

QUALITY : ♣ LASTS ♣ FOR EVER



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HI-TECH INDUSTRIAL AUTOMATIONS

(Regd. Highly Technical Industrial Automation Company)



HI-TECH INDUSTRIAL AUTOMATIONS is one of the leading **Highly Technical Industrial Service Industries** in Chennai, Tamilnadu. The parent company is **M/s. INDUSTRIAL ENGINEERS (INDIA)**.-Group of Company, web:-industrialengineersindia.com.

HI-TECH INDUSTRIAL AUTOMATIONS Our company is committed to offer a flawless quality range of Industrial Level Sales, Re-winding and Services, Branded AC, DC Servo Motors & Servo drives, Encoders (Incremental & Absolute), Resolvers, custom built PCBs & PLCs to our clients

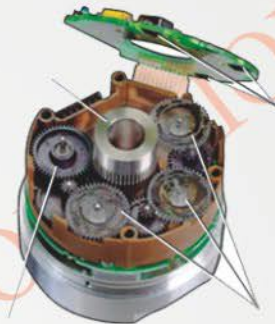
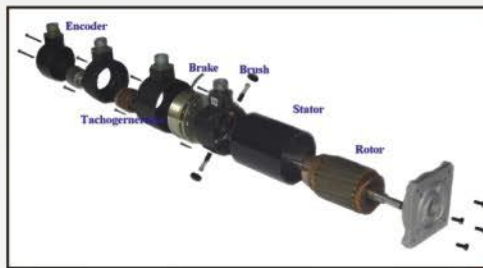
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WAY TO SUCCESS : TALK SAY LESS



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HI-TECH INDUSTRIAL AUTOMATIONS uses **high grade Genuine Components** procured from reputed vendors for assembling and repairing of industrial automation & Robotic machineries. Our company is backed by high qualified service Engineers & personnels, who are Expert in their respected domain. Our well trained professionals service wide array of **industrial automation & Robotic machines** in compliance with the **international & Domestic quality standards** that ensure their premium quality and flawless performance. For proper calibrations and operations, we also test our offered product and services.

HI-TECH INDUSTRIAL AUTOMATIONS personnel are familiar with the **latest technology** that helps us to complete the task within the stipulated time frame with quality. With the help of India wide service and sales experience of industrial Automations & Robotic Machines, **HI-TECH INDUSTRIAL AUTOMATIONS** have emerged as a leading name engaged in providing high quality services.

HI-TECH INDUSTRIAL AUTOMATIONS have highly skilled trained and technical personal to meet our client's service requirements before starting their work. Our company always strives hard to offer **maximum satisfaction** to our clients. However, customers can avail these product and services from us at **affordable charges**.

SERVICE

HI-TECH INDUSTRIAL AUTOMATIONS full fledged team with advanced Test Equipments for Service. Customer Communication & Satisfaction are the main aspects of Re-winding & Service. Our Company is having best systematic process and well calibrated equipments with highly technical sound knowledged persons in this field. We offer Re-winding, Repairing & Maintenance services like Automotive & Robotic equipment repair & maintenance services, PLC based control system design services, servo drive repair services, electronic equipment repair services, automation system repair services, marine & aviation equipment repair services, AC drives repair services, PCB repair services and servo motor Rewinding, Repairing & Services.

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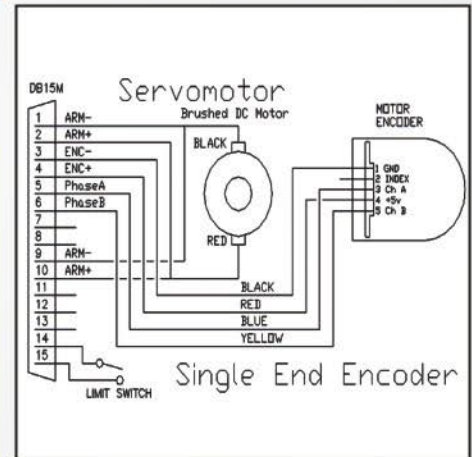
Ever since our establishment, we are providing flexible services to our clients based in India. These services are rendered by experts, We are using modern & Latest testing equipments to execute services as per the servicing needs of clients. Our continuum of services is acknowledged for timely execution, flexibility and cost effectiveness.

Our Team

We have gained wide popularity in the market with our quality based INDUSTRIAL Automation Services. Our company has **well trained personnel**, who have **wide knowledge of latest technology**. Our experts offer Industrial assembling and repairing services to Esteemed clients in India.



ENCODERS

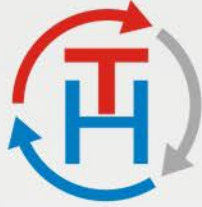


Client Satisfaction

Main objective of our company is **proper client satisfaction**. **HI-TECH INDUSTRIAL AUTOMATIONS** believes in following a **client-centric** approach and therefore strive to offer foremost AC, DC, SERVO-DRIVES, CARDS & Etc. services to our clients. Our team of qualified personnel does their best efforts to render **maximum satisfaction** to the clients.

