

CPC COOPERATIVE PATENT CLASSIFICATION

F02P IGNITION, OTHER THAN COMPRESSION IGNITION, FOR INTERNAL-COMBUSTION ENGINES; TESTING OF IGNITION TIMING IN COMPRESSION-IGNITION ENGINES ({[anti-pollution means for internal-combustion engines F02B 17/00](#)}; specially adapted for rotary-piston or oscillating-piston engines [F02B 53/12](#); {ignition of gas turbine plants [F02C 7/26](#); ignition of jet propulsion plants [F02K 9/95](#); starting of combustion engines [F02N 9/00](#)}; ignition of combustion apparatus in general, glowing plugs [F23Q](#); measuring of physical variables in general [G01](#); controlling in general [G05](#); data processing in general [G06](#); electrical components in general [see Section H](#); {ignition coils [H01F 38/12](#)}; sparking plugs [H01T 13/00](#))

Electric spark ignition installations characterised by the type of ignition power generation or storage

- 1/00 Installations having electric ignition energy generated by magneto- or dynamo- electric generators without subsequent storage** {(combination starter-magneto [F02N 11/06](#); magneto- or dynamo-electric generators [H02K 21/00](#))}
- 1/005 . {Construction and fastening of elements of magnetos other than the magnetic circuit and the windings ([F02P 1/02](#) - [F02P 1/08](#) take precedence)}
- 1/02 . the generator rotor being characterised by forming part of the engine flywheel
- 1/04 . the generator being specially adapted for use with specific engine types, e.g. engines with V arrangement of cylinders
- 1/06 . Generator drives, e.g. having snap couplings
- 1/08 . Layout of circuits
- 1/083 . . {for generating sparks by opening or closing a coil circuit}
- 1/086 . . {for generating sparks by discharging a capacitor into a coil circuit}
- 3/00 Other installations**
- 3/005 . {having inductive-capacitance energy storage (capacitive storage installations using an intermediate charging inductance [F02P 3/0876](#))}
- 3/01 . Electric spark ignition installations without subsequent energy storage, i.e. energy supplied by an electrical oscillator (with magneto- or dynamo-electric generators [F02P 1/00](#); piezo-electric ignition [F02P 3/12](#); with continuous electric spark [F02P 15/10](#))
- 3/02 . having inductive energy storage, e.g. arrangements of induction coils {(ignition coils structurally combined with sparking plugs [F02P 13/00](#); constructional details of ignition coils [H01F 38/12](#))}
- 3/04 . . Layout of circuits
- 3/0407 . . . {Opening or closing the primary coil circuit with electronic switching means ([F02P 3/045](#) - [F02P 3/055](#) take precedence)}
- 3/0414 {using digital techniques ([F02P 3/0428](#), [F02P 3/0442](#) take precedence)}
- 3/0421 {with electronic tubes}
- 3/0428 {using digital techniques}
- 3/0435 {with semiconductor devices ([F02P 3/0453](#), [F02P 3/051](#), [F02P 3/0552](#) take precedence)}

- 3/0442 {using digital techniques ([F02P 3/0456](#), [F02P 3/053](#), [F02P 3/0554](#), [F02P 3/0558](#) take precedence)}
- 3/045 for control of the dwell or anti dwell time
- 3/0453 {Opening or closing the primary coil circuit with semiconductor devices}
- 3/0456 {using digital techniques}
- 3/05 for control of the magnitude of the current in the ignition coil (during starting [F02P 15/12](#))
- 3/051 {Opening or closing the primary coil circuit with semiconductor devices}
- 3/053 {using digital techniques}
- 3/055 with protective means to prevent damage to the circuit, {e.g. semiconductor devices} or the ignition coil
- 3/0552 {Opening or closing the primary coil circuit with semiconductor devices}
- 3/0554 {using digital techniques ([F02P 3/0558](#) takes precedence)}
- 3/0556 {Protecting the coil when the engine is stopped}
- 3/0558 {using digital techniques}
- 3/06 . . having capacitive energy storage (piezo-electric or electrostatic ignition [F02P 3/12](#))
- 3/08 . . Layout of circuits (for low tension [F02P 3/10](#))
- 3/0807 {Closing the discharge circuit of the storage capacitor with electronic switching means ([F02P 3/0853](#), [F02P 3/0876](#), [F02P 3/09](#) take precedence)}
- 3/0815 {using digital techniques ([F02P 3/083](#), [F02P 3/0846](#) take precedence)}
- 3/0823 {with electronic tubes}
- 3/083 {using digital techniques}
- 3/0838 {with semiconductor devices ([F02P 3/0861](#), [F02P 3/0884](#), [F02P 3/093](#) take precedence)}
- 3/0846 {using digital techniques ([F02P 3/0869](#), [F02P 3/0892](#), [F02P 3/096](#) take precedence)}
- 3/0853 {for control of the dwell or anti-dwell time}
- 3/0861 {Closing the discharge circuit of the storage capacitor with semiconductor devices}
- 3/0869 {using digital techniques}
- 3/0876 {the storage capacitor being charged by means of an energy converter (DC-DC converter) or of an intermediate storage inductance}
- 3/0884 {Closing the discharge circuit of the storage capacitor with semiconductor devices}

