
INTERNATIONAL STANDARD



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Agricultural wheeled tractors — Three-point linkage — Part 1 : Categories 1, 2 and 3

*Tracteurs agricoles à roues — Attelage trois points —
Partie 1 : Catégories 1, 2 et 3*

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Agricultural wheeled tractors — Three-point linkage — Part I : Categories 1, 2 and 3

1 SCOPE

This International Standard specifies the requirements for the attachment of implements or equipment to the rear of agricultural wheeled tractors by means of a three-link hitch in association with a power lift.

2 FIELD OF APPLICATION

This International Standard applies to the three categories of agricultural wheeled tractors shown in table 1.

TABLE 1 — Categories

Category	Maximum power at the drawbar*, kW
1	up to 35
2	30 to 75
3	above 70

* As given in 3.2.6.5 a) (1) of ISO/R 789.

NOTE — Category 1 N : see ISO 730/II.¹⁾
Category 4 : see ISO 730/III.¹⁾

3 REFERENCE

ISO/R 789, *Test code for agricultural tractors*.

4 DEFINITIONS

4.1 General

4.1.1 linkage : A combination of one upper link and two lower links, each articulated to the tractor and the implement at opposite ends, in order to connect the implement to the tractor.

4.1.2 hitch point : An articulated connection between a link and the tractor; for geometrical purposes the link point hitch point is the centre of the articulated connection between a link and the implement.

4.1.3 link point : An articulated connection between a link and the tractor; for geometrical purposes the link point is the centre of the articulated connection between a link and the tractor.

1) In preparation.

