

**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 (F02P 3/045 to 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 3/045B, 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

- 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

F02P 5/005 . {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 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](#) 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**      **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](#) 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 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 ([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](#))

**Guidance heading:** Other ignition

<b>F02P 19/00</b>	<b>Incandescent ignition, e.g. during starting of internal combustion engines; Combination of incandescent and spark ignition</b>
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 ( <a href="#">use of burners for direct ignition F02P 21/00</a> )
<b>F02P 21/00</b>	<b>Direct use of flames or burners for ignition</b>
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 ( <a href="#">as starting aid F02N 17/02</a> )
<b>F02P 23/00</b>	<b>Other ignition</b>
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 }
<b>F02P 2017/00</b>	<b>Testing of ignition installations, e.g. in combination with adjusting (<a href="#">testing fuel injection apparatus F02M 65/00</a>; <a href="#">testing ignition installations in general F23Q 23/00</a>) ; Testing of ignition timing in compression-ignition engines</b>
F02P 2017/003	. using an inductive sensor, e.g. trigger tongs
F02P 2017/006	. using a capacitive sensor
F02P 2017/12	. Testing characteristics of the spark, ignition voltage or current ( <a href="#">testing of sparking plugs H01T 13/60</a> )
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