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Casing Rotator Series

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FES



Casing

Hydraulic power station

Working device



FES

Main Structure

1 Wedge clamping device



Being compared with the traditional clamping mechanism, it can clamp the casing no matter at what position, and keep the vertical accuracy of the casing; and the larger drawing resistance of casing causes greater lamp force.

2 Motor reducer



Multiple sets of motor reducer can supply the sufficient torque, transfer a strong rotary force to the casing, which can adapt to the complicated stratum and cut obstructions.

3 Vertical device



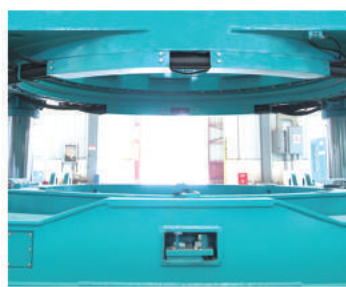
Hydraulic vertical device ensures the verticality of drill holes, and corrects the casing angle timely in the construction.

4 Caliber change device



The convenient caliber change makes the equipment adapt to various requirements of caliber change.

5 Auxiliary clamping device



It can better ensure the verticality of casing, and additionally compensate for the problem of low crane capacity of the equipped crane during deep excavation.

6 Work traveling device



The crawler traveling device is with the function of hydraulic transverse expansion, which is convenient for the equipment to move automatically and conduct the pile core localization.



Working Device



FES

Main Structure

1 Engine



The great power of engine can supply a huge torque of the equipment. It provides the machine with a great torque and make it adapt to any complicated and difficult stratum.

2 Convenient operating system



According to the working condition the operating system platform of micro computer can keep the machine at an optimum working state by adjusting the speed, torque and pressing force, and promote the work efficiency to the maximum.

3 Cutter head load automatic control system



When cutting the hard rock, it can well protect the cutter head, enhance the cutting efficiency by the automatic control of computer.

4 Instant enhancement system



When encountering obstructions, it can instantly enhance the pulling force and torque to clear the obstruction.

5 Emergency system



The emergency module control system is also set in the power station. When there is a malfunction, the emergency system can be adopted to complete the construction work.

6 Power station traveling device



The power station, which is convenient for traveling, can make the equipment travel freely on the construction site and complete itself transfer; the support structure can ensure the stability and safety of equipment during working.



Hydraulic power station



FES

Casing Rotator

Introduction to construction method

The casing rotator is a new type drill with the integration of the full hydraulic power and transmission, and the combination control of machine, power and fluid. It is a new, environmental and highly efficient drilling technology. In recent years, it is widely adopted in the projects such as the constructions of urban subway, articulation pile of deep foundation pit enclosure, clearance of waste piles (underground obstructions), high-speed rail, road and bridge, and urban construction piles, as well as the reinforcement of reservoir dam.

The successful research of this brand new process method has realized the possibilities for the construction workers to conduct the construction of casting piple, displacement pile, and underground continuous wall, as well as the possibilities for the pipe-jacking and shield tunnel to pass through the various pile foundations without barriers, when the obstructions, such as the gravel and boulder formation, cave formation, thick quicksand stratum, strong necking down formation and various pile founddion.

The construction method of casing rotator has successfully completed construction missions of more than 5000 projects at places of Singapore, Japan, Hongkong District, Shanghai, Hangzhou, Beijing, Tianjin and Chengdu. It certainly will play a bigger role in the future urban construction and other pile foundation construction fields.

① Foundation pile, continuous wall:

- * Foundation piles for high-speed rail, road and bridge and house building
- * Articulation pile constructions which are required to be excavated, such as subway platforms, underground architectures, continuous walls
- * Water retaining wall of reservoir reinforcement

② Drilling gravels, boulders and karst caves

- * It is allowable to conduct the foundation piles construction at mountain lands with gravel and boulder formations.
- * It is allowable to conduct operation and cast the foundation piles at the thick quicksand formation and necking down stratum or the filling layer.
- * Conduct rock-socketed drilling to the rock stratum, cast the foundation pile