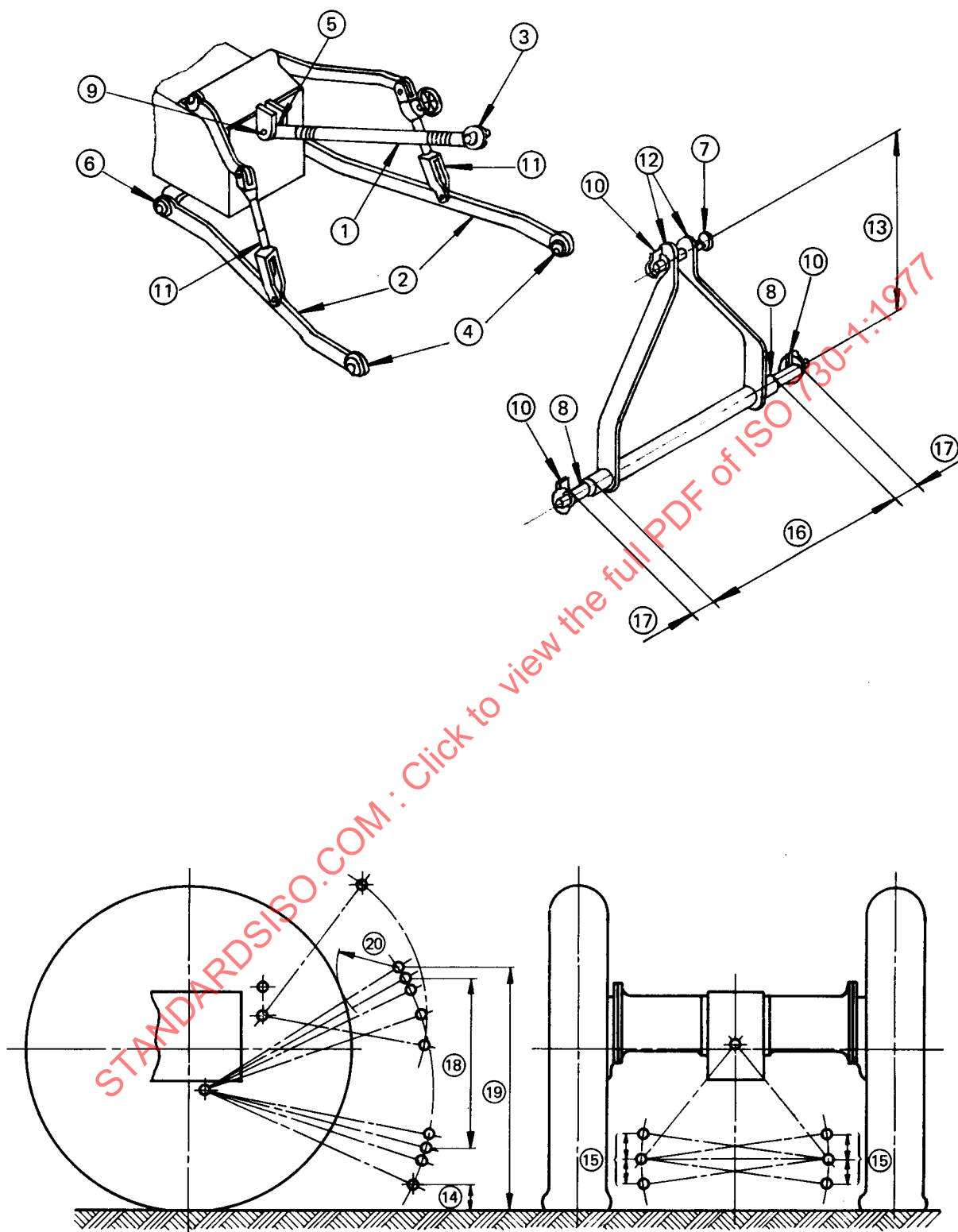


FIGURE 1 — Components and dimensional characteristics of three-point linkage
(See 4.2 and 4.3)

4.2 Components of the linkage

The numbers given below relate to figure 1.

- 1 upper link } : Elements of the linkage, each fitted
2 low link } with an articulated connection at both
ends.

3 upper hitch point : An articulated connection between the upper link and the implement.

4 lower hitch point : An articulated connection between a lower link and the implement.

5 upper link point : An articulated connection between the upper link and the tractor.

6 lower link point : An articulated connection between a lower link and the tractor.

7 upper hitch pin : A pin, usually detachable and forming part of the upper link assembly, by which the upper link is connected to the implement.

8 lower hitch pin : A pin, usually attached rigidly to the implement, on which a lower link is secured.

9 upper link pin : A pin by which the upper link is connected to the tractor.

10 linch pin : A pin, usually fitted with a spring retaining device, by which an articulated connection is retained in position.

11 lift rods : Connections that transmit force to the lower links for raising and lowering.

12 mast : The component that provides location of the upper hitch point on the implement.

4.3 Dimensional characteristics of linkage

The numbers given below (except 21) relate to figure 1.

13 mast height : The vertical distance between the upper hitch point and the common axis of the lower hitch points.

14 lower hitch points height : The height of the centre of the lower hitch points above ground level when they are in the fully lowered position.

15 levelling adjustment range : The movement, measured vertically, of one lower hitch point higher or lower than the other, to provide an inclination of the implement.

16 lower hitch point span : The distance between the shoulders of the lower hitch pins against which the sides of the lower link ball joints abut.

17 linch pin hole distance : The distance from the centre line of the linch pin hole to the shoulder of the pitch pin.

18 power range : The total vertical movement of the lower hitch points corresponding to the power travel of the lift, excluding any adjustment in the linkage or lift rods.

19 transport height : The height of the lower hitch points above the ground utilizing the full extent of manual adjustment provided in the lift rods in conjunction with the power range, the lower hitch point axis being maintained horizontal to the ground in a transverse plane.

20 lower hitch point clearance : The clearance expressed as a radial dimension from a lower hitch point to the outside diameter of the tyre, mudguard or other part of the tractor, measured in a longitudinal vertical plane with the implement in the raised position and all side sway removed from the links.

implement to tractor clearance : The horizontal dimension, in the area between the two lower links between the rear-most parts of the tractor and the horizontal line through the two lower hitch points, throughout the range of vertical movement of the hitch points.

