The simple *value* of a formula shows that 4 factors have an equivalent importance for our customers in the perception of value.

\[
V = \frac{Q \times S}{C \times T}
\]

- Value
- Quality
- Service
- Cost
- Time
Introduction

• **Servo Motors Adjust**, is a company specialized in the repair and adjustment of Servo Motor and special high revolution motors.
  
  • We repair and revise motors from ABB, Baldor, Baumuller, Bosch, Control Techniques, Fanuc, Indramat, Lenze, Yaskawa, Tamagawa, Mitsubishi, Siemens, Elmo etc.
  
  • Our highly specialized technical department covers all areas of industry, tools machines, automotive, robotics, stamping and press, food and glass industry, printing and packaging, textile, Paper Mills, etc..
  
  • Our 24-hours messenger service allows us to quickly and efficiently receive and deliver products.
  
  • For special products, we have at customer’s disposal motors and drives exchange, assigned to reduce the inactivity period.
  
  • When we receive a motor for it’s repair, we include all details and test data in our computerised system in order to have a historical technical data sheet.
  
  • When choosing **Servo Motors Adjust** as your specialized partner in the repair and adjustment of motors and Servo motors, you are dealing with a serious company for which work accuracy and customers care are a must.
Definition of a servo motor

• The word “servo” derives from Latin where it means, “slave”. This would correctly indicate that a servo motor is a “slave” or responds to instructions from devices external to the motor.

• Industrial servos had their beginnings during the Second World War.

• The 1990’s have seen many improvements in this area, and have been used extensively by industry.

• A servo system is any system that has one or more “close loops”.

The closed loops consists on:

i. A command.
ii. A feedback signal to indicate command compliance.
iii. An error output for noncompliance.
iv. A device or control that will respond in such a way as to correct for the error and reduce it to zero.
Motors used in servo systems

- AC Induction Three phase motor
- DC Brush Type motor
- Brushless Servo Motor (AC & DC)
- Stepper Motor
- Switched Reluctance Motors
- Linear Motor
  - Auxiliary devices: are used on many AC induction motors, brush type DC motors and brushless motors.
    - Encoder
    - Resolver
    - Tachometer generators
    - Hall effect
Types of servo motors

Danaher Motion

Allen Bradley

Parker

Siemens

Lenze

Fanuc

Schneider

ELAU

SKF

Servo Motors Adjust® Proveedor de Servicio Certificado Motores Eléctricos
Different types: AC & DC Motors
Feedback devices

1. Incremental Encoders
2. Serial Encoders
   - Fanuc.
   - Heidenhain.
   - Indramat.
   - Kawasaki.
   - Sumtak. / Sanyo.
   - Stegmann.
   - Tamagawa.
   - Yaskawa.
   - Mitsubishi.
   - Denki.

3. Encoders No Series
4. Absolute Encoders
5. Hall effect switches
6. Resolvers
7. Tachometer

Commutation is the process of switching current to generate a rotating magnetic field.
Servomotors are key components in CNC machines, robots, and other types of automated equipment in your plant.

Too often good servomotors are sent out for repair, and too often bad servomotors are put back into spare stock. Why? Because no testing program exists.

You can reduce your repair costs and downtime by using in-plant testing, entrusting in our Repair procedures.

When servomotors stop running, you have to get them running again as quickly as possible.
Getting the proper repair of servo motors, is essential to save time and costs.

With proper repair service **saves between 50% & 85%** of cost with respect to a new motor. You can save your money and undue expenditure.

Research has revealed that each servo motor can be repaired for a fraction of what it will cost to buy a new one.

The Technical Dept. Servo Motors Adjust offers an exhaustive evaluation and repair. (trained technicians and advanced repair techniques so they can delve into every nuance of the repair).

Servo Motors Adjust can rebuild a motor, with a good quality to provide the best repair services for most manufacturers in the market.

**Servo Motors Adjust offers 1 year warranty in all repairs.**
Repair Procedure

In order to be sure that our customer will receive a consistent and high-quality service our repair procedure is essential.

A. Inspection of servo motors before disassembly
   1. Identification of leads
   2. Mechanical configuration
   3. Pictures
   4. Generated voltage / waveform / balance
   5. Conmutation
   6. Tachometer output and waveform
   7. Auxiliary devices

B. Inspection after Disassembly:
   1. Bearings, Shafts and Housings.
   2. Windings
   3. Permanent Magnets
   4. Brakes
   5. Encoder / Resolver / Tachometer
   6. Hall effect
   7. Auxiliary devices

C. Repairs to Servo Motors
   1. Rewinding of stators
      1. Taking data
      2. Connections
      3. Testing new windings
   2. Mechanical tolerances
   3. Brakes
   4. Encoder / Resolver / Tachometer
   5. Hall effect
   6. Variable speed motor test stand
Test Reports
Our Services

• For our customers guaranteeing the performance of their production lines:

