SR180M

SANY SR180M ROTARY DRILLING RIG

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Multi-functional drilling rig SR180M integrates Kelly system and CFA system which is mainly used in pile foundation of civil engineering and small bridge construction. Equipped with the professional chassis, electro hydraulic control system, CFA construction management system, it features high efficiency, high reliability and stability.

1. High stability: equipped with new chassis designed for rotary drilling rig and adopt gravity optimization technology to double the machine stability.
2. Strong drilling ability: The max. drilling depth is 24m (CFA)/56m (Kelly) and the max. pull force is 640kN which break the record and take the leading position in the international market.
3. High efficiency: the originated self-crowding device (CFA) can provide 50kN self-crowding force, which improves the working efficiency when drilling in hard soil and loose pebble layers.
4. New multi ratio rotary drive (CFA): adopt multi ratio rotary drive which can increase the lifting force greatly and ensures it is large enough when drilling large hole.

Remark: in this brochure, (CFA) stands for rig fitted with CFA system; (Kelly) stands for rig fitted with Kelly system.
**PROFESSIONAL**

New chassis designed for rotary drilling rig

More stable

Equipped with a new chassis designed for rotary drilling rig; adopt gravity optimization technology; the chassis weight can be up to 55% of the whole machine; the machine stability is doubled; the vibration is reduced greatly even when drilling in pebble layers.

More powerful

The professional electro-hydraulic control system increases the output power of the pump; the excellent travelling reducer increases the travelling, turning and traction ability by over 10%.

Easier-to-operate

The 10.4 inch display, integrating the operation of under carriage and upper carriage, facilitates data enquiring; user friendly interface with full-color and full graphics display brings new interactive experience; the ergonomic design of handrails and steps, hole lamp, winch lamp and sunroof windshield wiper provides safer, more comfortable and more efficient operation.

**RELIABLE**

Stable structure and high reliability

Stable structure

Strengthened swing bearing and swing brake increase construction stability and braking ability. The proposed auxiliary winch and reinforced boom structure improve the stiffness of base machine.

The high strength H frame made of the imported steel and welded by robot which passes the stress analysis and fatigue test has longer service life and higher reliability.

Double adjusting structure (CFA)

Originated double adjusting structure of large triangle and parallelogram provides more flexibility and stability to the machine.

Integrated harness of high-performance and connectors of high protection level

Integrated harness is more reliable and reduces the failure significantly.

High precision oil filtering system

Statistics of authoritative sources indicate 70%-80% hydraulic failures are caused by low cleanliness of hydraulic oil. Equipped with high precision filtering system, the cleanliness of hydraulic oil can be improved to above level NASA8 and the hydraulic failures are decreased significantly.

Excellent imported components

Imported ISUZU engine, CAT, KAWASAKI main pump and auxiliary pump provide more power and higher reliability.
INTELLIGENT
The most intelligent rotary drilling rig

Intelligent Kelly bar protection technology
Sany unique intelligent Kelly bar protection technology can realize real-time monitoring, alarm in time and reduce Kelly bar clamping stagnation frequencies by over 80%, it can also reduce the impacts on equipment effectively and prolong the service life of machine.

Real-time display of backstay movement (CFA)
The unique control system can display the working status in real time to avoid the misoperation during the movement of backstay cylinder.

Intelligent construction management system (optional)
Intelligent construction management system can automatically collect and display main parameters such as pile shape, inner pressure and pile vertically to facilitate drilling operation.

Self-adjusting function of backstay cylinder
During construction, the backstay cylinder can make self-adjusting automatically, so it is easier-to-operate and more intelligent.

Intelligent security protection
Detection in real time makes sure the machine safety during working, traveling and rigging/derigging.

Intelligent troubleshooting technology
Through data scanning of engine, hydraulic system and control system, intelligent troubleshooting technology can diagnose if the machine works normally, shut down the machine when malfunction appears, prompt trouble spot automatically and provide fault code to increase troubleshooting efficiency.

Intelligent wire rope self-protection technology
Sany unique wire rope self-protection technology prevents rope twist and increases the service life of rope by over 30%.
FASTER
Reduce average pore-making time by 20%

Technology of fast main rope lifting/lowering speed
Sany unique technology of fast main rope lifting/lowering speed can reduce time during lifting and lowering drilling bucket, so the construction time can be saved by 10-20%.

In fast crowding and lifting mode, the speed of moving rotary drive up can be increased by 3 times, so the working efficiency can be increased significantly.

Self-crowding device (CFA)
The originated self-crowding device can provide 50kN crowding force and 18m crowding stroke, which improves the working efficiency when drilling in hard soil and loose pebble layers.

