ASABE/ISO 15077:2008 OCT2008 (R2018)
Tractors and self-propelled machinery for agriculture — Operator controls — Actuating forces, displacement, location and method of operation

American Society of Agricultural and Biological Engineers

STANDARD

ASABE is a professional and technical organization, of members worldwide, who are dedicated to advancement of engineering applicable to agricultural, food, and biological systems. ASABE Standards are consensus documents developed and adopted by the American Society of Agricultural and Biological Engineers to meet standardization needs within the scope of the Society; principally agricultural field equipment, farmstead equipment, structures, soil and water resource management, turf and landscape equipment, forest engineering, food and process engineering, electric power applications, plant and animal environment, and waste management.

NOTE: ASABE Standards, Engineering Practices, and Data are informational and advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. The ASABE assumes no responsibility for results attributable to the application of ASABE Standards, Engineering Practices, and Data. Conformity does not ensure compliance with applicable ordinances, laws and regulations. Prospective users are responsible for protecting themselves against liability for infringement of patents.

ASABE Standards, Engineering Practices, and Data initially approved prior to the society name change in July of 2005 are designated as “ASAE”, regardless of the revision approval date. Newly developed Standards, Engineering Practices and Data approved after July of 2005 are designated as “ASABE”.

Standards designated as “ANSI” are American National Standards as are all ISO adoptions published by ASABE. Adoption as an American National Standard requires verification by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by ASABE.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution.

CAUTION NOTICE: ASABE and ANSI standards may be revised or withdrawn at any time. Additionally, procedures of ASABE require that action be taken periodically to reaffirm, revise, or withdraw each standard.

Copyright American Society of Agricultural and Biological Engineers. All rights reserved.

ASABE, 2950 Niles Road, St. Joseph, MI 49085-9659, USA, phone 269-429-0300, fax 269-429-3852, hq@asabe.org

Documents
Document Sharing Hub

Full document details: ASABE ISO 15077-2008 (2018)

ASABE/ISO 15077:2008 OCT2008 (R2018)
Approved May 2009; Reaffirmed December 2018 as an American National Standard

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

These materials are subject to copyright claims of ISO and ASABE. No part of this publication may be reproduced in any form, including an electronic retrieval system, without the prior written permission of ASABE. All requests pertaining to the ASABE/ISO 15077:2008 Standard should be submitted to ASABE.

This standard was reviewed and approved by the ASABE Ergonomics, Safety and Health Internal Standards Development subcommittee. Replaces ASAE S335.4, Operator Controls on Agricultural Equipment and ASAE EP443.1, Color Coding Hand Controls. Adopted by ASABE October 2008; approved as an American National Standard May 2009; reaffirmed by ASABE December 2013; reaffirmed by ANSI January 2014; reaffirmed by ASABE October 2018; reaffirmed by ANSI December 2018.

Keywords: Controls

0 Foreword

0.1 ASABE/ISO 15077:2008, Tractors and self-propelled machinery for agriculture—Operator controls—actuating forces, displacement, location and method of operation, is an adoption without modification of the identically titled ISO standard, ISO 15077:2008. This ISO standard is a derivative of ASAE Standards S335, Operator Controls on Agricultural Equipment, and EP443, Color Coding Hand Controls.

0.2 ASABE/ISO 15077:2008 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.

0.3 Three normative references are listed in ISO 15077:2008. These references have been reviewed and accepted as part of the adoption of ASABE/ISO 15077:2008.

0.4 This standard had been approved as an American National standard by ANSI (American National Standards Institute).

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.

Documents
Document Sharing Hub
Full document details: ASABE ISO 15077-2008 (2018)

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*

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

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

Documents
Document Sharing Hub
Full document details: ASABE ISO 15077-2008 (2018)

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.

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.

Documents
Document Sharing Hub
Full document details: ASABE ISO 15077-2008 (2018)

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, 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	**Engine**	
1.1	Starting/stopping engine	Provision shall be made to prevent the engine starter from engaging unless a) the traction transmission(s) is (are) in the neutral or parked position or the traction clutch is disengaged, b) the master implement clutch/PTO clutch is disengaged.
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	**Engine speed**	
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.
1.2.2	Hand-operated variable speed	The control shall be positioned in front of, or to the right of, the operator. Direction of motion shall be in a plane generally parallel to the longitudinal axis of the vehicle. The control shall be moved away from the operator (generally forward) to increase engine speed.
1.2.3	Hand-operated discrete settings	The control shall be positioned in front of, or to the right of, the operator. The actuation of the part of the control which is generally away from the operator shall select higher speed settings.
1.2.4	Decelerator pedal	If provided, the control shall be positioned in front of, or to the right of, the operator and be readily accessible to the operator's right foot. The direction of motion shall be forward and/or downward to decrease engine speed. A foot-operated engine speed control as described in 1.2.1 shall not be provided.

Documents Document Sharing Hub
Full document details: ASABE ISO 15077-2008 (2018)