③ Clear the underground obstructions

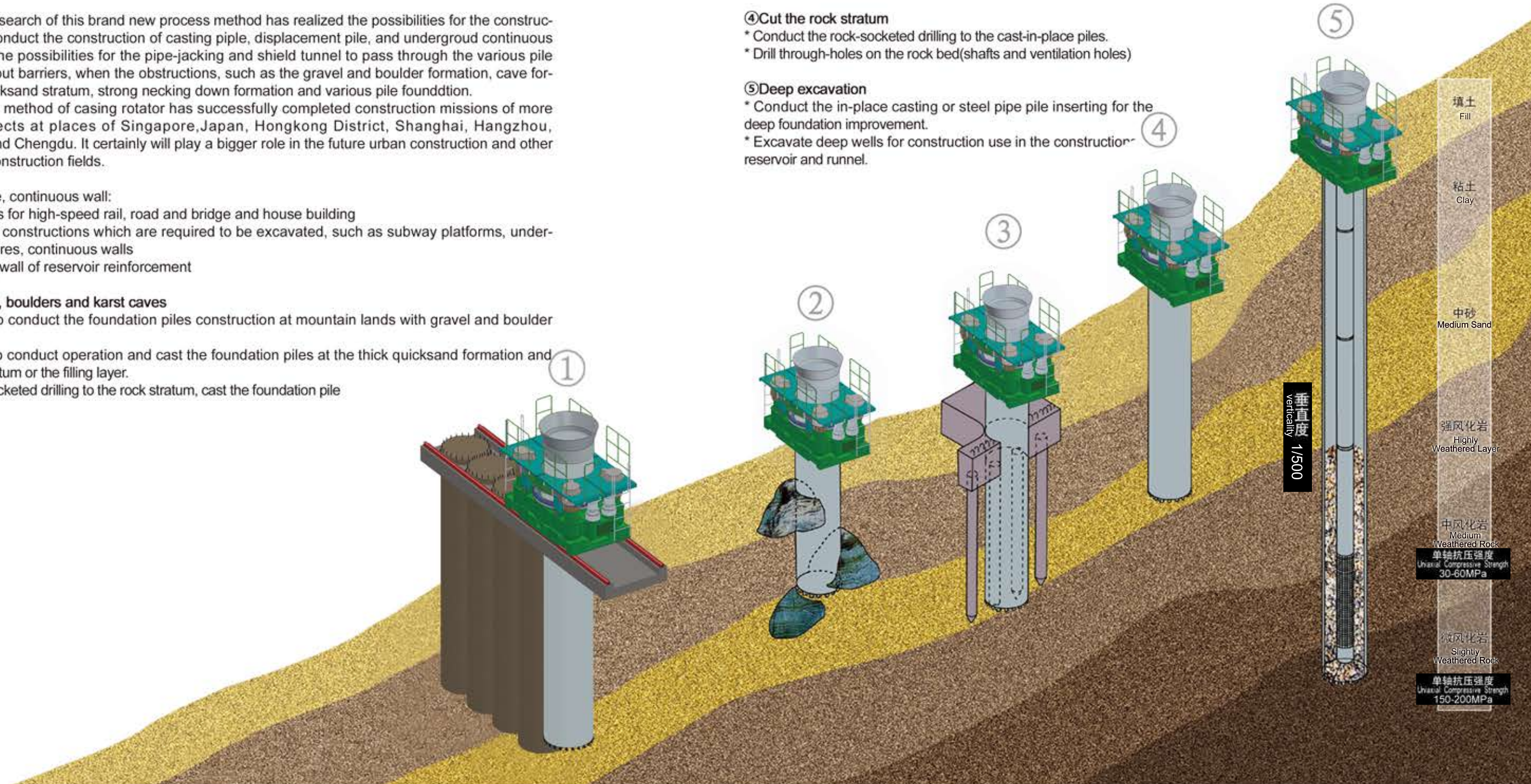
- * During the urban construction and bridge rebuilding, the obstructions such as the steel reinforced concrete pile, steel pipe pile, H steel pile, pc pile and wood pile can be cleared directly, and cast the foundation pile on the spot.

④ Cut the rock stratum

- * Conduct the rock-socketed drilling to the cast-in-place piles.
- * Drill through-holes on the rock bed (shafts and ventilation holes)

⑤ Deep excavation

- * Conduct the in-place casting or steel pipe pile inserting for the deep foundation improvement.
- * Excavate deep wells for construction use in the construction- reservoir and runnel.





Remove the obstruction

Auxiliary Machines

Multi-head claw+Spiral drill head

- * The rotary drill head and spiral drill head can be selected and matched for the multi-head claw according to the requirements.
- * It works at a state of low noise and low vibration.
- * It can choose the number of suspension wire rope, so the small-scaled crane can be adopted for cooperation.



Multi-head claw+rotary drilling bucket

The multi-head claw is an internal excavation device of sleeve, which is powerful when removing the underground obstructions such as the reinforced concrete, steel pile and broken stone; it can effectively transfer the torque and pressing force of the sleeve.



Impact-grab bucket+heavy hammer

When the impact excavation cannot be conducted in the rock stratum or concrete piles, use the heavy hammer to repeat the impact, and excavate is with the impact-grab bucket after it is broken. This is a commonly adopted construction method of the cooperation of impact-grab+heavy hammer.



Impact-grab bucket

The grab bucket is the main internal impact excavation device of the casing. It relies on the big and small hangers of crane to complete the impact and excavation work.

- * During operation, the impact-grab bucket falls freely along the internal wall of casing, with the fast falling speed and strong impact force, the hard stratum can be directly impacted and excavated with a high working efficiency.
- * The bucket blade is in the shape of circular arc with heavy bucket body, it can realize the underwater with high working efficiency.
- * With the built-in pulley block, the grabbing force is multiplied with the increasing lifting force.



