

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 (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)

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**
- 1/02 . the generator rotor being characterised by forming part of the engine flywheel
 - 1/04 . the generator being specially adapted for use with specific engine types, e.g. engines with V-arrangement of cylinders
 - 1/06 . Generator drives, e.g. having snap couplings
 - 1/08 . Layout of circuits
- 3/00 Other installations**
- 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]**
 - 3/02 . having inductive energy storage, e.g. arrangements of induction coils
 - 3/04 . . . Layout of circuits
 - 3/045 . . . for control of the dwell or anti-dwell time **[4]**
 - 3/05 . . . for control of the magnitude of the current in the ignition coil (during starting F02P 15/12) **[4]**
 - 3/055 . . . with protective means to prevent damage to the circuit or the ignition coil **[4]**
 - 3/06 . having capacitive energy storage (piezo-electric or electrostatic ignition F02P 3/12)
 - 3/08 . . . Layout of circuits (for low tension F02P 3/10)
 - 3/09 . . . for control of the charging current in the capacitor (F02P 15/12 takes precedence) **[4]**
 - 3/10 . . . Low-tension installation, e.g. using surface-discharge sparking plugs
 - 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

- 5/00 Advancing or retarding ignition; Control therefor [6]**
- 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)
 - 5/05 . . . using mechanical means **[4]**
 - 5/06 . . . dependent on engine speed **[4]**
 - 5/07 . . . Centrifugal timing mechanisms **[6]**
 - 5/10 . . . dependent on fluid pressure in engine, e.g. combustion-air pressure **[4]**
 - 5/12 . . . dependent on a specific pressure other than that of combustion-air, e.g. of exhaust, cooling fluid, lubricant **[4]**
 - 5/14 . . . dependent on specific conditions other than engine speed or engine fluid pressure, e.g. temperature **[4]**
 - 5/145 . . . using electrical means **[4]**
 - 5/15 . . . Digital data processing **[4]**
 - 5/152 . . . dependent on pinking (detecting or indicating knocks in internal-combustion engines G01L 23/22) **[6]**
 - 5/153 . . . dependent on combustion pressure **[6]**
 - 5/155 . . . Analogue data processing **[4]**
 - 5/16 . characterised by the mechanical transmission between sensing elements or personal controls and final actuating elements
- 7/00 Arrangement of distributors, circuit-makers or -breakers, 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)
- 7/02 . of distributors
 - 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]**
 - 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 [4]
 - 7/063 . . Mechanical pick-up devices, circuit-makers or -breakers, e.g. contact-breakers [4]
 - 7/067 . . Electromagnetic pick-up devices [4]
 - 7/07 . . . Hall-effect pick-up devices [4]
 - 7/073 . . Optical pick-up devices [4]
 - 7/077 . . Circuits therefor, e.g. pulse generators [4]
 - 7/08 . . having air-tight casings
 - 7/10 . Drives of distributors or of circuit-makers or -breakers
 - 9/00 Electric spark ignition control, not otherwise provided for**
 - 11/00 Safety means for electric spark ignition, not otherwise provided for**
 - 11/02 . Preventing damage to engines or engine-driven gearing
 - 11/04 . Preventing unauthorised use of engines (of vehicles B60R 25/04; ignition locks H01H 27/00)
 - 11/06 . Indicating unsafe conditions
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- 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)
 - 15/00 Electric spark ignition having characteristics not provided for in, or of interest apart from, groups F02P 1/00 F02P 13/00**
 - 15/02 . Arrangements having two or more sparking plugs
 - 15/04 . one of the spark electrodes being mounted on the engine working piston
 - 15/06 . the electric spark triggered by engine working cylinder compression
 - 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
 - 15/10 . having continuous electric sparks
 - 15/12 . having means for strengthening spark during starting
 - 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** [4]
 - 17/02 . Checking or adjusting ignition timing [6]
 - 17/04 . . dynamically [6]
 - 17/06 . . . using a stroboscopic lamp [6]
 - 17/08 . . . using a cathode-ray oscilloscope (F02P 17/06 takes precedence) [6]
 - 17/10 . Measuring dwell or antidwell time [6]
 - 17/12 . Testing characteristics of the spark, ignition voltage or current (testing of sparking plugs G01M 19/02) [6]
- Other ignition**
- 19/00 Incandescent ignition, e.g. during starting of internal-combustion engines; Combination of incandescent and spark ignition** [4]
 - 19/02 . electric, e.g. layout of circuits of apparatus having glowing plugs
 - 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 17/02)
 - 23/00 Other ignition**
 - 23/02 . Friction, pyrophoric, or catalytic ignition
 - 23/04 . Other physical ignition means, e.g. using laser rays