北奕机械
BEIYI MACHINERY

无锡市北奕挖掘机配件制造厂

WUXI BEIYI EXCAVATOR PARTS MANUFACTURING PLANT

北奕机械
BEIYI MACHINERY

静压植桩机

STATIC PRESSURE PILE DRIVER

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1.静压植桩机BY-ZZ600S

STATIC PRESSURE PILE DRIVER BY-ZZ600S

新一代机型BY-ZZ600S，采用全新的模块化设计理念(结构零部件的标准化)，通过对每个零部件的评估分析，彻底实现了结构、形状、材料的合理化。在提高主结构部件通用性的同时，搭载的新一代控制系统，全面提高了各部件的使用性能与寿命。

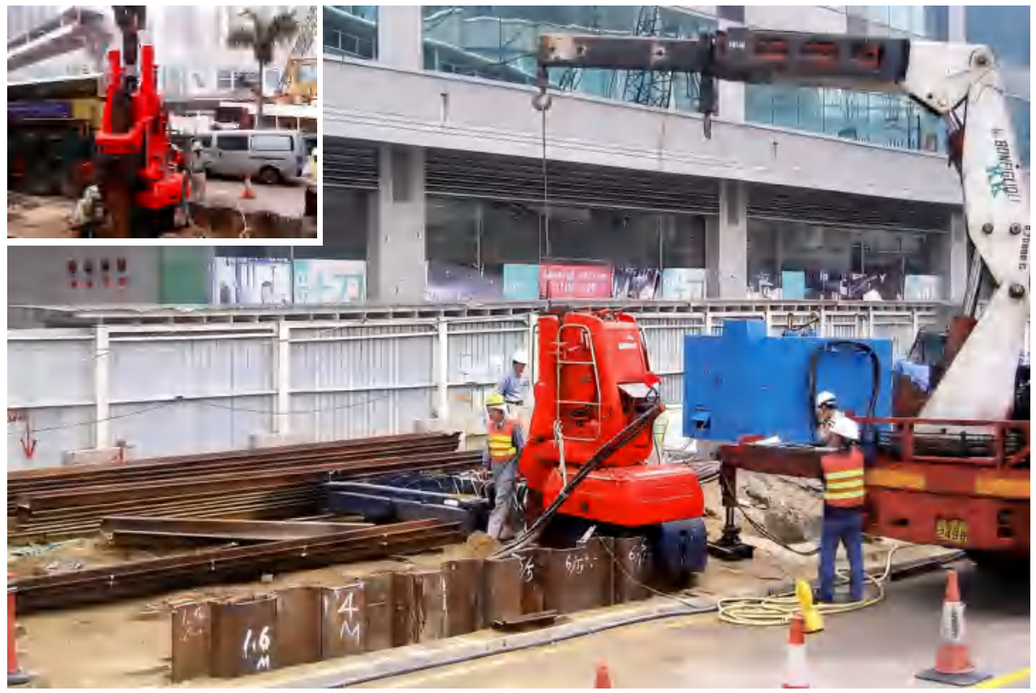
The new generation BY-ZZ600S adopts a brand-new modular design concept (standardization of structural components). Through evaluation and analysis of each component, the rationalization of structure, shape, and materials has been thoroughly achieved. While improving the versatility of the main structural components, the new generation control system comprehensively improves the performance and lifespan of each component.

可对应宽400~600mm U型钢板桩的单独压入~坚硬地质压入

Suitable for individual driving of U-shaped steel sheet piles with a width of 400~600mm to driving in hard geological conditions.

BY-ZZ600S实现了上机身、滑动座、机座、固定夹的通用性，通过对夹头、夹头架的换装以及固定夹的排列组合，可分别对应宽400mm(一般桩型)、宽600mm(经济性桩型)的U型钢板桩。同时，SAL-160是一款集单独压入、水刀并用压入、坚硬地质压入为一体的多功能机型。实现了1台静压桩机可对应各种地质条件与工况条件的压入施工，大大提高了机器的利用率。

The BY-ZZ600S achieves versatility in its upper body, sliding seat, base, and fixing clamps. By changing the clamps and clamp frames, and arranging the fixing clamps, it can accommodate U-shaped sheet piles with a width of 400mm (standard pile type) and 600mm (economical pile type). Meanwhile, the SAL-160 is a multi-functional machine integrating standalone pressing, water jet pressing, and pressing in hard geological conditions. It enables a single static pressure piling machine to handle various geological and working conditions, greatly improving machine utilization.



