

F02N

STARTING OF COMBUSTION ENGINES(starting of free-piston combustion engines F02B71/02; starting of gas-turbine plants F02C7/26); STARTING AIDS FOR SUCH ENGINES, NOT OTHERWISE PROVIDED FOR

Definition statement

This subclass/group covers:

Means and methods for starting of combustion engines or for aiding engine start.

References relevant to classification in this subclass

This subclass/group does not cover:

Starting of free-piston combustion engines	F02B 71/02
starting of gas-turbine plants	F02C 7/26

F02N 1/00

Starting apparatus having hand cranks (with intermediate power storage F02N5/00-F02N15/00)

Definition statement

This subclass/group covers:

Starting apparatus having hand cranks.

In old vehicles the engine was started using hand cranks. Nowadays these are limited to special applications like some airplanes

Informative references

Attention is drawn to the following places, which may be of interest for search:

Starting apparatus having mechanical power storage	F02N 5/00
Starting apparatus having fluid-driven auxiliary engines or apparatus	F02N 7/00
Starting of engines by supplying auxiliary pressure fluid to their	F02N 9/00

working chambers	
Starting of engines by means of electric motors	F02N 11/00
Starting of engines, or driving of starting apparatus by use of explosives	F02N 13/00
Other power-operated starting apparatus	F02N 15/00

F02N 3/00

Other muscle-operated starting apparatus (with intermediate power storage F02N5/00- F02N15/00)

Definition statement

This subclass/group covers:

Starting of engines achieved by manual actuation by the operator

References relevant to classification in this group

This subclass/group does not cover:

With intermediate power storage	F02N 5/00-F02N 15/00
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Starting using hand cranks	F02N 1/00
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F02N 3/02

having pull-cords

Definition statement

This subclass/group covers:

Pull-cord actuated starting, e.g. recoil mechanisms used in lawn movers.

F02N 3/04

having foot-actuated levers

Definition statement

This subclass/group covers:

Kick starters for motorbikes and similar arrangements

F02N 5/00

Starting apparatus having mechanical power storage

Definition statement

This subclass/group covers:

Starting apparatus having mechanical power storage

F02N 5/02

of spring type

Definition statement

This subclass/group covers:

Starting apparatus, whereby the energy for starting is at least partially stored in a spring and subsequently released to effect starting.

F02N 5/04

of inertia type

Definition statement

This subclass/group covers:

Starting apparatus, whereby the energy for starting is stored in moving parts. This can be the engine flywheel. Also covers the connection of the engine via the clutch to the wheels of a moving vehicle to accelerate the engine for starting (e.g. in hybrid vehicles) and the acceleration of the starter before the starter and the engine are connected.

F02N 7/00

Starting apparatus having fluid-driven auxiliary engines or apparatus

Definition statement

This subclass/group covers:

Starting apparatus, starting of engine by using auxiliary engine or hydraulic motors, e.g. air motor.

F02N 9/00

Starting of engines by supplying auxiliary pressure fluid to their working chambers

Definition statement

This subclass/group covers:

Supply of high pressure fluid to engine to achieve engine start.

F02N 11/00

Starting of engines by means of electric motors electric motors (arrangement or mounting of prime-movers consisting of electric motors and internal combustion engines for mutual or common propulsion B60K6/20)

Definition statement

This subclass/group covers:

The usual way to start an engine is to use one or more electric motors.

Special rules of classification within this group

Subgroups also cover control of engine starting.

F02N 11/04

the motors being associated with current generators

Definition statement

This subclass/group covers:

The starter is also used as a generator during normal engine running. Normally called starter/generator or starter/alternator.

F02N 11/06

and with ignition apparatus

Definition statement

This subclass/group covers:

Starting apparatus with ignition apparatus.

F02N 11/08

Circuits [N: or control means] specially adapted for starting engines

Definition statement

This subclass/group covers:

Circuits or control means specially adapted for starting engines; Starting apparatus.