A. Servo System Repair:
   1. Servo Motors
   2. AC & DC Motors
   3. Drivers & VFD

B. Maintenance:
   1. Preventive.
   2. Predictive
   3. Vibration Analysis
   4. Motor Alignment

C. Servo System Training:
   1. Servo Motors
   2. AC & Dc Motors
   3. Drivers

C. Servo System Sales
   1. Servo Motors
   2. AC &DC Motors
   3. Drivers
   4. Brakes
   5. Encoder / Resolver / Tachometers
   6. Cables
   7. Connectors

SKF
Servo Motors Adjust®
Proveedor de Servicio Certificado Motores Eléctricos
## Predictive Test

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Status</th>
<th>Caut. Level</th>
<th>Warn. Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Level (Over) [%]</td>
<td>103.45</td>
<td>Good</td>
<td>110.00</td>
<td>120.00</td>
</tr>
<tr>
<td>Voltage Level (Under) [%]</td>
<td>103.45</td>
<td>Good</td>
<td>95.00</td>
<td>90.00</td>
</tr>
<tr>
<td>Voltage Unbalance [%]</td>
<td>0.25</td>
<td>Good</td>
<td>2.00</td>
<td>3.50</td>
</tr>
<tr>
<td>THD [% of fund.]</td>
<td>0.97</td>
<td>Good</td>
<td>7.00</td>
<td>9.00</td>
</tr>
<tr>
<td>Total Distortion [% of fund.]</td>
<td>1.10</td>
<td>Good</td>
<td>10.00</td>
<td>12.00</td>
</tr>
<tr>
<td>Current Level [%]</td>
<td>111.84</td>
<td>Caution</td>
<td>110.00</td>
<td>120.00</td>
</tr>
<tr>
<td>Current Unbalance [%]</td>
<td>1.95</td>
<td>Good</td>
<td>10.00</td>
<td>20.00</td>
</tr>
<tr>
<td>Load [%]</td>
<td>106.30</td>
<td>Good</td>
<td>110.00</td>
<td>125.00</td>
</tr>
<tr>
<td>Ef. Service Factor [p.u.]</td>
<td>1.06</td>
<td>Good</td>
<td>1.10</td>
<td>1.25</td>
</tr>
<tr>
<td>Rotor Bar [db]</td>
<td>-59.72</td>
<td>Good</td>
<td>-45.00</td>
<td>-36.00</td>
</tr>
<tr>
<td>Op. Point [%]</td>
<td>0.00</td>
<td>Good</td>
<td>20.00</td>
<td>30.00</td>
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<tr>
<td>Loss Difference [%]</td>
<td>N/A</td>
<td>N/A</td>
<td>25.00</td>
<td>50.00</td>
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<tr>
<td>Payback [Months]</td>
<td>N/A</td>
<td>N/A</td>
<td>60.00</td>
<td>24.00</td>
</tr>
</tbody>
</table>
Preventive Test & Predictive Test
Motors Alignment
Vibration analysis
New Service: Drivers & VF Repair

- Servo Motors Adjust offers to his customers to all Brands Drivers, controllers, frequency inverters repairs.
In Training

- With our customized Training we give easy answers to difficult questions:
  - The essence of this course is the training of maintenance Technicians.
  - The benefits of good training impact:
  - In a good knowledge of the machine.
  - Increases the performance of the machines, increased production
  - Results in greater availability of machines.
  - We get a better quality product.
Maintenance Management Plan

Cost Vs. Benefits

- Corrective: $17 - $18 Per Hp
- Preventive: $11 - $13 Per Hp
- Predictive: $7 - $9 Per Hp

- 1983 EPRI Study of Maintenance Programs
Results of the Maintenance Plan

- Schedule regular routines
- Support knowledge based on historical experience.
- Preparation of a plan for each machine

CORRECTIVE
Availability
Security
PRODUCTION COSTS
Environment
Servo Motors Adjust in Europe

Our Customers
Our new shopping repair
Servo Motor Manufacturers

OTRAS MARCAS QUE HEMOS REPARADO

API · ATLAS COPCO · AUXILEC · BAG · BAUER · BBC · BONFIGLIOLI · CLARK · CLARET · COLLINS · CONTROL TECHNIQUES · DRIVE SYSTEMS · ELAU · ELCOM · ELECTROCRAFT · ELMO · ENCO · EXLAR · FADAL · FENWICK · HEIDENHAIN · HENGSTLER · INDUSTRIAL DRIVES · INLAND · KEB · KESSLER · KUKA · LAFERT · LEROY SOMER · LUST · MAGNA · MAGNETIC · MASAP · MAVILOR · MAXON · MAYR · MITSUBA · NACHI · OHIO · OMRON · ORMEC · PATAY · PEERLESS-PORTER · PMI · RADIO ENERGI · RAGONT · RELIANCE · RENCO · SCHABMULLER · SEIDEL · SERVOMAC · SEW · SIGMA · SHINKO · SLOSYN · SOPREL · STOBER · SUMTAK · SUPERIOR · TAMAGAWA · TELEMECANIQUE · MODICON · ULTRACT · VASCAT · VELCONIC · VICKERS · WHEDCO · YAMAZAKI · ZEBOTRONIC ·