

## **Development of hydraulic cylinders for seeders**

The use of hydraulic cylinders in cultivators has greatly increased the productivity and adaptability of the machinery. In this article, we will introduce you to the development of [Hydraulic cylinders for seeders](#).

### **1. Development history of hydraulic cylinders for seeders**

#### **(1) Early exploration and foundation laying (17th century-19th century)**

17th century: French physicist Pascal put forward the principle of hydrostatic transmission of liquid, laying the theoretical foundation for hydraulic technology.

1795: the United Kingdom to water as a medium to create the first hydraulic press, the first realization of the industrial application of hydraulic energy.

In 1905: the hydraulic medium from water to oil, greatly improving system performance and stability, hydraulic technology began to enter the practical stage.

#### **(2) the early stage of industrial application (early - mid-20th century)**

The 1950s: China's hydraulic cylinder production started, the initial period to copy the main products are mainly used for small agricultural machinery (such as tractors), technology is relatively simple.

After World War I: hydraulic transmission technology is widely used in industrial and military fields, hydraulic cylinders gradually become the core components of mechanical transmission.

#### **(3) Period of rapid technological development (late 20th century)**

1980s-1990s: material and process innovation, the introduction of precision casting, high-performance sealing materials (such as polyurethane), hydraulic cylinders pressure resistance increased to more than 250bar, began to be used in combine harvesters and other complex agricultural machinery.

The beginning of the 21st century: the integration of intelligent technology, hydraulic cylinders integrated sensors and electronic control systems, to achieve precise flow regulation (error  $\leq \pm 1.5\%$ ) and remote monitoring.

#### **(4) Modern intelligentization stage (21st century to present)**

Material innovation: the use of aluminum alloy, graphene coating and other lightweight materials, weight reduction, while improving corrosion resistance.

Intelligent upgrading: combining Beidou navigation and IoT technology to realize unmanned precision operation (e.g. centimeter-level positioning seeding).

High-pressure trend: ultra-high-pressure hydraulic cylinders are applied to large-scale agricultural machines to promote operational efficiency.

### **2. The great role of hydraulic cylinders on seeding machines and agriculture**

#### **(1) Improve the precision and efficiency of seeding**

Precision sowing: hydraulic cylinders drive air-absorption seeder, through the pressure control to realize single grain precision sowing, plant spacing error  $\leq \pm 1\text{cm}$ , seedling neatness of more than 95%, compared with the traditional sowing yield increase of 10% -15%.

High-speed operation: double-acting hydraulic cylinders support the continuous reciprocating motion of the seeder, the operation speed is improved, and the efficiency is 50 times higher than that of manual labor.

#### **(2) Adapt to complex terrain and diversified needs**

Hilly and mountainous terrain: the hydraulic system is adopted to make the planter work

stably in sloping terrain, and the land utilization rate is improved.

Protected tillage: Hydraulically driven no-till seeder can complete straw mulching, fertilizer application and seeding in one go, reducing soil disturbance and shortening the recovery cycle of ground power.

### (3) Promoting agricultural modernization and scale

Large-scale operation: the hydraulic system supports the synchronized lifting of multi-row planter, with a large operating area in a single day to meet the needs of farm scaling.

Contribute to environmental protection: low leakage sealing technology is adopted to reduce hydraulic oil pollution, which is in line with green agricultural standards.

The evolution of hydraulic cylinders from basic theory to intelligence has revolutionized traditional agricultural operations. [Hydraulic cylinders for seeders](#) have become a core technology for enhancing grain yield and achieving sustainable agricultural development through precise control, efficient power output and intelligent adaptation.

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