



# SLOVENSKI STANDARD

## SIST ISO 15077:2015

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Nadomešča:

SIST ISO 3789-1:1995

SIST ISO 3789-2:1995

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**Traktorji in stroji z lastnim pogonom za kmetijstvo - Krmilni elementi - Aktivacijske sile, deformacije, namestitvev in metoda delovanja**

Tractors and self-propelled machinery for agriculture - Operator controls - Actuating forces, displacement, location and method of operation

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Tracteurs et machines agricoles automotrices - Commandes de l'opérateur - Forces de manoeuvre, déplacements, emplacements et modes de fonctionnement

**Ta slovenski standard je istoveten z: ISO 15077:2008**

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**ICS:**

65.060.01	Kmetijski stroji in oprema na splošno	Agricultural machines and equipment in general
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**SIST ISO 15077:2015**

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**Tractors and self-propelled machinery for  
agriculture — Operator controls —  
Actuating forces, displacement, location  
and method of operation**

*Tracteurs et machines agricoles automotrices — Commandes de  
l'opérateur — Forces de manœuvre, déplacements, emplacements et  
modes de fonctionnement*

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**ISO 15077:2008(E)****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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15077 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 3, *Safety and comfort*.

This first edition of ISO 15077 cancels and replaces ISO/TS 15077:2002, of which it constitutes a technical revision.

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## Introduction

This International Standard has been developed to provide preferred methods of operation and requirements for operator controls. These provisions were derived from experience, current practice, human factors literature and existing standards. Specific operating requirements are given for controls common to many agricultural machines.

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# Tractors and self-propelled machinery for agriculture — Operator controls — Actuating forces, displacement, location and method of operation

## 1 Scope

This International Standard specifies the preferred method of operation and requirements related to operator controls actuated by hand and foot, installed in agricultural tractors and self-propelled agricultural machinery and used by a seated operator as intended and under the conditions foreseen by the manufacturer. It also gives recommendations for the maximum control actuating forces, direction of motion and location of these controls.

## 2 Normative references

The following referenced documents are indispensable for the application 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 3767-1, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 1: Common symbols*

<https://standards.iteh.ai/catalog/standards/sist/2c9cc89c-d142-4573-a011-3277c640e151/iso-3767-1-2015>

ISO 3767-2, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 2: Symbols for agricultural tractors and machinery*

ISO 11783-6 *Tractors and machinery for agriculture and forestry — Serial control and communications data network — Part 6: Virtual terminal*

## 3 Terms and definitions

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

### 3.1

#### control

device actuated by an operator to effect a response from the machine, its attachments or its implements

### 3.2

#### control actuating force

force exerted at the centre of the control contact surface, perpendicular to that surface and in the direction of its movement, to effect a control function

NOTE This force does not necessarily represent the force typically applied by the operator.

### 3.3

#### forward

direction the operator faces while seated in the operator's seat with the machine and the operator's seat in the position for forward travel as defined by the manufacturer

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**3.4**  
**minimum control strength**  
 ability of a control system to withstand a single excessive application of effort by the operator without being destroyed or having its primary function impeded

**3.5**  
**decelerator pedal**  
 control used on certain machines which, when actuated, reduces the engine speed

**3.6**  
**hand control**  
 control manipulated by the operator's hand

**3.6.1**  
**hand control with finger/wrist activation**  
 hand control manipulated by the movement of one or more fingers or the wrist, with little or no shoulder/elbow motion

**3.6.2**  
**hand control with arm activation**  
 hand control gripped by the hand and moved primarily by shoulder/elbow movement

**3.7**  
**auxiliary input unit**  
 electronic control unit (ECU) containing one or more VT operator controls for common use and facilitating the machine operation

NOTE See ISO 11783-6.

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**3.8**  
**non-critical function**  
 machine function which, when actuated, presents a minimal risk to the machine operator or bystanders

**3.9**  
**critical function**  
 machine function which, when actuated, can cause an action that could be hazardous to the machine operator or bystanders

**3.10**  
**virtual terminal operator control**  
**VT operator control**  
 element of an auxiliary input unit or of a remote key pad, or virtual terminal soft key or touch screen control meeting the requirements of ISO 11783-6 and those specified in Annex B

**3.10.1**  
**non-critical VT operator control**  
 VT operator control that is suitable only for the control of non-critical functions

**3.10.2**  
**critical VT operator control**  
 VT operator control input suitable for the control of critical functions

NOTE See Annex B.

## 4 Requirements

### 4.1 General

**4.1.1** Control functions and movements shall be identified by symbols conforming to ISO 3767-1 or ISO 3767-2 so that the operator can determine the proper control function and movement. Identification is not required for controls that have universal recognition by virtue of their shape, location, arrangements or method of actuation, such as a steering wheel, foot-operated clutch pedal, service brake or accelerator pedal.

For identification of manual controls by colour coding, see Annex C.

**4.1.2** Foot-operated controls shall be designed to minimize the risk of the foot slipping off the pedal.

### 4.2 Maximum control actuating force, direction of motion, and location

Guidelines for maximum control actuating forces and generic direction of motion for controls are given in Annex A. Minimum control actuating forces shall be sufficient to avoid inadvertent actuation by the force of a hand or foot resting on the control during anticipated operating conditions.

**NOTE** ISO 5697 and ISO 10998 specify maximum actuating forces not to be exceeded to meet the braking and steering performance requirements specified by those International Standards. Actuating forces to be applied for normal operation referred to in this International Standard are usually lower.

### 4.3 Control operation

The operation of controls, if provided on the machine, shall be in accordance with Table 1.

**NOTE** The control motion indicated in Table 1 represents the motion of several control types such as levers, rocker switches, pairs of push buttons, or sliders. For example, if a pair of buttons or a rocker switch are used to raise and lower the three-point hitch, the interpretation of Table 1, section 8.1.7 would be to use the button in the upper or rearward position to raise the hitch and the button in the lower or forward position to lower the hitch.

**Table 1 — Control operation**

No.	Control	Control operation and requirements
1	<b>Engine</b>	
1.1	<b>Starting/stopping engine</b>	Provision shall be made to prevent the engine starter from engaging unless <ol style="list-style-type: none"> <li>a) the traction transmission(s) is (are) in the neutral or parked position or the traction clutch is disengaged,</li> <li>b) the master implement clutch/PTO clutch is disengaged.</li> </ol>
1.1.1	Starting engine (rotational switch)	The control shall be rotated clockwise to operate engine starter.
1.1.2	Engine preheater circuit (rotational switch)	If an engine preheater circuit is provided, this control shall occur before or at the starting position. It may be activated by rotating the control anticlockwise (counter-clockwise) or pushing inwards on the control.
1.1.3	Stopping engine (rotational switch)	The control shall be rotated anticlockwise (counter-clockwise) to the stop position.
1.1.4	Stopping engine (mechanical control)	When the stop control is actuated, controls such as levers or buttons shall automatically remain in the stop position without the application of sustained manual effort. Direction of motion shall be pull to stop. The control shall be located within 150 mm of the engine start control. If the stop control is combined with the speed control, it shall be in the direction of and beyond the low idle position.
1.2	<b>Engine speed</b>	
1.2.1	Foot-operated	The control shall be readily accessible to the operator's right foot. The pedal shall be pushed forward and/or downward to increase engine speed.