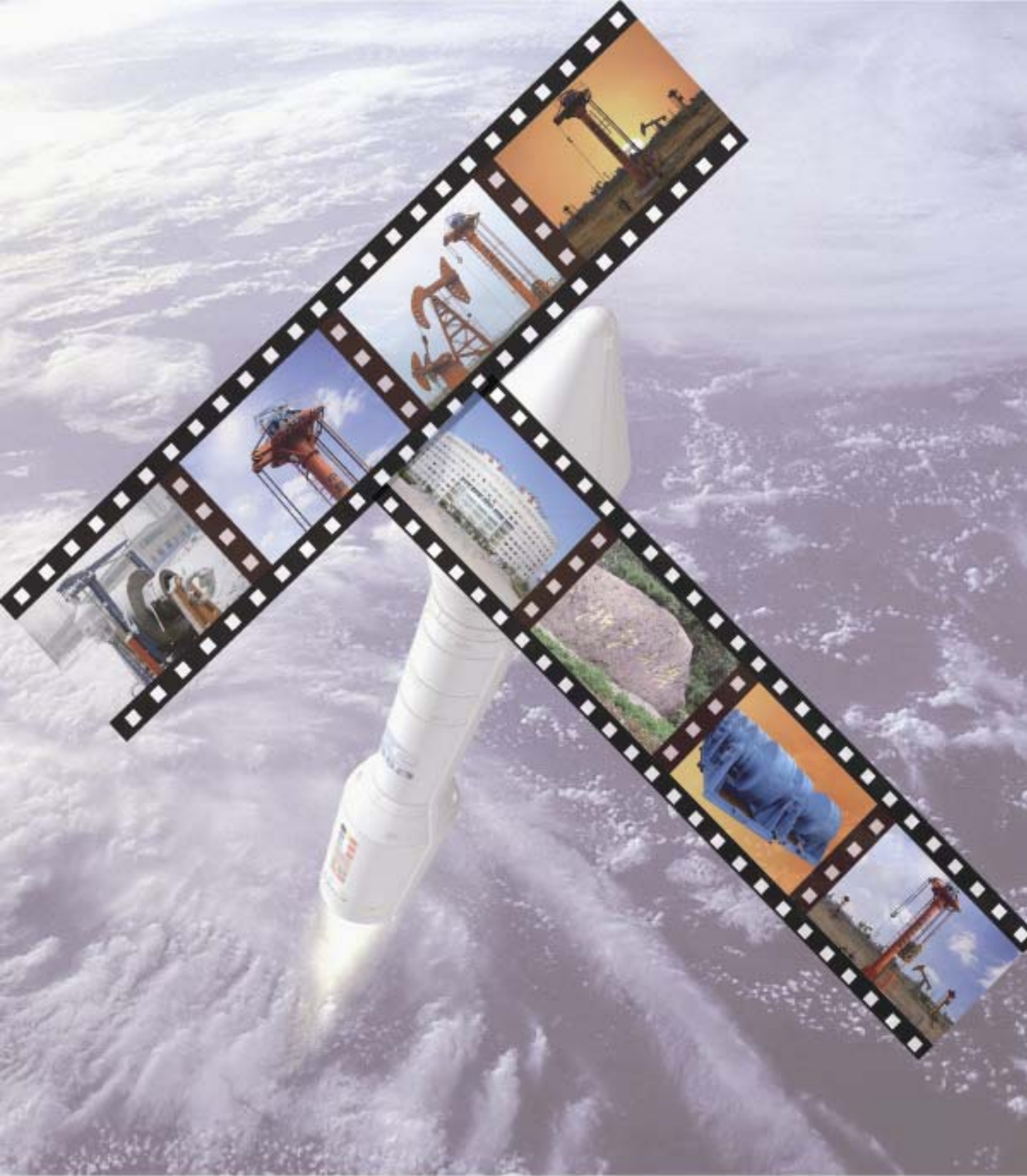




GUIZHOU AEROSPACE LINQUAN MOTOR CO.,LTD





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Corporation Profile

Linquan Petroleum Equipment Co., Ltd is a high-tech enterprise, which belongs to 061 Base, a key Aerospace Science & Industry Corporation in China that owns permits issued by Commission of Science Technology and Industry for National Defense of China, has a total asset of USD 1.5 billion and 15,000 employees. It has been awarded with the GJB9001A-2001 quality system certification. Linquan is committed to the research and development of oil-field equipment of high efficiency, energy-saving and environment friendly.

