219/50345	. . .	Bull nose tool, end is practical flat with rounded corners	2219/50393	. . .	Floor conveyor, AGV automatic guided vehicle
2219/50346	. . .	Ion ray	2219/50394	. . .	Bulk hopper
2219/50347	. . .	Tool sends via electromagnetic waves actual working condition	2219/50395	. . .	Pallet magazines, transport dollies
2219/50348	. . .	Deform tool to adapt to workpiece, bow tool with pressure	2219/50396	. . .	Gantry loader with two grippers, one always empty
2219/50349	. . .	Obtain normal vector of two points on surface, interpolate in between	2219/50397	. . .	Two conveyors transporting together a workpiece to station
2219/50351	. . .	Rotate cutting tool to vary cutting tool geometry	2219/50398	. . .	For a single machine
2219/50352	. . .	Inclination of tool as function of diameter of workpiece	2219/50399	. . .	Between machines
2219/50353	. . .	Tool, probe inclination, orientation to surface, posture, attitude	2219/50401	. . .	In line work storage system
2219/50354	. . .	If tool loses contact, change angle of tool with 90-degrees			
2219/50355	. . .	Tool perpendicular to a 2-D curve	2223/00		Indexing scheme associated with group G05B 23/00
2219/50356	. . .	Tool perpendicular, normal to 3-D surface	2223/02	. . .	Indirect monitoring, e.g. monitoring production to detect faults of a system
2219/50357	. . .	Tool tangential to path or surface	2223/04	. . .	Detection of intermittent failure
2219/50358	. . .	Work handling, automatic load unload workpiece	2223/06	. . .	Remote monitoring
2219/50359	. . .	Rotate workpiece pallet, workpieces on it, machine and load simultaneous			
2219/50361	. . .	Translatory workpiece pallet, translate between two stations			
2219/50362	. . .	Load unload with robot			
2219/50363	. . .	Load unload with two robots, one to load, other to unload			