2.静压植桩机压入原理及程序

STATIC PRESSURE PILE DRIVING MACHINE PRESSING PRINCIPLE AND PROCEDURE

压入原理 Press-in principle

运用压入原理，实现基础工程的历史性创新。

By applying the principle of indentation, a historic innovation in foundation engineering has been achieved.

什么是静压植桩工法？ What is the static pressure pile driving method?

桩贯入方式 Pile penetration method

桩贯入方式可以分为动态贯入法和静态贯入法。动态贯入工法在冲击或振动的作用下，不可避免的产生过大的噪音和振动。与之相比，静态贯入工法不会产生这种施工污染。但是，如果贯入力的反作用力仅仅依靠设备自身的重量，则需要笨重的重型设备，而且非常不实用。

静压植桩工法，利用液压缸产生的静载荷来压桩。压入力的反作用力来自完成桩的拔出阻力。这也是虽然静压植桩机小型轻量，但可以通过与地球成为一体而产生更大作用力的原因。这种轻小型设备可以在施工现场条件受限的工况下进行施工作业。

Pile penetration methods can be divided into dynamic penetration and static penetration. Dynamic penetration inevitably generates excessive noise and vibration under impact or vibration. In contrast, static penetration does not produce this kind of construction pollution. However, if the reaction force of the penetration force relies solely on the weight of the equipment itself, it requires cumbersome heavy equipment, which is very impractical.

Static pressure pile driving utilizes the static load generated by a hydraulic cylinder to drive the pile. The reaction force of the driving force comes from the pull-out resistance of the pile. This is why, although static pressure pile drivers are small and lightweight, they can generate greater force by integrating with the earth. This compact equipment can be used in construction operations under conditions with limited space.

压入地中获得反作用力 Obtaining reaction force when pressed into the ground

压入机制 Push-in mechanism

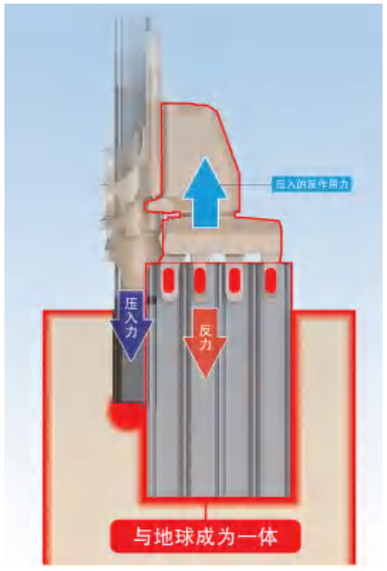
静压植桩机通过液压固定夹夹住已经贯入地中的桩材。然后，由夹头夹紧下一根桩材，通过液压产生的静载荷将桩材压入地中。

The static pressure pile driver uses hydraulic clamps to hold the piles that have already been driven into the ground. Then, the clamps hold the next pile in place, and the static load generated by hydraulic pressure presses the pile into the ground.

压入原理 Press-in principle

压入过程中，会产生包括表面摩擦、桩端抵抗和锁口间抵抗在内的贯入抵抗力，即为压入力的反作用力。反力桩会有更大的拔出阻力来对抗该反作用力。因此，压入力可以将桩材贯入地中。

During the driving process, penetration resistance forces are generated, including surface friction, pile end resistance, and interlocking resistance; these are the reaction forces of the driving force. Reaction piles will have greater pull-out resistance to counteract this reaction force. Therefore, the driving force can drive the pile material into the ground.