Linquan owns the intellectual property of Compound permanent magnetic electrical motor pumping unit (patent No.: 200520116972.3).

Product Introduction

The pumping unit is built in tower type structure, which consists of a compound permanent magnetic electric rotary motor supported by a tubular steel post. The motor directly drives the polished rod through belts. The stroke and the stroke frequency of the rod are steplessly adjusted within a given range through a frequency conversion unit. A suspended weight is used as a balanced weight. The base flange of the post is fixed to the foundation by bolts.



Product Features:

- (1) Simple and compact structure, light weight, and small area occupying space.

The components of the pumping unit include a compound permanent magnetic rotary motor and frequency conversion unit. Compared with conventional pumping units, it has no gear box and direction-changing mechanism. Therefore the pumping unit is simple and compact in structure.

- (2) Power saving up to 50%

With the advanced compound permanent magnetic rotary motor and the advanced frequency conversion technology, the pumping unit is excellent in power-saving.

- (3) The front belt wheels can be flipped up to give space to service rigs.

- (4) Easy operation and very low maintenance.

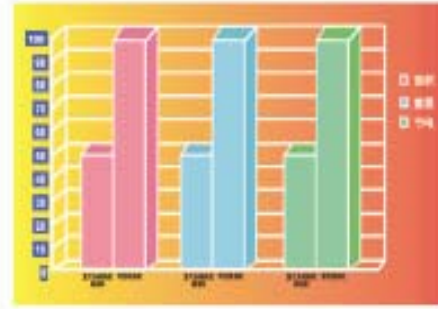
Through setting at the control panel, the rotary speed of the motor, pumping stroke and stroke frequency can be easily adjusted. The rod reciprocating motion is achieved by programming without any directional switches. Changing balance weights helps to keep the pumping unit stability. The pumping unit can be self-unloaded without any cranes.

- (5) It is featured by long stroke and low pumping frequency, especially good for heavy oil wells, deep oil wells and big pump wells.

The maximum pumping stroke is 9m and the relevant maximum pumping frequency is 3min^{-1} . Compared with conventional pump jacks, this pumping unit occupies only 50% land area and the weight is only 50% of conventional pumping unit. Under similar condition, it may save power up to 50%.



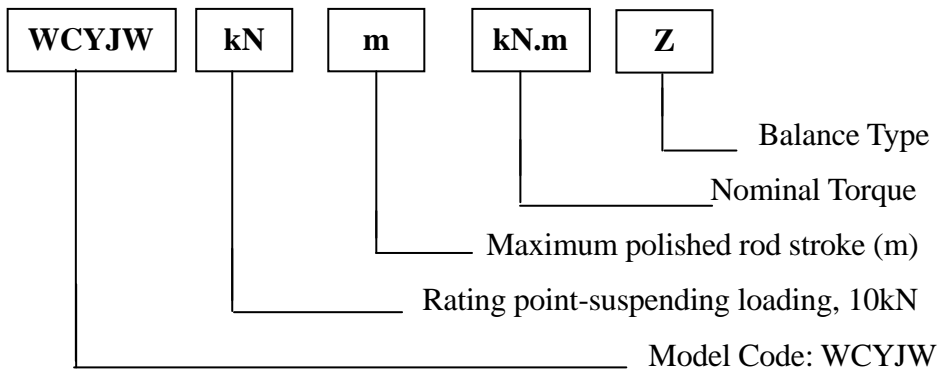
(6) With a novel aerospace technology, the belt won't shiver, shake or vibrate in strong winds.



