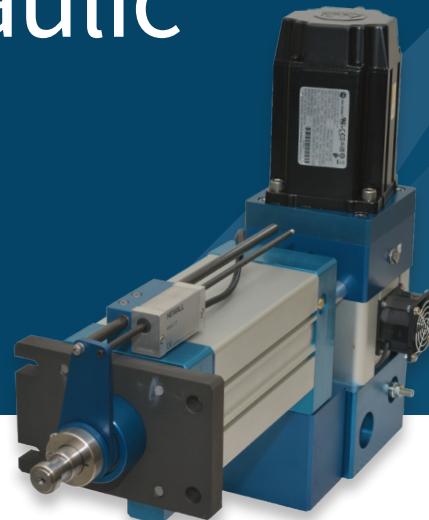




SMART Electro-Hydraulic Actuators (SHA) and Servo Power Units

➤ Fusing the Power of Hydraulics with the Precision of Servo Control



➤ Do you Experience These **Challenges** with your Actuators?

Hydraulic Cylinders/HPU



A Mess of Hoses



Complex Servo Valves



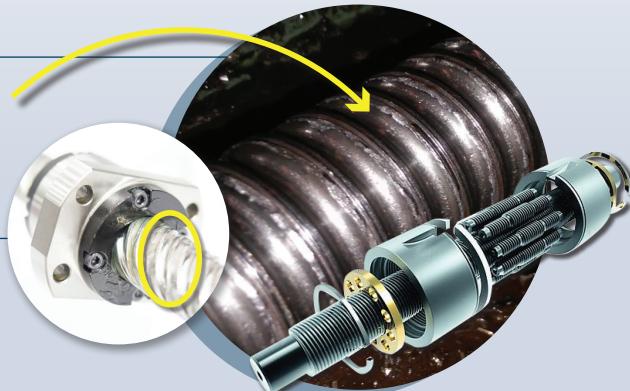
Inevitable Leaks



Constantly Running HPU Wastes Energy

Screw-Type Electro-Mechanical Actuators

- Damaged screws from Shock Loads
- Pre-mature wear and poor reliability
- High maintenance costs



Kyntronics SHAs Combine the **Best Features** of Screw-Type EMAs and Hydraulic Actuators and Eliminate Their Shortcomings



EMA BENEFITS

- Power on Demand
- Ease of Control
- Fieldbus
- Diagnostics
- Easy to Reconfigure



SMART ELECTRO-HYDRAULIC ACTUATOR (SHA)



HYDRAULIC BENEFITS

- Shock Tolerance
- High Force Density
- Fluid Characteristics
- Ingress Protection
- Cost Effective

THE SHA ELIMINATES



EMA SHORTCOMINGS

- Side Loading
- Shock Loading
- Limited Life
- Metal to Metal Wear
- Ingress Protection
- Limited Force & Stroke



HYDRAULIC SHORTCOMINGS

- Leaks / High Maintenance
- Network Integration
- High Energy Consumption
- Difficult to Reconfigure
- Control Challenges
- Noisy



Up to 150,000 lb.
(667 kN) of Force



All-In-One Totally
Sealed System



Eliminates
Leaks



Significant
Cost Savings



Power On Demand
Saves Energy



Provides Precise
Control of Position,
Force & Speed



Minimal
Maintenance



Sustainable
Solution

Actuators that are **Smarter**, More **Efficient** and More **Precise**

SHA Standard Features

- High-Precision Servo Motor
- Precise Displacement, Bi-Directional Pump
- Manifold with Integral Valving
- Heavy-Duty Rod / Cylinder with Patent-Pending Rod Compensation
- Temperature Sensor
- Servo Drive / Motion Controller
- Fieldbus Interface, IoT Compatible
- Minimal Hydraulic Fluid

SHA Optional Features

- Standard or High-Resolution Position Sensor – External or Internal Mounting
- Pressure Sensor for Force Measurement and Control
- Load Cell Interface
- Food Grade Fluid
- IP67, IP68, IP69k packaging
- Special Coatings
- Explosion Proof: Class 1 Div 1 / Div II
- Supplemental Heating or Cooling
- Manual Operation
- Long Stroke Actuators – up to 120 in (3,048 mm)



SHA Product Families

S-Series – General Purpose



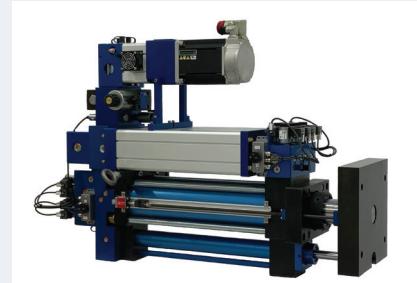
- Up to 150,000 lbf (667 kN)
- Up to 34.5 in/s (877 mm/s)
- Up to 120 in (3,048 mm) stroke
- 240, 460 VAC