Principle and examples

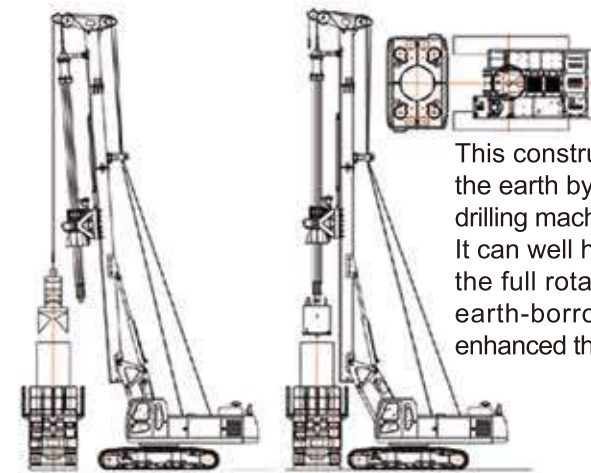
Pulling out (clearing) the old pile

The construction of adopting the casing rotator to pull out steel reinforced concrete piles cannot be completed by other machines. This construction method is: conduct the cutting work by using the casing to cover the pile body, then the strong rotary torque of casing can twist off the pile body and the impact-grab bucket grabs it out. According to different construction conditions, the construction methods of division cutting-off, entire pulling-out, heavy hammer breaking and multi-head claw mashing can be adopted for the clearing.



Combination construction method

Rotary drill and casing rotator



This construction method is a method to borrow the earth by using the casing rotator as the major drilling machine, with the cooperation of rotary drill. It can well highlight the respective advantages of the full rotary to drill into the rock and the rapid earth-borrow of rotary drill, which has greatly enhanced the work efficiency.



Drilling performance of machine

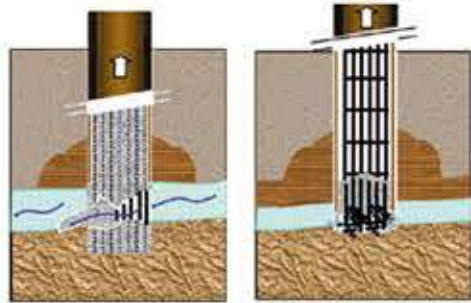


Rock drilling

The Casing rotator, with the strong torque and pressing force can complete the construction task in the hard rock formation. The rock hardness which can be drilled can reach: the uniaxial compressive strength of 150-200MPa; Because of the perfect cutting performance, it has been widely applied in the clearing constructions of cutting concrete blocks, high strength bolts, H piles and steel pipe piles.

Drill through the karst cave and conduct the casing pile construction

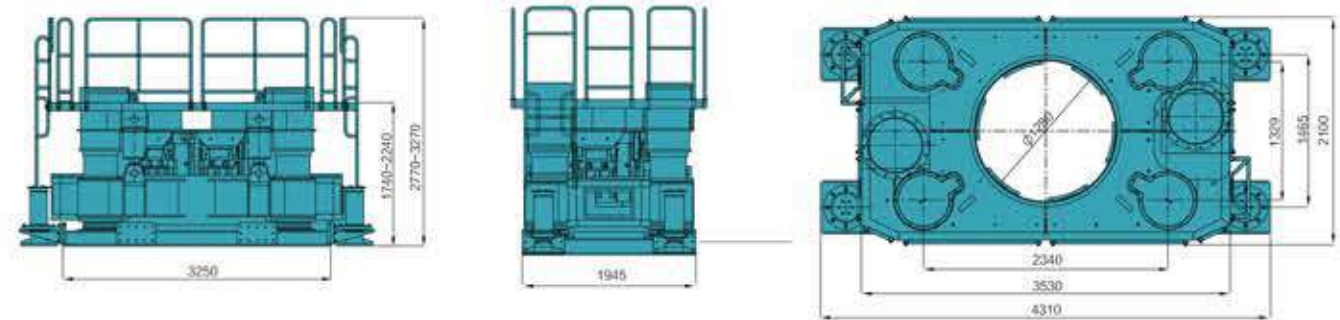
The casing rotator possesses an incomparable advantage than other construction technologies: there is no need to refill the rock block and use additional casing. With the good verticality adjusting performance, the self-control properties of drilling pressure and torque, It can easily complete the drilling work trough the karst cave. When conducting the concrete casting in the karst cave, the operation is conducted in the casing. So the concrete added with setting accelerator is not easily lost. And because of the powerful pulling force of the drill, the pulling can be delayed. So, it can well complete the cast pile constructon in the cave.



FES1305Y Casing Rotator

The main technical parameters of working device:

Diameter of drill hole	mm	φ600~ φ1300
Rotary torque	kN · m	1030/609/344 Instantaneous 1130
Rotary speed	rpm	1.9/3.3/5.8
Lower pressure of sleeve	kN	Max.300
Puling force of sleeve	kN	2690
Pressure-pulling stroke	mm	500
Weight	ton	28 (With transition frame, without reducer blocks)