F02N 11/0803

[N: characterised by means for initiating engine start or stop (F02N11/0814 takes precedence)]

Definition statement

This subclass/group covers:

Means to initiate the engine start, could be related to specific arrangements of ignition switches but also automatic restart at engine stall or based on temperature measurements, both in driver cabin (for trucks) and engine temperature.

Furthermore automatically stopping the engine at extended idling (important for the US) or after they have been automatically started.

References relevant to classification in this group

This subclass/group does not cover:

Arrangements for automatically starting and stopping engine during idling, e.g. at vehicle stop	F02N 11/0814
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Ignition switches	H01N 27/06
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Special rules of classification within this group

Safety means, especially for preventing engine start for safety reasons, should additionally be classified in [F02N 11/10](#)

F02N 11/0807

[N: Remote means]

Definition statement

This subclass/group covers:

Automatic engine start using a remote, popular especially in the US to preheat the vehicle or the engine.

F02N 11/0814

[N: comprising means for controlling automatic idle-start-stop]

Definition statement

This subclass/group covers:

Starting apparatus comprising means for controlling automatic idle-start-stop.

Starting apparatus with a start-stop system wherein the engine is automatically stopped when the vehicle has stopped at e.g. a traffic light. The engine will then be automatically restarted based on driver's intention to continue driving or based on system requirements.

F02N 11/0822

[N: related to action of the driver]

Definition statement

This subclass/group covers:

Means for detecting driver's will to continue driving or to maintain current vehicle position.

F02N 11/0825

[N: related to prevention of engine restart failure, e.g. disabling automatic stop at low battery state]

Definition statement

This subclass/group covers:

Means not allowing automatic engine stop is if restart cannot be guaranteed, e.g. at low battery or starter failure.

F02N 11/0829

[N: related to special engine control, e.g. giving priority to engine warming-up or learning]

Definition statement

This subclass/group covers:

Means prohibiting automatic stop is if engine running is required for other reasons related to the engine, e.g. for adaptation, cleaning of catalysts or purging of fuel vapors.

F02N 11/084

[N: State of vehicle accessories, e.g. air condition or power steering]

Definition statement

This subclass/group covers:

The engine is automatically started (or not stopped) if the engine running is required to support vehicle accessories.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Engine is started if battery charge is low	F02N 11/0825
Engine running is required for engine related aspects	F02N 11/0829

F02N 11/0844

[N: with means for restarting the engine directly after an engine stop request, e.g. caused by change of driver mind]

Definition statement

This subclass/group covers:

Means restarting engine when engine is still rotating.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control of engagement between starter pinion and engine gear while engine is still rotating	F02N 11/0855
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F02N 11/0848

[N: with means for detecting successful engine start, e.g. to stop starter actuation]

Definition statement

This subclass/group covers:

Means for detecting successful engine start, e.g. to stop starter actuation;
Means detecting when the engine has started, e.g. to stop the starter or for other engine control.

F02N 11/0851

[N: characterised by means for controlling the engagement or disengagement between engine and starter, e.g. meshing of pinion and engine gear]

Definition statement

This subclass/group covers:

Means for controlling the engagement or disengagement between engine and starter, e.g. meshing of pinion and engine gear; Control or circuit aspects for connecting the starter and the engine, mainly starters using pinions.

Informative references

Attention is drawn to the following places, which may be of interest for search:

More mechanical aspects concerning the connection between the engine and the starter	F02N 15/02
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F02N 11/0855

[N: during engine shutdown or after engine stop before start command, e.g. pre-engagement of pinion]

Definition statement

This subclass/group covers:

Engagement of pinion while the engine is still rotating , e.g. by accelerating starter first and thereafter engage the pinion with the engine gear.

Also engaging the pinion when the engine has stopped but when no engine start request has been detected. This can be done when future engine start is likely, e.g. based on vehicle door opening.

F02N 11/0859

[N: specially adapted to the type of the starter motor or integrated into it]

Definition statement

This subclass/group covers:

All circuits specially adapted to a certain type of motor, e.g. all inverter circuits are inside here.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Starter/generators	F02N 11/04
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F02N 11/0862

[N: characterised by the electrical power supply means, e.g. battery]

Definition statement

This subclass/group covers:

Anything related to the battery or other means for supplying energy for starting.

