

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

- F02P 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](#))}
- [F02P 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)}
- [F02P 1/02](#) . the generator rotor being characterised by forming part of the engine flywheel
- [F02P 1/04](#) . the generator being specially adapted for use with specific engine types, e.g. engines with V arrangement of cylinders
- [F02P 1/06](#) . Generator drives, e.g. having snap couplings
- [F02P 1/08](#) . Layout of circuits
- [F02P 1/083](#) . . {for generating sparks by opening or closing a coil circuit}
- [F02P 1/086](#) . . {for generating sparks by discharging a capacitor into a coil circuit}
- F02P 3/00** Other installations
- [F02P 3/005](#) . {having inductive-capacitance energy storage (capacitive storage installations using an intermediate charging inductance [F02P 3/0876](#))}
- [F02P 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](#))
- [F02P 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](#))}
- [F02P 3/04](#) . . Layout of circuits
- [F02P 3/0407](#) . . . {Opening or closing the primary coil circuit with electronic switching means ([F02P 3/045](#) - [F02P 3/055](#) take precedence)}
- [F02P 3/0414](#) {using digital techniques ([F02P 3/0428](#), [F02P 3/0442](#) take precedence)}
- [F02P 3/0421](#) {with electronic tubes}

F02P 3/0428	. . . . . {using digital techniques}
F02P 3/0435	. . . . {with semiconductor devices (F02P 3/0453 , F02P 3/051 , F02P 3/0552 take precedence)}
F02P 3/0442	. . . . . {using digital techniques (F02P 3/0456 , F02P 3/053 , F02P 3/0554 , F02P 3/0558 take precedence)}
F02P 3/045	. . . for control of the dwell or anti dwell time
F02P 3/0453	. . . . {Opening or closing the primary coil circuit with semiconductor devices}
F02P 3/0456	. . . . . {using digital techniques}
F02P 3/05	. . . for control of the magnitude of the current in the ignition coil (during starting F02P 15/12)
F02P 3/051	. . . . {Opening or closing the primary coil circuit with semiconductor devices}
F02P 3/053	. . . . . {using digital techniques}
F02P 3/055	. . . with protective means to prevent damage to the circuit, {e.g. semiconductor devices} or the ignition coil
F02P 3/0552	. . . . {Opening or closing the primary coil circuit with semiconductor devices}
F02P 3/0554	. . . . . {using digital techniques (F02P 3/0558 takes precedence)}
F02P 3/0556	. . . . . {Protecting the coil when the engine is stopped}
F02P 3/0558	. . . . . {using digital techniques}
F02P 3/06	. having capacitive energy storage (piezo-electric or electrostatic ignition F02P 3/12)
F02P 3/08	. . Layout of circuits (for low tension F02P 3/10)
F02P 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)}
F02P 3/0815	. . . . {using digital techniques (F02P 3/083 , F02P 3/0846 take precedence)}
F02P 3/0823	. . . . {with electronic tubes}
F02P 3/083	. . . . . {using digital techniques}
F02P 3/0838	. . . . {with semiconductor devices (F02P 3/0861 , F02P 3/0884 , F02P 3/093 take precedence)}
F02P 3/0846	. . . . . {using digital techniques (F02P 3/0869 , F02P 3/0892 , F02P 3/096 take precedence)}
F02P 3/0853	. . . {for control of the dwell or anti-dwell time}
F02P 3/0861	. . . . {Closing the discharge circuit of the storage capacitor with semiconductor devices}
F02P 3/0869	. . . . . {using digital techniques}
F02P 3/0876	. . . {the storage capacitor being charged by means of an energy converter (DC-DC converter) or of an intermediate storage inductance}
F02P 3/0884	. . . . {Closing the discharge circuit of the storage capacitor with semiconductor devices}
F02P 3/0892	. . . . . {using digital techniques}
F02P 3/09	. . . for control of the charging current in the capacitor (F02P 15/12 takes precedence)

- F02P 3/093 {Closing the discharge circuit of the storage capacitor with semiconductor devices}
- F02P 3/096 {using digital techniques}
- F02P 3/10 . . Low-tension installation, e.g. using surface-discharge sparking plugs
- F02P 3/12 . Piezo-electric ignition; Electrostatic ignition