Quality Assurance & Testing

All units undergo incoming and final testing. Upon arrival all units are evaluated to determine the actual cause of failure, if any, in order to properly characterize the level of repair required. After evaluation, all units are repaired at the least expense to the customer. Customers are kept apprised of their job, often coming in to witness key milestones throughout the repair process.



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TYPES OF ENCODERS



Servo Motor Control :-

For understanding **servo motor control** let us consider an example of servo motor that we have given a signal to rotate by an angle of 45° and then stop and wait for further instruction.

The shaft of the DC motor is coupled with another shaft called output shaft, with help of gear assembly. This gear assembly is used to step down the high rpm of the motor's shaft to low rpm at output shaft of the servo system.

Servo Motor Types : There are two main types of Servo Motors:- Rotary and Linear.

Rotary Servo Motor :-

A Rotary Servo Motor is what most people think of when they think of a Servo Motor. The three types of Rotary Servo Motors are: 1. AC Servo Motors, 2. Brush DC Servo Motors, and 3. Brushless DC Servo Motors. The motion of a rotary Servo Motor is often converted into linear motion by the use of a screw thread or with the use of belts and pulleys.

A Rotary AC Servo Motor is an AC type motor that is used with a feedback device. These are typically used in smaller applications, because a large AC Servo Motor is typically inefficient when compared to its DC or Brushless counterparts.

Linear Servo Motor :-

A **linear Servo Motor** is a flattened out Servo Motor where the rotor is on the inside, and the coils are on the outside of a moveable U-Channel. Both Servo Motor types are becoming more popular as Servo Motor prices continue to come down.



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SERVO MOTORS

Brushless DC (BLDC) Motor, also called AC Servo. The Rotor assembly has rare-earth, permanent magnets mounted on a lamination stack. These magnets are wrapped with resin-coated, fiber glass material to hold the magnets in place during high-speed operation. This motor is equipped with an absolute encoder, on the right, as is typically used in machine tools.



Basic Principle Of Servo Motor :-

A simple **ELECTRICAL MOTOR** controlled with the help of servomechanism. If the motor as controlled device, associated with servomechanism is **DC Motor**, then it is commonly known **DC Servo Motor**. If the controlled motor is operated by AC, it is called AC Servo Motor.

Basic Servo Motor Theory :-

There are some special types of application of Electrical Motors, where Rotation of the motor is required for just a certain angle not continuously for long period of time. For these applications some special Types of motors are required with some special arrangement, which makes the motor to Rotate a certain angle for a given electrical input (signal). For this purpose **servo motor** comes into picture. This is normally a simple DC motor which is controlled for specific angular Rotation with help of additional servomechanism (a typical closed loop feedback control system).

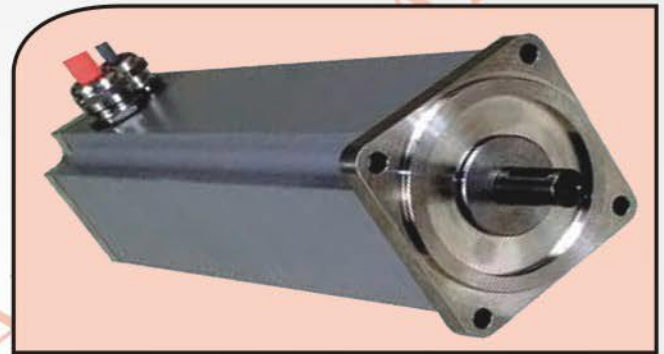
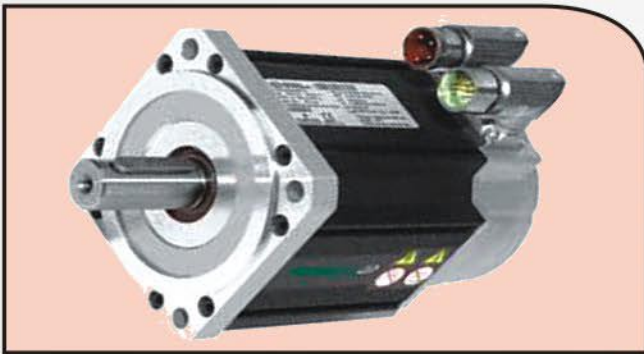
Now a day's servo system has huge industrial applications. Servo motor applications are also commonly seen in our daily life. The main reason behind using a servo is that it provides angular precision, i.e. it will only rotate as much we want and then stop and wait for next signal to take further action. This is unlike a normal electrical motor which starts rotating as and when power is applied to it and the rotation continues until we switch off the power. We cannot control the rotational progress of electrical motor, but we can only control the speed of rotation and can turn it ON and OFF.



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A servo system mainly consists of three basic components - 1. controlled device, 2. output sensor, 3. Feedback system. This is an automatic closed loop control system. Here instead of controlling a device by applying variable input signal, the device is controlled by a feedback signal generated by comparing output signal and reference input signal.



