SMART Hydraulic Actuators (SHA)
Fusing the power of hydraulics with the precision of servo control.

All-In-One Solution
• Pre-Engineered, Factory setup & tested, ready to install

Precision Servo Control
• Accurate control of position, force and speed

Energy Efficient - Small Footprint
• Maximum force density; superior to electro-mechanical and pneumatic actuators
• Saves energy, power on demand
• Less heat, Less noise

Eliminates the Hydraulic Infrastructure
• No hoses, no leaks
• Fewer components, significant cost savings

Reliable and Durable
• No metal-to-metal wear points unlike roller or ball screw actuators
• Shock load resistant
• Exceptional long-life, minimal maintenance

The Smart Alternative to Hydraulic Cylinders and Ball Screw / Roller Screw Actuators
SMART Hydraulic Actuators – System Features

Why Choose the SMART Hydraulic Actuator?
The SHA combines the best features of hydraulic power with the precision of servo control (used in ball screw & roller screw electro-mechanical actuators), without the inherent disadvantages of those approaches. The result is an actuation solution with up to 170,000 Lbs (755kN) of force and superior functionality at a lower price point.

• High-Precision Brushless Servo Motor
• Servo-Controlled, Precise Displacement, Bi-Directional Variable Speed Pump
• Manifold with Integral Valve Controls
• Heavy-Duty Rod/Cylinder with Patent-Pending Rod Compensation
• Servo Drive/Motion Controller
• Fieldbus Interface, IoT Compatible
• Pressure Sensor for Force Control Operation
• High-Resolution Position Sensor

Benefits of Kyntronics SHA over Hydraulic Actuation and Ball Screw/Roller Screw Actuators

Kyntronics SHA
• All-In-One, Factory Configured, ready to install
• Closed system, no leaks, minimal maintenance
• Energy efficient, only consumes power when operating
• Precision servo control of position, force, speed
• Quiet operation

Hydraulic Cylinder Actuators
• Require an expensive HPU and many components that must be engineered, assembled and tested
• Many connection points, hoses, prone to leaks
• Runs continuously, significant energy consumption
• Costly to precisely control
• Very noisy
• Requires regular HPU component maintenance and fluid changes

Kyntronics SHA
• Highest force density, small footprint
• Small cost increase as force/load requirements grow
• High efficiency, no metal-to-metal contact points improves reliability
• Tolerant of “Shock Loads”, high operational reliability
• Cannot be “back-driven”

Ball Screw/Roller Screw Actuators
• Larger space requirements
• Expensive for high-force applications
• Gears and mechanical components create friction and losses
• “Shock loads” can cause significant damage and premature localized wear. Require regular lubrication
• Require a brake to hold position… additional expense

Replace this HPU mess with the SHA
SHA Product Families

**S-Series – General Purpose All-In-One Replacement for Hydraulic Cylinders & Electro-Mechanical Actuators**
- Up to 85,000 lbf (377 kN)
- Up to 120” (3,048 mm) stroke length
- Up to 45 in/s (1,159 mm/s)
- 115, 230, 460 VAC

**E-Series – High-Performance Upgrade from Pneumatic & Electro-Mechanical Actuators**
- Up to 9,500 lbf (42 kN)
- Up to 120” (3,048 mm) stroke length
- Up to 10.6 in/s (269 mm/s)
- 12, 24, 48 or 72 VDC
- IP68 option

**H-Series – High Speed / High Force In an Integrated Package**
- Up to 170,000 lbf (775 kN)
- Up to 24” (610 mm) stroke length
- Up to 45 in/s (1,159 mm/s)
- 115, 230, 460 VAC

SHA Configurations - Flexibility to fit your application

SHA Controller Options

An All-In-One Solution… Engineered and ready to install

**System Features:**
- Servo Motor, Drive and Cables Designed to Length
- Software - Factory Programmed and Tested
- Ability to integrate customer supplied motors and/or drives
- Temperature Monitoring

**Control capabilities:**
- Position Control
  - Standard +/-0.010in (+/-0.250mm)
  - Precision +/-0.001in (+/-0.025mm)
- Force Control
- Position & Force Control
- Four Quadrant Motion Control
- Compound Moves / Multi-axis Synchronization

**Control Feedback Options:**
- Force
  - Pressure Transducer(s) and/or Load Cell; 0-10Vdc or 0-20mA
- Position
  - Internal or External Mount
  - Analog: 0-10Vdc or 0-20mA
  - Digital: SSI, TTL A Quad B, Profinet, EtherNet/IP, CANopen, IO-Link
  - As low as 4.0µin (0.1 µm) resolution

**Networking:**
- Modbus RT
- Modbus TCP
- PROFINET
- EtherCAT
- Ethernet/IP
- PROFINET
- Other - Consult Factory

SHA Mounting Options

**Rod End**
- Spherical Ball Joint
- Threaded Male Standard
- Threaded Female Standard

**Actuator Mount**
- Clevis, 0 Degrees
- Clevis, 90 Degrees (0 Degrees Position Shown)
- Rod Eye Bracket, 0 Degrees
- Rod Eye Bracket, 90 Degrees (0 Degrees Position Shown)

**Rear Flange Plate**
- Front Flange Plate
- End Feet
- Side Feet
- Trunnion
Kyntronics SMART Hydraulic Actuators are used successfully in many industries and applications.

- Aerospace
- Automotive
- Defense/Military
- Entertainment/Animatronics
- Energy
- Forestry/Lumber
- Medical Equipment
- Metals/Metal Fabrication
- Mobile Equipment
- Plastics
- Special Machines/Industrial Machinery
- Flexible Tooling
- Folding
- Handling
- Lifting
- Moving & Motion Simulation
- Positioning
- Pressing
- Punching
- Testing/Inspection
- Welding

### S-Series SMART Hydraulic Actuator – Product Specifications

<table>
<thead>
<tr>
<th>Series</th>
<th><em>SHA</em> Force-Lbf (kN)</th>
<th>Avg-In/s (mm/s)</th>
<th>Force-Lbf (kN)</th>
<th>Avg-In/s (mm/s)</th>
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<td>6.2 (27.6)</td>
</tr>
</tbody>
</table>

* Shown configurations are a sampling of many options that are available. Contact Kyntronics for a specific configuration for your application. Refer to Kyntronics.com for E and H-Series Product Specifications.

### About Kyntronics

An ISO 9001: 2015, AS9100D certified company, all Kyntronics actuation products are made in the USA. With vast experience in industrial, aerospace and medical industries, our in-house team of mechanical, electronic, hydraulic and software engineers have hundreds of years of engineering experience. Customer-centric, we thrive on ‘solving the unsolvable’ application problems while working with customers worldwide.

To discuss your application and see how the SMART Hydraulic Actuator can maximize cost efficiencies, contact Kyntronics today!