Attachment: Comparison Diagram on Pillar State Picture

Applications: It can be applied to all kinds of oil wells, particularly to heavy oil well, deep wells, horizontal wells and crude oil extracted on big-pump powerful oil extracted.

Descriptions of Model codes:



The code for the pumping unit is WCYJW.

Major Specifications:

Models	Nominal post load (10kN)	Maximum polished rod stroke (m)	Max stroke frequency (min-1)	Nominal torque (kN•m)	Weight (T)
8 - 5 - 5.7	10	5	4	5.7	
10 - 8 - 7.6	10	8	3	7.6	
12 - 8 - 9.6	12	8	3	9.6	12
14 - 8 - 11.5	14	8	3	11.5	12
16 - 8.5 - 13.5	16	8.5	3	13.5	14
18 - 9 - 15.5	18	9	3	15.5	16
20 - 9 - 17.5	20	9	3	17.5	18

Example: The pumping unit WCYJW14 - 8 - 11.5 - Z indicates that a 14-type compounding permanently magnetic motor whose nominal post load is 140 kN, the maximum polished rod stroke is 8m, and the nominal torque for electric motor is 11.5 kN·m.

Intelligent Control System

- **The Stroke and Frequency Steplessly Adjustable**

By turning the knobs on the control panel, the up & down motion speeds can be easily set. The stroke and frequency are adjusted steplessly. The flexible motion control improves pumping efficiency and production rate.

- **Strong Protection from Interference**

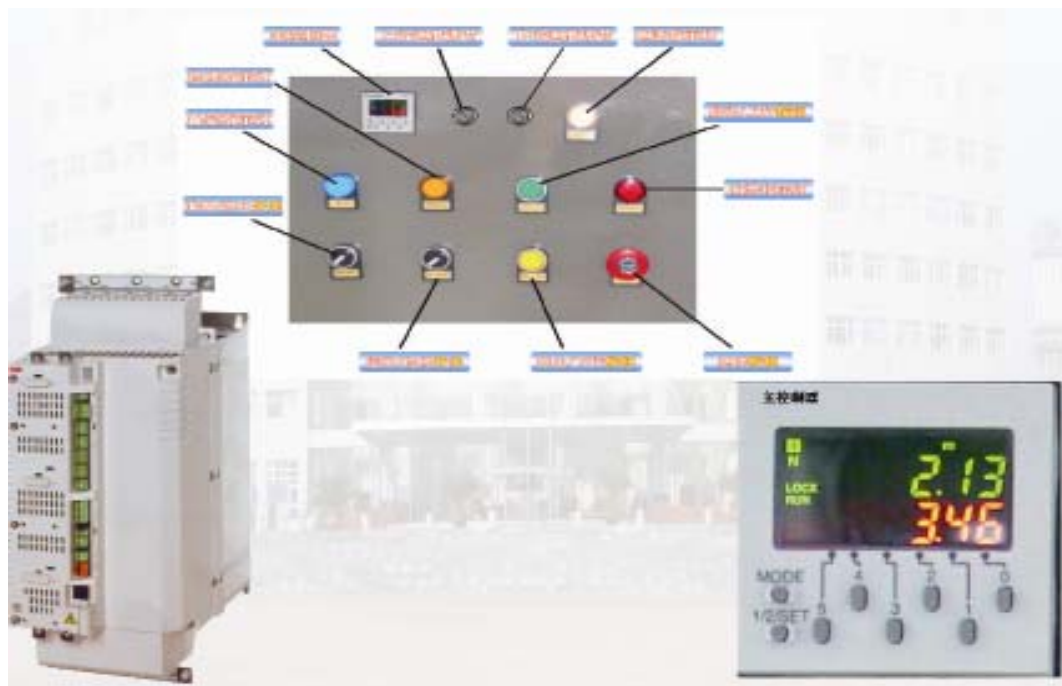
The frequency conversion system makes use of the latest anti-jamming technology which enables the unit working in various fields.