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

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

- F02P 5/1512 {with particular means concerning an individual cylinder}
- F02P 5/1514 {with means for optimising the use of registers or of memories, e.g. interpolation}
- F02P 5/1516 {with means relating to exhaust gas recirculation, e.g. turbo}
- F02P 5/1518 {using two or more central computing units, e.g. interpolation}
- F02P 5/152 dependent on pinking (detecting or indicating knocks in internal-combustion engines [G01L 23/22](#))
- F02P 5/1521 {with particular means during a transient phase, e.g. starting, acceleration, deceleration, gear change}
- F02P 5/1522 {with particular means concerning an individual cylinder}
- F02P 5/1523 {with particular laws of return to advance, e.g. step by step, differing from the laws of retard}
- F02P 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](#))}
- F02P 5/1526 {with means for taking into account incorrect functioning of the pinking sensor or of the electrical means}
- F02P 5/1527 {with means allowing burning of two or more fuels, e.g. super or normal, premium or regular}
- F02P 5/1528 {for turbocompressed engine}
- F02P 5/153 dependent on combustion pressure
- F02P 5/155 Analogue data processing
- F02P 5/1551 {by determination of elapsed time with reference to a particular point on the motor axle, dependent on specific conditions}
- F02P 5/1553 {by determination of elapsed angle with reference to a particular point on the motor axle, dependent on specific conditions}
- F02P 5/1555 {using a continuous control, dependent on speed}
- F02P 5/1556 {using a stepped control, dependent on speed}
- F02P 5/1558 {with special measures for starting}
- F02P 5/16 characterised by the mechanical transmission between sensing elements or personal controls and final actuating elements

F02P 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](#))

- F02P 7/02 of distributors
- F02P 7/021 {Mechanical distributors}
- F02P 7/022 {Details of the distributor rotor or electrode}
- F02P 7/023 {with magnetically controlled mechanical contacts}
- F02P 7/025 {with noise suppression means specially adapted for the distributor}
- F02P 7/026 {Distributors combined with other ignition devices, e.g. coils, fuel-injectors}

- F02P 7/027 {combined with centrifugal advance devices}
- F02P 7/028 {combined with circuit-makers or -breakers (and with centrifugal advance devices [F02P 7/027](#))}
- F02P 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](#))
- F02P 7/035 . . . {without mechanical switching means}
- F02P 7/04 . . having distributors with air-tight casing
- F02P 7/06 . . of circuit-makers or -breakers, or pick-up devices adapted to sense particular points of the timing cycle
- F02P 7/061 . . {pick-up devices without mechanical contacts ([F02P 7/067](#) - [F02P 7/077](#) take precedence)}
- F02P 7/063 . . Mechanical pick-up devices, circuit-makers or -breakers, e.g. contact-breakers
- F02P 7/0631 . . . {Constructional details of contacts}
- F02P 7/0632 . . . {with rotary contacts}
- F02P 7/0634 . . . {Details of cams or cam-followers}
- F02P 7/0635 . . . {with means to set the breaker gap}
- F02P 7/0637 . . . {with several circuit-makers or -breakers actuated by the same cam}
- F02P 7/0638 . . . {with noise suppression means specially adapted for the breakers}
- F02P 7/067 . . Electromagnetic pick-up devices, {e.g. providing induced current in a coil}
- F02P 7/0672 . . . {using Wiegand effect}
- F02P 7/0675 . . . {with variable reluctance, e.g. depending on the shape of a tooth}
- F02P 7/0677 . . . {Mechanical arrangements}
- F02P 7/07 . . . Hall-effect pick-up devices
- F02P 7/073 . . Optical pick-up devices
- F02P 7/077 . . Circuits therefor, e.g. pulse generators
- F02P 7/0775 . . . {Electronical verniers}
- F02P 7/08 . . having air-tight casings
- F02P 7/10 . . Drives of distributors or of circuit-makers or -breakers

F02P 9/00 Electric spark ignition control, not otherwise provided for

- F02P 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](#))}
- F02P 9/005 . . {by weakening or suppression of sparks to limit the engine speed}
- F02P 9/007 . . {by supplementary electrical discharge in the pre-ionised electrode interspace of the sparking plug, e.g. plasma jet ignition}