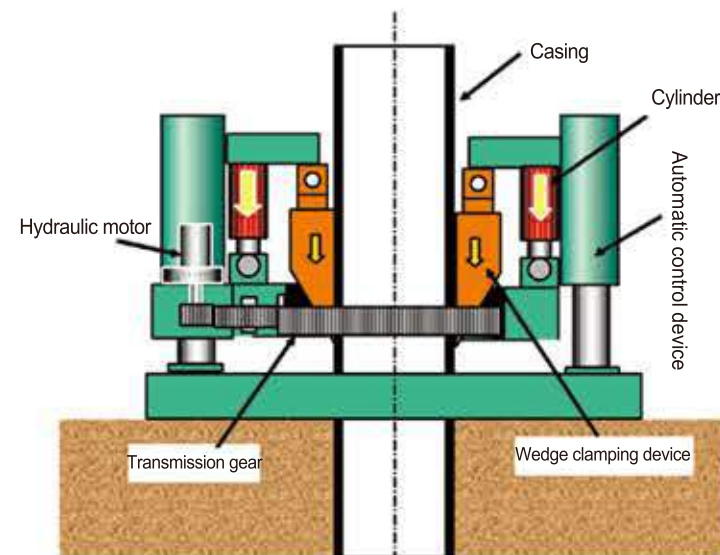


Automatic control device

Working Principle

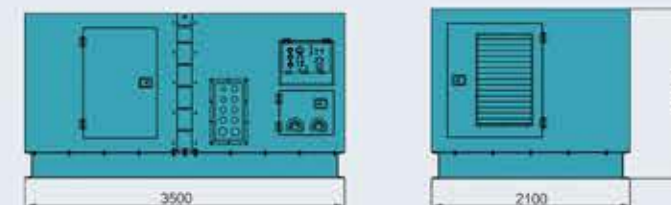
The automatic control device, which is the cutter head load control device, controls the pressure of thrust hydraulic oil cylinder, makes the cutter head load not change with the changes of the casing weight and the surrounding resistance, and keeps the machine in its optimum working state.

This is the most advanced automatic control system in the world. It is a perfect representation of the integrated machine, power and fluid, which has greatly enhanced the safety and working efficiency of the construction.



Major technical parameters of hydraulic power station:

Engine Model		Cummins QSB6.7-C260
Engine Power	kw/rpm	194 / 2200
Fuel consumption of engine	g/kwh	222 (when the maximum power rate)
weight	ton	8
Control mode		Wired remote control / wireless remote control



FES1505

Casing Rotator

FES1605H

Casing Rotator

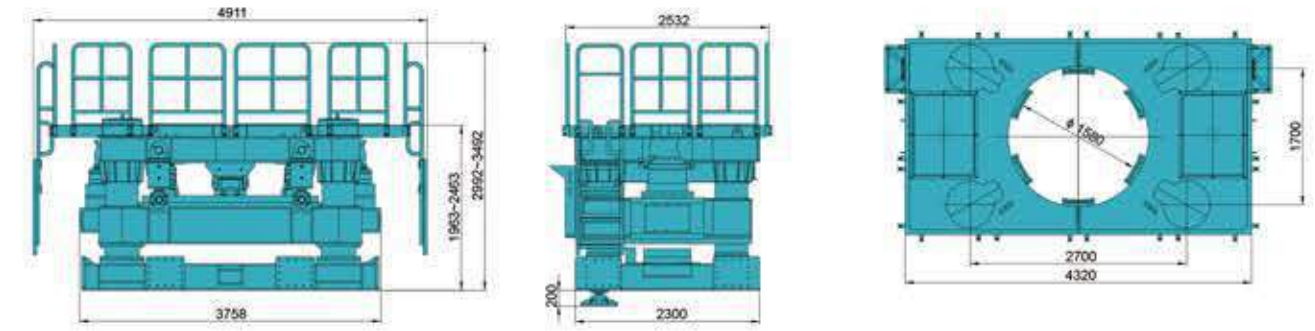
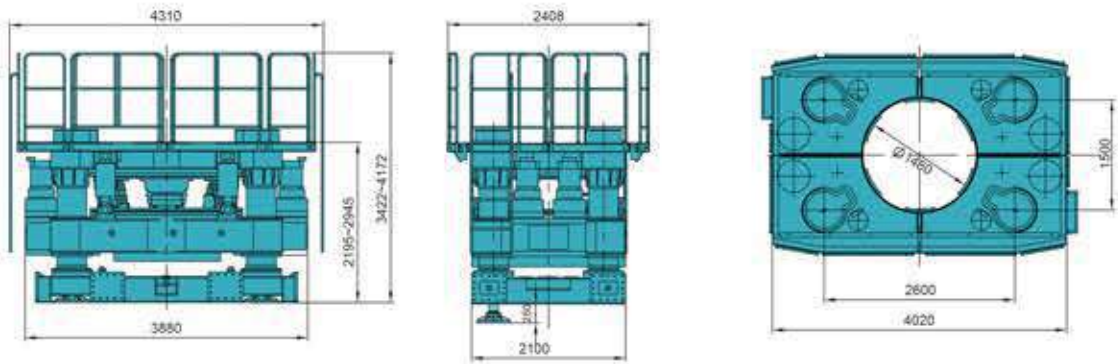


The main technical parameters of working device:

Diameter of drill hole	mm	φ800~φ1500
Rotary torque	kN · m	1018/815/509 instantaneous 1117
Rotary speed	rpm	2.0/2.5/4.0
Rotary motor model		A6VM200 four pieces
Lower pressure of sleeve	kN	Max.360
Pulling force of sleeve	kN	2444 Instantaneous 2690
Pressure-pulling stroke	mm	750
Weight	ton	34 (With transition frame, without reducer blocks)

