

**CPC****COOPERATIVE PATENT CLASSIFICATION****F05B**

**INDEXING SCHEME RELATING TO MACHINES OR ENGINES OTHER THAN NON-POSITIVE-DISPLACEMENT MACHINES OR ENGINES, TO WIND MOTORS, TO NON-POSITIVE DISPLACEMENT PUMPS, AND TO GENERATING COMBUSTION PRODUCTS OF HIGH PRESSURE OR HIGH VELOCITY**

**NOTE**

This subclass constitutes an internal scheme for indexing only.

**Guidance heading:****F05B 2200/00****Mathematical features**

F05B 2200/10	. Basic functions
F05B 2200/11	.. Sum
F05B 2200/12	.. Substraction
F05B 2200/13	.. Product
F05B 2200/14	.. Division
F05B 2200/15	.. Inverse
F05B 2200/20	. Special functions
F05B 2200/21	.. Root
F05B 2200/211	... Square root
F05B 2200/212	... Cubic root
F05B 2200/22	.. Power
F05B 2200/221	... Square power
F05B 2200/222	... Cubic power
F05B 2200/23	.. Logarithm
F05B 2200/24	.. exponential
F05B 2200/25	.. Hyperbolic trigonometric, e.g. sinh, cosh, tanh
F05B 2200/26	.. trigonometric
F05B 2200/261	... Sine
F05B 2200/262	... Cosine
F05B 2200/263	... Tangent
F05B 2200/264	... Cotangent
F05B 2200/30	. miscellaneous
F05B 2200/31	.. odd
F05B 2200/32	.. even
F05B 2200/33	.. bigger/smaller

F05B 2200/34	..	biggest/smallest
F05B 2200/35	..	first
F05B 2200/36	..	last

**Guidance heading:****F05B 2210/00 Working fluid****NOTE**

Indexing codes of group [F05B 2210/00](#) can be followed by a name for a specific working fluid preceded by the "+" sign, e.g. [F05B 2210/11](#)+water.

F05B 2210/10	.	Kind or type
F05B 2210/11	..	liquid, i.e. incompressible
F05B 2210/12	..	gaseous, i.e. compressible
F05B 2210/13	..	mixed, e.g. two-phase fluid
F05B 2210/132	...	Pumps with means for separating and evacuating the gaseous phase
F05B 2210/14	..	Refrigerants with particular properties, e.g. HFC- <a href="#">134a</a>
F05B 2210/16	.	Air or water being indistinctly used as working fluid, i.e. the machine can work equally with air or water without any modification
F05B 2210/18	.	Air and water being simultaneously used as working fluid
F05B 2210/20	.	Properties
F05B 2210/30	.	Flow characteristics
F05B 2210/301	..	with Mach-number kept constant along the flow
F05B 2210/302	..	Pressure kept constant along the flow
F05B 2210/40	.	Flow geometry or direction
F05B 2210/401	..	upwards due to the buoyancy of compressed air
F05B 2210/402	..	Axial inlet and radial outlet
F05B 2210/403	..	Radial inlet and axial outlet
F05B 2210/404	..	bidirectional, i.e. in opposite, alternating directions

**F05B 2220/00 Application**

F05B 2220/10	.	in ram-jet engines or ram-jet driven vehicles
F05B 2220/20	.	within closed fluid conduits, e.g. pipes
F05B 2220/25	.	as advertisement
F05B 2220/30	.	in turbines

F05B 2220/301	..	in steam turbines
F05B 2220/302	..	in gas turbines
F05B 2220/3021	...	for a special turbine stage
F05B 2220/3022	....	the first stage of a turbine
F05B 2220/3023	....	an intermediate stage of the turbine
F05B 2220/3025	....	the last stage of the turbine
F05B 2220/303	...	for aircraft propulsion, e.g. jet engines
F05B 2220/304	...	to drive unshrouded, low solidity propeller
F05B 2220/305	...	to drive unshrouded, high solidity propeller
F05B 2220/306	...	to drive shrouded, low solidity propeller
F05B 2220/307	...	to drive shrouded, high solidity propeller
F05B 2220/308	...	providing direct vertical lift
F05B 2220/309	...	in a helicopter
F05B 2220/31	..	in ram-air turbines ("RATS")
F05B 2220/32	..	in water turbines
F05B 2220/33	..	specially adapted for the fan of turbofan engines
F05B 2220/40	.	in turbochargers
F05B 2220/50	.	for auxiliary power units (APU's)
F05B 2220/60	.	making use of surplus or waste energy
F05B 2220/602	..	with energy recovery turbines
F05B 2220/604	..	for domestic central heating or production of electricity
F05B 2220/61	.	for hydrogen and/or oxygen production
F05B 2220/62	.	for desalination
F05B 2220/64	.	for aeration
F05B 2220/70	.	in combination with
F05B 2220/702	..	a steam turbine
F05B 2220/704	..	a gas turbine
F05B 2220/706	..	an electrical generator
F05B 2220/7062	...	of the direct current (D.C.) type
F05B 2220/7064	...	of the alternating current (A.C.) type
F05B 2220/70642	....	of the synchronous type
F05B 2220/70644	....	of the asynchronous type, i.e. induction type
F05B 2220/70646	.....	Double fed induction generators (DFIGs)
F05B 2220/7066	...	via a direct connection, i.e. a gearless transmission
F05B 2220/7068	...	equipped with permanent magnets
F05B 2220/707	...	of the linear type
F05B 2220/708	..	Photoelectric means, i.e. photovoltaic or solar cells
F05B 2220/709	..	Piezoelectric means

