Hydraulic cylinders for plows

Hydraulic cylinders for plows is designed for agricultural machinery (such as tractors, ploughs) designed for hydraulic actuators, the main function is to convert the pressure energy of the hydraulic system into mechanical energy, to achieve the precise control of the plows lifting, turning and so on. Through the flow of hydraulic oil in the closed cylinder body to promote the piston movement, so as to drive the plow to complete the plowing action.

1. Structural components

As a dedicated hydraulic actuator, the structure of the hydraulic cylinder for plowing has been highly integrated and designed to contain the following core components:

(1) Cylinder cylinder assembly

Material: Usually made of high-strength seamless steel tubes or nickel-plated alloy steel, with the inner wall precision ground to ensure high pressure resistance and corrosion resistance.

Function: Accommodate hydraulic oil and piston, provide airtight space for liquid pressure action.

Special design: Rust-resistant coating may be added in agricultural environments to cope with wet soil and fertilizer corrosion.

(2) Piston-rod assembly

Material: High-strength alloy steel, hard chrome plated surface, high hardness.

Dust ring: multi-layer dust scraping structure to prevent soil and debris from intruding into the sealing system.

Corrosion-resistant layer: Piston rod suitable for paddy field operation may be sprayed with ceramic coating.

Function: Transmits the thrust or pull of the piston to the plow tool and bears external loads.

(3) Sealing system

Piston seal: combination seal, pressure resistance up to 40MPa.

Rod seal: Y-ring or U-ring, with dust ring to block external pollutants.

Static seal: O-ring or metal sealing ring for static sealing between end cap and cylinder barrel.

(4) Air Vent Valve

Location: Usually located at the top of the cylinder.

Function: To exhaust air mixed into the hydraulic fluid to prevent stagnation or vibration caused by “air pockets”.

Operation: Manual or automatic air venting to ensure smooth cylinder operation.

(5) Cushioning device

Structure: Built-in throttle type cushioning, forming a back pressure chamber at the end of the stroke.

Function: Decelerate the piston rod to below 0.3m/s to eliminate hydraulic shock.

2. Typical application scenarios

Hydraulic cylinders for plows show a high degree of adaptability in agricultural production, the main application scenarios and technical realization are as follows:

(1) Tractor suspension system:

Tillage depth adjustment: the cylinder expansion and contraction is controlled by proportional valve to realize precise tillage depth adjustment.

(2) Plow turning mechanism

Double-acting control: adopting three-position four-way reversing valve to realize 0-90°

turning of the plow blade, together with hydraulic locking circuit.

Synchronization control: multi-cylinder parallel system, through the shunt valve to ensure the synchronization of turning (error <5mm).

(3) Intelligent agricultural equipment:

Variable tillage: combining GPS and electronic control unit, automatically adjusting the tillage depth according to soil hardness.

Energy-saving mode: Enable the differential connection circuit in the transportation state to reduce the power consumption of idling by 30%.

(4) Special working condition adaptation:

Wetland operation: Corrosion-resistant coating (e.g. zinc-aluminum coating) is used to improve flexural strength.

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