- 3/0892 {using digital techniques}
- 3/09 . . . for control of the charging current in the capacitor ([F02P 15/12 takes precedence](#))
- 3/093 {Closing the discharge circuit of the storage capacitor with semiconductor devices}
- 3/096 {using digital techniques}
- 3/10 . . . Low-tension installation, e.g. using surface-discharge sparking plugs
- 3/12 . . . Piezo-electric ignition; Electrostatic ignition

- 5/1514 {with means for optimising the use of registers or of memories, e.g. interpolation}
- 5/1516 {with means relating to exhaust gas recirculation, e.g. turbo}
- 5/1518 {using two or more central computing units, e.g. interpolation}
- 5/152 dependent on pinking ([detecting or indicating knocks in internal-combustion engines G01L 23/22](#))

Advancing or retarding electric ignition spark; Arrangements of distributors or of circuit-makers or -breakers for electric spark ignition; Electric spark ignition control or safety means, not otherwise provided for

- 5/00 Advancing or retarding ignition; Control therefor**
- 5/005 . . . {with combination of automatic and non- automatic means}
- 5/02 . . . non-automatically; dependent on position of personal controls of engine, e.g. throttle position
- 5/04 . . . automatically, as a function of the working conditions of the engine or vehicle or of the atmospheric conditions ([dependent on position of personal controls of engine F02P 5/02](#))
- 5/045 . . . {combined with electronic control of other engine functions, e.g. fuel injection ([in general F02D 37/02](#))}
- 5/05 . . . using mechanical means
- 5/06 . . . dependent on engine speed
- 5/07 Centrifugal timing mechanisms
- 5/075 {Centrifugal devices combined with other specific conditions}
- 5/10 . . . dependent on fluid pressure in engine, e.g. combustion-air pressure
- 5/103 {dependent on the combustion-air pressure in engine}
- 5/106 {Combustion-air pressure devices combined with other specific conditions ([with centrifugal devices F02P 5/075](#))}
- 5/12 dependent a specific pressure other than that of combustion-air, e.g. of exhaust, cooling fluid, lubricant
- 5/14 . . . dependent on specific conditions other than engine speed or engine fluid pressure, e.g. temperature
- 5/142 {dependent on a combination of several specific conditions ([F02P 5/075](#), [F02P 5/106 takes precedence](#))}
- 5/145 . . . using electrical means
- 5/1455 . . . {by using a second control of the closed loop type ([dependent on pinking F02P 5/152](#))}
- 5/15 . . . digital data processing
- 5/1502 {using one central computing unit}
- 5/1504 {with particular means during a transient phase, e.g. acceleration, deceleration, gear change ([during starting F02P 5/1506](#))}
- 5/1506 {with particular means during starting}
- 5/1508 {with particular means during idling}
- 5/151 {with means for compensating the variation of the characteristics of the engine or of a sensor, e.g. by ageing}
- 5/1512 {with particular means concerning an individual cylinder}