F05B 2220/80	. in supersonic vehicles excluding hypersonic vehicles or ram, scram or rocket propulsion
F05B 2220/90	. in vehicles adapted for vertical or short take off and landing ( <a href="#">v/stol vehicles</a> ) , ( <a href="#">gas turbines providing direct vertical lift F05B 2220/308</a> )
<b>F05B 2230/00</b>	<b>Manufacture</b>
	<b><u>NOTE</u></b>
	Manufacture comprises also treatment, assembly or disassembly methods, repairing, handling or the like.
F05B 2230/10	. by removing material
F05B 2230/101	.. by electrochemical methods
F05B 2230/102	.. by spark erosion methods
F05B 2230/103	.. using lasers
F05B 2230/104	. Micromachining
F05B 2230/20	. essentially without removing material
F05B 2230/21	.. by casting
F05B 2230/211	... by precision casting, e.g. microfusing or investment casting
F05B 2230/22	.. by sintering
F05B 2230/23	.. by permanently joining parts together
F05B 2230/232	... by welding
F05B 2230/233	.... Electron beam welding
F05B 2230/234	.... Laser welding
F05B 2230/235	.... Tig/Mig welding
F05B 2230/236	.... Diffusion bonding
F05B 2230/237	.... Brazing
F05B 2230/238	.... Soldering
F05B 2230/239	.... Inertia or friction welding
F05B 2230/24	.. by extrusion
F05B 2230/25	.. by forging
F05B 2230/26	.. by rolling
F05B 2230/30	. with deposition of material
F05B 2230/31	.. Layer deposition
F05B 2230/311	... by torch or flame spray
F05B 2230/312	... by plasma spray
F05B 2230/313	... by physical vapour deposition
F05B 2230/314	... by chemical vapour deposition
F05B 2230/40	. Heat treatment

- F05B 2230/41 . . Hardening; Annealing
- F05B 2230/50 . Building or constructing in particular ways
- F05B 2230/502 . . using existing or "off the shelf" parts, e.g. using standardised turbocharger elements
- F05B 2230/60 . Assembly methods
- F05B 2230/601 . . using limited numbers of standard modules which can be adapted by machining
- F05B 2230/604 . . using positioning or alignment devices for aligning or centering, e.g. pins
- F05B 2230/606 . . . using maintaining alignment while permitting differential dilatation
- F05B 2230/608 . . . for adjusting the position or the alignment, e.g. wedges or excenters
- F05B 2230/61 . . using auxiliary equipment for lifting or holding ([hoisting on to a stationary structure with provisions on the structure itself F05B 2240/916](#))
- F05B 2230/6102 . . . carried on a floating platform
- F05B 2230/70 . Disassembly methods
- F05B 2230/80 . Repairing, retrofitting or upgrading methods
- F05B 2230/90 . Coating; Surface treatment ([manufacture with deposition of material F05B 2220/30](#))

## **F05B 2240/00 Components**

### **NOTE**

Components are the basic elements of construction.

- F05B 2240/10 . Stators
- F05B 2240/11 . . Shroud seal segments
- F05B 2240/12 . . Fluid guiding means, e.g. vanes
- F05B 2240/121 . . . Baffles or ribs
- F05B 2240/122 . . . Vortex generators, turbulators, or the like, for mixing ([by creating turbulence F05B 2260/222](#))
- F05B 2240/123 . . . Nozzles
- F05B 2240/1231 . . . . Plug nozzles
- F05B 2240/124 . . . Cascades, i.e. assemblies of similar profiles acting in parallel
- F05B 2240/13 . . to collect or cause flow towards or away from turbines
- F05B 2240/131 . . . by means of vertical structures, i.e. chimneys
- F05B 2240/132 . . . creating a vortex or tornado effect
- F05B 2240/133 . . . with a convergent-divergent guiding structure, e.g. a Venturi conduit
- F05B 2240/14 . . Casings, housings, nacelles, gondels or the like, protecting or supporting assemblies within
- F05B 2240/142 . . . in the form of a standard ISO container
- F05B 2240/20 . Rotors
- F05B 2240/201 . . using the Magnus-effect

