

## SECTION F — MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

### F02 COMBUSTION ENGINES; 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** (specially adapted for rotary-piston or oscillating-piston engines F02B 53/12; 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; sparking plugs H01T)

#### Subclass index

##### ELECTRIC SPARK IGNITION

Directly from generator; other installations.....	1/00, 3/00
Sparking plugs structurally combined with engine parts.....	13/00
Control: timing, distributing; other.....	5/00, 7/00, 9/00
Safety means.....	11/00
Other features.....	15/00
Testing.....	17/00

##### IGNITION OTHERWISE THAN BY ELECTRIC SPARK: BY INCANDESCENCE; BY DIRECT

FLAME; BY OTHER MEANS..... 19/00, 21/00, 23/00

#### 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 [1, 2006.01]**
- 1/02 • the generator rotor being characterised by forming part of the engine flywheel [1, 2006.01]
- 1/04 • the generator being specially adapted for use with specific engine types, e.g. engines with V-arrangement of cylinders [1, 2006.01]
- 1/06 • Generator drives, e.g. having snap couplings [1, 2006.01]
- 1/08 • Layout of circuits [1, 2006.01]
- 3/00 Other electric spark ignition installations characterised by the type of ignition power generation storage [1, 2006.01]**
- 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) [4, 2006.01]
- 3/02 • having inductive energy storage, e.g. arrangements of induction coils [1, 2006.01]
- 3/04 • • Layout of circuits [1, 2006.01]
- 3/045 • • • for control of the dwell or anti-dwell time [4, 2006.01]
- 3/05 • • • for control of the magnitude of the current in the ignition coil (during starting F02P 15/12) [4, 2006.01]
- 3/055 • • • with protective means to prevent damage to the circuit or the ignition coil [4, 2006.01]

- 3/06 • having capacitive energy storage (piezo-electric or electrostatic ignition F02P 3/12) [1, 2006.01]
- 3/08 • • Layout of circuits (for low tension F02P 3/10) [1, 2006.01]
- 3/09 • • • for control of the charging current in the capacitor (F02P 15/12 takes precedence) [4, 2006.01]
- 3/10 • • Low-tension installation, e.g. using surface-discharge sparking plugs [1, 2006.01]
- 3/12 • Piezo-electric ignition; Electrostatic ignition [1, 2006.01]

#### 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 electric ignition spark; Control therefor [1, 6, 2006.01]**
- 5/02 • non-automatically; dependent on position of personal controls of engine, e.g. throttle position [1, 2006.01]
- 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) [1, 2006.01]
- 5/05 • • using mechanical means [4, 2006.01]
- 5/06 • • • dependent on engine speed [1, 4, 2006.01]
- 5/07 • • • Centrifugal timing mechanisms [6, 2006.01]
- 5/10 • • • dependent on fluid pressure in engine, e.g. combustion-air pressure [1, 4, 2006.01]
- 5/12 • • • dependent on a specific pressure other than that of combustion-air, e.g. of exhaust, cooling fluid, lubricant [1, 4, 2006.01]

