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International Standard



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**Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Location and method of operation of operator controls —  
Part 3 : Controls for powered lawn and garden equipment**

*Tracteurs, matériels agricoles et forestiers, matériel à moteur pour jardins et pelouses — Emplacement et mode de fonctionnement des commandes de l'opérateur — Partie 3 : Commandes pour matériel à moteur pour jardins et pelouses*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3789/3 was developed by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, and was circulated to the member bodies in March 1981.

It has been approved by the member bodies of the following countries:

Australia	India	Romania
Austria	Iran	South Africa, Rep. of
Belgium	Iraq	Spain
Canada	Italy	Sweden
China	Korea, Dem. P. Rep. of	Switzerland
Czechoslovakia	Korea, Rep. of	Turkey
Denmark	Mexico	United Kingdom
Egypt, Arab Rep. of	New Zealand	USA
France	Poland	USSR
Germany, F.R.	Portugal	

The member body of the following country expressed disapproval of the document on technical grounds:

Finland

International Standards ISO 3789, Parts 1 to 4 cancel and replace International Standard ISO 3789-1976, of which they constitute a technical revision.

# Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Location and method of operation of operator controls —

## Part 3 : Controls for powered lawn and garden equipment

### 0 Introduction

This document forms part of a series dealing with operator controls, location and method of operation.

Other parts in the series will be as follows :

Part 1 : Common controls.

Part 2 : Controls for agricultural tractors and machines.

Part 4 : Controls for forestry machines.

### 1 Scope and field of application

This part of ISO 3789 specifies the type, location and method of operation (including direction of motion) of the operator controls for powered rotary mowers, including ride-on (riding) types, ride-on (riding) lawn tractors, and lawn and garden tractors with mower attachments, designed primarily for use at and around the home, and having a width of cut greater than 300 mm.

The operator controls location and method of operation specified in this part of ISO 3789 are supplementary to the requirements established in ISO 3789/1.

The operator controls are divided into two categories :

- a) ride-on (riding) machines ;
- b) pedestrian-operated machines.

The controls included in this International Standard are those which are located at the operator's normal working position and readily accessible and convenient to the operator.

The common operator controls given in ISO 3789/1 and the operator controls given in this part of ISO 3789 are not required

on all machines, but when provided on a machine, they shall conform to the requirements specified herein and in ISO 3789/1.

### 2 References

ISO 3767, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays —*

Part 1 : *Common symbols.*

Part 2 : *Symbols for agricultural tractors and machinery.*

Part 3 : *Symbols for powered lawn and garden equipment.*<sup>1)</sup>

ISO 3789, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Location and method of operation of operator controls —*

Part 1 : *Common controls.*

Part 2 : *Controls for agricultural tractors and machinery.*

Part 4 : *Controls for forestry machines.*<sup>2)</sup>

### 3 General

The movement of the control, in appropriate circumstances, shall be clearly indicated (see ISO 3767/1 and ISO 3767/3).

### 4 Type, location and operation of controls

The type, location and method of operation of the operator controls are laid down in table 1 for ride-on (riding) machines and in table 2 for pedestrian-operated machines.

1) At present at the stage of draft. (Revision of ISO 3767-1979.)

2) At present at the stage of draft. (Revision of ISO 3789-1976.)

Table 1 — Ride-on (riding) machines

No.	Control	Location	Operation
1	<b>Engine</b>		
1.1	<b>Starting</b>		<p>It shall be impossible for the engine to be started unless :</p> <p>a) the traction transmission is in neutral or disengaged, and the attachment drive is in neutral or disengaged, or</p> <p>b) the traction clutch is disengaged and the attachment drive is in neutral or disengaged, or</p> <p>c) the operator is in the operator's seat (station).</p> <p>NOTE — The above method of operation shall apply to machines with electric and manual start and be optional on manual start only machines. For manual start machines, a durable warning label shall be provided.</p>
1.2	<b>Speed</b>		
1.2.1	Foot-operated	Shall be readily accessible to the operator's right foot.	Push pedal forward and/or downward to increase engine speed.
1.2.2	Hand-operated	See ISO 3789/1 sub-clause 1.2.2.	
1.3	<b>Stop</b>		
1.3.1	Battery powered engine starting units	Easily accessible from the operator's seat.	A control with a removable component to prevent unauthorized use of the unit.
1.3.2	Manual start	Easily accessible from the operator's seat.	A means that does not depend on sustained manual pressure.
2	<b>Steering</b>	Forward of the operator.	<p>When a steering wheel control is provided, a clockwise rotation shall effect a right turn, and a counterclockwise motion shall effect a left turn.</p> <p>A ride-on mower shall not have a steering control mechanism which requires lateral motion of a handle or a lever in a direction opposite to the direction of turn in such a manner as to cause the operator to move in a direction resulting in decreased vehicle stability during a turn on a slope.</p> <p>Steering control mechanisms should not have sharp protrusions.</p>
3	<b>Brakes</b>	See ISO 3789/1, sub-clause 3.1.1.	
3.1	<b>Service</b>		
3.1.1	Foot-operated <sup>1)</sup>		When separate brake pedals are provided for the independent right-hand and left-hand brake control, means shall be provided to lock the pedals together.

1) Except when combined with a clutch (see 4.2.1).

