

**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.

**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

## **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-[134a](#)
- 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 ([v/stol vehicles](#)), ([gas turbines providing direct vertical lift F05B 2220/308](#))

**F05B 2230/00****Manufacture****NOTE**

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

<a href="#">F05B 2280/6011</a>	..	Coating
<a href="#">F05B 2280/6012</a>	..	Foam
<a href="#">F05B 2280/6013</a>	..	Fibres
<a href="#">F05B 2280/6014</a>	..	Filler
<a href="#">F05B 2280/6015</a>	..	Resin
<a href="#">F05B 2280/70</a>	.	Treatments or modification of materials
<a href="#">F05B 2280/701</a>	..	Heat treatments
<a href="#">F05B 2280/702</a>	..	Reinforcements