21 mast adjustment¹⁾ : The usable range of movement of the mast in a vertical plane. It is measured as the maximum and minimum heights of the lower hitch points above the ground between which a mast of height 460 mm in case of category 1, 510 mm in case of category 2 and 560 mm in case of category 3 can be adjusted to any inclination between the vertical and 10° to the vertical towards the rear.

1) Adjustment of the mast controls the pitch of the implement. Specifying the mast adjustment to be provided enables the tractor designer to determine the minimum acceptable adjustment of the length of the top link in relation to the points of attachment of the linkage; it also permits the implement designer to determine the range of operating depths of the implement over which pitch adjustment can be obtained.

5 DIMENSIONS¹⁾

5.1 Hitch points and zone around the hitch points

The dimensions concerning the hitch point shall be as given in table 3 and those concerning the zone around the hitch points shall be as given in table 2.

NOTE — The dimensions *A* to *K* and *S* given for category 2 are recommended also for future developments and designs of category 1 tractors.

5.2 Lift, power lift, and levelling adjustments

The ranges of lift, power lift and levelling adjustments shall be as given in table 4.

NOTES

1 In order to assist in adapting implements or other pieces of mounted equipment for use with different sizes of tractor in the most convenient way, alternative dimensions for the lower hitch point span are given.

2 Provision may be made in the design of the lower links, or by the use of double-ended hitch points, to enable designs based on the dimensions of category 1 to be fitted to designs made in accordance with category 2 or vice versa.

5.3 Other dimensions concerning the zone around the hitch points

Dimensions *S* and *T* in table 2 shall be as given in figure 4.

6 POWER LIFT CAPACITY

For tractors with low and medium performance, up to 65 kW drawbar power, a minimum lift force of 300 N for each drawbar power unit (kW) shall be available at a distance of 610 mm to the rear of the hitch points.

For tractors with high performance, above 65 kW drawbar power, a minimum lift force of 20 000 N and an additional 150 N for each drawbar power unit (kW) above 65 kW drawbar power of the tractor shall be available at a distance of 610 mm to the rear of the hitch points.

NOTE — The above mentioned values relate to 90 % of the hydraulic relief valve pressure setting and the recommended mast height, and should be available through the full power range.

When determining the lift force, a minimum angle of 10° between the vertical and the mast shall be observed; see figure 2.

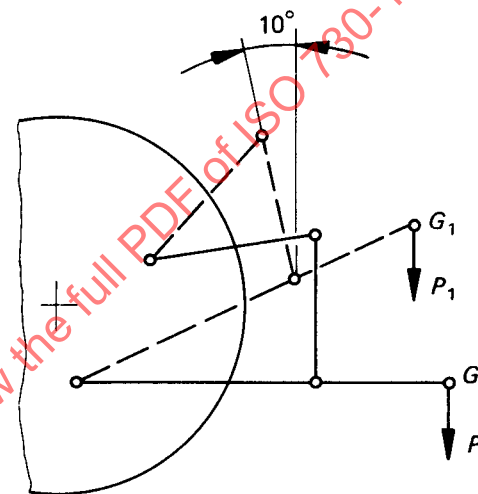


FIGURE 2 — Minimum angle between the vertical and the mast

1) Dimensions are based on the assumption that the tractor manufacturer's normal wheel equipment is fitted.