Multi ratio lifting technology (CFA)
Adopt multi ratio lifting technology; the max. pull force of 640kN is at the forefront of the industry.

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Two speed modes to choose
Rotary drive moves to locking recesses at high speed and performs crowded drilling at low speed; Select different working modes according to various working conditions to increase drilling speed by 20%.

Hard layer
Soft layer
Regular layer

Energy saving technology
Engine perfectly matches the hydraulic system; adopt various energy saving technologies to achieve high cost-effective fuel consumption. 10-40% fuel consumption can be saved.

Auxiliary winch used as a small crane
Auxiliary winch with optimized design can be used as a small crane which can increase construction efficiency and save construction cost. Patented rope guard technology can avoid rope twist and prolong service life of wire rope.

Pulley yoke auto folding technology
Modular designed pulley yoke with folding cylinder features convenience for disassembly and saving manpower.

Faster and more convenient maintenance
Add 24 testing ports to reduce troubleshooting time greatly
NEW ROTARY DRIVE

The 3rd new generation of rotary drive with excellent performance

New key components

- Optimize transmission configuration to increase the service life of motor and reducer by 3 times.
- Adopt aero shock absorber instead of the traditional one to increase the damping ability by 4.3 times (Kelly).

New function

- Adopt new great purification function to improve the fluid cleanliness up to above level NAS9, which prolongs the service life of key components such as bearing and gear.

New structure

- Multi ratio rotary drive lifting device increases pull force significantly (CFA).
- Adopt new bushing to increase the guiding ability of Kelly bar by 87.6%, which improves the drilling accuracy and prolongs Kelly bar service life (Kelly).
- Adopt new way of installing key bar to facilitate installation and maintenance (Kelly).
- Adopt new oil seal to prevent mud entering and oil leaking.
- Adopt new discharge device to realize discharging oil completely without lowering the mast, which increases service efficiency by 40%.
- Adopt new slag discharge structure to realize discharging slag and changing oil thoroughly.
- The stiffness of structural parts is increased by 58%; the rig is more stable and the hole quality is higher.
- Sany unique patented technology of changeable drive key with symmetrical structure doubles the service life of drive key.

ADVANCED TEST SYSTEM

The biggest, most advanced and comprehensive test system

4000 m² professional testing ground and 6 rotary drilling rigs specially used for testing!
The ongoing 24 hours reliability test on mechanical, hydraulic and electrical system!
Eliminate each fault before delivery; make sure the customers will take no risk!
Each new function is built on experimental verification until it is mature!

¥100,000,000 test equipment
¥20,000,000 test consumption
30 professional testing personnel
CONSTRUCTION METHOD

We provide not only a machine, but also the unique technical support on construction method

Technical support of construction method
According to geological report and construction requirements, we provide customers with total solution which includes equipment configuration, cost analysis and construction management. In the respects of construction plan design, on-site technical guidance and customers' special requirements, etc., customers who buy our products will buy the rest assured and will be free from worry in future use.

Solving various problems
If you have encountered such problems as hard rock unable to drill, hole collapse on soft ground, oversized hole, eccentric hole-drilling, sediment too thick? Sany technical support team on construction method will provide you with technical support and on-site guidance for free.

New standard, new construction method and new equipment research
Participate in making GB Rotary Drilling Rig, GB General Regulations of Rotary Drilling Rig Construction and Rotary Drilling Rig Telescopic Kelly Bar; Research on all-casing construction method, secant piling construction method, mud purification, developing special drilling tool, etc. All these will help you on construction, expanding construction range, increasing construction efficiency and profits.
The LARGEST INTELLIGENT PLANT

No.1 workshop of Nankou Industrial Park is an important part of Beijing Sany Manufacturing Center. The production area is 40,000, and the total investment is 230 million USD. By the end of 2011, it had achieved the capacity of manufacturing 1500 rotary drilling rigs per year. It has a modern production line with greatest output and highest level of automation.
**Integrated parameter**

