

# CPC COOPERATIVE PATENT CLASSIFICATION

## F MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING (NOTE omitted)

### ENGINES OR PUMPS

#### F02 COMBUSTION ENGINES (cyclically operating valves therefor, lubricating, exhausting, or silencing engines [F01](#)); HOT-GAS OR COMBUSTION-PRODUCT ENGINE PLANTS

#### 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

<b>1/00</b>	<b>Installations having electric ignition energy generated by magneto- or dynamo- electric generators without subsequent storage</b> {(combination starter-magneto <a href="#">F02N 11/06</a> ; magneto- or dynamo-electric generators <a href="#">H02K 21/00</a> )}	3/0407	. . . . {Opening or closing the primary coil circuit with electronic switching means ( <a href="#">F02P 3/045</a> - <a href="#">F02P 3/055</a> take precedence)}
		3/0414	. . . . {using digital techniques ( <a href="#">F02P 3/0428</a> , <a href="#">F02P 3/0442</a> take precedence)}
		3/0421	. . . . {with electronic tubes}
		3/0428	. . . . {using digital techniques}
1/005	. {Construction and fastening of elements of magnetos other than the magnetic circuit and the windings ( <a href="#">F02P 1/02</a> - <a href="#">F02P 1/08</a> take precedence)}	3/0435	. . . . {with semiconductor devices ( <a href="#">F02P 3/0453</a> , <a href="#">F02P 3/051</a> , <a href="#">F02P 3/0552</a> take precedence)}
1/02	. the generator rotor being characterised by forming part of the engine flywheel	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)}
1/04	. the generator being specially adapted for use with specific engine types, e.g. engines with V arrangement of cylinders	3/045	. . . for control of the dwell or anti dwell time
1/06	. Generator drives, e.g. having snap couplings	3/0453	. . . . {Opening or closing the primary coil circuit with semiconductor devices}
1/08	. Layout of circuits	3/0456	. . . . {using digital techniques}
1/083	. . {for generating sparks by opening or closing a coil circuit}	3/05	. . . for control of the magnitude of the current in the ignition coil ( <a href="#">during starting F02P 15/12</a> )
1/086	. . {for generating sparks by discharging a capacitor into a coil circuit}	3/051	. . . . {Opening or closing the primary coil circuit with semiconductor devices}
		3/053	. . . . {using digital techniques}
<b>3/00</b>	<b>Other installations</b>	3/055	. . . with protective means to prevent damage to the circuit, {e.g. semiconductor devices} or the ignition coil
3/005	. {having inductive-capacitance energy storage (capacitive storage installations using an intermediate charging inductance <a href="#">F02P 3/0876</a> )}	3/0552	. . . . {Opening or closing the primary coil circuit with semiconductor devices}
3/01	. Electric spark ignition installations without subsequent energy storage, i.e. energy supplied by an electrical oscillator (with magneto- or dynamo-electric generators <a href="#">F02P 1/00</a> ; piezo-electric ignition <a href="#">F02P 3/12</a> ; with continuous electric spark <a href="#">F02P 15/10</a> )	3/0554	. . . . {using digital techniques ( <a href="#">F02P 3/0558</a> takes precedence)}
		3/0556	. . . . {Protecting the coil when the engine is stopped}
3/02	. having inductive energy storage, e.g. arrangements of induction coils {(ignition coils structurally combined with sparking plugs <a href="#">F02P 13/00</a> ; constructional details of ignition coils <a href="#">H01F 38/12</a> )}	3/0558	. . . . {using digital techniques}
		3/06	. having capacitive energy storage (piezo-electric or electrostatic ignition <a href="#">F02P 3/12</a> )
3/04	. . Layout of circuits	3/08	. . Layout of circuits (for low tension <a href="#">F02P 3/10</a> )
		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)}

- 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
- 5/142 . . . . {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}
- 5/1514 . . . . {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](#))
- 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}