The main technical parameters of working device:

Diameter of drill hole	mm	φ800~φ1600
Rotary torque	kN · m	1248/738/417 Instantaneous 1369
Rotary speed	rpm	1.6/2.7/4.8
Lower pressure of sleeve	kN	Max.360
Pulling force of sleeve	kN	2444 Instantaneous 2690
Pressure-pulling stroke	mm	500
Weight	ton	31.5 (With transition frame, without reducer blocks)

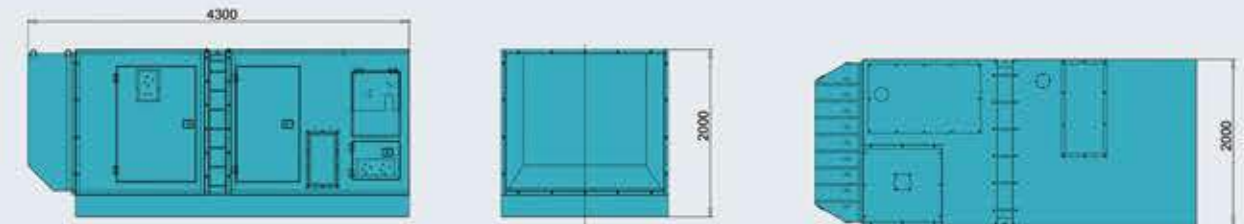
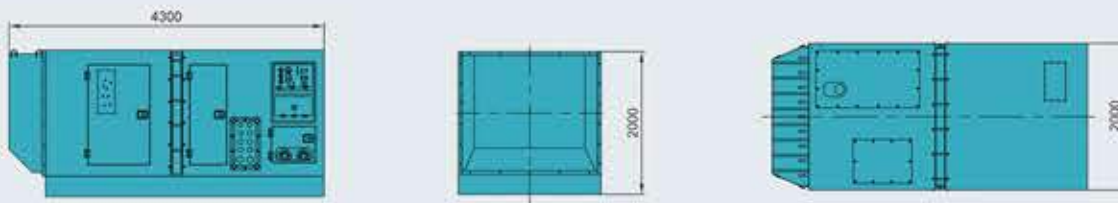


Major technical parameters of hydraulic power station:

Engine Model		Cummins QSB6.7-C260
Engine Power	kw/rpm	194 / 2200
Fuel consumption of engine	g/kwh	222 (when the maximum power rate)
weight	ton	8
Control mode		Wired remote control/wireless remote control

Major technical parameters of hydraulic power station:

Engine Model		Cummins QSB6.7-C260
Engine Power	kw/rpm	194 / 2200
Fuel consumption of engine	g/kwh	222 (when the maximum power rate)
weight	ton	8
Control mode		Wired remote control/wireless remote control

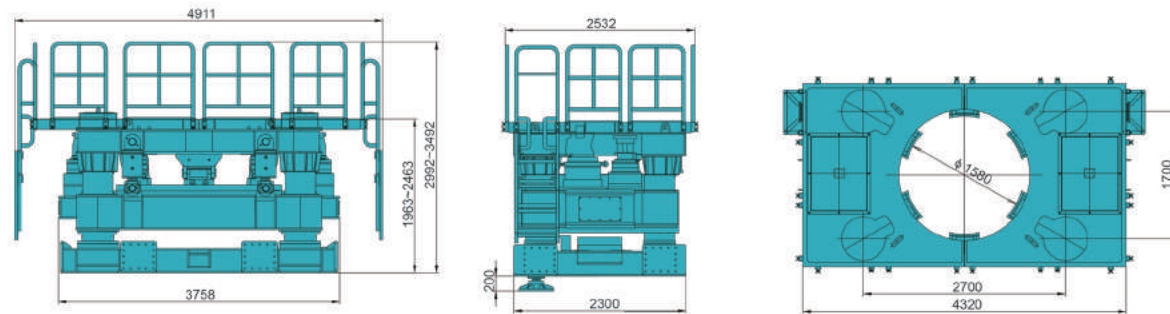


FES1605HH

Casing Rotator

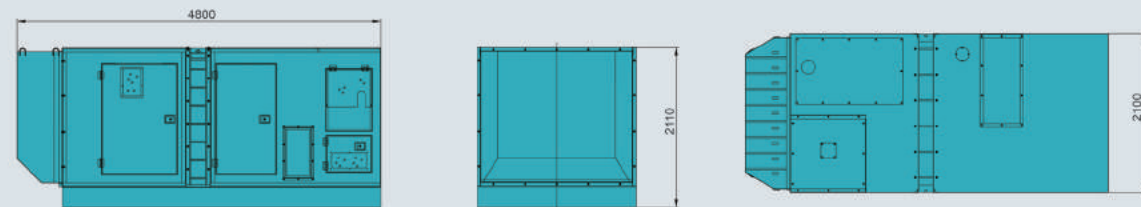
The main technical parameters of working device:

Diameter of drill hole	mm	∅800-∅1600
Rotary torque	kN·m	1792/1282/961 Instantaneous 1913
Rotary speed	rpm	1.5/2.0/2.7
Rotary motor model	A6VM200 four pieces + M3B530AP four pieces	
Lower pressure of sleeve	kN	Max.360
Pulling force of sleeve	kN	2444 Instantaneous 2690
Pressure-pulling stroke	mm	500
Weight	ton	33 (With transition frame, without reducer blocks)