F05B 2240/202	..	with adjustable area of intercepted fluid
F05B 2240/2021	...	by means of telescoping blades
F05B 2240/2022	...	by means of tethering or coning blades
F05B 2240/2023	...	by means of radially reefing blades
F05B 2240/21	..	for wind turbines
F05B 2240/211	...	with vertical axis
F05B 2240/212	....	of the Darrieus type
F05B 2240/213	....	of the Savonius type
F05B 2240/214	....	of the Musgrove or "H"-type
F05B 2240/215	....	of the panemone or "vehicle ventilator" type
F05B 2240/216	....	of the anemometer type
F05B 2240/217	....	of the crossflow- or "Banki"- or "double action" type
F05B 2240/218	....	with horizontally hinged vanes
F05B 2240/221	...	with horizontal axis
F05B 2240/2211	....	of the multibladed, low speed, e.g. "American farm" type
F05B 2240/2212	....	perpendicular to wind direction
F05B 2240/2213	....	and with the rotor downwind from the yaw pivot axis
F05B 2240/231	...	driven by aerodynamic lift effects
F05B 2240/232	....	driven by drag
F05B 2240/24	..	for turbines
F05B 2240/241	...	of impulse type
F05B 2240/2411	....	Pelton type
F05B 2240/242	...	of reaction type
F05B 2240/243	...	of the Archimedes screw type
F05B 2240/244	...	of the cross-flow, e.g. Banki, Ossberger type
F05B 2240/30	..	Characteristics of rotor blades, i.e. of any element transforming dynamic fluid energy to or from rotational energy and being attached to a rotor
F05B 2240/301	...	Cross-section characteristics
F05B 2240/302	...	Segmented or sectional blades
F05B 2240/31	...	of changeable form or shape
F05B 2240/311	....	flexible or elastic
F05B 2240/312	....	capable of being reefed
F05B 2240/3121	.....	around an axis orthogonal to rotor rotational axis
F05B 2240/313	....	with adjustable flow intercepting area ( <a href="#">F05B 2240/312</a> takes precedence)
F05B 2240/32	...	with roughened surfaces
F05B 2240/33	..	Shrouds which are part of or which are rotating with the rotor
F05B 2240/34	..	with auxiliary or secondary rotors attached to blades of main rotor
F05B 2240/35	.	Combustors or associated equipment
F05B 2240/36	..	Fuel vaporizer
F05B 2240/40	.	Use of a multiplicity of similar components
F05B 2240/50	.	Bearings

F05B 2240/51	..	magnetic
F05B 2240/511	...	with permanent magnets
F05B 2240/515	...	electromagnetic
F05B 2240/52	..	Axial thrust bearings
F05B 2240/53	..	Hydrodynamic or hydrostatic bearings
F05B 2240/54	..	Radial bearings
F05B 2240/57	.	Seals
F05B 2240/571	..	Brush seals
F05B 2240/572	..	Leaf seals
F05B 2240/60	.	Shafts
F05B 2240/61	..	hollow
F05B 2240/62	..	flexible
F05B 2240/63	..	Glands for admission or removal of fluids from shafts
F05B 2240/70	.	Slinger plates or washers
F05B 2240/80	.	Platforms for stationary or moving blades
F05B 2240/801	..	cooled platforms
F05B 2240/90	.	Mounting on supporting structures or systems
F05B 2240/91	..	on a stationary structure
F05B 2240/911	...	already existing for a prior purpose
F05B 2240/9111	....	which is a chimney
F05B 2240/9112	....	which is a building
F05B 2240/9113	....	which is a roadway, rail track, or the like for recovering energy from moving vehicles
F05B 2240/912	...	on a tower
F05B 2240/9121	....	on a lattice tower
F05B 2240/913	...	on a mast
F05B 2240/914	...	on an inflatable structure
F05B 2240/915	...	which is vertically adjustable
F05B 2240/9151	....	telescopically
F05B 2240/9152	....	by being hinged
F05B 2240/91521	.....	at ground level
F05B 2240/916	...	with provision for hoisting onto the structure
F05B 2240/917	...	attached to cables
F05B 2240/92	..	on an airborne structure
F05B 2240/921	...	kept aloft due to aerodynamic effects
F05B 2240/922	...	kept aloft due to buoyancy effects
F05B 2240/923	...	which is a vehicle
F05B 2240/93	..	on a structure floating on a liquid surface
F05B 2240/931	...	which is a vehicle

- F05B 2240/932 . . . which is a catamaran-like structure
- F05B 2240/94 . . on a movable wheeled structure
- F05B 2240/941 . . . which is a land vehicle
- F05B 2240/95 . . offshore
- F05B 2240/96 . . as part of a wind farm
- F05B 2240/97 . . on a submerged structure
- F05B 2240/98 . . which is inflatable
- F05B 2240/99 . characterised by colour or colour patterns

**F05B 2250/00****Geometry****NOTE**

Geometry indicates the shape or form of a component or the configuration or arrangement of components in a machine or in a plant.