**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

5/16	<ul style="list-style-type: none"> <li>characterised by the mechanical transmission between sensing elements or personal controls and final actuating elements</li> </ul>	9/002	<ul style="list-style-type: none"> <li>{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>)}</li> </ul>
<b>7/00</b>	<b>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 <a href="#">F02P 5/00</a>; such devices per se, see the relevant classes of Section H, e.g. rotary switches <a href="#">H01H 19/00</a>, contact-breakers, distributors <a href="#">H01R 39/00</a>, generators <a href="#">H02K</a>)</b>	9/005	<ul style="list-style-type: none"> <li>{by weakening or suppression of sparks to limit the engine speed}</li> </ul>
7/02	<ul style="list-style-type: none"> <li>of distributors</li> </ul>	9/007	<ul style="list-style-type: none"> <li>{by supplementary electrical discharge in the pre-ionised electrode interspace of the sparking plug, e.g. plasma jet ignition}</li> </ul>
7/021	<ul style="list-style-type: none"> <li>{Mechanical distributors}</li> </ul>	<b>11/00</b>	<b>Safety means for electric spark ignition, not otherwise provided for</b>
7/022	<ul style="list-style-type: none"> <li>{Details of the distributor rotor or electrode}</li> </ul>	11/02	<ul style="list-style-type: none"> <li>Preventing damage to engines or engine-driven gearing</li> </ul>
7/023	<ul style="list-style-type: none"> <li>{with magnetically controlled mechanical contacts}</li> </ul>	11/025	<ul style="list-style-type: none"> <li>{Shortening the ignition when the engine is stopped (to prevent damage to the coil <a href="#">F02P 3/0556</a>)}</li> </ul>
7/025	<ul style="list-style-type: none"> <li>{with noise suppression means specially adapted for the distributor}</li> </ul>	11/04	<ul style="list-style-type: none"> <li>Preventing unauthorised use of engines (of vehicles <a href="#">B60R 25/04</a>; ignition locks <a href="#">H01H 27/00</a>)</li> </ul>
7/026	<ul style="list-style-type: none"> <li>{Distributors combined with other ignition devices, e.g. coils, fuel-injectors}</li> </ul>	11/06	<ul style="list-style-type: none"> <li>Indicating unsafe conditions</li> </ul>
7/027	<ul style="list-style-type: none"> <li>{combined with centrifugal advance devices}</li> </ul>	<b>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> - <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	<ul style="list-style-type: none"> <li>{combined with circuit-makers or -breakers (and with centrifugal advance devices <a href="#">F02P 7/027</a>)}</li> </ul>	<b>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> - <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>
7/03	<ul style="list-style-type: none"> <li>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>)</li> </ul>	15/001	<ul style="list-style-type: none"> <li>{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>)}</li> </ul>
7/035	<ul style="list-style-type: none"> <li>{without mechanical switching means}</li> </ul>	15/003	<ul style="list-style-type: none"> <li>{Layout of ignition circuits for gas turbine plants (ignition of gas turbine plants per se <a href="#">F02C 7/26</a>)}</li> </ul>
7/04	<ul style="list-style-type: none"> <li>having distributors with air-tight casing</li> </ul>	15/005	<ul style="list-style-type: none"> <li>{Layout of ignition circuits for rotary- or oscillating piston engines (ignition of those engines per se <a href="#">F02B 53/12</a>)}</li> </ul>
7/06	<ul style="list-style-type: none"> <li>of circuit-makers or -breakers, or pick-up devices adapted to sense particular points of the timing cycle</li> </ul>	15/006	<ul style="list-style-type: none"> <li>{Ignition installations combined with other systems, e.g. fuel injection (to advance or to retard the ignition spark <a href="#">F02P 5/045</a>)}</li> </ul>
7/061	<ul style="list-style-type: none"> <li>{pick-up devices without mechanical contacts (<a href="#">F02P 7/067</a> - <a href="#">F02P 7/077</a> take precedence)}</li> </ul>	15/008	<ul style="list-style-type: none"> <li>{Reserve ignition systems; Redundancy of some ignition devices}</li> </ul>
7/063	<ul style="list-style-type: none"> <li>Mechanical pick-up devices, circuit-makers or -breakers, e.g. contact-breakers</li> </ul>	15/02	<ul style="list-style-type: none"> <li>Arrangements having two or more sparking plugs</li> </ul>
7/0631	<ul style="list-style-type: none"> <li>{Constructional details of contacts}</li> </ul>	15/04	<ul style="list-style-type: none"> <li>one of the spark electrodes being mounted on the engine working piston</li> </ul>
7/0632	<ul style="list-style-type: none"> <li>{with rotary contacts}</li> </ul>	15/06	<ul style="list-style-type: none"> <li>the electric spark triggered by engine working cylinder compression</li> </ul>
7/0634	<ul style="list-style-type: none"> <li>{Details of cams or cam-followers}</li> </ul>	15/08	<ul style="list-style-type: none"> <li>having multiple-spark ignition, i.e. ignition occurring simultaneously at different places in one engine cylinder or in two or more separate engine cylinders</li> </ul>
7/0635	<ul style="list-style-type: none"> <li>{with means to set the breaker gap}</li> </ul>	15/10	<ul style="list-style-type: none"> <li>having continuous electric sparks</li> </ul>
7/0637	<ul style="list-style-type: none"> <li>{with several circuit-makers or -breakers actuated by the same cam}</li> </ul>	15/12	<ul style="list-style-type: none"> <li>having means for strengthening spark during starting</li> </ul>
7/0638	<ul style="list-style-type: none"> <li>{with noise suppression means specially adapted for the breakers}</li> </ul>	<b>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>
7/067	<ul style="list-style-type: none"> <li>Electromagnetic pick-up devices {, e.g. providing induced current in a coil}</li> </ul>		
7/0672	<ul style="list-style-type: none"> <li>{using Wiegand effect}</li> </ul>		
7/0675	<ul style="list-style-type: none"> <li>{with variable reluctance, e.g. depending on the shape of a tooth}</li> </ul>		
7/0677	<ul style="list-style-type: none"> <li>{Mechanical arrangements}</li> </ul>		
7/07	<ul style="list-style-type: none"> <li>Hall-effect pick-up devices</li> </ul>		
7/073	<ul style="list-style-type: none"> <li>Optical pick-up devices</li> </ul>		
7/077	<ul style="list-style-type: none"> <li>Circuits therefor, e.g. pulse generators</li> </ul>		
7/0775	<ul style="list-style-type: none"> <li>{Electronical verniers}</li> </ul>		
7/08	<ul style="list-style-type: none"> <li>having air-tight casings</li> </ul>		
7/10	<ul style="list-style-type: none"> <li>Drives of distributors or of circuit-makers or -breakers</li> </ul>		
<b>9/00</b>	<b>Electric spark ignition control, not otherwise provided for</b>		

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

#### **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}