Major technical parameters of hydraulic power station:

Engine Model	Cummins QSM11-335	
Engine Power	kw/rpm	272/1800
Fuel consumption of engine	g/kwh	216(when the maximum power rate)
weight	ton	8
Control mode	Wired remote control+wireless remote control	

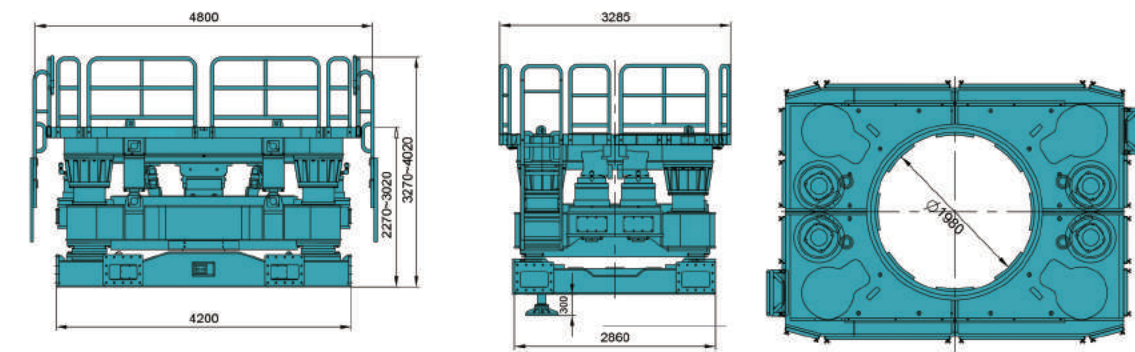


FES2005H

Casing Rotator

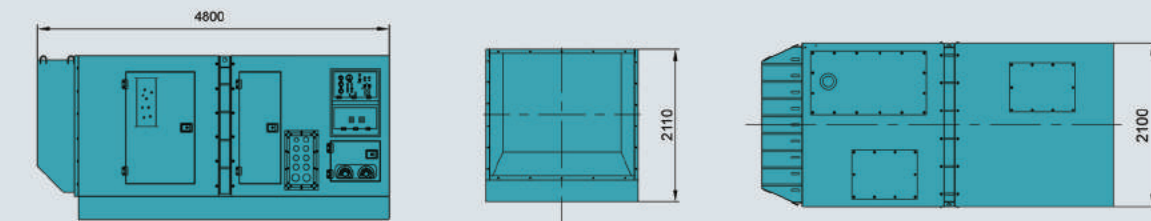
The main technical parameters of working device:

Diameter of drill hole	mm	∅1000-∅2000
Rotary torque	kN·m	2965/1752/990 Instantaneous 3391
Rotary speed	rpm	1.0/1.7/2.9
Lower pressure of sleeve	kN	Max.600
Pulling force of sleeve	kN	3760 Instantaneous 4300
Pressure-pulling stroke	mm	750
Weight	ton	46 (With transition frame, without reducer blocks)



Major technical parameters of hydraulic power station:

Engine Model	Cummins QSM11-335	
Engine Power	kw/rpm	272/1800
Fuel consumption of engine	g/kwh	216 (when the maximum power rate)
weight	ton	8
Control mode	Wired remote control+wireless remote control	

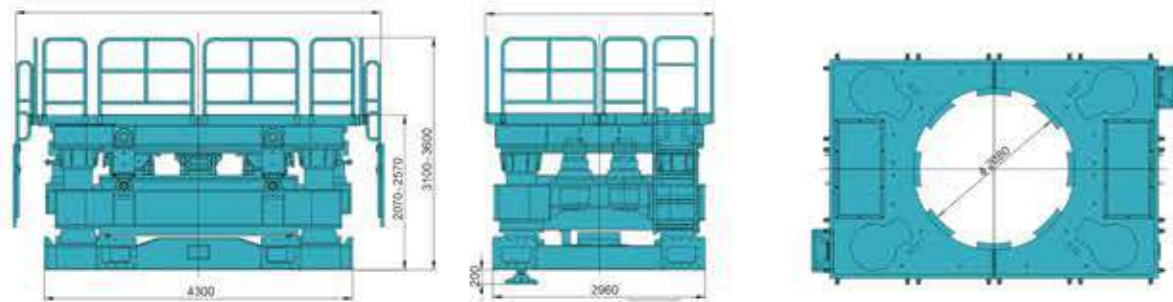


FES2106H

Casing Rotator

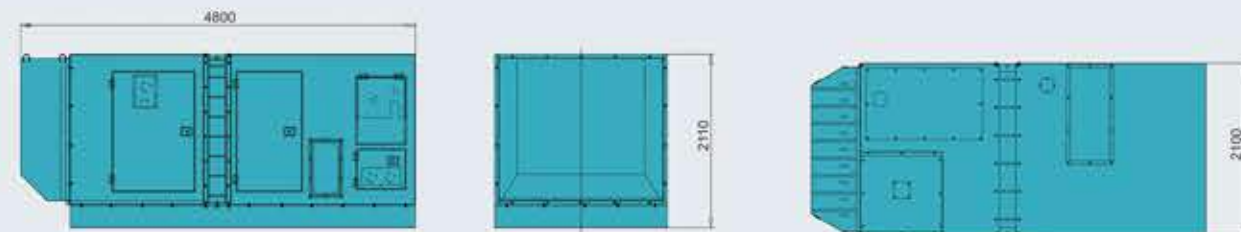
The main technical parameters of working device:

