Tian Shi AC speed regulating motor

The motor of the invention mouna core and winding generating a rotating magnetic field in a rotatable housing, when the core and winding are mechanically rotated with the shell, the rotational speed of the rotating magnetic field generated by the core and the winding is superimposed on the mechanical rotation speed of the rotating shell as the outer rotor, the other rotor of the motor acts as the inner rotor, the inner and outer rotors extend the axis, the dual-rotor and dual-axial structure of the motor, it can control the speed of one axis in its two axes, change the rotational speed of the other shaft.

The present invention calls the above two-rotor and dual-axis structure device as the main device of the present invention, and the power supply can be connected through the sliding ring and brush system. Control is applied over one shaft called the control shaft and the other shaft with load is called the output shaft. The device for connecting the control shaft in the present invention is called an auxiliary device, by which the rotational speed of the control shaft is determined.

The AC motor is connected to the main device control shaft through the variable speed transmission mechanism, that is, the combination of the AC motor and the variable speed transmission mechanism constitutes the auxiliary device of the present invention.

The present invention consists of the above-mentioned main device, the auxiliary device and the corresponding power supply and distribution system.

In operation, when the main device is between the two axes of the braking, such as the main device through the DC braking, then the output shaft synchronization speed is the control shaft speed.When the main device through alternating current, the magnetic field rotation direction and the control shaft speed is the opposite direction, the output shaft synchronous speed is the difference between the two, if the two direction is the same, it is the sum of the two, when the auxiliary device brake, the output shaft synchronous speed is the synchronous speed of the main

device. If the auxiliary device has n synchronous speeds, the output shaft of the present invention has 3n + 1, all synchronous speeds. For example, if the AC motor in the auxiliary device of the present invention is a 4 / 8 pole double speed motor and the variable speed ratio of the variable speed transmission mechanism is 5:2, the control shaft synchronous speed is 600 / 300r / min. If the main device is 1500 r/min, 2100, 1800, 1500, 1200, 900, 600, 300, seven synchronous speeds can be obtained at the output shaft. The combination of the AC motor with 7 synchronous rotation speeds and the variable speed transmission mechanism can be used as an auxiliary device to control a main device. If the transmission ratio of the variable speed transmission mechanism is 3:1, and if the synchronous speed of the main device is 1500 r/min, the output shaft synchronous speed of the present invention motor is 2200 to 100, and the every stage difference is 100 and with 22 synchronous speeds. Then also to control the main device, you can get 67 synchronous speeds and so on. In the same way, you can get enough synchronous speed and different series of synchronous speed, change the transmission ratio, you can also get a different speed regulation range.

Powered by the auxiliary device, so that the relative speed of the two axes of the main device is close to or equal to the synchronous speed of the main device, and then the main device turns on the AC current, can reduce the current when the asynchronous motor turns on the AC power supply, that is, reduce the starting current of the AC motor.

For example, the control shaft of the main device rotates the output shaft in the opposite direction through the variable speed transmission mechanism. When the control shaft rises from a low speed to a certain speed, the relative speed of the two shafts of the main device is equal to or close to the synchronous speed of the main device, then the main device is connected to the AC power supply, and the transmission device connecting the two shafts of the main device is pulled out to be ineffective.

For example, the main device through the DC brake, so that the output shaft of the

main device speeds up with the control shaft, then the main unit is powered off, keep its output shaft speed by inertia or through another motor,for example, two identical Tian Shi motors are run together, and pull the control shaft for reverse operation with the auxiliary device,make the relative speed of the main device two shaft equal to or close to the synchronous speed of the main device, the main unit then connects the AC and removes the motor that maintains the output shaft speed.

Advantages of the Tian Shi motor

The starting current is low.

Since each of the dual rotor motors that compose the motor is started at synchronous speed, only one single rotor motor is started directly asynchronously, and the motor is at the end of the Tian Shi motor with the least power, and its influence can be ignored.

