



## I 三节伸缩臂 Three section telescopic arm

三段式伸缩臂由三个臂段（一节臂、二节臂、三节臂）、一个末端执行器（如挖斗、贝売斗、梅花抓斗、冻土钩等）和一个底座组成。每臂节之间通过液压油缸、钢丝绳和滑轮组等部件进行连接和驱动。

三段式伸缩臂的工作原理主要基于液压传动和机械运动学原理。当液压油泵提供高压液压油时，操作人员通过操纵杆控制换向阀，将油液分配到相应的液压油缸中。这些油缸在油液的推动下进行伸缩运动，从而带动臂段的伸长或缩短。同时，钢丝绳和滑轮组等部件起到传递力和调整运动轨迹的作用。

通常，三段式伸缩臂安装在 22 吨 -45 吨挖掘机，挖掘深度一般情况下可以达到 32 米左右，并具有以下特点：

工作半径大：通过伸缩臂的伸长，可以扩大挖掘机的作业范围，主要功能体现在向下深度挖掘。斗杆油缸主要用于调节臂挖掘角度。

工作精度高：现代三节伸缩臂挖掘机通常配备有先进的控制系统和监控系统，可以精确控制臂架的伸缩速度和角度变化，提高作业的准确性和安全性。

适应性强：三节伸缩臂挖掘机可以应用于多种复杂工况，如狭小的施工空间、深基坑开挖等。

The three-stage telescopic arm consists of three arm segments (one arm, two arm, three arm), one end effector (such as digging bucket, shell bucket, plum blossom grab bucket, frozen soil hook, etc.), and a base. Each arm is connected and driven by hydraulic cylinders, steel wire ropes, pulley groups, and other components.

The working principle of the three-stage telescopic arm is mainly based on hydraulic transmission and mechanical kinematics principles. When the hydraulic oil pump provides high-pressure oil, the operator controls the directional valve through the joystick to distribute the oil to the corresponding hydraulic cylinder. These oil cylinders perform telescopic movements under the push of oil, thereby driving the extension or shortening of the arm segments. At the same time, components such as steel wire ropes and pulley systems play a role in transmitting force and adjusting motion trajectories.

Usually, the three-stage telescopic arm is installed on excavators ranging from 22 tons to 45 tons, and the excavation depth can generally reach about 32 meters, with the following characteristics:

Large working radius: By extending the telescopic arm, the operating range of the excavator can be expanded, and its main function is to excavate deeply downwards. The boom cylinder is mainly used to adjust the excavation angle of the arm.

High work accuracy: Modern three section telescopic excavators are usually equipped with advanced control and monitoring systems, which can accurately control the telescopic speed and angle changes of the boom, improving the accuracy and safety of the operation.

Strong adaptability: The three section telescopic arm excavator can be applied to various complex working conditions, such as narrow construction spaces, deep foundation pit excavation, etc.