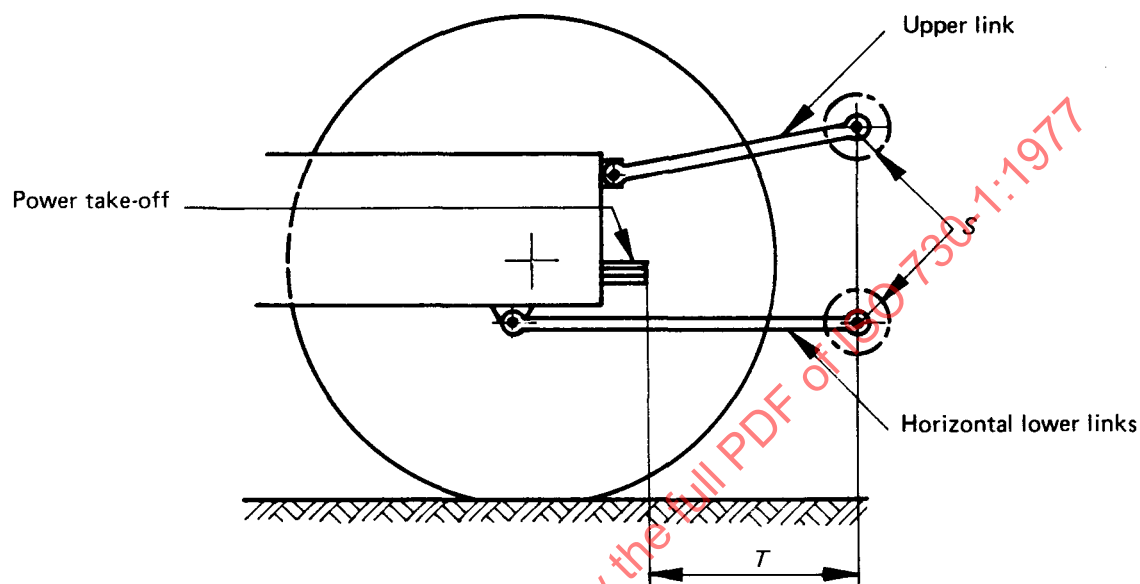
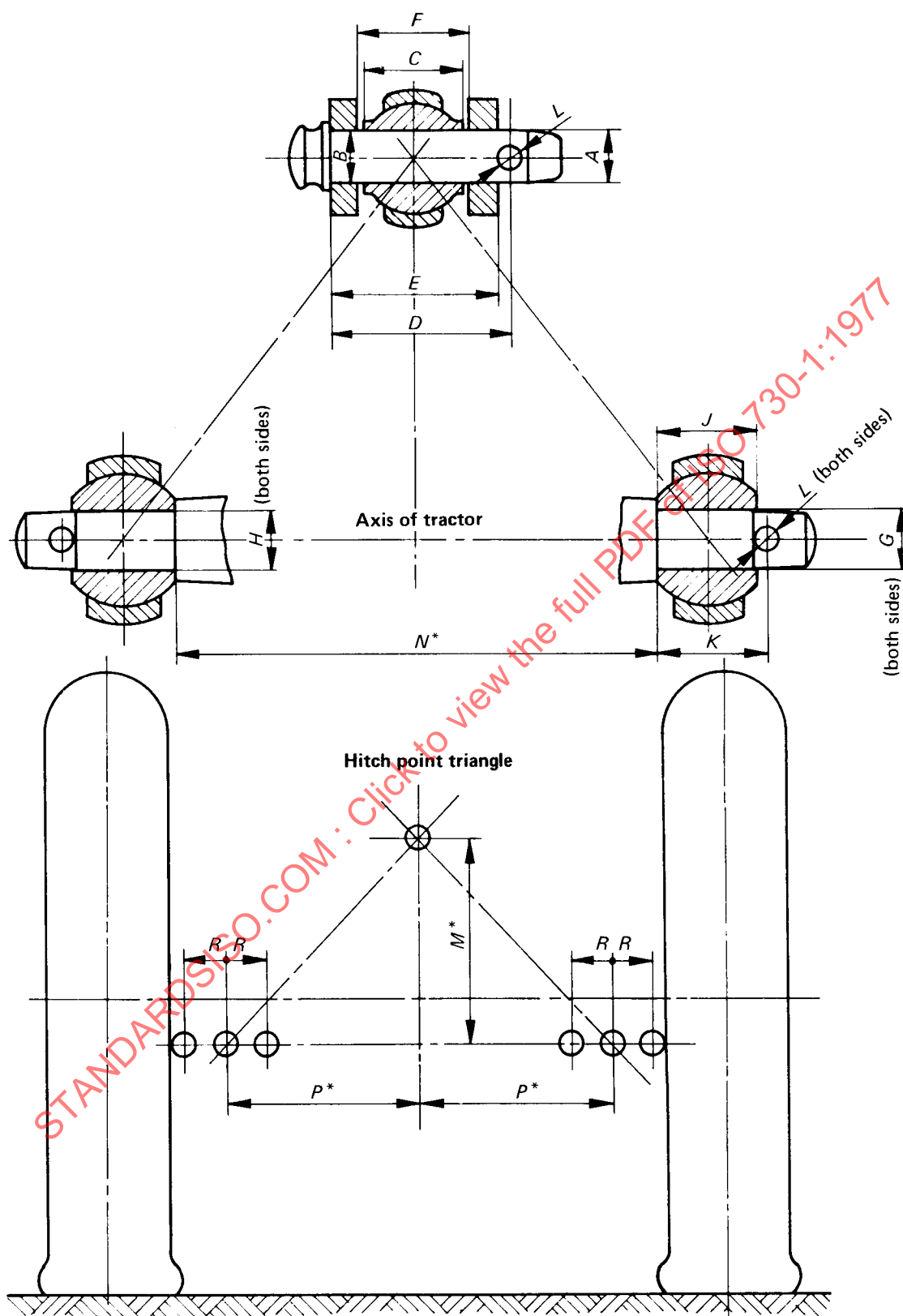