Diameter of drill hole	mm	φ1000-φ2100
Rotary torque	kN·m	3085/1823/1030 Instantaneous 3505
Rotary speed	rpm	0.9/1.5/2.7
Lower pressure of sleeve	kN	Max.600
Pulling force of sleeve	kN	3760 Instantaneous 4300
Pressure-pulling stroke	mm	500
Weight	ton	48 (With transition frame, without reducer blocks)



Major technical parameters of hydraulic power station:

Engine Model	Cummins QSM11-335
Engine Power	kw/rpm 272/1800
Fuel consumption of engine	g/kwh 216(when the maximum power rate)
weight	ton 8
Control mode	Wired remote control+wireless remote control

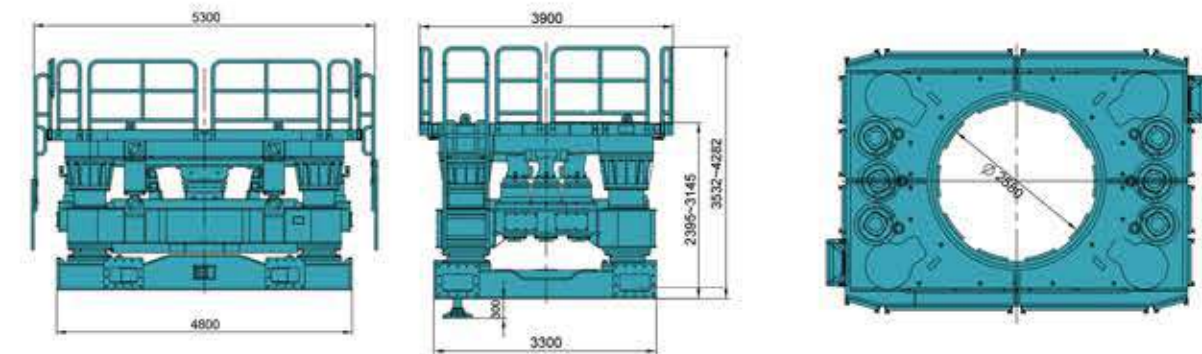


FES2605H

Casing Rotator

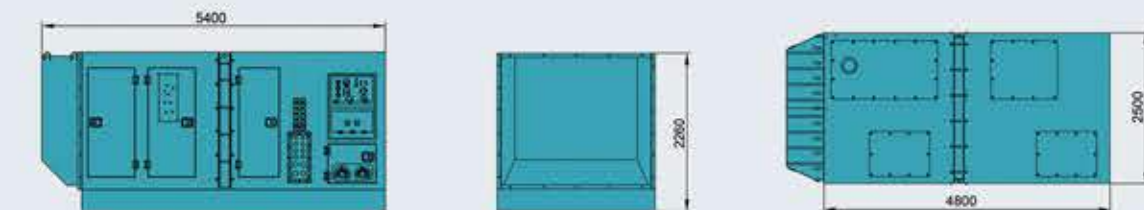
The main technical parameters of working device:

Diameter of drill hole	mm	φ1200-φ2600
Rotary torque	kN·m	5292/3127/1766 Instantaneous 6174
Rotary speed	rpm	0.6/1.0/1.8
Lower pressure of sleeve	kN	Max.830
Pulling force of sleeve	kN	3800 Instantaneous 4340
Pressure-pulling stroke	mm	750
Weight	ton	56 (With transition frame, without reducer blocks)



Major technical parameters of hydraulic power station:

Engine Model	Cummins QSX15-500
Engine Power	kw/rpm 441/1800
Fuel consumption of engine	g/kwh 213(when the maximum power rate)
weight	ton 13
Control mode	Wired remote control+wireless remote control



