
Batni motorji z notranjim zgorevanjem - Ročna startna naprava - 1. del: Varnostne zahteve in preskusi (ISO/DIS 11102-1:2020)

Reciprocating internal combustion engines - Hand starting equipment - Part 1: Safety requirements and tests (ISO/DIS 11102-1:2020)

Hubkolben-Verbrennungsmotoren - Handkurbel-Starteinrichtungen - Teil 1: Sicherheitstechnische Anforderungen und Prüfung (ISO/DIS 11102-1:2020)

Moteurs alternatifs à combustion interne - Dispositifs de démarrage à la manivelle - Partie 1: Exigences de sécurité et essais (ISO/DIS 11102-1:2020)

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ICS:

27.020	Motorji z notranjim zgorevanjem	Internal combustion engines
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Reciprocating internal combustion engines — Handle starting equipment —

Part 1: Safety requirements and tests

*Moteurs alternatifs à combustion interne — Dispositifs de démarrage à la manivelle —
Partie 1: Exigences de sécurité et essais*

ICS: 27.020

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

This document was prepared by Technical Committee ISO/TC 70, Internal combustion engines.

The main changes compared to the previous edition are as follows:

[Clause 6.1](#) has been updated;

Clause 7.a) has been updated;

Clause 7.b) has been updated;

Clause 7.f) has been deleted;

Clause 7.h) has been updated;

[Clause 3.2](#) line 1 has been updated, the “interrupt” has been changed to “releases”;

[Clause 7](#) line 1 has been updated, the “his” has been changed to “their”.

A list of all parts in ISO 11102 series can be found on ISO website.

Reciprocating internal combustion engines — Handle starting equipment —

Part 1: Safety requirements and tests

1 Scope

This document specifies requirements for handle starting equipment used on reciprocating internal combustion engines for land, rail and marine use, excluding engines used to propel road vehicle and aircraft. It may be applied to engines used to propel road construction, earth moving machines and for other applications where no suitable International Standards exist.

In addition to the technical safety requirements, this document describes procedures for checking adherence to these requirements.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11102-2:1997, *Reciprocating internal combustion engines — Handle starting equipment — Part 2: Method of testing the angle of disengagement*

3 Terms and definitions

For the purposes of this document, the following definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

handle starting system

starting system using a crank handle to rotate the engine up to the required firing speed

3.2

automatic disengagement device

device which automatically releases the connection between the engine and the starting handle once the engine is running, thus preventing the handle from being turned by the engine

3.3

guide

that part of the handle starting system which guides the starting handle during starting and prevents its being thrown out after disengagement

3.4

kick back limiter

that part of the handle starting system which, when used in accordance with the instructions and when maintained correctly, prevents or limits the kick back travel to such an extent as to avoid the risk of injury

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3.5

kick back

sudden change of direction of rotation of the starting handle, caused by compression or combustion pressure of the engine during starting procedure

3.6

disengagement travel

circumferential distance which the grip of the starting handle travels from the point of its change of rotational direction to its disengagement from the starting shaft, measured at the centre of the grip

3.7

angle of disengagement

angle through which the shank of the starting handle turns from the point of change of rotational direction to its disengagement from the starting shaft

3.8

kick back travel

distance which the grip of the handle travels from the point of its change of rotational direction until it comes to the rest, measured at the centre of the grip

3.9

kick back angle

angle through which the shank of the starting handle turns from the point of its change of rotational direction until it comes to the rest

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4 Other regulations and requirements

4.1 For engines used on board ships and offshore installations which have to comply with rules of a classification society, the additional requirements of the classification society shall be observed. If this applies the name of the classification society shall be stated by the customer prior to placing the order.

For engines which do not require such classification, any additional requirements shall in each case be subject to agreement between the manufacturer, supplier and customer.

4.2 If special requirements from regulations of any other authority, e.g. inspecting and/or legislative authorities, have to be met, the authority shall be stated by the customer prior to placing the order.

4.3 Any further additional requirements shall be subject to agreement between the manufacturer, supplier and customer.

5 Technical safety requirements

5.1 Introduction

When a reciprocating internal combustion engine, which is being manually started using a starting handle, suddenly changes its direction of rotation, the handle is subject to an acceleration in the opposite direction to the start of rotation (see [figure 1](#)).

The resulting angular velocity is at a maximum at the point of disengagement. Due to its inertia, the handle will turn further until all of the kinetic energy has been dissipated in overcoming friction and the force exerted by the operator or until it comes up against a stop.

For this reason, the kick back travel and angle are larger, by an undefined amount, than the disengagement travel and angle respectively.

The main factor which leads to injury is not the force itself with which the handle kicks back but the distance during which this force can act upon the operator.