- 5/1521 {with particular means during a transient phase, e.g. starting, acceleration, deceleration, gear change}
- 5/1522 {with particular means concerning an individual cylinder}
- 5/1523 {with particular laws of return to advance, e.g. step by step, differing from the laws of retard}
- 5/1525 {with means for compensating the variation of the characteristics of the pinking sensor or of the electrical means, e.g. by ageing ([when variation of characteristics results only from incorrect functioning F02P 5/1526](#))}
- 5/1526 {with means for taking into account incorrect functioning of the pinking sensor or of the electrical means}
- 5/1527 {with means allowing burning of two or more fuels, e.g. super or normal, premium or regular}
- 5/1528 {for turbocompressed engine}
- 5/153 dependent on combustion pressure
- 5/155 Analogue data processing
- 5/1551 {by determination of elapsed time with reference to a particular point on the motor axle, dependent on specific conditions}
- 5/1553 {by determination of elapsed angle with reference to a particular point on the motor axle, dependent on specific conditions}
- 5/1555 {using a continuous control, dependent on speed}
- 5/1556 {using a stepped control, dependent on speed}
- 5/1558 {with special measures for starting}
- 5/16 . . . characterised by the mechanical transmission between sensing elements or personal controls and final actuating elements

7/00 Arrangements of distributors, circuit-makers or -breakers, {e.g. of distributor and circuit-breaker combinations} or pick-up devices (advancing or retarding ignition or control therefor [F02P 5/00](#); such devices [per se](#), see the relevant classes of Section H, e.g. rotary switches [H01H 19/00](#), contact-breakers, distributors [H01R 39/00](#), generators [H02K](#))

- 7/02 . . . of distributors
- 7/021 . . . {Mechanical distributors}
- 7/022 . . . {Details of the distributor rotor or electrode}
- 7/023 . . . {with magnetically controlled mechanical contacts}
- 7/025 . . . {with noise suppression means specially adapted for the distributor}
- 7/026 . . . {Distributors combined with other ignition devices, e.g. coils, fuel-injectors}