- F05B 2250/02 . variable
- F05B 2250/10 . two-dimensional
- F05B 2250/11 . . triangular
- F05B 2250/12 . . rectangular
- F05B 2250/121 . . . square
- F05B 2250/13 . . trapezoidal
- F05B 2250/131 . . . polygonal
- F05B 2250/132 . . . hexagonal
- F05B 2250/14 . . elliptical
- F05B 2250/141 . . . circular
- F05B 2250/15 . . spiral
- F05B 2250/16 . . parabolic
- F05B 2250/17 . . hyperbolic
- F05B 2250/18 . . patterned
- F05B 2250/181 . . . ridged
- F05B 2250/182 . . . crenellated, notched
- F05B 2250/183 . . . zigzag
- F05B 2250/184 . . . sinusoidal
- F05B 2250/19 . . machined; miscellaneous
- F05B 2250/191 . . . perforated
- F05B 2250/192 . . . beveled
- F05B 2250/193 . . . milled
- F05B 2250/20 . three-dimensional
- F05B 2250/21 . . pyramidal
- F05B 2250/22 . . parallelepipedic



F05B 2250/221	...	cubic
F05B 2250/23	..	prismatic
F05B 2250/231	...	cylindrical
F05B 2250/232	...	conical
F05B 2250/24	..	ellipsoidal
F05B 2250/241	...	spherical
F05B 2250/25	..	helical
F05B 2250/26	..	paraboloidal
F05B 2250/27	..	hyperboloidal
F05B 2250/28	..	patterned
F05B 2250/281	...	threaded
F05B 2250/282	...	Cubic pattern
F05B 2250/283	...	Honeycomb
F05B 2250/29	..	machined; miscellaneous
F05B 2250/291	...	hollowed
F05B 2250/292	...	tapered
F05B 2250/293	...	lathed, e.g. rotation symmetrical
F05B 2250/30	.	Arrangement of components
F05B 2250/31	..	according to the direction of their main axis or their axis of rotation
F05B 2250/311	...	the axes being in line
F05B 2250/312	...	the axes being parallel to each other
F05B 2250/313	...	the axes being perpendicular to each other
F05B 2250/314	...	the axes being inclined in relation to each other
F05B 2250/315	...	the main axis being substantially vertical
F05B 2250/32	..	according to their shape
F05B 2250/321	...	asymptotic
F05B 2250/322	...	tangential
F05B 2250/323	...	convergent
F05B 2250/324	...	divergent
F05B 2250/33	..	symmetrical
F05B 2250/34	..	translated
F05B 2250/35	..	rotated
F05B 2250/36	..	in inner-outer relationship, e.g. shaft-bearing arrangements
F05B 2250/40	.	Movement of component
F05B 2250/41	..	with one degree of freedom
F05B 2250/411	...	in rotation
F05B 2250/42	..	with two degrees of freedom
F05B 2250/43	..	with three degrees of freedom
F05B 2250/50	.	Inlet or outlet
F05B 2250/501	..	Inlet

F05B 2250/5011	...	augmenting, i.e. with intercepting fluid flow cross sectional area greater than the rest of the machine behind the inlet
F05B 2250/5012	...	concentrating only, i.e. with intercepting fluid flow cross sectional area not greater than the rest of the machine behind the inlet
F05B 2250/502	..	Outlet
F05B 2250/503	..	of regenerative pumps
F05B 2250/60	.	Structure; Surface texture
F05B 2250/61	..	corrugated
F05B 2250/611	...	undulated
F05B 2250/62	..	smooth
F05B 2250/621	...	polished
F05B 2250/70	.	Shape
F05B 2250/71	..	curved
F05B 2250/711	...	convex
F05B 2250/712	...	concave
F05B 2250/713	...	inflexed
F05B 2250/72	..	symmetric
F05B 2250/73	..	asymmetric
F05B 2250/80	.	Size or power range of the machines
F05B 2250/82	..	Micromachines
F05B 2250/84	..	Nanomachines ( <a href="#">Nanotechnology for interacting, sensing or actuating Y01N 8/00</a> )
F05B 2250/86	..	Megamachines
<b>F05B 2260/00</b>	<b>Function</b>	
F05B 2260/02	.	Transport, e.g. specific adaptations or devices for conveyance ( <a href="#">transport of wind turbines or equipments therefore F03D 1/005</a> )
F05B 2260/10	.	Particular cycles
F05B 2260/20	.	Heat transfer, e.g. cooling
F05B 2260/201	..	by impingement of a fluid
F05B 2260/202	..	by film cooling
F05B 2260/203	..	by transpiration cooling
F05B 2260/205	..	Cooling fluid recirculation, i.e. after having cooled one or more components the cooling fluid is recovered and used elsewhere for other purposes
F05B 2260/207	..	using a phase changing mass, ( <a href="#">e.g. heat absorbing by melting or boiling</a> )
F05B 2260/208	..	using heat pipes
F05B 2260/209	..	using vortex tubes
F05B 2260/211	..	by intercooling, e.g. during a compression cycle
F05B 2260/212	...	by water injection
F05B 2260/221	..	Improvement of heat transfer