The variable speed is stable, without jitter.

For example, an electric locomotive does not feel like shaking at a changing speed.

Electric, power generation condition automatically transformed, in the power generation condition, electric power feedback to the grid and produce the braking force distance.

When the load falls and slows down, the motor automatically shifts to a power generation condition. For example, when the electric locomotive turns from uphill to downhill, the motor automatically turns from electric to power generation condition, and the braking torque is generated while feedback the grid power, which keeps the locomotive speed basically unchanged, which can avoid the runaway of shaft tile heating caused by continuous mechanical braking.

System reliability is high, easy to operate, and maintenance.

Operation is divided into three domains:

Speed up: automatically accelerate step by step from the speed of that time up to the most high-grade speed by the program control.

Decelerating: automatically reduce the speed step by step from the speed of that time to 0 speed by the program control.

Retaining: When the required gear speed is reached during the speed change process, press the Retain key to remain at the speed, and the speed will not change again.

In the process of variable speed, each motor unit forming the motor must constantly change its operating state according to the prescribed requirements, and all the changes of the motor state are uniformly managed and controlled by the microcomputer.

Easy synchronization.

All the rotor of the dual-rotor motors are driven with the mechanical rotation of the stator, all started from zero, so easy to synchronize, can be manufactured into an ac synchronous motor, without other auxiliary devices, simple structure.

No damage to the power supply supply.

The system is a standard load and operates smoothly under sine wave; and the load supplied by cross-direct power conversion will produce high strength pulse current shock and high harmonic pollution in the power grid.

If the frequency conversion power supply works by cross-direct power, the AC voltage charges the capacitor by rectifying, in order to smooth DC end, requirements good ripple coefficient, the DC end must maintain a high voltage, and with the high voltage to maintain the power output throughout the cycle. In this process, when the grid voltage is below the DC end voltage, unable to provide the energy, until the next cycle, when the grid voltage is above the voltage of the input current at the DC end, the better the voltage ripple coefficient at the DC end, The higher the dc-end voltage is, the smaller the area of energy input of the AC grid. System is running smoothly, the input and output power is equal for each cycle. Under the conditions where the output power is determined, the smaller the area of the input power, the

higher the peak current value is, The greater the impact is on the power grid.

What is more terrible is that the shock current of all parallel variable frequency conversion power supply is in the peak range of the AC voltage, which will produce a superposition effect and make the AC terminal power grid cannot bear it. This is the reason why the burst of Zhangjiakou hub power station when multiple variable frequency conversion electric locomotives operate at the same time.

Speeds are fine, wide range; high power, can achieve the maximum power.
By increasing the series of the motor, the density of the output shaft synchronous speed can be increased to achieve fine speed adjustment. At the same time, the variable speed mechanism magnifies the output torque and power between all levels, through multi-stage amplification, can create the world's largest single capacity speed regulating motor.
Wind tunnel fan; shield tunneling machine; lifting machine; energy storage power station water pump; electric locomotive, etc., all need such high-power motor.

For example, when used in wind alternator:
Rough calculation, synchronous speed of 1500 motor, the difference between rated power speed and synchronous speed is 20 revolutions, if the maximum speed of the TS motor is 2100 rpm, at all ambient wind speed conditions, the motor should be run within the rated working condition, it requires 105 speed gears. To each additional a stage of double-rotor motor, can increase the speed gear at three times. The level 5 dual-rotor motor has 243 speed gears, enough to meet the actual needs.
With each additional a stage of double-rotor motor, can increase the power at three times, terminal single-speed motor with a power of 10KW, so the level 5 TS motor can have 2400KW, and with 243 speed gears. If that much power is not needed, The power of each unit motor can be reduced appropriately.
The 6-stage dual-rotor motor can have 7,000 KW and 729 speed gears.
The TS variable speed motor of the level 7 dual-rotor motor can have 22,000 KW and 2,187 speed

gears, and so on.