Xtrem Dynamics redefines SHUTON’s philosophy in the search of technologies and materials with the aim of increasing the rigidity of the Ball screws, to improve the dynamics and therefore the efficiency of the machine, resulting in productivity for longer.
HIGHER DURABILITY
Parallel improvements in materials, treatment and manufacturing processes contribute to an additional increase of the ball screw life.

HIGHER PERFORMANCE
Improvement in ball screw acceleration and feed speeds for a better performance for longer duration in extreme applications.

HIGHER DYNAMICS
Improvement of accelerations and feed speeds of the drive, keeping optimum temperature and noise levels.

HIGHER RIGIDITY
Efficient rigidity oriented at enhancing the machining quality of the parts, optimizing the natural frequency of the system and improving motor parameters $K_v$ and $K_p$, and the jerk.

INCREASED UPTIME
Improvement of ball screw life for increasing the machine uptime.

LESS MAINTENANCE
Improvement of ball screw performance and life for a reduction of life-cycle costing (LCC).

HIGHER DURABILITY
Parallel improvements in materials, treatment and manufacturing processes contribute to an additional increase of the ball screw life.
Major SHUTON markets in:

**AMERICA**
- Brazil
- Canada
- United States

**EUROPE**
- Austria
- Czech Republic
- France
- Germany
- Italy
- Slovaquia
- Spain
- Switzerland
- Turkey
- United Kingdom

**ASIA**
- China
- India
- Japan
- South Korea
SHUTON is a leading company in the manufacture of high precision ball screws located in the Basque Country, central and leading area in the machine tool industry in the north of Spain and throughout Europe.

SHUTON has been a part of the Nadella Group since 2020, and with more than 45 years of experience in the development and manufacture of high precision ball screws, our presence in the most advanced machine construction markets, and our close relationship with leading manufacturers facilitates the optimization of our products in order to offer the most efficient results for the most demanding applications.

We are an active and experienced team, of innovative mentality and great capacity for growth and improvement, committed to offer the most innovative and appropriate products and services that best suit the needs of our customers.

Excellence is our key principle that leads us to be present today and in the future as key collaborators and best partners of our customers.
Lead precision is verified with laser

1975
- Traditional markets, Spain, Italy, Germany and France
- Strategy: Open New Markets (Europe, Asia, etc.)
- Investment in machines, increasing production

1982
- ISO 9001

1997
- SHUTON Complex Development
- ISO 14001

2000
- Strong Marketing plan
- New facilities

2005
- European Environmental Awards

2009
- New products
- Lean Manufacturing

2012
- Main supplier position in worldwide leading MT and IM manufacturers

2017
- SHUTON joins NADELLA GROUP

2018
- IAZ Group

2018
- New product range definition

2020
- New Product Catalogue
CONTINUOUS TECHNOLOGY DEVELOPMENT

High response capacity

One of key principles of Shuton is to become the “Best Partner” of our customers. We work to respond to the needs that our customers may have in all aspects of engineering, supply and customer support. This is backed by an advanced management system and bold company values such as communication, formation, commitment, participation and professional ethics, resulting in a highly involved and committed team.

Applied engineering

Our innovative mentality and the continuous search to improve results and respond to new needs have led us to develop new technologies that make SHUTON precision ball screws the most competitive. This is how SHUTON COMPLEX, SHUTON HIGH LOADS, SHUTON PRIME and SHUTON ATR ball screw ranges were developed, as well as the solutions adapted to the specific needs of our customers.
Reliability

The high performance offered by SHUTON products has its guarantee of reliability, which is verified by internal and external technology homologation processes, study of materials and treatments, continuous update and improvement of the manufacturing and control systems, product traceability and unitary verification.

High performance

SHUTON main objective is to offer our customers the ball screw that will offer the best performance. Knowledge of customer requirements, strong ball screw technology development and innovation program and a detailed study of each ball screw application are the key aspects for getting the best of each ball screw design.
In line with this Xtrem Dynamics philosophy and with the aim of obtaining the best results in the most demanding applications, SHUTON has developed different technologies adapted to the different application areas:

High precision ball screws for high dynamics machine tools with efficient rigidity requirements and extreme duty cycles. Oriented to improve machining times in productively demanding sectors such as automotive, aeronautics, die mold processing machines, etc.
High dynamics and high load ball screws for injection molding machines, presses and other heavy duty applications operated by electric servo drive in extreme conditions.

Fine-lead high precision ball screws for precise positioning and average dynamics demand applications, such as grinding machines and EDM machines that ensure smooth rotation in short strokes.