F02P 11/00 Safety means for electric spark ignition, not otherwise provided for

- F02P 11/02 . Preventing damage to engines or engine-driven gearing
- F02P 11/025 . . {Shortening the ignition when the engine is stopped (to prevent damage to the coil [F02P 3/0556](#))}
- F02P 11/04 . Preventing unauthorised use of engines (of vehicles [B60R 25/04](#); ignition locks [H01H 27/00](#))

- F02P 11/06
 - Indicating unsafe conditions
- F02P 13/00**
 - Sparkling 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](#))
- F02P 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](#))}**
- F02P 15/001
 - {Ignition installations adapted to specific engine types (ignition of jet propulsion plants [F02K 9/95](#); for rotary piston engines [F02B 53/12](#))}
- F02P 15/003
 - • {Layout of ignition circuits for gas turbine plants (ignition of gas turbine plants per se [F02C 7/26](#))}
- F02P 15/005
 - • {Layout of ignition circuits for rotary- or oscillating piston engines (ignition of those engines per se [F02B 53/12](#))}
- F02P 15/006
 - {Ignition installations combined with other systems, e.g. fuel injection (to advance or to retard the ignition spark [F02P 5/045](#))}
- F02P 15/008
 - {Reserve ignition systems; Redundancy of some ignition devices}
- F02P 15/02
 - Arrangements having two or more sparking plugs
- F02P 15/04
 - one of the spark electrodes being mounted on the engine working piston
- F02P 15/06
 - the electric spark triggered by engine working cylinder compression
- F02P 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
- F02P 15/10
 - having continuous electric sparks
- F02P 15/12
 - having means for strengthening spark during starting
- F02P 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**
- F02P 2017/003
 - {using an inductive sensor, e.g. trigger tongs}
- F02P 2017/006
 - {using a capacitive sensor}
- F02P 17/02
 - Checking or adjusting ignition timing
- F02P 17/04
 - • dynamically
- F02P 17/06
 - • • using a stroboscopic lamp
- F02P 17/08
 - • • using a cathode-ray oscilloscope ([F02P 17/06](#) takes precedence)
- F02P 17/10
 - Measuring dwell or antidwell time
- F02P 17/12
 - Testing characteristics of the spark, ignition voltage or current (testing of sparking plugs [H01T 13/60](#))
- F02P 2017/121
 - • {by measuring spark voltage}
- F02P 2017/123
 - • {Generating additional sparks for diagnostics}
- F02P 2017/125
 - • {Measuring ionisation of combustion gas, e.g. by using ignition circuits}
- F02P 2017/126
 - • • {for burners}
- F02P 2017/128
 - • • {for knock detection}

Other ignition**F02P 19/00****Incandescent ignition, e.g. during starting of internal combustion engines;
Combination of incandescent and spark ignition**

- F02P 19/02 . electric, e.g. layout of circuits of apparatus having glowing plugs
- F02P 19/021 . . {characterised by power delivery controls}
- F02P 19/022 . . . {using intermittent current supply}
- F02P 19/023 . . . {Individual control of the glow plugs}
- F02P 19/025 . . {with means for determining glow plug temperature or glow plug resistance}
- F02P 19/026 . . {Glow plug actuation during engine operation}
- F02P 19/027 . . {Safety devices, e.g. for diagnosing the glow plugs or the related circuits}
- F02P 19/028 . . {the glow plug being combined with or used as a sensor}
- F02P 19/04 . non-electric, e.g. heating incandescent spots by burners (use of burners for direct ignition [F02P 21/00](#))

F02P 21/00**Direct use of flames or burners for ignition**

- F02P 21/02 . the flames being kept burning essentially external to engine working chambers
- F02P 21/04 . Burning-cartridges or like inserts being arranged in engine working chambers (as starting aid [F02N 19/02](#))

F02P 23/00**Other ignition**

- F02P 23/02 . Friction, pyrophoric, or catalytic ignition
- F02P 23/04 . Other physical ignition means, e.g. using laser rays
- F02P 23/045 . . {using electromagnetic microwaves}