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AMENDMENT 2

Household and similar electrical appliances – Safety – Part 2-107: Particular requirements for robotic battery powered electrical lawnmowers

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-107: Particular requirements for robotic battery powered electrical lawnmowers

AMENDMENT 2

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Amendment 2 to IEC 60335-2-107:2017 has been prepared by IEC technical committee 116: Safety of motor-operated electric tools.

The text of this Amendment is based on the following documents:

Draft	Report on voting
116/516/CDV	116/540/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Amendment is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications/.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

NOTE The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 36 months from the date of publication.

22 Construction

Replace the existing subclause 22.105.2 with the following:

22.105.2 Obstruction sensors

The machine shall be provided with an **obstruction sensor**(s). In **automatic mode**, the **sensor**(s) shall be active and capable of performing its intended function in all operating positions and in all directions of travel, except those directions of travel where

– the **cutting means** is not operating and the distance travelled does not exceed 2,0 times the length of the machine; or

– the **cutting means** is operating and the distance travelled does not exceed the distance from the edge of the machine in the direction of travel to the nearest **cutting means tip circle**.

NOTE 101 The machine does not have to incorporate discrete sensing devices for each **sensor** requirement. The various sensing functions can be achieved by fewer devices that respond to multiple stimuli. Sensing requirements can also be fulfilled by mechanical devices instead of **electrical circuits**.

The maximum force applied by the machine against an obstruction in **automatic mode** shall not be greater than

– 260 N during the first 0,5 s after impact and a minimum of 50 N is exceeded; and

– 130 N thereafter.

NOTE 102 ISO/TS 15066 provides guidance on relevant values of maximum force.

If an **obstruction sensor** is activated, the **traction drive** in the direction of travel shall stop within

$t_{ts} = D/v$, where

t_{ts} is the **traction drive stopping time**;

D is the distance from the front edge of the machine to the nearest edge of the nearest **cutting means tip circle**; and

v is the velocity of the machine upon approach.

The machine shall then restart in a different direction to allow the machine to move away from the object such that the **sensor** is deactivated within 3 s of initial activation. If the **sensor** is not deactivated within 3 s of initial activation, the **cutting means** shall stop as required by 20.102.2.

An additional non-contact **sensor**, if relied upon to reduce speed in order to fulfil the requirement for maximum force upon impact, is permitted providing that it responds to a rigid non-metallic target:

– of cylindrical shape;
– of (70 ± 2) mm diameter by (400 ± 5) mm height, standing on end;
– of a colour or shade that matches the background; and
– normalized to the ambient temperature.

Compliance is checked by inspection, by measurement, by the following test and by 20.102.2.

The machine is placed on a level test surface as described in Clause CC.3. The machine shall be made to collide with a force measuring means. The force to operate the ***obstruction sensor*** *at impact shall be measured parallel to the ground plane and vertically aligned with the point of contact with the force measuring means. The point of contact shall not be higher than 150 mm from the ground plane. Friction, misalignment and other factors associated with the mounting of the force measuring means shall minimise error in the measurement.*

The force is measured by means of an instrument which incorporates a rigid impact plate having a diameter of (90 ± 10) mm and a spring having a spring constant of (60 ± 2) N/mm. The spring acts on a sensing element which is connected to a measuring instrument having a bandwidth limited to (150 ± 50) Hz and with an accuracy of 5 %. The sampling rate shall be at least double the bandwidth. A typical arrangement is shown in Figure 106.

The test is performed a total of five times. The maximum forces during the first 0,5 s after impact and thereafter are computed as the average of each of the five measurements.

If compliance relies on the operation of an ***electronic circuit****, the test is repeated under the following condition:*

- *the fault conditions in a) to g) of 19.11.2 applied one at a time to the* ***electronic circuit****;*

If the ***electronic circuit*** *is programmable, the software shall contain measures to control the fault/error conditions specified in Table R.1 and is evaluated in accordance with the relevant requirements of Annex R.*

Alternatively, a non-contact **sensor** may fulfil the requirements of an **obstruction sensor**, providing that it responds to a rigid non-metallic target:

– of cylindrical shape;
– of (25 ± 2) mm diameter by (145 to 150) mm height, standing on end;
– of a colour or shade that matches the background; and
– normalized to the ambient temperature.

Compliance is checked by the following test and by 20.102.2.

The machine is placed on a level test surface as described in Clause CC.3. It shall not be possible for the machine to contact the rigid non-metallic target.

*If compliance relies on the operation of an **electronic circuit**, the test is repeated under the following condition:*

- *the fault conditions in a) to g) of Clause 19.11.2 applied one at a time to the **electronic circuit**;*

*If the **electronic circuit** is programmable, the software shall contain measures to control the fault/error conditions specified in Table R.1 and is evaluated in accordance with the relevant requirements of Annex R.*

If within 10 s of the machine stopping due to contact or avoidance of an object, the **obstruction sensor**(s) has become deactivated, the drive to the **cutting means** may be restarted providing the **cutting means** start-up indication procedure in 22.110 is completed.

If after 10 s of the machine stopping due to contact or avoidance of an object, the **obstruction sensor**(s) has not become deactivated, the **traction drive** shall be deactivated. Restarting the **cutting means** and **traction drive** shall only be possible by fulfilling the requirements the restart procedure in 20.102.6.

Compliance is checked by inspection and by practical tests.

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