<table>
<thead>
<tr>
<th>Main performance</th>
<th>Unit</th>
<th>CPA equipment</th>
<th>Kelly equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall height</td>
<td>m</td>
<td>28.559</td>
<td>19.930</td>
</tr>
<tr>
<td>Operating weight (including normal Kelly bar)</td>
<td></td>
<td>55</td>
<td>56</td>
</tr>
<tr>
<td>Max. pile diameter</td>
<td>mm</td>
<td>1,000</td>
<td>1,600</td>
</tr>
<tr>
<td>Max. pile depth</td>
<td>m</td>
<td>20(Φ100)/24(Φ800)</td>
<td>65</td>
</tr>
<tr>
<td><strong>Rotary Drive</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. output torque</td>
<td>kN·m</td>
<td>185</td>
<td>185</td>
</tr>
<tr>
<td>Speed of rotation</td>
<td>rpm</td>
<td>7-50</td>
<td>2-30</td>
</tr>
<tr>
<td><strong>Crowd system</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crowd force</td>
<td>kN</td>
<td>50</td>
<td>185</td>
</tr>
<tr>
<td>Line pull</td>
<td>kN</td>
<td>/</td>
<td>190</td>
</tr>
<tr>
<td>Stroke</td>
<td>mm</td>
<td>17,770</td>
<td>4,250</td>
</tr>
<tr>
<td><strong>Main winch</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line pull (1st layer)</td>
<td>kN</td>
<td>44+180</td>
<td>180</td>
</tr>
<tr>
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<td>mm</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td><strong>Auxiliary winch</strong></td>
<td></td>
<td></td>
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<tr>
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<td>mm</td>
<td>14</td>
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</tr>
<tr>
<td><strong>Engine</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of cylinder-bore x stroke</td>
<td></td>
<td>6×133×34mm</td>
<td></td>
</tr>
<tr>
<td>Engine</td>
<td></td>
<td>7.79L</td>
<td></td>
</tr>
<tr>
<td>Engine displacement</td>
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</table>

**Engine parameter**

| Chassis model                          | SY280R |
| Chassis length                         | 6,100mm |
| Extended width                         | 4100mm  |
| Track width                            | 700mm   |
| Swing radius (frenside/fackside)       | 3,700mm |
| Transport width                        | 3,100mm |
| Transport height                       | 3,280mm |
| Engine                                  | ISUZU AA-6HK1XQP |
| Engine power                            | 183.9kW@2000rpm |
| Fuel                                    | Diesel oil (JIS Type 2) |
| Emission standard                      | EU stage II/EPA Tier 2 |
| No. of cylinder-bore x stroke          | 6×133×34mm |
| Engine displacement                    | 7.79L   |

**Standard equipment/Optional equipment**

- Mast vertically measuring
- Line angle measuring
- Real time drilling depth measuring
- Main winch pull measuring
- Oil pressure measuring device
- GPS/GPS data transmission
- Diesel engine fault diagnosis
- PLC control module
- Auto/manual mast vertically adjusting function
- Main winch floating control function
- Auto idle mode
- Cab collision protection
- Electrical protection module
- Ground touching protection
- Slow jar

**Standard**

**Optional**

**Transport dimensions**

Steps for switching CPA system to Kelly system

Steps:
1. Remove CPA pulley yoke (1), upper mast (2), upper mast extension (3), backstay (4), guide rod (5), CPA auger (7), auger cleaner (8) and casing (9);
2. Install crowd cylinder (10), upper mast for Kelly system (11), pulley yoke for Kelly system (12), rope swivel (13), Kelly guide (14) and Kelly bar (15);
3. Assemble rotary drive (6) according to the pictures and steps on the right;
4. Add hydraulic lines to (10) and adjust the electrical procedures;
5. Drill bucket standard diameter of φ445-6×12.5m can realize the maximum drilling depth of 69m. The maximum diameter of drill bucket is 1600mm.

Steps:
1. Remove sheave block (1), sleeve (2), mounting seat of sleeve (4) and speed encoder (5) of CPA rotary drive;
2. Install buffer device (6) and lower pressure plate (7);
3. After the two steps above, the installation of rotary drive of Kelly system (8) is finished.

- Mast inclination
  - Forward ±5
  - Lateral ±5

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Advantages of Sany Kelly bar

1. Time verified
   Verified by long time using, economic and high efficient, Sany Kelly bar has been widely used in the civil foundation construction.
2. More reliable
   With the most advanced welding robots, CNC automatic cutting machines and other advanced equipments, high components precision and welding quality guarantee high reliability.
3. Longer service life
   Specific debugging field is established to simulate real Kelly bar working conditions to analyze and improve key parts, like the drive key service life is significantly increased with Sany self developed high strength anti-wearing steel.
4. Optimized structure
   Static analysis, dynamic analysis and fatigue analysis are taken with the most advanced analysis software like ANSYS and ADAMS during the designing process, which optimize Kelly bar with lighter weight and better structure without any missing of the design requirements. Dozens of patents have been applied by Sany in this field which keeps Sany’s leading position in China.