压入工法的优越性 Advantages of the pressing method

形成压力球根 Formation of pressure bulb

在桩被压入地中时，桩端附近土体会形成压实变硬的压缩区域，称之为“压力球根*1”。该压力球根为桩基结构提供水平和垂直方向的强度。

静压植桩机可以控制压入桩的压入方向，精准的压入桩材。因为是采用静荷载进行压桩，所以可以检测和控制完成桩的质量，建造高品质的桩基结构。

*1压力球根是指在施加载荷于土层时，垂直应力或垂直应力和垂直荷载比相等点，在地层内部形成的球形区域。

When a pile is driven into the ground, a compacted and hardened compression zone forms near the pile tip, known as the "pressure bulb1". This pressure bulb provides horizontal and vertical strength to the pile foundation structure.

Static pile driving machines can control the driving direction of the pile, precisely driving the pile material in. Because static loads are used for pile driving, the quality of the completed pile can be monitored and controlled, resulting in a high-quality pile foundation structure.

*1 Pressure bulb refers to the spherical region formed within the soil layer at the point where the vertical stress or the ratio of vertical stress to vertical load is equal when a load is applied to the soil layer.

静压植桩工法的优越性 Advantages of static pressure pile driving method

压入原理的优势是“可以构筑与地球成为一体的完成桩”。除此之外，还有以下优势:

The advantage of the driven-in principle is that it allows for the construction of a complete pile that becomes one with the earth. In addition, it offers the following advantages:

环保性	利用静载荷将桩压入地中的方式，解决了噪音和振动等的建设公害。静压植桩机体积小重量轻，将工程的影响控制在更小的范围。
安全性	静压植桩机抓住已压入地下的完成桩而进行压入施工的,所以在原理上不存在机械倾倒的危险。因为直接压入在工厂生产的预制桩，所以可以构筑值得信赖高质量的完成桩。
快速性	由于静压植桩机机体轻小，施工工序简单，如果同时使用多套设备，能够缩短工期。无论是在环境管制严格的区域还是夜间,施工都不会受到时间段的限制
经济性	由于设备轻量小型，所以压入施工工法可以将工程影响范围降低到最小，轻减交通堵塞，影响地区经济活动。
文化性	根据使用目的选用预先在工厂生产的高质量,标准化的建筑材料，可以实现施工现场的高效率作业。 由于可以正确自如地控制压入桩，复杂的施工环境也能构筑高精度地结构物。施工过程中，能在控制压入桩的同时确认桩的性能，从而实现构筑高质量的完成桩。

Environmental friendliness	The static pressure pile driving method solves construction pollution problems such as noise and vibration. Static pressure pile drivers are small and lightweight, minimizing the impact of the project.
Safety	The static pressure pile driver grips the already driven pile for driving, so in principle, there is no risk of mechanical tipping. Because it directly drives precast piles produced in the factory, it can construct reliable, high-quality finished piles.
Speed	Due to the small size and lightweight nature of the static pressure pile driver and the simple construction process, using multiple sets of equipment simultaneously can shorten the construction period. Construction is not limited by time of day, whether in areas with strict environmental regulations or at night.
Economy	The lightweight and compact equipment minimizes the impact of the project, reducing traffic congestion and impacting local economic activities. Using high-quality, standardized building materials pre-produced in the factory according to the intended use allows for highly efficient on-site operations.
Cultural appeal	Because the pile driving can be controlled precisely, high-precision structures can be constructed even in complex construction environments. During construction, the pile performance can be confirmed while controlling the driving process, thus achieving the construction of high-quality finished piles.

实际应用 Practical Applications

地下土壤由于粘附产生的摩擦力会增大桩的拔出难度，同时夹住多支已压入地的桩材，机器与大地成为一个整体，利用压入桩的反力即拔出抵抗力，将下一支桩压人或拔出，使用静载荷将桩压入地中，这样就可以实现无振动、低噪音的静压植桩机。

The friction generated by the adhesion of the underground soil increases the difficulty of pulling out the pile. At the same time, it clamps multiple piles that have been pressed into the ground, and the machine and the ground become a whole. It uses the reaction force of the pressed pile, that is, the pull-out resistance, to press the next pile in or pull it out. It uses static load to press the pile into the ground, thus realizing a vibration-free and low-noise static pressure pile planting machine.