- F05B 2260/222 . . . by creating turbulence ([vortex generators](#), [turbulators](#) or the like for mixing [F05B 2240/122](#))
- F05B 2260/224 . . . by increasing the heat transfer surface
- F05B 2260/2241 . . . . using fins or ribs
- F05B 2260/231 . . Preventing heat transfer
- F05B 2260/232 . . characterised by the cooling medium
- F05B 2260/233 . . . the medium being steam
- F05B 2260/24 . . for draft enhancement in chimneys, using solar or other heat sources
  
- F05B 2260/30 . Retaining components in desired mutual position
- F05B 2260/301 . . Retaining bolts or nuts
- F05B 2260/3011 . . . of the frangible or shear type
- F05B 2260/302 . . by means of magnetic or electromagnetic forces
- F05B 2260/303 . . with a bayonet coupling
- F05B 2260/304 . . Balancing of radial or axial forces on regenerative rotors
- F05B 2260/305 . . Reducing friction between regenerative impeller discs and casing walls
  
- F05B 2260/40 . Transmission of power
- F05B 2260/402 . . through friction drives
- F05B 2260/4021 . . . through belt drives
- F05B 2260/4022 . . . through endless chains
- F05B 2260/4023 . . . through a friction clutch
- F05B 2260/403 . . through the shape of the drive components
- F05B 2260/4031 . . . as in toothed gearing
- F05B 2260/40311 . . . . of the epicyclic, planetary or differential type
- F05B 2260/404 . . through magnetic drive coupling
- F05B 2260/4041 . . . the driven magnets encircling the driver magnets
- F05B 2260/406 . . through hydraulic systems
- F05B 2260/407 . . through piezoelectric conversion
- F05B 2260/408 . . through magnetohydrodynamic conversion
  
- F05B 2260/42 . Storage of energy
- F05B 2260/421 . . in the form of rotational kinetic energy , e.g. in flywheels
  
- F05B 2260/50 . Kinematic linkage, i.e. transmission of position
- F05B 2260/502 . . involving springs
- F05B 2260/503 . . using gears
- F05B 2260/5032 . . . of the bevel or angled type
- F05B 2260/504 . . using flat or V-belts and pulleys
- F05B 2260/505 . . using chains and sprockets; using toothed belts
- F05B 2260/506 . . using cams or eccentrics
- F05B 2260/507 . . using servos, independent actuators, etc.
  
- F05B 2260/60 . Fluid transfer

- F05B 2260/601 . . using an ejector or a jet pump
- F05B 2260/602 . . Drainage
- F05B 2260/603 . . . of leakage having past a seal ([seals F05B 2240/57](#); [glands F05B 2240/63](#))
- F05B 2260/604 . . Vortex non-clogging type pumps
- F05B 2260/63 . . Preventing clogging or obstruction of flow paths by dirt, dust, or foreign particles
- F05B 2260/64 . . Aeration, ventilation, dehumidification or moisture removal of closed spaces
  
- F05B 2260/70 . Adjusting of angle of incidence or attack of rotating blades
- F05B 2260/71 . . as a function of flow velocity
- F05B 2260/72 . . by turning around an axis parallel to the rotor centre line
- F05B 2260/74 . . by turning around an axis perpendicular the rotor centre line
- F05B 2260/75 . . the adjusting mechanism not using auxiliary power sources ("servos")
- F05B 2260/76 . . the adjusting mechanism using auxiliary power sources
- F05B 2260/77 . . the adjusting mechanism driven or triggered by centrifugal forces
- F05B 2260/78 . . the adjusting mechanism driven or triggered by aerodynamic forces
- F05B 2260/79 . . Bearing, support or actuation arrangements therefor
  
- F05B 2260/80 . Diagnostics
  
- F05B 2260/82 . Forecasts
- F05B 2260/821 . . Parameter estimation or prediction
- F05B 2260/8211 . . . of the weather
  