High efficiency precision ball screws for pick and place applications, factory automation, actuators and other transport applications.
SHUTON COMPLEX ball screws have been designed for applications with requirements of accurate positioning, high speeds and high loads, such as high speed, 5 axis machining centres, large sized machining centres and combined machine tools, die mold processing machines, aeronautics and automotive work pieces and other applications with highly demanding conditions.
Main features:

- Efficient Rigidity, highest rigidity with the lowest preload/temperature.
- Higher dynamics, the greater rigidity allows greater accelerations and jerks, thus achieving a more dynamic machine. DN values of up to 210,000.
- Elimination of the chatter effect and the inversion error, avoiding the “lost motion moment” effect, obtaining improved ball bar test results, and therefore considerably improving the surface finish of the work piece, especially in 5-axis machines with challenging machining operations.
- Increase of the dynamic and static load capacities of the ball screw, attaining a very high durability with greater fatigue life and capacity to work under the most extreme conditions.
- A very high efficiency in low distance forward and backward machining with minimum torque variation.
- Very low torque variation along the shaft, offering a very smooth rotation and reduced noise levels.

Nut detail:

COMPLEX TD preloaded double nut (with 1 or 2 starts) or COMPLEX TUC Ultracompact nut (2 starts), with ball recirculation by U-type or B-type recirculation system.

<table>
<thead>
<tr>
<th>Preload</th>
<th>Nut type</th>
<th>Recirc.</th>
<th>Diameter</th>
<th>Lead</th>
<th>Ball size</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>TD Double Nut (1 start)</td>
<td>U</td>
<td>25-120</td>
<td>10-80</td>
<td>5-12</td>
<td>High dynamic applications, Average load requirement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>50-160</td>
<td>12-25</td>
<td>9-19</td>
<td>High dynamic applications, Higher load requirement</td>
</tr>
<tr>
<td></td>
<td>TD Double Nut (2 start)</td>
<td>U</td>
<td>32-120</td>
<td>20-80</td>
<td>6-12</td>
<td>High dynamic applications, Higher load requirement, without nut length limitation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>63-140</td>
<td>25-32</td>
<td>9-12</td>
<td>High dynamic applications, Extra high load requirement, without nut length limitation</td>
</tr>
<tr>
<td></td>
<td>TUC Ultracompact Nut (2 start)</td>
<td>U</td>
<td>32-100</td>
<td>20-80</td>
<td>6-9</td>
<td>High dynamic applications, High load requirement, with nut length limitation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>63-100</td>
<td>25</td>
<td>9</td>
<td>High dynamic applications, Extra high load requirement, with nut length limitation</td>
</tr>
</tbody>
</table>
Main features:
- SHUTON PRIME ball screws are used in applications in which the load and the speed requirements are not as demanding as in COMPLEX ball screws.
- Maximum DN of 100,000, low speed and short lead applications
- Accurate results in positioning
- Very smooth rotation in short strokes.
- Best performance along the life cycle of the ball screw.

Nut detail:
PRIME TD Preloaded Double nut or PRIME TC Preloaded Compact nut, with ball recirculation by S-type recirculation system.

<table>
<thead>
<tr>
<th>Preload</th>
<th>Nut type</th>
<th>Recirc.</th>
<th>Diameter</th>
<th>Lead</th>
<th>Ball size</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>TC Compact Nut (1 start)</td>
<td>S</td>
<td>20-100</td>
<td>5-20</td>
<td>3-9</td>
<td>General Machine tool application, with short nut length. Improved T9</td>
</tr>
<tr>
<td></td>
<td>TD Double Nut (1 start)</td>
<td>S</td>
<td>20-100</td>
<td>5-20</td>
<td>3-9</td>
<td>General Machine tool application. Possibility of greater circuit quantity</td>
</tr>
</tbody>
</table>
The PRIME ball screw range are fine-lead high precision ball screws for precise positioning and average dynamics demand applications, such as grinding machines and EDM machines that ensure smooth rotation in short strokes.
The SHUTON HIGH LOAD ball screw range are high dynamic and high load ball screws for injection molding machines, presses and other heavy duty applications operated by electric servodrives which may reach extreme working condition requirements.
Main features:

