

**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](#) 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 ( <b>F02P3/045B</b> , <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, { 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 ( <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 (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 ( <a href="#">F02P 15/12</a> 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 <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 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 <a href="#">F02P 7/027</a> )}
F02P 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> )
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 ( <a href="#">F02P 7/067</a> to <a href="#">F02P 7/077</a> 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
<b>F02P 9/00</b>		<b>Electric spark ignition control, not otherwise provided for</b>
F02P 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> )}
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}
<b>F02P 11/00</b>		<b>Safety means for electric spark ignition, not otherwise provided for</b>
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 <a href="#">F02P 3/0556</a> )}
F02P 11/04	.	Preventing unauthorised use of engines (of vehicles <a href="#">B60R 25/04</a> ; ignition locks <a href="#">H01H 27/00</a> )
F02P 11/06	.	Indicating unsafe conditions
<b>F02P 13/00</b>		<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> to <a href="#">H01T 13/06</a> ; predominant aspects of sparking plug, see <a href="#">H01T 13/40</a> to <a href="#">H01T 13/44</a> }; predominant aspects of the parts, see the relevant subclasses)

<b>F02P 15/00</b>	<b>Electric spark ignition having characteristics not provided for in, or of interest apart from, groups <a href="#">F02P 1/00</a> to <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>
<a href="#">F02P 15/001</a>	. {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> )}
<a href="#">F02P 15/003</a>	.. {Layout of ignition circuits for gas turbine plants (ignition of gas turbine plants <a href="#">per se F02C 7/26</a> )}
<a href="#">F02P 15/005</a>	.. {Layout of ignition circuits for rotary- or oscillating piston engines (ignition of those engines <a href="#">per se F02B 53/12</a> )}
<a href="#">F02P 15/006</a>	. {Ignition installations combined with other systems, e.g. fuel injection (to advance or to retard the ignition spark <a href="#">F02P 5/045</a> )}
<a href="#">F02P 15/008</a>	. {Reserve ignition systems; Redundancy of some ignition devices}
<a href="#">F02P 15/02</a>	. Arrangements having two or more sparking plugs
<a href="#">F02P 15/04</a>	. one of the spark electrodes being mounted on the engine working piston
<a href="#">F02P 15/06</a>	. the electric spark triggered by engine working cylinder compression
<a href="#">F02P 15/08</a>	. having multiple-spark ignition, i.e. ignition occurring simultaneously at different places in one engine cylinder or in two or more separate engine cylinders
<a href="#">F02P 15/10</a>	. having continuous electric sparks
<a href="#">F02P 15/12</a>	. having means for strengthening spark during starting

<b>F02P 17/00</b>	<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>
<a href="#">F02P 2017/003</a>	. {using an inductive sensor, e.g. trigger tongs}
<a href="#">F02P 2017/006</a>	. {using a capacitive sensor}
<a href="#">F02P 17/02</a>	. Checking or adjusting ignition timing
<a href="#">F02P 17/04</a>	.. dynamically
<a href="#">F02P 17/06</a>	... using a stroboscopic lamp
<a href="#">F02P 17/08</a>	... using a cathode-ray oscilloscope ( <a href="#">F02P 17/06</a> takes precedence)
<a href="#">F02P 17/10</a>	. Measuring dwell or antidwell time
<a href="#">F02P 17/12</a>	. Testing characteristics of the spark, ignition voltage or current (testing of sparking plugs <a href="#">H01T 13/60</a> )
<a href="#">F02P 2017/121</a>	.. {by measuring spark voltage}
<a href="#">F02P 2017/123</a>	.. {Generating additional sparks for diagnostics}
<a href="#">F02P 2017/125</a>	.. {Measuring ionisation of combustion gas, e.g. by using ignition circuits}
<a href="#">F02P 2017/126</a>	... {for burners}
<a href="#">F02P 2017/128</a>	... {for knock detection}

### 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>
<a href="#">F02P 19/02</a>	. 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}