- F05B 2260/83 . Testing, e.g. methods, components or tools therefor
  
- F05B 2260/84 . Modeling or simulation
  
- F05B 2260/845 . Redundancy
  
- F05B 2260/85 . Starting
  
- F05B 2260/90 . Braking
- F05B 2260/901 . . using aerodynamic forces, i.e. lift or drag
- F05B 2260/9011 . . . of the tips of rotor blades
- F05B 2260/902 . . using frictional mechanical forces
- F05B 2260/903 . . using electrical or magnetic forces
- F05B 2260/904 . . using hydrodynamic forces
  
- F05B 2260/95 . Preventing corrosion ([coating or surface treatment F05B 2230/90](#))
  
- F05B 2260/96 . Preventing, counteracting or reducing vibration or noise
- F05B 2260/962 . . my means creating "anti-noise"
- F05B 2260/964 . . by damping means
- F05B 2260/966 . . by correcting static or dynamic imbalance
  
- F05B 2260/97 . Reducing windage losses

F05B 2260/972 . . . in radial flow machines

F05B 2260/98 . Lubrication

F05B 2260/99 . Radar absorption

## **F05B 2270/00 Control**

F05B 2270/10 . Purpose of the control system

F05B 2270/101 . . . to control rotational speed (n)

F05B 2270/1011 . . . . . to prevent overspeed

F05B 2270/1012 . . . . . to prevent underspeed

F05B 2270/1013 . . . . . of different spools or shafts

F05B 2270/1014 . . . . . to keep rotational speed constant

F05B 2270/1016 . . . in variable speed operation

F05B 2270/102 . . . to control acceleration (u)

F05B 2270/1021 . . . . . by keeping it below damagingly high values

F05B 2270/1022 . . . . . by making it as high as possible

F05B 2270/103 . . . to affect the output of the engine

F05B 2270/1031 . . . . . Thrust

F05B 2270/1032 . . . . . Torque

F05B 2270/1033 . . . . . Power (if explicitly mentioned)

F05B 2270/104 . . . to match engine to driven device

F05B 2270/1041 . . . . . in particular the electrical frequency of driven generator

F05B 2270/105 . . . to improve fuel economy

F05B 2270/1051 . . . . . in particular at idling speed

F05B 2270/106 . . . to produce clean exhaust gases

F05B 2270/1061 . . . . . with as little smoke as possible

F05B 2270/1062 . . . . . with as little NOx's as possible

F05B 2270/1063 . . . . . by monitoring combustion conditions

F05B 2270/1064 . . . . . indirectly, at the exhaust

F05B 2270/107 . . . to cope with emergencies

F05B 2270/1071 . . . . . in particular sudden load loss

F05B 2270/10711 . . . . . applying a low voltage ride through method

F05B 2270/1072 . . . . . in particular blow-out and relight

F05B 2270/1073 . . . . . of one engine in a multi-engine system

F05B 2270/1074 . . . . . by using back-up controls

F05B 2270/1075 . . . . . by temporary overriding set control limits

F05B 2270/1076 . . . . . caused by water or hail ingestion

F05B 2270/108 . . . to cope with, or avoid, compressor flow instabilities

F05B 2270/1081 . . . . . Compressor surge or stall

F05B 2270/10812 . . . . . caused by working fluid flow velocity profile distortion

F05B 2270/10815 . . . . . due to high angle of attack of aircraft

F05B 2270/10817	.....	due to compressor degradation
F05B 2270/109	..	to prolong engine life
F05B 2270/1091	...	by limiting temperatures
F05B 2270/1095	...	by limiting mechanical stresses
F05B 2270/1097	...	by preventing reverse rotation
F05B 2270/11	..	to maintain desired vehicle trajectory parameters
F05B 2270/1101	...	Altitude
F05B 2270/1102	...	Speed or Mach number
F05B 2270/111	..	to control two or more engines simultaneously
F05B 2270/15	..	to control thermoacoustic behaviour in the combustion chambers ( <a href="#">counteracting noise or vibration F05B 2260/96</a> )
F05B 2270/16	..	to control water or steam injection
F05B 2270/17	..	to avoid excessive deflection of the blades
F05B 2270/18	..	to control buoyancy
F05B 2270/19	..	to avoid stroboscopic flicker shadow on surroundings
F05B 2270/20	..	to optimise the performance of a machine
F05B 2270/30	.	Control parameters, e.g. input parameters
F05B 2270/301	..	Pressure
F05B 2270/3011	...	Inlet
F05B 2270/3013	...	Outlet
F05B 2270/3015	...	differential
F05B 2270/303	..	Temperature
F05B 2270/3032	...	excessive temperatures, e.g. caused by overheating
F05B 2270/304	..	Spool rotational speed
F05B 2270/305	..	Tolerances
F05B 2270/309	..	Rate of change of parameters
F05B 2270/31	..	Fuel schedule for stage combustors
F05B 2270/32	..	Wind speeds
F05B 2270/3201	...	"cut-off" or "shut-down" wind speed
F05B 2270/321	..	Wind directions
F05B 2270/322	..	the detection or prediction of a wind gust
F05B 2270/323	..	Air humidity
F05B 2270/324	..	Air pressure
F05B 2270/325	..	Air temperature
F05B 2270/326	..	Rotor angle
F05B 2270/327	..	Rotor or generator speeds
F05B 2270/328	..	Blade pitch angle
F05B 2270/329	..	Azimuth or yaw angle
F05B 2270/33	..	Proximity of blade to tower
F05B 2270/331	..	Mechanical loads
F05B 2270/332	..	Maximum loads or fatigue criteria
F05B 2270/333	..	Noise or sound levels