F02N 11/0866

[N: comprising several power sources, e.g. battery and capacitor or two batteries]

Definition statement

This subclass/group covers:

Everything related to the use of two batteries or power supplies in a vehicle in relation with starting:

- choice of battery;
- one battery for starting and one battery for accessories;
- capacitor charging, e.g. before engine start.

F02N 11/10

Safety devices (F02N11/08 takes precedence)

Definition statement

This subclass/group covers:

Safety devices; diagnosis of starters.

References relevant to classification in this group

This subclass/group does not cover:

Circuits or control means specially adapted for starting engines	F02N 11/08
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F02N 11/101

[N: for preventing engine starter actuation or engagement (preventing unauthorised use or theft of vehicles B60R25/04)]

Definition statement

This subclass/group covers:

Devices prohibiting engine start, and therefore the starter actuation, in order to protect the engine, the starter or the environment.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Preventing unauthorised use or theft of vehicle	B60R 25/04
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F02N 11/105

[N: when the engine is already running (F02N11/0848 takes precedence)]

Definition statement

This subclass/group covers:

Devices preventing new starter actuation when the engine is already or still running in order to protect the starter, e.g. the pinion.

References relevant to classification in this group

This subclass/group does not cover:

With means for detecting successful engine start	F02N 11/0848
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F02N 13/00

Starting of engines, or driving of starting apparatus by use of explosives, e.g. stored in cartridges

Definition statement

This subclass/group covers:

Systems or Methods for starting combustion engines moved by explosive mixture other than the combustion mixture, in particular explosive cartridges. It could be either portable or constructional fixed to the engine. This is e.g. the case for model cars

F02N 15/00

Other power-operated starting apparatus; Component parts, details, or accessories, not provided for in, or of interest apart from groups F02N5/00 to F02N13/00

Definition statement

This subclass/group covers:

Covers all remaining aspects of starting devices, especially the connection between the starting apparatus and the engine.

F02N 15/02

Gearing between starting-engines and started engines; Engagement or disengagement thereof

Definition statement

This subclass/group covers:

Connections between the engine and the starting means.

F02N 15/04

the gearing including disengaging toothed gears

Definition statement

This subclass/group covers:

The gearing between the engine and the starting means (mainly starter) is disengaged.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electrical or electronical control of the engagement and disengagement and circuits therefore	F02N 11/0851
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F02N 19/00

Starting aids for combustion engines, not otherwise provided for

Definition statement

This subclass/group covers:

Starting aids; means for aiding engine start.

F02N 19/004

[N: Aiding engine start by using decompression means or variable valve actuation]

Definition statement

This subclass/group covers:

Means for reduction of the necessary torque for starting using decompression valves or variable intake or exhaust valve actuation

F02N 19/005

[N: Aiding engine start by starting from a predetermined position, e.g. pre-positioning or reverse rotation]

Definition statement

This subclass/group covers:

Means for reducing torque needed to start the engine taking into account engine crank angle, e.g. by moving the engine to a certain position the necessary torque can be reduced.

F02N 19/02

Aiding engine start by thermal means, e.g. using lighted wicks (using electrically-heated glow-plugs F02P19/02)

Definition statement

This subclass/group covers:

Heating the engine or its components prior to engine start.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control of glow plugs	F02P 19/02
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F02N 99/00

Subject matter not provided for in other groups of this subclass

Definition statement

This subclass/group covers:

Subject matter not provided for in other groups of this subclass.

F02N 99/002

[N: Starting combustion engines by ignition means]

Definition statement

This subclass/group covers:

So-called direct start by injecting fuel into one engine cylinder and igniting it, can be without or combined with starter actuation.

F02N 99/006

[N: Providing a combustible mixture inside the cylinder]

Definition statement

This subclass/group covers:

Starting whereby the fuel is injected directly into the combustion chamber and then ignited to achieve engine start.