压入程序 Push program

初期压入 Initial pressing

初期压入时，由于没有完成桩可获取反力，所以通常利用“反作用力基座”来完成初期压入作业。

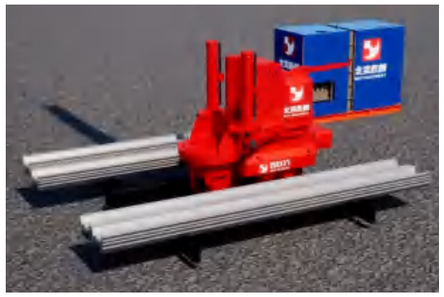
During the initial pressing, since there is no completed pile to obtain reaction force, a "reaction force base" is usually used to complete the initial pressing operation.

1)将静压植桩机和反作用力基座水平设置于地面上。

1) Place the static pressure pile driver and reaction force base horizontally on the ground.

2)设置反力配重。

2) Set up a counterweight for the reaction force.



3)吊第一根桩材，并开始压入。

3) Lift the first pile and begin driving it in.

4)植入数根桩材。

4) Install several piles

5)撤除反力配重

5) Remove the reaction weight

6)撤除反作用力基座，完成初期压入。

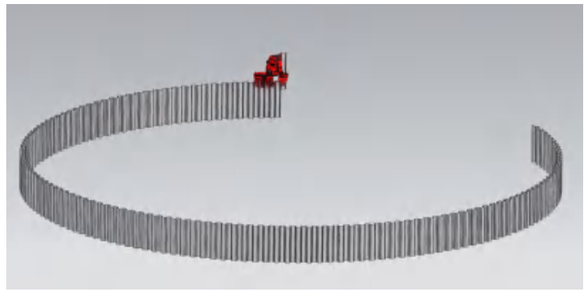
6) Remove the reaction force base to complete the initial pressing.

压入程序 Push program

曲线施工 Curved construction

静压植桩机具有夹头旋转、上机身旋转、固定夹左右移动的功能即使是曲线或复杂施工也可以顺利完成。最小施工半径由桩型号与静压植桩机型号而决定。

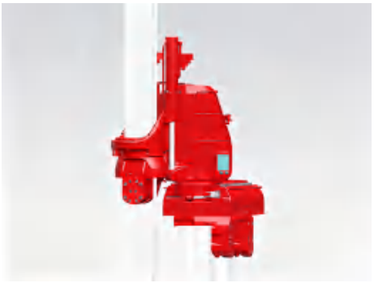
The static pressure pile driver features a rotating chuck, a rotating upper body, and a movable fixed clamp, allowing for smooth completion even on curved or complex terrains. The minimum construction radius is determined by the pile type and the static pressure pile driver model.



拐角施工 Corner construction

静压植桩机的上机身可以旋转至一定的角度，从而完成拐角施工。复杂的压入法线，也可施工。

The upper body of the static pressure pile driver can rotate to a certain angle, thus enabling corner construction. It can also construct complex driving lines.

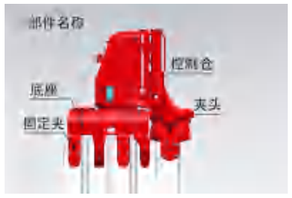


压入程序 Push program

自走后退 Self-reverse

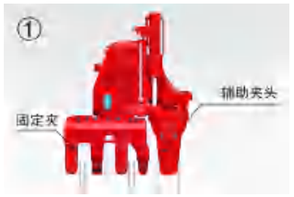
如果最终施工位置距离起重机过远，超过起重机起吊范围，导致无法撤走设备。可以通过静压植桩机自走后退至起吊范围内，撤走。

If the final construction location is too far from the crane, exceeding its lifting range, making equipment removal impossible, the static pressure pile driver can be driven backward to within the lifting range for removal.



1)将自走装置安装到夹头上，夹紧反力桩

1) Install the self-propelled device onto the clamp and clamp the reaction pile.



2)打开固定夹，升起上机身和机座。

2) Open the retaining clip and raise the upper body and base.