E-Series – DC-Powered



- Up to 150,000 lbf (667 kN)
- Up to 34.5 in/s (877 mm/s)
- Up to 120 in (3,048 mm) stroke
- 24, 36, 48, 60, 80 VDC

H-Series – High Speed and High Force in an Integrated Package



- Up to 84,823 lbf (377 kN)
- Up to 11.7 in/s (298 mm/s)
- Up to 24 in (610 mm) stroke
- 240, 460 VAC

Servo Power Units



- Servo controlled
- Works with most any cylinder
- Standard ISO 16028 3/8 in cylinder connections
- Up to 9.88 cc/rev (7.8 GPM) fluid flow at 3,000 PSI

SHA Controller Options



Subpanel Package



Multi-Axis Package



Enclosure with Optional Touchscreen HMI

Kyntronics “All-In-One”... Engineered and Ready to Install

System Features

- Servo Motor, Drive and Cables
- Software - Factory Programmed and Tested
- Subpanel, Enclosure or Multi-Axis Packaging
- Optional 5 in or 7 in HMI with Software
- AC or DC Voltage

Control Capabilities

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

Control Feedback Options

- 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
- Force
 - Pressure Transducer(s) and/or Load Cell; 0-10Vdc or 0-20mA

Networking

- Modbus RTU
- Modbus TCP
- PROFIBUS
- PROFINET
- Ethernet/IP
- EtherCAT
- Other - Consult Factory

Add-On-Instruction for Rockwell Automation Motors, Drives and Logix Software

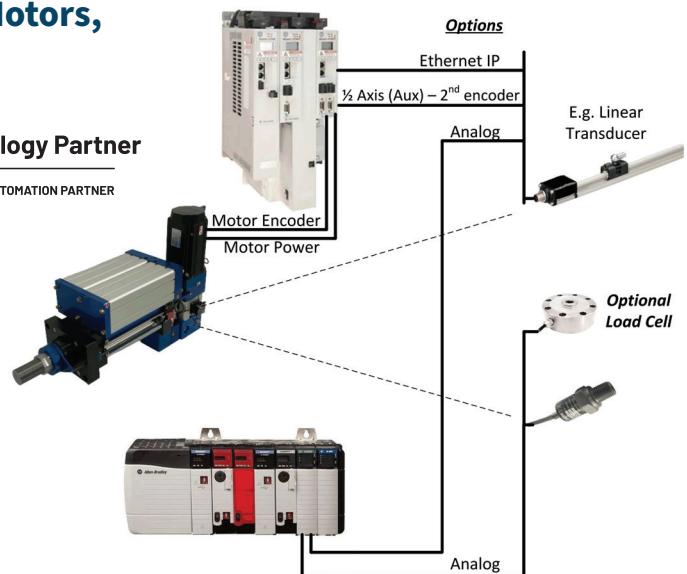
System Features

- Rockwell Servo Motor, Drive and Cables



Control Capabilities

- 0-10vdc feedback inputs
- Hyperface linear encoder input
- Position Control
- Force Control
- Position & Force Control
- Position Control with Force & Speed Limiting
- Compound Moves
- Multi-Axis Synchronization



Other Motor/Control Options Including:

Siemens | Mitsubishi | Omron | Others – Contact Factory

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Improve Sustainability / Reduce Total Cost of Ownership

The SHA Improves Your Environmental Footprint while Providing Significant Operating Cost Reduction Compared with Hydraulic Actuation Systems

Annual Operating Cost Comparison Kyntronics SMART Electro-Hydraulic Actuator (SHA) vs. Traditional Hydraulic System (HPU)			
Operating Cost Component	SHA	HPU	Assumptions / Cost Basis (Feb 2023)
Environmental			200 Gallon HPU Tank with Hydraulic Fluid Index (HFI) = 4.1 SHA is sealed - no fluid replenishment or disposal required \$42/gal X 800 gallons (4:1 HFI) \$20/gal X 800 gallons (4:1 HFI)
Oil Replenishment	\$0	\$33,600	
Used Oil Disposal	\$0	\$16,000	
Energy			SHA Uses Power on Demand 30 HP Hydraulic Power Unit that Runs Continuously SHA is 70% efficient (based on Kyntronics testing) HPU is 22% efficient (based on IFPE paper) Using \$0.17 per KWh (average US rate - Feb 2023)
Energy Usage	\$1,642	\$16,429	
Maintenance			SHA @ 1 hr/week @ Labor \$35/hr HPU @ 3 hrs/week @ Labor \$35/hr
Maintenance Time	\$1,750	\$5,250	
Machine Downtime / Product Scrap			SHA is totally sealed, no oil leak risk, minimal downtime risk. \$4k-\$6k average downtime costs per incident. Assuming two downtime events. 1% scrap from product contamination due to leaky connections
80% of unplanned machine downtime is caused by contaminated lubricants	\$0	\$10,000	
Product Spoilage	\$0	\$10,000	
Annual Operating Costs	\$3,392	\$91,279	

