

# 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    | <b>Sparking plugs structurally combined with other parts of internal-combustion engines</b> ((connection of ignition coil to spark plug connector <a href="#">F02P 3/02</a> ); with fuel injectors <a href="#">F02M 57/06</a> ; {spark plug connectors per se <a href="#">H01T 13/04</a> - <a href="#">H01T 13/06</a> ; predominant aspects of sparking plug, see <a href="#">H01T 13/40</a> - <a href="#">H01T 13/44</a> }; predominant aspects of the parts, see the relevant subclasses) |
| 7/028  | . . . . {combined with circuit-makers or -breakers (and with centrifugal advance devices <a href="#">F02P 7/027</a> )}  |          |   |
| 7/03   | . . with electrical means (ignition occurring simultaneously at different places in one engine cylinder or in two or more separate engine cylinders <a href="#">F02P 15/08</a> )  |          |   |
| 7/035  | . . . . {without mechanical switching means}  | 15/00    | <b>Electric spark ignition having characteristics not provided for in, or of interest apart from, groups <a href="#">F02P 1/00</a> - <a href="#">F02P 13/00</a> {and combined with layout of ignition circuits (not combined <a href="#">F02B</a>, <a href="#">F02C</a>, <a href="#">F02G</a>, <a href="#">F02K</a>)}</b>   |
| 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 <a href="#">F02K 9/95</a> ; for rotary piston engines <a href="#">F02B 53/12</a> )}   |
| 7/061  | . . {pick-up devices without mechanical contacts ( <a href="#">F02P 7/067</a> - <a href="#">F02P 7/077</a> take precedence)}  | 15/003   | . . {Layout of ignition circuits for gas turbine plants (ignition of gas turbine plants per se <a href="#">F02C 7/26</a> )}   |
| 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 <a href="#">F02B 53/12</a> )}  |
| 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 <a href="#">F02P 5/045</a> )}  |
| 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    | <b>Testing of ignition installations, e.g. in combination with adjusting (testing fuel injection apparatus <a href="#">F02M 65/00</a>; testing ignition installations in general <a href="#">F23Q 23/00</a>); Testing of ignition timing in compression-ignition engines</b>  |
| 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 ( <a href="#">F02P 17/06</a> takes precedence)   |
| 9/00   | <b>Electric spark ignition control, not otherwise provided for</b>  | 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 <a href="#">F02P 3/05</a> , <a href="#">F02P 3/09</a> , during starting <a href="#">F02P 15/12</a> )} | 17/12    | . Testing characteristics of the spark, ignition voltage or current (testing of sparking plugs <a href="#">H01T 13/60</a> )   |
| 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  | <b>Safety means for electric spark ignition, not otherwise provided for</b>   | 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 <a href="#">F02P 3/0556</a> )}   | 2017/128 | . . . {for knock detection}   |
| 11/04  | . Preventing unauthorised use of engines (of vehicles <a href="#">B60R 25/04</a> ; ignition locks <a href="#">H01H 27/00</a> )  |          |   |
| 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}