3)后移机座

3) Move the base backward

4)降下上机身和基座，固定夹夹紧反力桩。

4) Lower the upper fuselage and base, and clamp the reaction piles with the fixing clamps.

5)打开自走装置，升起夹头。

5) Activate the self-propelled mechanism and raise the chuck.

6)后移上机身。

6) Move it to the upper fuselage.

7)自走装置夹紧反力桩。重复2-直到后退至起吊范围内

7) The self-propelled device clamps the reaction pile. Repeat step 2 until it retracts into the lifting range.

注意:该方式也可用于自走前行。 Note: This method can also be used for autonomous driving.

3.预制桩的优点 ADVANTAGES OF PRECAST PILES

经过质检的预制结构材料
Precast structural materials that have passed quality inspection

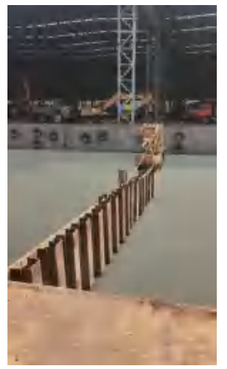
预制桩在严格的品质管理下，通过工厂自动化生产制造，保证了均一的质量和强度。此外，预制桩可以在材料成本低廉的时候提前生产，储存也简便。预制桩可以根据工程的进度，安排生产计划，保证稳定的供应。

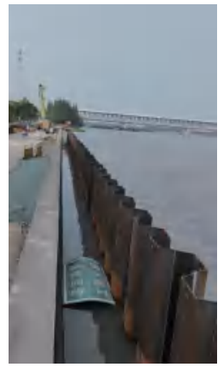
Precast piles are manufactured in a factory under strict quality control and automated production processes, ensuring uniform quality and strength. Furthermore, precast piles can be produced in advance when material costs are low, and storage is convenient. Production plans for precast piles can be arranged according to the project schedule, guaranteeing a stable supply.

应用广泛 Wide range of applications

静压植桩工法只需要在地面将桩材压入地中，构筑自立式壁体结构物。通过选用内支撑结构、锚杆结构或双重结构来增强壁体的强度。预制桩不仅广泛适用于临时结构，如围堰和挡土墙，还适用于河川以及港湾的护岸、铁路和公路挡土墙以及地下设施建筑构架等永久性结构。

Static pressure pile driving is a method of constructing self-supporting wall structures by pressing piles into the ground. The strength of the wall can be enhanced by using internal bracing, anchoring, or a combination of both. Precast piles are widely applicable not only to temporary structures such as cofferdams and retaining walls, but also to permanent structures such as river and harbor revetments, railway and highway retaining walls, and underground infrastructure frameworks.