- Top results with high durability and reliability.
- Especially high values of dynamic and static load capacity, as well as high values of maximum permissible loads.
- Very smooth rotation ensuring uniform ball circulation, avoiding any crashes between balls and resulting in very low noise levels and enabling the use of higher feed speed values, thus reaching DN values up to 170,000.
- Accuracy grade and axial play.
  - H 0.020 mm or less.
  - A 0.040 mm or less.
- Depending on the application requirement of load capacity and speed, and in order to obtain the optimum life results in each case, SHUTON has developed three different types of HIGH LOAD ball screws:
  - HIGH LOAD IML Specially designed for HIGH LOAD and high speed applications, DN up to 170,000.
  - HIGH LOAD HDL Specially designed for very HIGH LOAD and moderate speed applications, DN up to 110,000.
  - HIGH LOAD PKL Specially designed for applications with momentary extreme peak loads.
- Optimized ball screw design by study of:
  - Type of HIGH LOAD design.
  - Shaft and nut thread geometry.
  - Ball circuit distribution and position.
  - Number of thread starts.
  - Load distribution in HIGH LOAD ball screws
  - Tying method
  - Lubrication

Nut detail:

HIGH LOADS TS single nut (with 1 or 2 starts), with ball recirculation by U-type or B-type recirculation system.

<table>
<thead>
<tr>
<th>Preload</th>
<th>Nut type</th>
<th>Recirc.</th>
<th>Starts</th>
<th>Diameter</th>
<th>Lead</th>
<th>Ball size</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>TS</td>
<td>Single nut</td>
<td>U</td>
<td>1s</td>
<td>80-120</td>
<td>20-50</td>
<td>12</td>
</tr>
<tr>
<td>HDL</td>
<td>1s</td>
<td>63-160</td>
<td>16-32</td>
<td>12-25</td>
<td></td>
<td></td>
<td>Very high load and moderate rotation speed applications, DN up to 110,000.</td>
</tr>
<tr>
<td>IML</td>
<td>1s</td>
<td>50-160</td>
<td>12.5-25</td>
<td>9-19</td>
<td></td>
<td></td>
<td>High load and high rotation speed applications, DN up to 170,000.</td>
</tr>
<tr>
<td>PKL</td>
<td>1s</td>
<td>63-160</td>
<td>20-32</td>
<td>15-25</td>
<td></td>
<td></td>
<td>Momentary especially extreme peak loads. DN up to 170,000.</td>
</tr>
</tbody>
</table>
ATR ball screws are high efficiency precision ball screws for pick and place applications, factory automation, actuators and other transport applications.
Main features:
- High precision ball screws, assembled with non-preloaded single nuts
- Cost-effective alternative to pneumatic and hydraulic actuators.
- Best performance throughout the life cycle of the ball screw.

Nut detail:
ATR TS Single nut, with ball recirculation by S-type or U-type recirculation system.

<table>
<thead>
<tr>
<th>Preload</th>
<th>Nut type</th>
<th>Recirc.</th>
<th>Diameter</th>
<th>Lead</th>
<th>Ball size</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>TS Single Nut</td>
<td>S</td>
<td>20-100</td>
<td>5-20</td>
<td>3-9</td>
<td>General transportation application</td>
</tr>
<tr>
<td></td>
<td></td>
<td>U</td>
<td>25-100</td>
<td>10-80</td>
<td>5-11</td>
<td>General transportation application, higher speed and load requirement</td>
</tr>
</tbody>
</table>
CUSTOMISED SOLUTIONS

- Asymmetric nut
- Special wipers
- Ceramic balls
- Single nut with preload
- Special nuts
- Rotary nut system
The intelligent ball screw has been developed to match novel industry 4.0 demands, including predictive maintenance, environmental aspects like the reduction in lubrication quantity, optimization of machining parameters, etc.

Specific sensors are placed on strategic nut points in order to obtain the required performance information from the ball screw. Combined data from the ball screw and other components of the machine are analyzed on the edge and the results are stored or communicated to other intelligent systems of the machine.

To optimize the benefits of iBall screw, specific strategies can be followed, like obtaining the fingerprint of the ball screw under a specific duty cycle and periodically compare the results against the original fingerprint. In any case, this optimization requires a close collaboration with the machine manufacturer. Please contact SHUTON Engineering Department for further and updated information.
SHUTON applied engineering department provides the necessary knowledge both at technical level and at product level, to offer the best solution adapted to customer needs.

SHUTON “Engineering Service”, which has 3-dimensional drawing systems, CAM programming, and different calculation programs; offers its customers comprehensive advice for the selection of the precision ball screw and optimal use for each application, studying the different solutions and detecting new developments needs that may arise.
SHUTON

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