Sany drilling teeth

Compare with other drilling teeth, SANY drilling teeth features the following characteristics:

Better material. After many times of material testing, the wear resistance and the strength of SANY teeth are more than 30% higher than the general products in the market.

Construction based designing. SANY V20 drilling teeth has larger cutting angle and has higher working efficiency. SANY drilling bullet is more adaptive to pebble, gravel and soft rock geological formations.
CONSTRUCTION CASES

No matter what kind of terrain environment, Sany rotary drilling rig can work easily.

With characteristics of wide application, high construction efficiency, stable performance, excellent service, environmental protection and energy saving, Sany rotary drilling rigs are widely used in pile foundation of civil engineering, high-speed rail, highway, bridge, airport, water conservancy and hydropower engineering, etc.

No matter in city, desert, snow, mountain or river, with suitable drilling head and construction method, all construction issues can be resolved easily by Sany rotary drilling rigs.
One machine one parts manual.
Global service inspection patrolling is carried out every season.

One month’s special service for new machine, including new machine assembling, commissioning, delivery inspection and operator training.

Professional training for oversea clients holds in China twice a year.

Provide service cards and service stickers, set up Global Customer Support Hotline and Global Customer Support Email.

At present, the sales and service system has been established in 30 countries. 280 overseas customer support engineers are working overseas.

Set up 22 oversea parts warehouses, with more than 3,000 kinds of spare parts can be selected by customers.

Quality Changes The World  Service Create Value

Global Customer Support Email: rigservice@sany.com.cn
SANY ROTARY DRILLING RIG

Hydraulic Rotary Drilling Rig

- **SR150C**
  - Max. Drilling Depth: 51m
  - Max. Drilling Dia.: 1500mm

- **SR200C**
  - Max. Drilling Depth: 71m
  - Max. Drilling Dia.: 1800mm

- **SR200Ⅲ**
  - Max. Drilling Depth: 63m
  - Max. Drilling Dia.: 1800mm

- **SR220C**
  - Max. Drilling Depth: 70m
  - Max. Drilling Dia.: 2200mm

- **SR250**
  - Max. Drilling Depth: 70m
  - Max. Drilling Dia.: 2200mm

- **SR280R**
  - Max. Drilling Depth: 84m
  - Max. Drilling Dia.: 2200mm

- **SR280LH**
  - Max. Drilling Depth: 66m
  - Max. Drilling Dia.: 2000mm

- **SR280RⅡ**
  - Max. Drilling Depth: 84m
  - Max. Drilling Dia.: 2100mm

- **SR280RⅢ**
  - Max. Drilling Depth: 111m
  - Max. Drilling Dia.: 2100mm

- **SR285RC8**
  - Max. Drilling Depth: 103m
  - Max. Drilling Dia.: 2300mm

- **SR315RC8**
  - Max. Drilling Depth: 133m
  - Max. Drilling Dia.: 2500mm

- **SR360Ⅲ**
  - Max. Drilling Depth: 96m
  - Max. Drilling Dia.: 2500mm

- **SR385RC8**
  - Max. Drilling Depth: 116m
  - Max. Drilling Dia.: 2900mm

- **SR460**
  - Max. Drilling Depth: 122m
  - Max. Drilling Dia.: 3100mm

- **SR180M**
  - Max. Drilling Depth: 24m(20m)
  - Max. Drilling Dia.: 800mm(LM)

- **SR220C**
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Electro-hydraulic/Hydraulic Track Pile Driving Rig

- **SF808Ⅲ**
  - Main Winch Pull: 121KN
  - Max. Overall Height: 42m

- **SF808E**
  - Main Winch Pull: 110KN
  - Max. Overall Height: 44m

- **SFY858K (Hydraulic)**
  - Main Winch Pull: 150KN
  - Max. Overall Height: 44m

- **STM062A**
  - Type of tunnel shield: EPB
  - Total thrust: 36000KN
  - Thrust speed: 8mm/min
  - Driving power: 2000KVA

- **STM063D**
  - Type of tunnel shield: Open TBM
  - Total thrust: 36000KN
  - Thrust speed: 8mm/min
  - Driving power: 1000KVA

Tunnel Boring Machines

Hydraulic Diaphragm Wall Grab

- **SH350A**
  - Max. Excavation Depth: 60m
  - Max. Excavation Thickness: 1000mm

- **SH400C**
  - Max. Excavation Depth: 70m
  - Max. Excavation Thickness: 1500mm

- **SH520**
  - Max. Excavation Depth: 85m
  - Max. Excavation Thickness: 1500mm

Multifunctional Rotary Drilling Rig