F05B 2270/334	..	Vibration measurements
F05B 2270/335	..	Output power or torque
F05B 2270/336	..	Blade lift measurements
F05B 2270/337	..	Electrical grid status parameters, e.g. voltage, frequency or power demand
F05B 2270/40	.	Type of control system
F05B 2270/402	..	passive or reactive, e.g. using large wind vanes
F05B 2270/404	..	active, predictive, or anticipative
F05B 2270/50	.	Control logic embodiment by
F05B 2270/502	..	electrical means, e.g. relays or switches
F05B 2270/504	..	electronic means, e.g. electronic tubes, transistors or IC`s within an electronic circuit
F05B 2270/506	..	hydraulic means, e.g. hydraulic valves within a hydraulic circuit
F05B 2270/508	..	mechanical means, e.g. levers, gears or cams
F05B 2270/60	.	Control system actuates through
F05B 2270/602	..	electrical actuators
F05B 2270/604	..	hydraulic actuators
F05B 2270/605	..	Pneumatic actuators
F05B 2270/606	..	mechanical actuators ( <a href="#">F05B 2270/602</a> takes precedence)
F05B 2270/70	.	Type of control algorithm
F05B 2270/701	..	proportional
F05B 2270/702	..	differential
F05B 2270/703	..	integral
F05B 2270/704	..	proportional-differential
F05B 2270/705	..	proportional-integral
F05B 2270/706	..	proportional-integral-differential
F05B 2270/707	..	fuzzy logic
F05B 2270/708	..	with comparison tables
F05B 2270/709	..	with neural networks
F05B 2270/80	.	Devices generating input signals, e.g. transducers, sensors, cameras or strain gauges
F05B 2270/802	..	Calibration thereof
F05B 2270/803	..	Sampling thereof
F05B 2270/804	..	Optical devices
F05B 2270/8041	...	Cameras
F05B 2270/8042	...	Lidar systems
F05B 2270/805	..	Radars
F05B 2270/806	..	Sonars
F05B 2270/807	..	Accelerometers
F05B 2270/808	..	Strain gauges; Load cells
F05B 2270/809	..	Encoders

F05B 2270/81      ..      Microphones  
 F05B 2270/821      ..      Displacement measuring means, e.g. inductive

**F05B 2280/00      Materials; Properties thereof**

F05B 2280/10      .      Inorganic materials, e.g. metals  
 F05B 2280/101      ..      Iron  
 F05B 2280/1011      ..      Cast iron  
 F05B 2280/102      ..      Light metals  
 F05B 2280/1021      ...      Aluminium  
 F05B 2280/1022      ...      Beryllium  
 F05B 2280/1023      ...      Boron  
 F05B 2280/1024      ...      Lithium  
 F05B 2280/1025      ...      Magnesium  
 F05B 2280/103      ..      Heavy metals  
 F05B 2280/10301      ...      Refractory metals, e.g. V, W  
 F05B 2280/10302      ...      Chromium  
 F05B 2280/10303      ...      Molybdenum  
 F05B 2280/10304      ...      Titanium  
 F05B 2280/10305      ...      Zirconium  
 F05B 2280/10306      ...      Hafnium  
 F05B 2280/10307      ...      Manganese  
 F05B 2280/10308      ...      Lead  
 F05B 2280/10309      ...      Tin  
 F05B 2280/1031      ...      Zinc  
 F05B 2280/10311      ...      Mercury  
 F05B 2280/104      ..      Noble metals  
 F05B 2280/1041      ...      Silver  
 F05B 2280/1042      ...      Gold  
 F05B 2280/1043      ...      Platinum group, e.g. Pt, Ir  
 F05B 2280/1044      ...      Palladium  
 F05B 2280/1045      ...      Ruthenium  
 F05B 2280/1046      ...      Osmium  
 F05B 2280/1047      ...      Iridium  
 F05B 2280/1048      ...      Rhodium  
 F05B 2280/105      ..      Copper  
 F05B 2280/106      ..      Rare earth metals, e.g. Sc, Y  
 F05B 2280/107      ..      Alloys  
 F05B 2280/1071      ...      Steel alloys  
 F05B 2280/1072      ..      Copper alloys  
 F05B 2280/10721      ...      Bronze  
 F05B 2280/10722      ...      Phosphor-bronze alloy