FIGURE 3 — Relation between power take-off and rear hitch points.
Zones of clearance around hitch points

TABLE 2 — Dimensions concerning the zone around hitch points (see figure 3)

Dimensions in millimetres

Dimension	Dimensional characteristics	Category 1		Category 2		Category 3	
		min.	max.	min.	max.	min.	max.
S	Zone of clearance around each hitch point, spherical radius	45	—	55	—	55	—
T	Distance from end of power take-off to centre of lower hitch point. Lower link in horizontal position	500	575	500	575	500	575



* Recommended dimensions. It may be necessary to vary these dimensions in the case of specialized implements.

FIGURE 4 — Dimensions concerning the hitch points

TABLE 3 — Dimensions concerning hitch points (see figure 4)

Dimensions in millimetres

Dimension	Dimensional characteristics	Category 1		Category 2		Category 3	
		min.	max.	min.	max.	min.	max.
Upper hitch points							
A	Diameter of hitch pin	18,916	19	25,27	25,4	31,5	31,75
B	Diameter of hitch pin hole	19,3	19,51	25,7	25,91	32,0	32,25
C	Width of ball	—	44	—	51	—	51
D	Linch pin hole distance	76	—	93	—	102	—
E	Width between outer faces of yoke	—	69	—	86	—	95
F	Width between inner faces of yoke	44,5	—	52	—	52	—
Lower hitch points							
G	Diameter of hitch pin	21,79	22	27,79	28	36,4	36,6
H	Diameter of hitch pin hole	22,4	22,73	28,7	29,03	37,4	37,75
J	Width of ball	34,8	35,0	44,80	45,0	44,8	45
K	Linch pin hole distance*	39	—	49	—	52	—
Linch pin hole							
L	Diameter of linch pin hole for upper hitch pin	12	—	12	—	12	—
	for lower hitch pins					17	—
M	Mast height	460** (min.)		510** (min.)		560** (min.)	
N	Lower hitch point span	683 ± 1,5**		825 ± 1,5**		965 ± 1,5**	
P	Lateral distance from lower hitch point to centreline of tractor	359**		435**		505**	
R	Lateral movement of lower hitch point	100 (min.)		125 (min.)		125 (min.)	

* When lateral stays picking up on the lower hitch point holes are employed to limit side sway of the implement, the minimum dimensions should be : for category 1 : 51 mm, for category 2 : 61 mm and for category 3 : 64 mm.

** Recommended dimensions. It may be necessary to vary these dimensions in the case of specialized implements.