INTERNATIONAL STANDARD 3789

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Agricultural tractors and machines — Operator's controls — Location and method of operation

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FOREWORD

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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.

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It has been approved by the Member Bodies of the following countries :

Australia	Finland	Romania
Austria	Germany	South Africa, Rep. of
Belgium	Hungary	Spain
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The Member Body of the following country expressed disapproval of the document on technical grounds :

France

Printed in Switzerland

Agricultural tractors and machines — Operator's controls — Location and method of operation

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the type, location and method of operation (including direction of motion) of the operator's controls for agricultural tractors and machines.

This International Standard applies to the following agricultural equipment : agricultural tractors, self-propelled machines, implements, combinations of tractors, implements and self-propelled machines, and pedestrian-operated machines designed primarily for use in agricultural operations.

NOTES

1 For the purposes of this International Standard, "agricultural" covers horticultural and forestry tractors and machines.

2 The controls included in this International Standard are those which are located at the operator's normal working position, and all controls shall meet the requirements of this International Standard when provided on the machine.

2 REFERENCE

ISO 3767, *Agricultural tractors and machines — Operator's controls symbols.*[1)]

3 DEFINITIONS

3.1 agricultural tractor : A self-propelled wheeled, track-laying or semi track-laying machine (but excluding any machine in 3.2 or 3.3), primarily designed to pull, push, carry and/or operate trailers, implements and machines used for agricultural work. It may be provided with a loading platform.

3.2 self-propelled machine : A machine, having one or more internal power units which propel and operate the machine, designed to carry out agricultural operations while on the move (but excluding any machine in 3.1 or 3.3).

3.3 pedestrian-operated machine : A machine as defined in 3.1 or 3.2 but normally operated by a pedestrian, and which may also be operated from a seat on an attachment or trailer.

3.4 towed, semi-mounted and mounted equipment : Implements or equipment used in conjunction with agricultural tractors or self-propelled machines.

3.5 right-hand, left-hand and forward : Designations related to the operator when sitting in the operating position.

NOTE — The definitions in 3.1 to 3.5 are presented for information and will be reviewed later.

4 GENERAL

The movement of the control in appropriate circumstances shall be clearly indicated. See ISO 3767.

5 TYPE, LOCATION AND OPERATION OF CONTROLS

The type, location and method of operation of the operator's controls are laid down in table 1 for agricultural tractors and self-propelled machines, and in table 2 for pedestrian-operated machines.

1) At present at the stage of draft.

TABLE 1 – **Agricultural tractors and self-propelled machines**

No.	Control	Location	Operation
1	**ENGINE**		
1.1	**Starting**		It shall be impossible for the engine to be started unless : 1) the traction transmission(s) is (are) in the neutral or park position or 2) the traction clutch is disengaged or 3) the operator is in the operator's seat (station)
1.1.1	Ignition switch (If separate from starter switch)	Easily accessible from the operator's seat.	Move control to "on" position.
1.1.2	Starter switch (If separate from ignition switch)	Easily accessible from the operator's seat.	Move control to start position.
1.1.3	Starter/ignition switch (spark ignition)	Easily accessible from the operator's seat.	Rotate switch in a clockwise direction to positive ignition position. Any auxiliary positions provided shall be located between the "off" and ignition positions.
1.1.4	Starter switch (compression ignition)	Easily accessible from the operator's seat.	Move control to start position. If a rotational switch is provided, rotate clockwise to operate engine starter. If an engine preheater circuit is provided, this control shall occur before the starter position or may be activated by rotating the control counter-clockwise.
1.2	**Speed**		
1.2.1	Foot-operated	Shall be readily accessible to the operator's right foot and preferably to the right of the brake pedal(s).	Push pedal forward and/or downward to increase engine speed.
1.2.2	Hand-operated	Within easy reach and preferably in front of, or to the right side of, the operator.	The recommended direction of motion of the control is in a plane generally parallel to the longitudinal axis of the propelling vehicle. The direction of motion shall be away from the operator (generally forward or upward) to increase engine speed.
1.3	**Stop**		
1.3.1	Spark ignition	Easily accessible from the operator's seat.	Rotate starter ignition switch counter-clockwise to "off" (open circuit) position.
1.3.2	Compression ignition	Easily accessible from the operator's seat. Colour of the control or the position "stop" shall contrast with background and any other control.	Move control to stop position. Control shall automatically remain in the stop position without the application of sustained manual effort.