- **Reliable Braking System**

In case of accidental cases, e.g. power failure, operation suspended, etc, the automatic braking system immediately holds the external rotor of the electric motor to stop the pumping unit. If it is due to power failure, the system restarts in 4 minutes.

- **Instant Alarming**

GSM communication technology is embedded in the control system. Whenever any malfunction takes place, the alarming system immediately starts to work. By using any cellular phone, one can send digital text to the alarming pumping unit, and the unit will report the detail information in the form of message.



Major specifications of the compound permanently magnetic motor:

Pumping Unit Model No	WCYJW 8-5-5.7	WCYJW 10-7-7.6	WCYJW 12-7-9.6	WCYJW 14-8-11.5
Nominal Post load (10kN)	8	10	12	14
Nominal voltage (v)	380	380	380	380
Nominal rotary speed (rpm)	25	25	25	25
Nominal Frequency (Hz)	10	10	10	10
Maximum stroke (m)	5	7	8	8
Max Stroke frequency (min ⁻¹)	4	3	3	3
Models of compound permanently magnetic motor	HLM15-5.7	HLM20-7.6	HLM25-9.6	HLM30-11.5
Nominal power of the motor (kW)	15	20	25	30
Nominal Torque of motor(kN·m)	5.7	7.6	9.6	11.5
Power of the transducer (kW)	15	22	22	30

Specifications of the transducer:

Item		Parameters		
Type		UC15LS	UC22LS	UC30LS
Power of accompanied compound permanent magnetism motor		15kW	20 , 25kW	30kW
Input	input voltage and frequency	Tri-phase 380V , 50/60Hz		
	Allowable voltage fluctuation	±20%		
	Allowable frequency fluctuation	±10%		
Output	Rating current	25A	35A	48A
	Output frequency range	0 ~ 10 Hz		
Control character	Capacity	380V/15kW	380V/22kW	380V/30kW
	Moment accuracy	±5%		
	Carrier frequency	5kHz		
	Capability for overloading	200% , 10s		
	Setting signal for frequency/Load input signal	0 ~ 10V , 4 ~ 20mA		
Protection function	Transient over-current	Nominal outputting current 200%		
	Overload	Nominal outputting current 200%		
	Over-voltage	The voltage for direct current generatrix exceeds 800V that is stopped		
	Under- voltage	The voltage for direct current generatrix is lower than 300V that is stopped		
	Protection for stall out	Valid		
	Indication on Charging	LED Charge indicator		
	Cooling	Fan cooling		

Introduction to Electric Motor

Compound permanently magnetic motor is the core part of the pumping unit. This new type of electric motor is a three-dimensional permanently magnetic electric motor compounded by a novel double-plate electric motor and an external-rotor electric motor. With technologies of the pole conversion and frequency conversion, new permanent magnetic materials, plate-panel electric motor, external-rotor electric motor, and improvements in structure, material, control system and manufacturing technology, the new motor has significantly higher torque when compared with existing low-speed and high torque electric motors. This motor has a completely different structure from conventional electric motors, which finds solutions to low rotation speed and high torque. It completely overcomes the problem of 'a big horse dragging a small cart' which has puzzled the oil field industries for decades.

The three-dimensional magnetic field of the compound permanently magnetic electric motor is good for mechanical-electrical energy conversion, therefore, it boasts advantages, e.g. high torque, low rotation speed, high-efficiency, high power factor, little noise, and long life-span, etc.

The compound permanently magnetic electric motor has broad applications in oil fields, chemical industries, architectures, mines, etc. The worldwide market volume is about tens of billions US dollars. We wish to collaborate with worldwide oil industries to reduce energy consumption and carbon emission for environment protection.



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