PUMPING UNIT

Pumping units made in the Plant conform to API Spec 11 E, and the product was authorized to use API Spec 11 E monogram (Certificate NO.11 E-0066).

Beam Pumping Unit
Conventional beam pumping unit has advantages of simple structure, reliable performance, easy to install and maintain.

Characteristics of this kind of pumping unit:
1. Pumping units conform to API Spec 11 E.
2. The structure is simple and reasonable, it works smoothly with lower noise, easy to install and maintain.
3. Walking beam is a box or welded H steel beam with high strength, good rigidity and heavy capacity.
4. Gear reducer uses herringbone involutes or double circular-arc gears with high bearing capacity and long working life.
5. Horse head with swinging device move side or upwards is flexible and convenient for well workover.
6. Central bearing and equalizer bearing feature heavy duty and reliable seal by adopting medium and wide series roller bearings.
7. Self-aligning bearing is used on equalizer to reduce mounting error and operating vibration.
8. Internal expansion or external contracting brake with safety device is easy, quick and effective for operating.

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Double-horsehead Pumping Unit

Double-horsehead pumping unit is an energy saving product that has a long stroke and low SPM. It is used for pumping oil of middle and high viscosity and high water content.

In addition to the common advantages of conventional beam pumping unit, the unit has advantages of long in stroke length, small in dynamic loads and variation of the torque, high in efficiency, low in energy consumption, smooth in operation and easy in start, etc. A multi-purpose electric cabinet is incorporated in the unit, which has the functions of short circuit protection, overload or underload protection, offset without work, automatic start after power resuming, over speed control of the motor, etc. It is made of the materials cut by numerically controlled flame cutting machines to ensure accuracy and surface quality. As compared with the same model of the conventional pumping unit, it increases the stroke length by about 70%, reduces energy consumption by 20-30% and decreases unit installed capacity by about 50%.

The unit is new in structure and evident in energy saving. It was taken as a stressed spreading project by CNPC in 1994 and a nationally stressed spreading project in 1995.

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Motor Reversing Pumping Unit

Motor reversing pumping unit is a high efficiency and low energy consumption product. It employs the intelligent analog and digital control and uses the switched reluctance motor as the prime mover which the power factor is \( \cos \Phi = 1 \). As the transmission of the friction wheel is the working mechanism, the mechanical transmission line is short and the efficiency is high, realizing the reversion of the motor. The starting reversion is stable with low impact. The stroke and stroke frequency can be regulated independently and steplessly. The velocity of the up stroke and down stroke of the polished rod can be controlled respectively.

Its mechanical efficiency is about two times that of conventional beam pumping unit, its system efficiency reaches to 50%, and energy saving rate is about 46%. The product is an ideal pumping unit to replace conventional beam pumping unit.
Characteristics

1. Lower installed capacity and mechanical efficiency is over 95%. The electromotor power factor is $\cos \Phi \approx 1$, so it can improve the utilization ratio of transformer. The start-up current of motor is so low that it is only 30% of rated current, while the actual load is 150% of rated load. And motor can not be burned because of excellent motor protection system.

2. Symmetric balance can reach precise.

3. Stroke and SPM can be regulated steplessly which makes it adaptable for well condition easily in a few minutes. The pump efficiency will be improved accordingly.

4. High efficiency and low power consumption. In normal cases, the system efficiency can reach 40-50%.

5. The unit is adaptable for drawing viscous crude and adjusting the parameter properly, it can ease the problem of eccentric wear of sucker rod and tubing.

6. Work system adopts the friction transmission when the pump is blocked, the friction system can slide to avoid overload, it can stop running automatically for protecting.

7. Because the center of gravity is set in the frame of unit, it is safe to people and livestock.

8. Easy maintenance. Transmission parts has only two inlets of filling lubricant, the electric system is equipped with self-examination indicator when disorder.

9. Easy operation. Stroke can be regulated within a few minutes and SPM can be regulated within a few seconds without extra-devices.

The wireless concentrate monitoring and controlling interface are available.
 Transmission structure of work system, which are consist of switched reluctance Motor (1), cycloidal-pin gear speed reducer (2) and friction wheel (3), is set up on the up-platform. Control system is the other part of work system.
Switched Reluctance Motor
Power factor is $\cos \Phi \approx 1$, mechanical efficiency can reach 95%. It is simple mechanism, reliably working and is adaptable for alternatively rotating frequently. When start-up current is 150% of rated torque, start-up current is 30% of rated current. There is not peak load when working.

Cycloidal-pin Gear Speed Reducer
It is small and light and suitable for frequently rotating alternatively. It is also high transmission ratio and efficiency, high excess load ability, low breakdown ratio, long operation life, easy maintenance and reliably working.

Friction Transmission Mechanism
Steel rope is flexible and of long operation life. When pump is blocked, raising rope make a slide on the surface of friction wheel for protecting sucker rod and sucker rod pump.

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