FES3205H

Casing Rotator



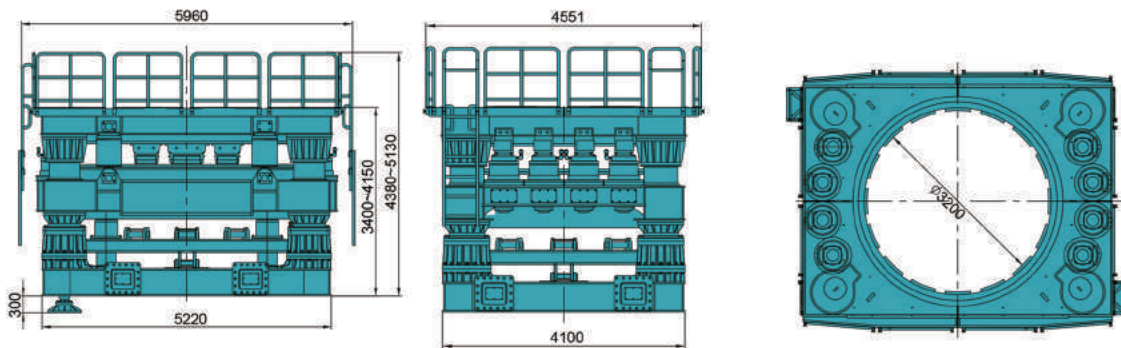
The advantages of casing rotator

FES

The advantages of adopting the casing rotator for construction

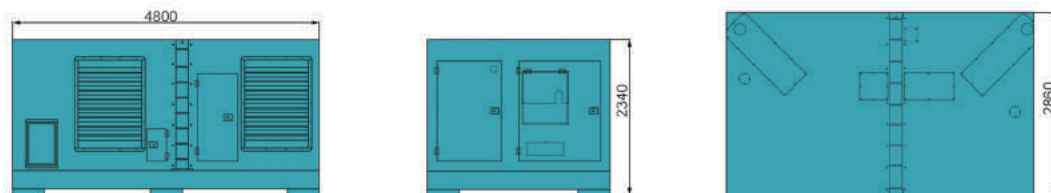
The main technical parameters of working device:

Diameter of drill hole	mm	φ2000-φ3200
Rotary torque	kN·m	9080/5368/3034 Instantaneous 10593
Rotary speed	rpm	0.6/1.0/1.8
Lower pressure of sleeve	kN	Max.1100
Pulling force of sleeve	kN	7237 Instantaneous 8370
Pressure-pulling stroke	mm	750
Weight	ton	96 (With wedge-shaped auxiliary clamping, transition frame, without reducer)

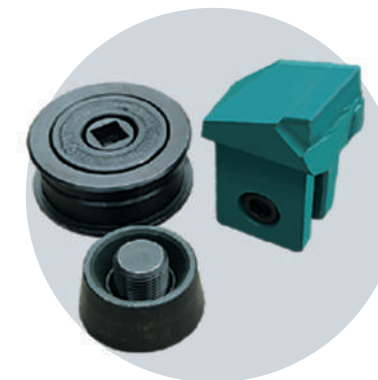


Major technical parameters of hydraulic power station:

Engine Model		Cummins QSM11-335
Engine Power	kw/rpm	2 × 272/1800
Fuel consumption of engine	g/kwh	216 × 2 (when the maximum power rate)
weight	ton	13
Control mode		Wired remote control+wireless remote control



- ▲ No noise, no vibration, and high safety;
- ▲ Without mud, clean working surface, good environmental friendliness, avoiding the possibility for mud to enter the concrete, high pile quality, enhancing the bond stress of concrete to the steel bar;
- ▲ During construction drilling, the characteristics of stratum and rock can be directly distinguished;
- ▲ The drilling speed is fast and reaches about 14m/h for the general soil layer;
- ▲ The drilling depth is large and reaches about 143.8m according to the situation of soil layer;
- ▲ The hole forming verticality is easy to master, which can be accurate to 1/500;
- ▲ No hole collapse will be caused, and the hole forming quality is high.
- ▲ The hole forming diameter is standard, with little filling factor, being compared with other hole forming methods, it can save a lot of concrete usage;
- ▲ The hole clearing is thorough and fast. The drilling mud at the hole bottom can be clear to about 3.0 cm.



Casing Rotator
Construction cases



Nanjing DaShengguan site: Underground pipe gallery construction



NingBo pile pulling site construction



Project construction of Guiyang Guizhou Free Trade Zone



Nanjing Electric Power Company Continuous wall project of the underground pipe gallery



Xuzhou 2# metro line WenBoyuan Station interdigitated pile construction



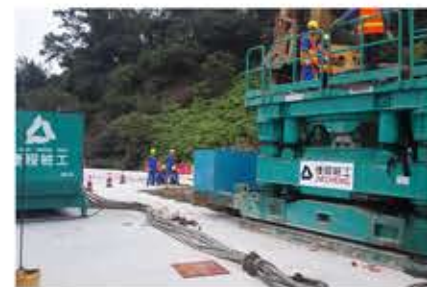
Beijing 14# subway line Pingleyuan Station steel upright post insert construction



Jiujiang China twenty-four Bureau 's Jiu.Jingqu railway project construction



Sichuan Taiping Station of Chenglan railway' s Sixian bridge construction



Xiamen Haicang the cross-sea Metro Construction



Subway pile foundation construction approaching to Beijing biological bases



Shenzhen sewage treatment plant project II:secant pile construction



Longyan:China Railway first Bureau XiNan south road Underground passageway



Liuzhou Metro:Secant pile construction



Guiguang high-speed rail construction



Fuzhou #2 Metro line:Pile pulling construction



Vanke Shenzhen Binhai landmark project inserted steel column construction



WeiQi road of Nanjing Jiangbei new area:Rapid transformation I



Ningbo rail transit line 4 construction



Guiyang Shanghai-Kunming line foundation pile construction



Trends Property Site in Yuanzhou District, Yichun City, Jiangxi Province



The first people's Hospital of Hefei interdigitated pile construction