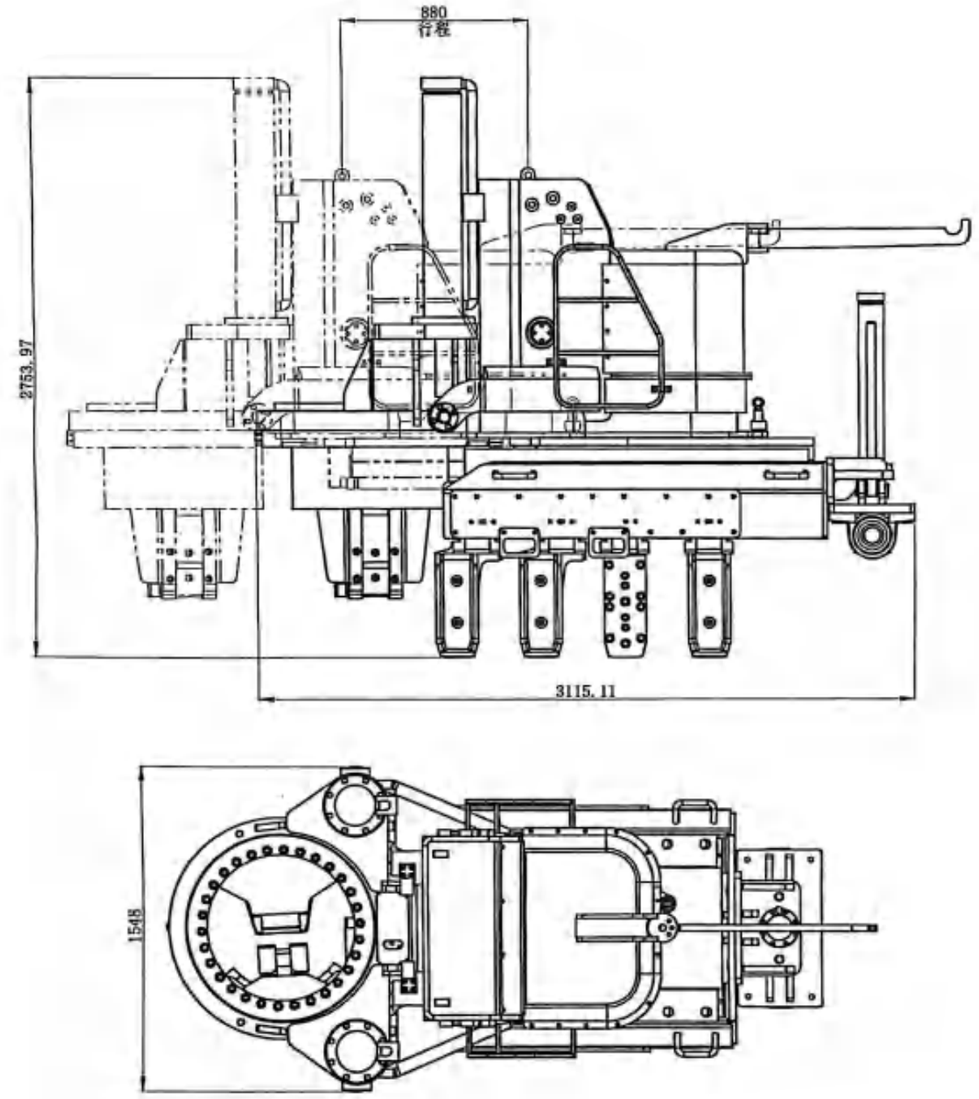


缩短工期，降低工程成本
Shorten the construction period and reduce project costs

从多样的桩材中，根据材质、刚性以及止水性等结构物的需要来选择合适的桩材，有助于提高结构物的设计的经济性。预制桩的适当使用能够缩短工期并减少劳动力，从而节省总成本。另外，一些钢板可重复作为临时结构物的钢材使用，从而降低总成本。

Selecting the appropriate pile material from a variety of options, based on its material composition, rigidity, and water-stopping properties, helps improve the economic efficiency of structural design. The proper use of precast piles can shorten construction time and reduce labor, thereby saving overall costs. Additionally, some steel plates can be reused as steel for temporary structures, further reducing overall costs.

4.主机尺寸/Main unit size



高度/High:2753.9MM

宽度/Width:1548MM

长度/Length:3115MM

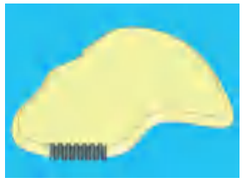
5.应用领域/Application field

静压植桩机打桩可用于拦砂坝、填海护岸、道路挡土墙、废弃物处理场、码头岛屿、分洪水库、河道护岸、防浪堤管道工程等.

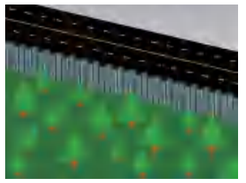
Pile driving with static pressure pile drivers can be used for sand dams, reclamation and revetment, road retaining walls, waste disposal sites, dock islands,Flood diversion reservoirs, riverbank protection, breakwater pipeline projects, etc.

