

**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](#) )

**Guidance heading:** 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](#) to [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 ( <a href="#">F02P 3/045</a> to <a href="#">F02P 3/055</a> take precedence ) }
F02P 3/0414	....	{ using digital techniques ( <a href="#">F02P 3/0428</a> , <a href="#">F02P 3/0442</a> take precedence ) }
F02P 3/0421	....	{ with electronic tubes }
F02P 3/0428	.....	{ using digital techniques }
F02P 3/0435	....	{ with semiconductor devices ( <a href="#">Fo2P3/045B</a> , <a href="#">F02P 3/051</a> , <a href="#">F02P 3/0552</a> take precedence ) }
F02P 3/0442	.....	{ using digital techniques ( <a href="#">F02P 3/0456</a> , <a href="#">F02P 3/053</a> , <a href="#">F02P 3/0554</a> , <a href="#">F02P 3/0558</a> 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 ( <a href="#">during starting F02P 15/12</a> )
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, { <a href="#">e.g. semiconductor devices</a> } or the ignition coil
F02P 3/0552	....	{ Opening or closing the primary coil circuit with semiconductor devices }
F02P 3/0554	.....	{ using digital techniques ( <a href="#">F02P 3/0558</a> 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 ( <a href="#">piezo-electric or electrostatic ignition F02P 3/12</a> )
F02P 3/08	..	Layout of circuits ( <a href="#">for low tension F02P 3/10</a> )
F02P 3/0807	...	{ Closing the discharge circuit of the storage capacitor with electronic switching means ( <a href="#">F02P 3/0853</a> , <a href="#">F02P 3/0876</a> , <a href="#">F02P 3/09</a> take precedence ) }
F02P 3/0815	....	{ using digital techniques ( <a href="#">F02P 3/083</a> , <a href="#">F02P 3/0846</a> take precedence ) }
F02P 3/0823	....	{ with electronic tubes }
F02P 3/083	.....	{ using digital techniques }
F02P 3/0838	....	{ with semiconductor devices ( <a href="#">F02P 3/0861</a> , <a href="#">F02P 3/0884</a> , <a href="#">F02P 3/093</a> take precedence ) }
F02P 3/0846	.....	{ using digital techniques ( <a href="#">F02P 3/0869</a> , <a href="#">F02P 3/0892</a> , <a href="#">F02P 3/096</a> 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 ( <a href="#">DC-DC converter</a> ) 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 ( <a href="#">F02P 15/12</a> takes precedence )
F02P 3/093	....	{ Closing the discharge circuit of the storage capacitor with semiconductor

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devices }
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F02P 3/096 . . . . . { using digital techniques }

F02P 3/10 .. Low-tension installation, e.g. using surface-discharge sparking plugs

- Piezo-electric ignition; Electrostatic ignition

**Guidance heading:** 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

- { with combination of automatic and non- automatic means }

- 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 <a href="#">G01L 23/22</a> )
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 <a href="#">F02P 5/1526</a> ) }
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 sepcial 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 occuring 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](#) to [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](#) to [H01T 13/06](#); predominant aspects of sparking plug, [see](#) [H01T 13/40](#) to [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](#) to [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

**Guidance heading: 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 17/02](#) )

**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 }