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Application of Hydraulic Remote Control to Agricultural Tractors and Trailing Type Agricultural Implements – SAE J716 DEC84

SAE Standard
Completely Revised December 1984

ϕ APPLICATION OF HYDRAULIC REMOTE CONTROL TO AGRICULTURAL TRACTORS AND TRAILING TYPE AGRICULTURAL IMPLEMENTS—SAE J716 DEC84

SAE Standard

Report of the Tractor Technical Committee, approved January 1949, completely revised, Agricultural Tractor Technical Committee, December 1984. This standard is the English translation of ISO 2057 dated 1981-11-15, except where indicated by a double asterisk (which indicates a change, an addition or a deletion) and the addition of SAE reference documents where applicable.

1. Scope and Field of Application—This standard gives the specifications and dimensions for the assembly and clearances common to hydraulically-operated cylinders and to trailing-type farm implements.

The specifications given permit the interchangeability of hydraulic operation between tractors equipped with a cylinder and trailing-type implements designed for this purpose, the tractor possessing enough power at its draw-bar to operate the implement; and the transference of the hydraulic cylinder from one implement to another.

This standard applies to three categories of agricultural tractors, as follows:

Category	Maximum Power at the Draw-bar
1	Up to 35 kW
2	30 to 75 kW
3	Over 70 kW

2. References

2.1 SAE J1170, Rear Power Take-Off for Agricultural Tractors, and J717, Auxiliary Power Take-Off Drives for Agricultural Tractors. (ISO 500)

2.2 SAE J715, Three-Point Free-Link Hitch Attachment of Implements to Agricultural Wheeled Tractors. (ISO 730/1)

3. Definitions

3.1 Moving End—The yoke of the piston rod.

3.2 Anchor End—The closed end of the cylinder.

3.3 Attaching Pins—Removable pins in the yokes for attaching the cylinder to the implement.

4. Classification and Rating—Minimum thrust capacity (extending stroke of the moving end) shall be based on the calculated piston area and on a pressure of 80% of the relief valve setting.

Implements requiring a cylinder thrust of more than 80 kN shall be provided with 400 mm stroke cylinders.

5. Dimensional Characteristics—See Table 2.

5.1 Hydraulic Cylinders—For diagram of clearances and indication of cylinder dimensions, see Fig. 2.

5.2 Yokes—For diagram of clearances and indication of anchor end dimensions, see Fig. 3.

For diagram of clearances and indication of moving end dimensions, see Fig. 4.

5.3 Length of Hoses for Hydraulic Control—The hose length shall be sufficient for the cylinder to be operated at a distance when the front attaching pin is positioned in accordance with the dimensions in Table 1.

5.3.1 For tractors with a power take-off, the disengagement area around the power take-off and the position of the draw-bar shall be in accordance with SAE J1170, See Fig. 5.**

5.3.2 For an implement coupled to the tractor by means of a three-point linkage, the maximum spherical radius (which determines the position of the front anchor pin on the implement) shall be measured from a point situated in the horizontal plane between the two lower coupling

TABLE 1—GENERAL CHARACTERISTICS

Category	Length of Stroke	Minimum Thrust per kilowatt at the Draw-bar	Spherical Radius to Front Attaching Pin*
	mm	N	mm
1	200^{+5}_{0}	924	1500
2	200^{+5}_{0}	924	2100
3	200^{+5}_{0}	924	2500
	400^{+5}_{0}	924	2500

* See Figs. 5 and 6.

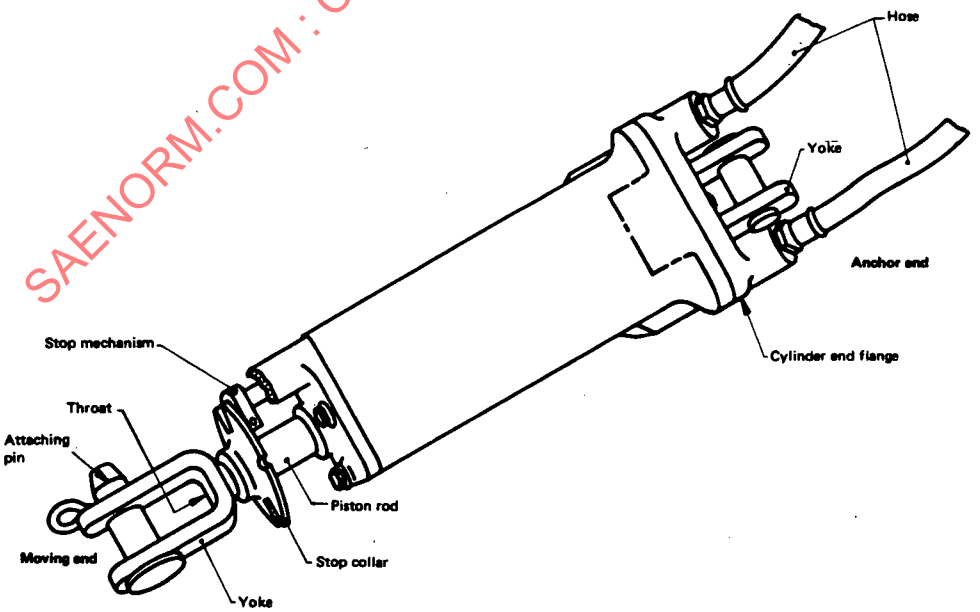

FIG. 1—HYDRAULIC CYLINDER—GENERAL VIEW

The ϕ symbol is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.