Table 1 — (continued)

No.	Control	Location	Operation
3.2	<b>Parking</b>		<p>An automatically operated parking brake, when provided, shall be activated when the deadman's control is released.</p> <p>NOTE — The parking brake may be in combination with the service brake.</p>
3.2.1	Hand-operated	Convenient to the operator.	Direction of motion shall be rearward or upward to engage.
3.2.2	Foot-operated	Convenient to the operator.	Depress brake pedal downward or forward to engage.
4	<b>Clutch</b>		
4.1	<b>Traction clutch or neutral return (or both)</b>		
4.1.1	Foot-operated <sup>1)</sup>	Convenient to the operator's left foot.	Push pedal forward and/or downward for disengagement, except for deadman's control.
4.1.2	Hand-operated	Within convenient reach of the operator.	The direction of motion shall be generally rearward or toward the operator for disengagement, except for deadman's control. It shall be overridden by the service brake.
4.1.3	Deadman's control Foot-operated Seat-activated	When provided, a right-foot deadman's control shall be the outboard of the service brake pedal.	Drive engagement shall be produced by a forward or downward motion. It shall be overridden by the service brake.  When provided, shall be overridden by the service brake.
4.2	<b>Traction clutch or neutral return and brake combined</b>		
4.2.1	Foot-operated (either foot) combination vehicle clutch or neutral return, or both, and brake control		When the control is used, the direction of activation shall be forward, or downward, or both, to cause traction disengagement and brake engagement. Provision shall be made to retain control of the machine during the transition zone of brake disengagement to tractive engagement.

1) Except when combined with a brake (see 4.2.1).

Table 1 (continued)

No.	Control	Location	Operation
4.3	<b>Combination ground speed and direction</b> (continuously variable combined control)		
4.3.1	Foot-operated — one control	See ISO 3789/1, sub-clause 4.2.1.	
4.3.1.1	Foot-operated — two pedal	Convenient to the operator's right foot.	Forward and/or downward motion on the outer pedal shall cause forward motion and increasing forward speed. Forward and/or downward motion on the inner pedal shall cause rearward motion, and increasing rearward speed.
4.3.1.2	Foot-operated — two pedal	Convenient to the operator's feet.	Forward and/or downward motion on the right pedal shall cause forward motion and increasing forward speed. Forward and/or downward motion on the left pedal shall cause rearward motion, and increasing rearward speed.  On both types of the two pedal controls where the control can pass directly from forward to reverse through the neutral position, a "neutral" location shall be provided. For driving on roadways, provision shall be made for a secondary motion to prevent accidental movement of the control.
4.3.2	Hand-operated	See ISO 3789/1, sub-clause 4.2.2.	For interlocks, see sub-clause 1.1 of this table.
4.4	<b>Gear selection</b>		
4.4.1	In-line operation (hand-operated)	See ISO 3789/1, sub-clause 4.3.1.	
4.4.2	Non-in-line operation (hand-operated)	See ISO 3789/1, sub-clause 4.3.2.	
4.5	<b>Direction control</b> (forward-reverse non-variable speed) Hand-operated	See ISO 3789/1, sub-clause 4.4	
4.6	<b>Machine attachments</b>		
4.6.1	Mower attachment clutch (Hand-operated)	Convenient to the operator.	The direction for engagement shall be generally forward and/or upward. For disengagement, the direction shall be generally rearward and/or downward. Engagement and/or disengagement of the blade(s) shall be independent from the traction.  The direction of engagement and disengagement shall be clearly identified with a durable label.
4.6.2	Mower drive clutch	A mower drive clutch disconnect shall be provided between the engine (motor) and the blade(s). For blades directly attached to an electric motor(s), this disconnect shall be between the motor and the power source (battery).	

Table 1 (concluded)

No.	Control	Location	Operation
5	Power take off (PTO) attachment drive(s)	See ISO 3789/1, sub-clause 6.1.2.	
6	Attachments		
6.1	Lift		
6.1.1	Foot-operated	Convenient to the operator and activated from the operator's station.	The direction of motion of the forward part of the control shall be downward to lower and upward to raise. The direction of activation shall be clearly identified with a durable label.
6.1.2	Hand-operated	Convenient to the operator and activated from the operator's station.	The direction of motion shall be generally forward or downward to lower, and rearward or upward to raise the attachments. The direction of activation shall be clearly identified with a durable label.
6.1.3	Power-operated (battery) or (accumulator)	Convenient to the operator.	The lift device shall be rendered inoperative by the removal of a key or by some similar device.

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Table 2 — Pedestrian-operated machines

No.	Control	Location	Operation
1	<b>Engine</b>		
1.1	<b>Starting</b>		
1.1.1	Start switch (battery powered) (battery start engine)	Situated so that it can only be operated from the normal operation position.	Requires manual and intentional actuation.
1.1.2	Start — manual means		Requires manual and intentional actuation.
1.2	<b>Speed</b>		
1.2.1	Handle mounted control (where provided)		The direction of motion of the control shall be in a plane parallel to the longitudinal axis of travel of the vehicle. The direction of motion shall be forward to increase engine speed.
1.3	<b>Stop</b>		
1.3.1	Battery powered engine starting units	Control to be forward and within easy reach of the operator in the operator's position.	A control with a removable component to prevent unauthorized use of the unit.
1.3.2	Manual		Move control to stop position. Control shall remain in the stop position without the application of sustained manual effort.
2	<b>Traction drive</b>		
2.1	<b>Clutch</b>		
2.1.1	Handle mounted control	Convenient to the operator.	For disengagement, the control shall move opposite to the direction of travel. For the normally off control, the control shall move forward.
2.2	Reverse	Convenient to the operator.	When a reverse gear is fitted, it should only engage as a result of the operator applying sustained manual pressure to a control.

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