拦砂坝
Silt retention dam

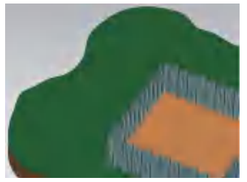
填海护岸
reclamation and revetment



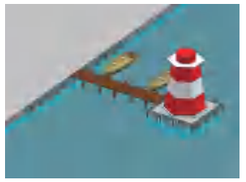
道路挡土墙
Road retaining wall



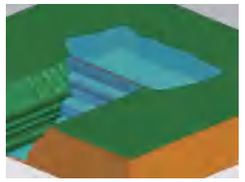
废弃物处理场
Waste disposal site



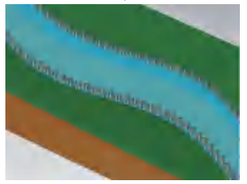
码头岛屿
Dock islands



分洪水库
Flood diversion reservoirs

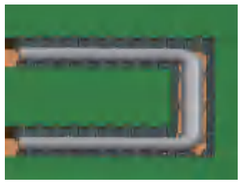


河道护岸
Riverbank protection

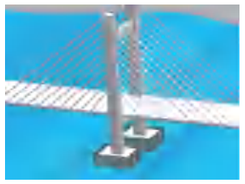


防浪堤
Breakwaters

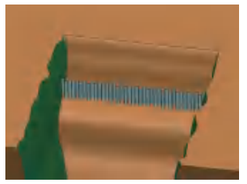
管道工程
Pipeline engineering



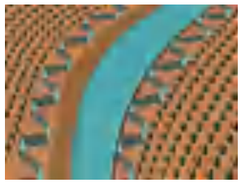
桥基防护
Bridge foundation protection



土体加固
Soil reinforcement



灌溉渠
Irrigation canals



6.环保设计/Eco-design

无振感低噪音设计 / Vibration-free and low-noise design

尾气排放符合国3标准 The exhaust emissions meet the National III standard

7.技术参数/Technical Specifications

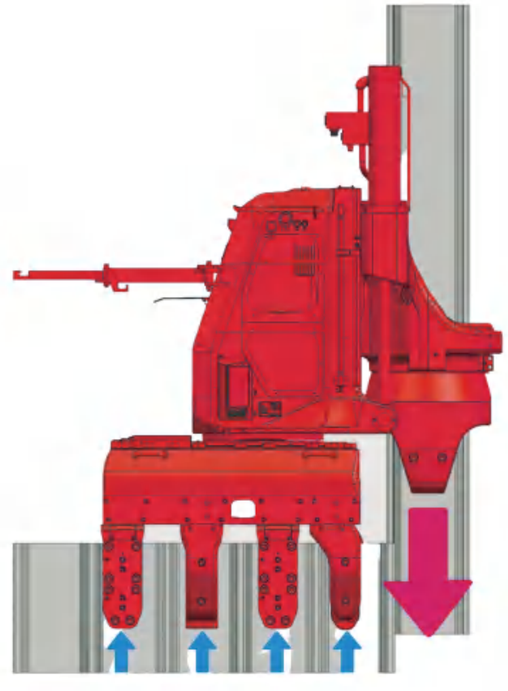
静压植桩机主体Static Pressure Pile Driver BY-ZZ600S	
适用桩材 Suitable pile material	U型钢板桩(宽400mm) II 、III、IV型 U-shaped steel sheet piles (400mm wide), Type II, Type III, and Type IV
压入力 pressing force	900KN
拔出力 extraction force	1100KN
行程 itinerary	750mm
压入速度 pressing speed	2.6~35.7m/min
起拔速度 lifting speed	2.0~26.9m/min
操作方法 Operation Method	无线电操作盘/有线操作盘
质量(单独压入规格) Quality (individual pressing specifications)	6945KG
质量(水刀并用压入规格) Quality (with water jet and press-in specifications)	7345KG
动力单元power unit	
动力源 power source	柴油引擎 diesel engine
高功率模式 High Power Mode	195 KW(265 ps)/1750 min-i
环保模式 Eco Mode	173 KW(265 ps)/1650 min-i
超环保模式 Eco-friendly Mode	152 KW(265 ps)/1450 min-i
柴油箱容积 Diesel tank capacity	590L
液压油箱容积 Hydraulic oil tank capacity	500L
质量 quality	6490KG(标准20m液压管) (Standard 20m hydraulic hose)

反力基座reaction base	
质量 quality	1580KG
水刀卷筒Water jet scroll	
适用桩长 Applicable pile length	标准17m(最大27m) Standard 17m (maximum 27m)
质量 quality	500KG
配件部分,根据需要购置 For accessories, purchase as needed	

8.工作原理/working principle

BY-ZZ600S静压植桩机使用反作用力压入的原理，将U型钢板桩压入地面以下。
The BY-ZZ600S static pressure pile driver utilizes the principle of counteracting force to press U-shaped steel sheet piles into the ground.