When reference input signal or command signal is applied to the system, it is compared with output reference signal of the system produced by output sensor, and a third signal produced by feedback system. This third signal acts as input signal of controlled device. This input signal to the device presents as long as there is a logical difference between reference input signal and output signal of the system. After the device achieves its desired output, there will be no longer logical difference between reference input signal and reference output signal of the system. Then, third signal produced by comparing these above said signals will not remain enough to operate the device further and to produce further output of the system until the next reference input signal or command signal is applied to the system. Hence the primary task of a servomechanism is to maintain the output of a system at the desired value in the presence of disturbances.

A Basic Working Principle of Servo Motor :-

A servo motor is basically a DC motor (in some special cases it is AC motor) along with some other special purpose components that make a DC motor a servo. In a servo unit, you will find a small DC motor, a potentiometer, gear arrangement and an intelligent circuitry. The intelligent circuitry along with the potentiometer makes the servo to rotate according to our wishes.

As we know, a small DC motor will rotate with high speed but the torque generated by its rotation will not be enough to move even a light load. This is where the gear system inside a servomechanism comes into picture. The gear mechanism will take high input speed of the motor (fast) and at the output; we will get a output speed which is slower than original input speed but more practical and widely applicable.

Say at initial position of servo motor shaft, the position of the potentiometer knob is such that there is No Electrical signal generated at the output port of the potentiometer. This output port of the potentiometer is connected with one of the input terminals of the error detector amplifier. Now an electrical signal is given to another input terminal of the error detector amplifier. Now difference between these two signals, one comes from potentiometer and another comes from external source, will be amplified in the error detector amplifier and feeds the dc motor.



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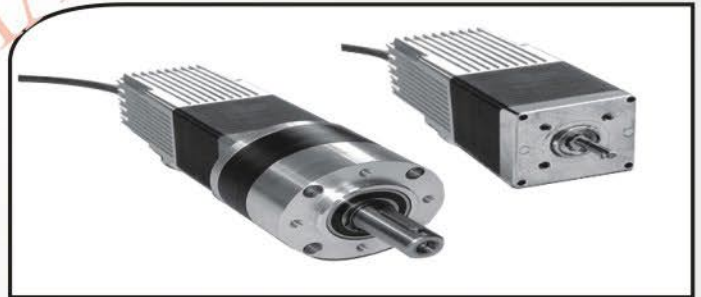
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Servo Motor Feedback :-

There are two options for Servo Motor feedback controls, either a servo encoder or a servo resolver. A servo encoder and a servo resolver provide the same solution in many applications, but are vastly different. They are both used to sense speed, direction, and position of the Servo Motor output shaft.

The resolver on the Servo Motor uses a second set of rotor and stator coils called the transformer to induce rotor voltages across an air gap. The resolver does not use any electronic components, therefore it is very robust with a high temperature range, and is inherently shock-resistant due to its design. A Resolver is mostly used in harsh environments.

The optical encoder on the Servo Motor uses a rotating shutter to interrupt a beam of light across an air gap between a light source and a photo detector, over time the wear associated with the rotating shutter reduces the longevity and reliability of the encoder. The application will determine whether a resolver or an encoder is needed. Encoders are more accurate and are easier to implement so they should be the first choice for any application. The only reason to choose a resolver is environmental concerns and longevity requirements.



Required Maintenance for a Servo Motor :-

Servo Motors are not prone to wear over time, and therefore require little maintenance. However, periodic maintenance checks should be performed so that the servo motor keeps running like new. Upon first arrival of the servo motor one should double-check the following: the motor is the correct model, motor does not have any visible damage, shaft can be rotated by hand, the brake works correctly, and there are no loose bolts. Operators should periodically check the motor for vibration and noise while the motor is not rotating, rotating at low speeds, and accelerating and decelerating. Inspect the motor for scratches or cracks on the motor casing. If crevices or cracks are found on the motor, action should be taken immediately by repairing or replacing the damaged unit. Check the motor casing for oil or cutting fluid because this can corrode the coating – possibly leading to future failure. Use an insulation level tester to check insulation resistance between motor coil and motor frame and refer to the owner's manual to see if insulation value falls within an operable range. Observe the normal voltage waveforms on an oscilloscope periodically and take notes for future comparison purposes and report any inconsistencies to manufacturer. Check cables and wiring for cracks and frays. Replace if found worn, as this could be dangerous .



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TESTING EQUIPMENTS



This amplified error signal acts as the input power of the DC motor and the motor starts rotating in desired direction. As the motor shaft progresses the potentiometer knob also rotates as it is coupled with motor shaft with help of gear arrangement. As the position of the potentiometer knob changes there will be an electrical signal produced at the potentiometer port. As the angular position of the potentiometer knob progresses the output or feedback signal increases. After desired angular position of motor shaft the potentiometer knob is reaches at such position the electrical signal generated in the potentiometer becomes same as of external electrical signal given to amplifier. At this condition, there will be no output signal from the amplifier to the motor input as there is no difference between external applied signal and the signal generated at potentiometer. As the input signal to the motor is nil at that position, the motor stops rotating. This is how a simple conceptual servo motor works.

ADMINISTRATION & WORKS

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