Limitation of the kick back force can therefore not be accepted as a measure to prevent accidents when correctly using a starting handle. Instead, the concern is to limit the kick back travel.

5.2 General requirements

5.2.1 The handle starting system shall be equipped with an automatic disengagement device (see 3.2). The handle shall be prevented from re-engaging when the engine is running.

5.2.2 The handle starting system shall be fitted with a guide (see 3.3) which allows the handle to be removed from the engine only when it is disengaged. This can be achieved, for example, when the handle is not being turned, or being turned only very slowly, or when turning it in the direction opposite to the starting rotation.

5.2.3 The starting handle shall be fitted with a non-removable grip which can freely rotate and shall guarantee safe operation when used properly. These requirements also apply to the use of sleeves.

5.2.4 Starting handles are to be permanently marked with the manufacturers or supplier's identification.

5.3 Requirements in the event of kick back

The angle of disengagement shall not exceed 35° and the disengagement travel shall not exceed 100 mm.

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6 Tests

6.1 Checking angle of disengagement and travel

Tests in accordance with ISO 11102-2 shall be made.

6.2 Checking of other requirements

All other requirements shall be checked by reference to the manufacturer's data and by physical tests.

These must include a visual check for functional suitability of the starting pin, the starting dog and the starting handle guide.

7 Test report

The manufacturer/importer or their agent shall supply a test report which contains at least the following:

- a) starting handle identification:
 - type;
 - manufacturer/supplier;
 - Technical specifications of the handle;
- b) engine identification:
 - type;
 - manufacturer/supplier;
 - Technical specifications of the engine;

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- c) description of the kick back limiter;
- d) angle of disengagement;
- e) disengagement travel;
- f) results of the tests according to 6.2;
- g) date on which tests were carried out;
- h) Automatic disengagement device test:
 - type;
 - manufacturer/supplier;
 - Technical specifications of the automatic disengagement device.

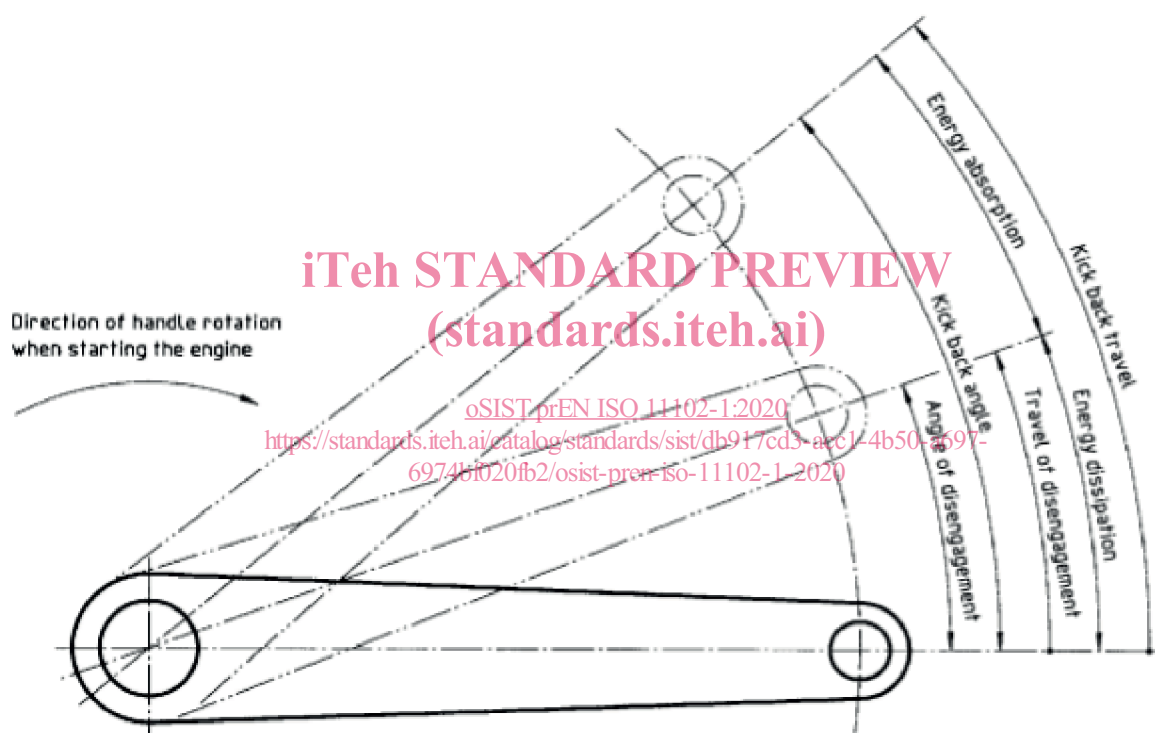


Figure 1 — Direction of rotation of handle