TABLE 1 *(continued)*

No.	Control	Location	Operation
2	**STEERING**	Forward of the operator.	When a steering wheel control is provided, a clockwise rotation shall effect a right turn, and a counter-clockwise rotation shall effect a left turn. When two levers are provided for steering, to achieve a right turn the right-hand lever shall move rearward; to achieve a left turn the left-hand lever shall move rearward. When one lever is provided for steering, a lateral motion of the lever to the right shall effect a right turn and a lateral motion to the left shall effect a left turn.
3	**BRAKES**		
3.1	**Service**		
3.1.1	Foot-operated	The brake pedal(s) shall be located convenient to the operator's right foot.	The direction of motion shall be generally forward and/or downward for engagement. Where separate brake pedals are provided on wheeled tractors for the independent right-hand and left-hand brake control, it shall be possible to obtain combined control such that there is no undue deviation from a straight path of travel.
3.1.2	Hand-operated	Convenient to the operator.	Pull motion to apply is preferred. Where means are provided for independent right and left hand operation, it shall be possible to obtain combined control such that there is no undue deviation from a straight path of travel.
3.2	**Parking**		
3.2.1	Hand-operated	Convenient to the operator.	Pull motion to apply is preferred. A device shall be provided to retain brake(s) in the applied position. The device shall not be liable to accidental release.
3.2.2	Foot-operated		Depress brake pedal and lock in position.
3.3	**Braking of trailers or towed equipment**		
3.3.1	Foot-operated	Combined with the pedal(s) of service brake.	
3.3.2	Hand-operated	Separate right-hand lever.	Pull motion to apply.
4	**TRANSMISSION**		
4.1	**Clutch** (includes combined transmission and P.T.O.) See also P.T.O. control		
4.1.1	Foot-operated	Convenient to the operator's left foot.	Push pedal forward or downward for disengagement.

TABLE 1 *(continued)*

No.	Control	Location	Operation
4.1.2	Hand-operated	Within convenient reach of the operator.	Move rearward for disengagement. Positive means shall be provided for holding the clutch control in the disengaged position so that it is incapable of being re-engaged unless manually operated. It is recommended that the clutch be operable only from the operator's seat.
4.2	**Combination ground speed and direction** (continuously variable combined control)		
4.2.1	Foot-operated	Convenient to the operator's right foot.	The control shall have the effect of a pedal being pivoted under the operator's foot and shall remain at rest in the neutral position. Forward and/or downward motion of the front of the pedal shall cause forward motion and increasing forward speed; downward motion of the rear of the pedal shall cause reverse motion and increasing reverse speed. Where the control can pass directly from forward to reverse through the neutral position, provision shall be made for a secondary motion. A positive "neutral" location shall be provided.
4.2.2	Hand-operated	Convenient to the operator.	Move control from neutral position forwards and/or upwards for forward motion and increasing forward speed; rearwards and/or downwards for reverse motion and increasing reverse speed. Where the selection control can pass directly from forward to reverse through the neutral position, provision shall be made for a secondary motion. A positive "neutral" location shall be provided.
4.3	**Gear selection**		
4.3.1	In-line operation (hand-operated)	Convenient to the operator.	From neutral position, move control progressively in an upward and/or forward direction to select gears giving increased forward speeds. From neutral position, move control progressively in a rearward and/or downward direction to select reverse gears giving increased reverse speeds. Where the selection control can pass directly from forward to reverse through the neutral position, a separate positive "neutral" location shall be provided. Provision shall be made for secondary motion when passing through neutral so as to prevent accidental movement of the control.
4.3.2	Non-in-line operation (hand-operated)	Convenient to the operator.	Shifting pattern shall be simple and clearly marked. In particular the neutral position shall be clearly identified and easy to select.