TABLE 2—CLEARANCE MEASUREMENTS OF CYLINDERS (Dimensions in millimeters)

Dimension	Dimensional Characteristics	200 mm Stroke	400 mm Stroke
	Length		
a	— between pin center lines, extended (maximum)	721	1210
b	— between pin center lines, retracted (minimum)	514	800
c	— overall, extended	785	1280
d	— anchor pin center lines to cylinder body	32	32
e	— cylinder end flange	64	89
f	— cylinder body	394	670
g	— moving end pin center lines to stop mechanism	114	270
h	— moving end pin center lines to stop collar	76	76
	Width		
j	— overall, stop mechanism	217	241
k	— yoke	114	114
m	— cylinder end flange (diameter)	152	178
n	— cylinder outside diameter	127	152
p	— for pin removal only	114	114
	Height		
q	— overall, cylinder end flange	190.5	216
r	— overall, cylinder body	178	203
s	— stop mechanism	60	60
t	— moving end center line to bottom of stop mechanism	30	30
u	— yoke	89	89
x	— moving end center line to bottom of yoke	38	38
y	— stop collar (diameter)	102	102

TABLE 3—CLEARANCE MEASUREMENTS OF YOKES (Dimensions in millimeters)

Dimension	Dimensional Characteristics	200 mm stroke	400 mm stroke
A	Yoke throat clearance		
	— minimum	27.0	27.0
	— maximum	28.5	28.5
B	Thickness of bar cleared		
	— maximum	26.0	26.0
	— minimum recommended	22.0	22.0
C	Pin diameter		
	— nominal	25.0	31.75
	— maximum	25.0	31.75
D	Length, pin center line to end of yoke (maximum)	32.0	35.0
E	Length, pin center line to bottom of throat (minimum) (anchor end)	41.0	45.0
F	Radius of yoke end (moving end)	32.0	35.0
G	Radius of throat clearance (moving end)	35.0	41.0
H	Length, pin center line to bottom of throat (minimum) (moving end)	41.0	57.0
J	Radius of yoke end (anchor end)	66.5	66.5
K	Radius of throat clearance (anchor end)	35.0	38.0
L	Clearance angle (moving end)	30 deg	35 deg
M	Pin hole diameter (minimum)	25.5	32.0

points and at 178 mm ahead of them, the two lower bars being horizontal (see Fig. 6).**

5.3.3 For implements coupled to a tractor by means of a three-point linkage, the length of the hoses attached to the hydraulic cylinder shall permit moving the implement 100 mm rearward.**

6. Other Specifications

6.1 Both single and double acting cylinders shall operate to raise the implement on their extending stroke.

6.2 Variable stroke control, necessary in the application of hydraulic control to some implements, shall be incorporated in the cylinder or hydraulic system and applied to the retracting stroke. Provision shall be made on the implement to accommodate the fully extended moving end.

6.3 Operating time, at maximum full load engine speed for moving end extension, shall be 1.5 to 2.5 s for categories 1 and 2, and 3 to 4 s for category 3.**

6.4 Hose support, as required for remote cylinder hose, shall be considered a part of the implement.

6.5 Hose connections to cylinders shall be such that the hose does not interfere with bars extending through the yoke on either end of the cylinder.

6.6 Attaching pins shall be considered a part of the cylinder. They shall be easily removed and attached.

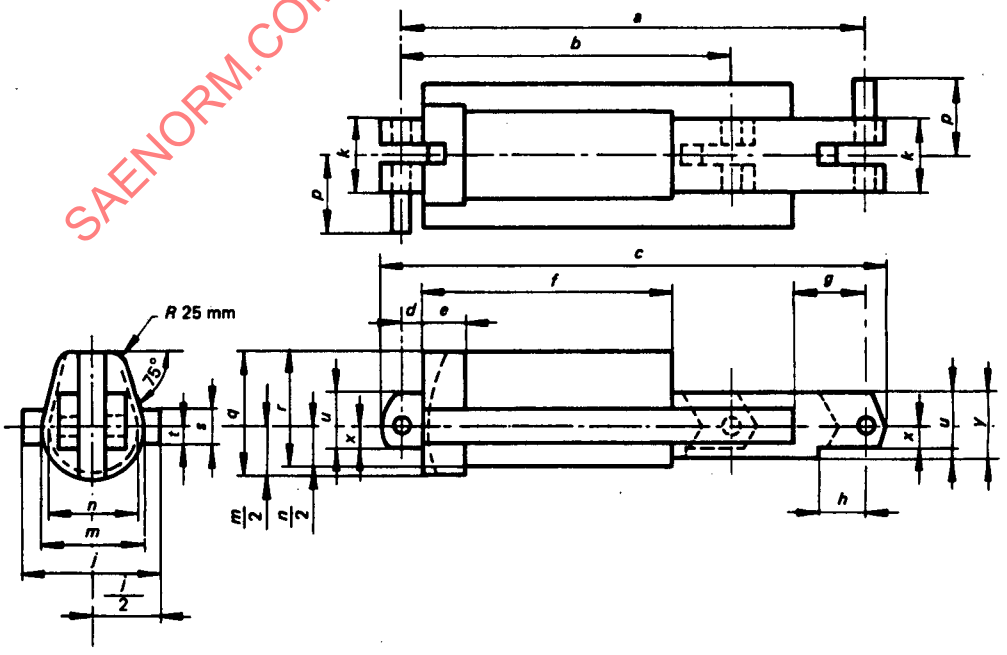

FIG. 2—HYDRAULIC CYLINDER—DIAGRAM OF CLEARANCES