**F02P**

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|--------------|---------|--|
| 5/14         | • • •   | dependent on specific conditions other than engine speed or engine fluid pressure, e.g. temperature [1, 4, 2006.01]  |
| 5/145        | • •     | using electrical means [4, 2006.01]  |
| 5/15         | • • •   | Digital data processing [4, 2006.01]   |
| 5/152        | • • • • | dependent on pinking (detecting or indicating knocks in internal-combustion engines G01L 23/22) [6, 2006.01]   |
| 5/153        | • • • • | dependent on combustion pressure [6, 2006.01]  |
| 5/155        | • • •   | Analogue data processing [4, 2006.01]  |
| 5/16         | •       | characterised by the mechanical transmission between sensing elements or personal controls and final actuating elements [1, 2006.01]   |
| <b>7/00</b>  |         | <b>Arrangement of distributors, circuit-makers, circuit-breakers or pick-up devices for electric spark ignition</b> (advancing or retarding ignition or control therefor F02P 5/00; such devices <i>per se</i> , <i>see</i> the relevant classes of section H, e.g. rotary switches H01H 19/00, contact-breakers, distributors H01R 39/00, generators H02K) [1, 2006.01] |
| 7/02         | •       | of distributors [1, 2006.01]   |
| 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) [4, 2006.01]   |
| 7/04         | • •     | having distributors with air-tight casing [1, 2006.01]   |
| 7/06         | •       | of circuit-makers or -breakers, or pick-up devices adapted to sense particular points of the timing cycle [1, 4, 2006.01]  |
| 7/063        | • •     | Mechanical pick-up devices, circuit-makers or -breakers, e.g. contact-breakers [4, 2006.01]  |
| 7/067        | • •     | Electromagnetic pick-up devices [4, 2006.01]   |
| 7/07         | • • •   | Hall-effect pick-up devices [4, 2006.01]   |
| 7/073        | • •     | Optical pick-up devices [4, 2006.01]   |
| 7/077        | • •     | Circuits therefor, e.g. pulse generators [4, 2006.01]  |
| 7/08         | • •     | having air-tight casings [1, 2006.01]  |
| 7/10         | •       | Drives of distributors or of circuit-makers or -breakers [1, 2006.01]  |
| <b>9/00</b>  |         | <b>Electric spark ignition control, not otherwise provided for [1, 2006.01]</b>  |
| <b>11/00</b> |         | <b>Safety means for electric spark ignition, not otherwise provided for [1, 2006.01]</b>   |
| 11/02        | •       | Preventing damage to engines or engine-driven gearing [1, 2006.01]   |
| 11/04        | •       | Preventing unauthorised use of engines (of vehicles B60R 25/04; ignition locks H01H 27/00) [1, 2006.01]  |
| 11/06        | •       | Indicating unsafe conditions [1, 2006.01]  |

- 13/00 Sparking plugs structurally combined with other parts of internal-combustion engines** (with fuel injectors F02M 57/06; predominant aspects of the parts, see the relevant subclasses) [**1, 2006.01**]
- 15/00 Electric spark ignition having characteristics not provided for in, or of interest apart from, groups F02P 1/00-F02P 13/00** [**1, 2006.01**]
- 15/02 • Arrangements having two or more sparking plugs [**1, 2006.01**]
- 15/04 • one of the spark electrodes being mounted on the engine working piston [**1, 2006.01**]
- 15/06 • the electric spark triggered by engine working cylinder compression [**1, 2006.01**]
- 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 [**1, 2006.01**]
- 15/10 • having continuous electric sparks [**1, 2006.01**]
- 15/12 • having means for strengthening spark during starting [**1, 2006.01**]
- 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** [**1, 4, 2006.01**]
- 17/02 • Checking or adjusting ignition timing [**6, 2006.01**]
- 17/04 • • dynamically [**6, 2006.01**]
- 17/06 • • • using a stroboscopic lamp [**6, 2006.01**]
- 17/08 • • • using a cathode-ray oscilloscope (F02P 17/06 takes precedence) [**6, 2006.01**]
- 17/10 • Measuring dwell or antidwell time [**6, 2006.01**]
- 17/12 • Testing characteristics of the spark, ignition voltage or current [**6, 2006.01**]

### Other ignition

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|-------|---|
| 19/00 | <b>Incandescent ignition, e.g. during starting of internal-combustion engines; Combination of incandescent and spark ignition [1, 4, 2006.01]</b> |
| 19/02 | • electric, e.g. layout of circuits of apparatus having glowing plugs <b>[1, 2006.01]</b>   |
| 19/04 | • non-electric, e.g. heating incandescent spots by burners (use of burners for direct ignition F02P 21/00) <b>[1, 2006.01]</b>                    |
| 21/00 | <b>Direct use of flames or burners for ignition [1, 2006.01]</b>  |
| 21/02 | • the flames being kept burning essentially external to engine working chambers <b>[1, 2006.01]</b>   |
| 21/04 | • Burning-cartridges or like inserts being arranged in engine working chambers (as starting aid F02N 19/02) <b>[1, 2006.01]</b>                   |
| 23/00 | <b>Other ignition [1, 2006.01]</b>  |
| 23/02 | • Friction, pyrophoric, or catalytic ignition <b>[1, 2006.01]</b>   |
| 23/04 | • Other physical ignition means, e.g. using laser rays <b>[1, 2006.01]</b>  |