TABLE 1 *(continued)*

No.	Control	Location	Operation
4.4	**Direction control** (forward-reverse non-variable speed) Hand-operated	Convenient to the operator.	Move control generally forward for forward vehicle motion and move generally rearward for rearward vehicle motion. If a neutral position is provided, provision shall be made to prevent accidental movement of the control from neutral.
4.5	**Master implement, header or gathering unit clutch** Self-propelled machines		
4.5.1	Hand-operated	Convenient to the operator.	Movement shall be generally rearward and/or downward for disengagement. Positive means shall be provided for holding the clutch control in the disengaged position so that it is incapable of being re-engaged unless manually operated. The clutch shall be operable only from the operator's seat.
4.5.2	Foot-operated	Preferably convenient to the operator's left foot.	Push pedal forward or downward for disengagement.
5	**DIFFERENTIAL LOCK**	Preferably convenient to the operator's right foot or hand.	Move forward or downward for engagement. There shall be clear indication when differential lock is engaged.
6	**POWER TAKE-OFF**		
6.1	**Clutch**		
6.1.1	Foot-operated	Convenient to the operator's left foot.	Push pedal forward and/or downward for disengagement. In the case of a combined traction-drive/P.T.O. clutch the P.T.O. disengagement shall be the second stage.
6.1.2	Hand-operated	Convenient to the operator.	Move control downward and/or rearward to disengage. Control should be operable only with the operator in the operator's station.
6.2	**P.T.O. shaft engagement**	Convenient to the operator.	The disengaged position shall be clearly marked, and visible from the operator's seat. Controls should be operable only with the operator in the operator's station.
7	**IMPLEMENTS AND AUXILIARIES**		
7.1	**Lift mechanism**		It shall be possible to lock the control lever(s) or mechanism in position during road transport and servicing, or adjusting of implements in the raised position, unless other means are provided.
7.1.1	Hand-operated	Convenient to the operator's right hand.	Move levers upward and/or rearward to raise; downward and/or forward to lower.

TABLE 1 *(concluded)*

No.	Control	Location	Operation
7.1.2	Foot-operated	Convenient to the operator's right foot.	Downward movement of the forward part of the pedal to lower and downward movement of the rear part to raise.
7.2	**Services selector(s)**		Clearly marked to identify function in each position.
7.2.1	Hydraulic	Optional, but readily visible from the operator's normal position.	
7.2.2	Electric	Optional.	

TABLE 2 – **Pedestrian-operated machines**

No.	Control	Location	Operation
1	**ENGINE**		
1.1	**Starting**		It shall be impossible for the engine to be started unless : 1) the traction transmission is in neutral or park position, or 2) the traction clutch is disengaged.
1.1.1	Starter/ignition switch (spark ignition)	Situated so that it can only be operated from the normal operation position.	Rotate switch in a clockwise direction to positive ignition position.
1.1.2	Starter switch (compression ignition)	Situated so that it can only be operated from the normal operating position.	Move control to start position. If a rotational switch is provided, rotate clockwise to operate engine starter. This start position shall always be the final position. If an engine preheater circuit is provided, this shall occur immediately before the starter position.
1.1.3	Recoil type	Recoil starter handle should be so located that it cannot be operated from the front of the machine.	Pull grip.
1.1.4	Inertia type	Should not be operable from the front of the machine.	Wind handle and release control. It shall be impossible to release the inertia mechanism unless : 1) the traction transmission is in neutral or park position, or 2) the traction clutch is disengaged.
1.2	**Speed**		
1.2.1	Hand accelerator		
1.2.1.1	Lever	Accessible to the operator's right hand and when at normal operating position.	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 and/or upward to increase engine speed.
1.2.1.2	Turning handle	Accessible to the operator's right hand.	Counter-clockwise to accelerate.
1.3	**Stop**		
1.3.1	Spark ignition	Control to be forward and within easy reach of the operator in the operator's position. Colour of the control to contrast with background and any other control.	Rotate starter ignition switch counter-clockwise to "off" (open circuit) position. With pull switch, pull out; with stop button, press button.
1.3.2	Compression ignition		Move control to stop position. Control shall remain in the stop position without the application of sustained manual effort.