7/027	. . . . {combined with centrifugal advance devices}	13/00	Sparking plugs structurally combined with other parts of internal-combustion engines ((connection of ignition coil to spark plug connector F02P 3/02); with fuel injectors F02M 57/06 ; {spark plug connectors per se H01T 13/04 - H01T 13/06 ; predominant aspects of sparking plug, see H01T 13/40 - H01T 13/44 }; predominant aspects of the parts, see the relevant subclasses)
7/028	. . . . {combined with circuit-makers or -breakers (and with centrifugal advance devices F02P 7/027)}		
7/03	. . with electrical means (ignition occurring simultaneously at different places in one engine cylinder or in two or more separate engine cylinders F02P 15/08)		
7/035	. . . . {without mechanical switching means}	15/00	Electric spark ignition having characteristics not provided for in, or of interest apart from, groups F02P 1/00 - F02P 13/00 {and combined with layout of ignition circuits (not combined F02B, F02C, F02G, F02K)}
7/04	. . having distributors with air-tight casing		
7/06	. . of circuit-makers or -breakers, or pick-up devices adapted to sense particular points of the timing cycle	15/001	. {Ignition installations adapted to specific engine types (ignition of jet propulsion plants F02K 9/95 ; for rotary piston engines F02B 53/12)}
7/061	. . {pick-up devices without mechanical contacts (F02P 7/067 - F02P 7/077 take precedence)}	15/003	. . {Layout of ignition circuits for gas turbine plants (ignition of gas turbine plants per se F02C 7/26)}
7/063	. . Mechanical pick-up devices, circuit-makers or -breakers, e.g. contact-breakers	15/005	. . {Layout of ignition circuits for rotary- or oscillating piston engines (ignition of those engines per se F02B 53/12)}
7/0631	. . . . {Constructional details of contacts}	15/006	. {Ignition installations combined with other systems, e.g. fuel injection (to advance or to retard the ignition spark F02P 5/045)}
7/0632	. . . . {with rotary contacts}	15/008	. {Reserve ignition systems; Redundancy of some ignition devices}
7/0634	. . . . {Details of cams or cam-followers}	15/02	. Arrangements having two or more sparking plugs
7/0635	. . . . {with means to set the breaker gap}	15/04	. one of the spark electrodes being mounted on the engine working piston
7/0637	. . . . {with several circuit-makers or -breakers actuated by the same cam}	15/06	. the electric spark triggered by engine working cylinder compression
7/0638	. . . . {with noise suppression means specially adapted for the breakers}	15/08	. having multiple-spark ignition, i.e. ignition occurring simultaneously at different places in one engine cylinder or in two or more separate engine cylinders
7/067	. . Electromagnetic pick-up devices, {e.g. providing induced current in a coil}	15/10	. having continuous electric sparks
7/0672	. . . . {using Wiegand effect}	15/12	. having means for strengthening spark during starting
7/0675	. . . . {with variable reluctance, e.g. depending on the shape of a tooth}		
7/0677	. . . . {Mechanical arrangements}	17/00	Testing of ignition installations, e.g. in combination with adjusting (testing fuel injection apparatus F02M 65/00; testing ignition installations in general F23Q 23/00); Testing of ignition timing in compression-ignition engines
7/07	. . . . Hall-effect pick-up devices	2017/003	. {using an inductive sensor, e.g. trigger tongs}
7/073	. . Optical pick-up devices	2017/006	. {using a capacitive sensor}
7/077	. . Circuits therefor, e.g. pulse generators	17/02	. Checking or adjusting ignition timing
7/0775	. . . . {Electronical verniers}	17/04	. . dynamically
7/08	. . having air-tight casings	17/06	. . . using a stroboscopic lamp
7/10	. Drives of distributors or of circuit-makers or -breakers	17/08	. . . using a cathode-ray oscilloscope (F02P 17/06 takes precedence)
9/00	Electric spark ignition control, not otherwise provided for	17/10	. Measuring dwell or antidwell time
9/002	. {Control of spark intensity, intensifying, lengthening, suppression (by means of current control in the storage devices F02P 3/05 , F02P 3/09 , during starting F02P 15/12)}	17/12	. Testing characteristics of the spark, ignition voltage or current (testing of sparking plugs H01T 13/60)
9/005	. . {by weakening or suppression of sparks to limit the engine speed}	2017/121	. . {by measuring spark voltage}
9/007	. . {by supplementary electrical discharge in the pre-ionised electrode interspace of the sparking plug, e.g. plasma jet ignition}	2017/123	. . {Generating additional sparks for diagnostics}
11/00	Safety means for electric spark ignition, not otherwise provided for	2017/125	. . {Measuring ionisation of combustion gas, e.g. by using ignition circuits}
11/02	. Preventing damage to engines or engine-driven gearing	2017/126	. . . {for burners}
11/025	. . {Shortening the ignition when the engine is stopped (to prevent damage to the coil F02P 3/0556)}	2017/128	. . . {for knock detection}
11/04	. Preventing unauthorised use of engines (of vehicles B60R 25/04 ; ignition locks H01H 27/00)		
11/06	. Indicating unsafe conditions		

Other ignition

- 19/00 Incandescent ignition, e.g. during starting of internal combustion engines; Combination of incandescent and spark ignition**
- 19/02 . electric, e.g. layout of circuits of apparatus having glowing plugs
- 19/021 . . {characterised by power delivery controls}
- 19/022 . . . {using intermittent current supply}
- 19/023 . . . {Individual control of the glow plugs}
- 19/025 . . {with means for determining glow plug temperature or glow plug resistance}
- 19/026 . . {Glow plug actuation during engine operation}
- 19/027 . . {Safety devices, e.g. for diagnosing the glow plugs or the related circuits}
- 19/028 . . {the glow plug being combined with or used as a sensor}
- 19/04 . non-electric, e.g. heating incandescent spots by burners ([use of burners for direct ignition F02P 21/00](#))
- 21/00 Direct use of flames or burners for ignition**
- 21/02 . the flames being kept burning essentially external to engine working chambers
- 21/04 . Burning-cartridges or like inserts being arranged in engine working chambers ([as starting aid F02N 19/02](#))
- 23/00 Other ignition**
- 23/02 . Friction, pyrophoric, or catalytic ignition
- 23/04 . Other physical ignition means, e.g. using laser rays
- 23/045 . . {using electromagnetic microwaves}