F05B 2280/10723	...	Nickel-Copper alloy, e.g. monel
F05B 2280/1073	..	Aluminium alloy, e.g. AlCuMgPb
F05B 2280/1074	..	Alloys not otherwise provided for
F05B 2280/10741	...	Superalloys
F05B 2280/10742	...	Heat stable alloys
F05B 2280/10743	...	Ni - Si alloys
F05B 2280/10744	...	Metal-aluminide intermetallic compounds
F05B 2280/20	.	Inorganic materials, e.g. non-metallic materials
F05B 2280/2001	..	Glass
F05B 2280/20011	...	MIBA
F05B 2280/20012	...	Quartz
F05B 2280/2002	..	Phosphor
F05B 2280/2003	..	Silicon
F05B 2280/2004	..	Ceramics; Oxides
F05B 2280/20041	...	Aluminium oxides
F05B 2280/20042	...	Zinc oxides
F05B 2280/20043	...	Zirconium oxides
F05B 2280/2005	..	Non-oxide ceramics
F05B 2280/2006	..	Carbon, e.g. graphite
F05B 2280/2007	..	Carbides
F05B 2280/20071	...	of silicon
F05B 2280/20072	...	of titanium, e.g. TiB
F05B 2280/20073	...	of wolfram, e.g. tungsten carbide
F05B 2280/2008	..	Nitrides
F05B 2280/20081	...	of aluminium
F05B 2280/20082	...	of boron
F05B 2280/20083	...	of silicon
F05B 2280/20084	...	of titanium
F05B 2280/20085	...	of zirconium
F05B 2280/2009	..	Sulfides
F05B 2280/20091	...	of molybdenum
F05B 2280/201	..	Sapphire
F05B 2280/2011	..	Aluminium titanate
F05B 2280/2013	..	Silica
F05B 2280/2014	..	Arsenic
F05B 2280/2015	..	Antimony
F05B 2280/2016	..	Bismuth
F05B 2280/2017	..	Barium
F05B 2280/30	.	Inorganic materials not otherwise provided for
F05B 2280/40	.	Organic materials

F05B 2280/4001	..	Leather
F05B 2280/4002	..	Cellulosic materials, e.g. wood
F05B 2280/4003	..	Synthetic polymers, e.g. plastics; Rubber
F05B 2280/4004	..	Rubber
F05B 2280/4005	..	PTFE (PolyTetraFluorEthylene)
F05B 2280/4006	..	Polyamides, e.g. NYLON
F05B 2280/4007	..	Thermoplastics
F05B 2280/4008	..	Polyamides, e.g. Aurum
F05B 2280/4009	..	Polyetherketones, e.g. PEEK
F05B 2280/401	..	Silicon polymers
F05B 2280/4011	..	Organic materials not otherwise provided for
F05B 2280/50	.	Intrinsic material properties or characteristics
F05B 2280/5001	..	Elasticity
F05B 2280/5002	..	Thermal properties
F05B 2280/5003	..	Expansivity
F05B 2280/50031	...	similar
F05B 2280/50032	...	dissimilar
F05B 2280/5004	..	Heat transfer
F05B 2280/5005	..	Reflective properties
F05B 2280/5006	..	Shape memory
F05B 2280/5007	..	Hardness
F05B 2280/5008	..	Magnetic properties
F05B 2280/5009	..	non-magnetic
F05B 2280/501	..	Self lubricating materials; Solid lubricants
F05B 2280/5011	..	Surface roughness
F05B 2280/60	.	Properties or characteristics given to material by treatment or manufacturing
F05B 2280/6001	..	Fabrics
F05B 2280/6002	...	Woven fabrics
F05B 2280/6003	..	Composites; e.g. fibre-reinforced
F05B 2280/6004	..	amorphous
F05B 2280/6005	..	crystalline
F05B 2280/6006	..	Directionally-solidified crystalline structures
F05B 2280/6007	..	monocrystalline
F05B 2280/6008	..	Structures
F05B 2280/6009	..	Grain size
F05B 2280/601	..	Syntactic
F05B 2280/6011	..	Coating
F05B 2280/6012	..	Foam
F05B 2280/6013	..	Fibres
F05B 2280/6014	..	Filler
F05B 2280/6015	..	Resin

- [F05B 2280/70](#) . Treatments or modification of materials
- [F05B 2280/701](#) . . Heat treatments
- [F05B 2280/702](#) . . Reinforcements