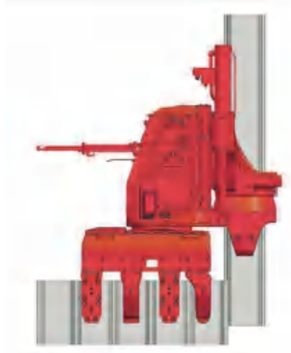
适用于3号和4号U型钢板桩
Applicable to No. 3 and No. 4 U-shaped steel sheet piles



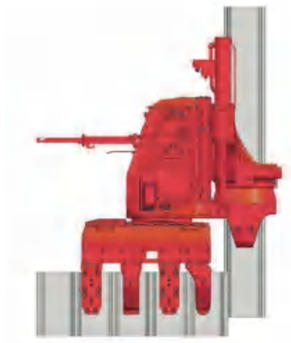
9.压入方式选择/Selection of pressing method

BY-ZZ600S静压植桩机用于打拔U型钢板桩，可根据地质情况选择压入方式:
单独压入和水刀压入

The BY-ZZ600S static pressure pile driver is used for driving and extracting U-shaped steel sheet piles.The pressing method can be selected according to the geological conditions: individual pressing and water jet pressing



N值:0~25
单独压入



+

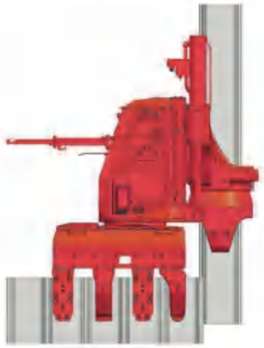
N值:25~50
带水刀压入

10.施工灵活/Flexible construction

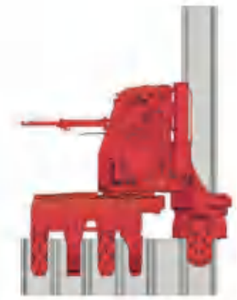
BY-ZZ600S静压植桩机机身小，可以实现临桩打拔、隔桩打拔、拐角施工、桩上自走等。机器操作灵活，设置自动打拔程序，更易上手。

The BY-ZZ600S static pressure pile driver, with its compact body, is capable of driving and extracting piles adjacent to each other, driving and extracting piles separated by a distance, working around corners, and driving and extracting piles while the machine is still on the pile. The machine is flexible to operate and features an automatic driving and extracting program, making it easier to get started.

临桩打拔
pile driving and extraction

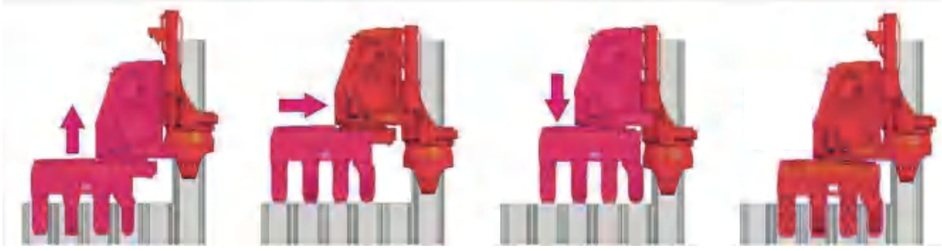


隔桩打拔
beat around the bush



拐角施工
Construction at the corner

桩上自走步骤/Self-propelled steps on the pile



自动打拔设定
打桩:自动+夹头下
拔桩:自动+夹头下

Automatic driving and pulling setting
Pile driving: automatic + with collet under
Pile extraction: automatic + with collet under