Additional Sustainability Benefits:

- Safety / Lost Time Accidents – HPUs leak and create safety hazards. The SHA is a totally sealed system
- Ergonomics – The SHA is far quieter than HPU systems

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Flexible Configurations to Fit your Machine



Parallel Standard

Parallel with Spacer Block

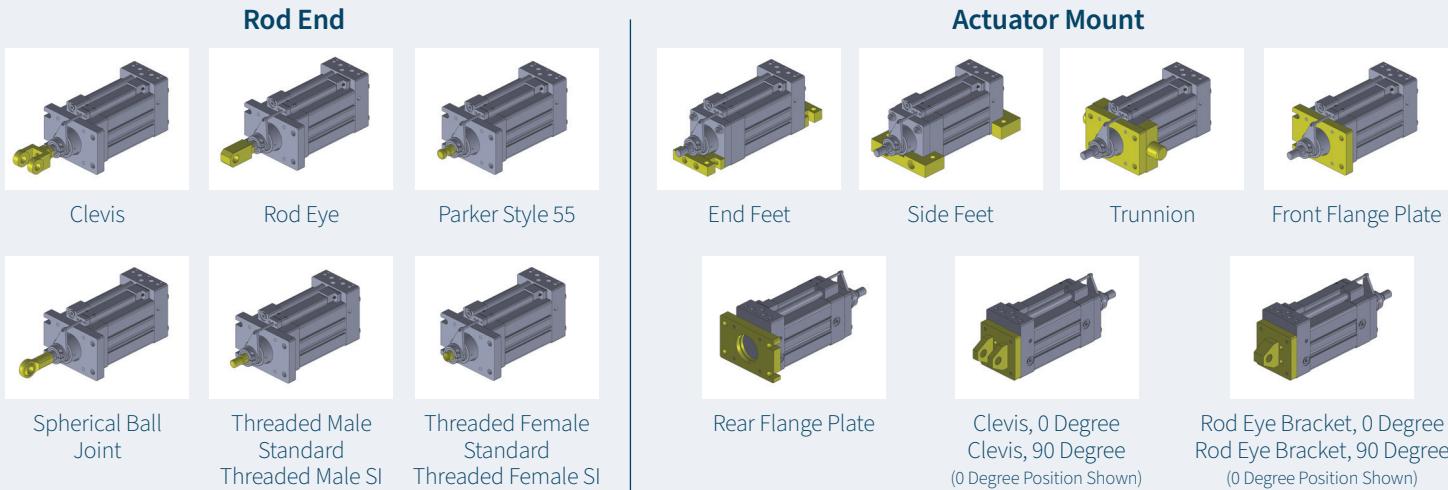
90° Centered

Parallel Inverted

Inline

90° Behind Power Unit

SHA Mounting Options



Clevis

Rod Eye

Parker Style 55

Spherical Ball Joint

Threaded Male Standard
Threaded Male SI

Threaded Female Standard
Threaded Female SI

Actuator Mount

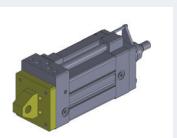
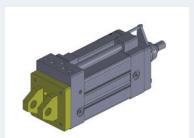
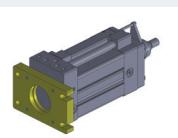


End Feet

Side Feet

Trunnion

Front Flange Plate



Rear Flange Plate

Clevis, 0 Degree
Clevis, 90 Degree
(0 Degree Position Shown)

Rod Eye Bracket, 0 Degree
Rod Eye Bracket, 90 Degree
(0 Degree Position Shown)

SMART Electro-Hydraulic Actuator **Product Specifications**

S-Series – General Purpose and E-Series - DC-Powered Actuators

Cylinder Diameter		Rod Diameter		*Maximum Extend Force @3,000 PSI		*Maximum Retract Force @3,000 PSI		*Maximum Speed - Extend		*Maximum Speed - Retract	
In	mm	In	mm	lbf	kN	lbf	kN	in/s	mm/s	in/s	mm/s
1.00	25.40	0.63	15.88	2,356	10	1,436	6	34.5	876	56.7	1440
1.50	38.10	1.00	25.40	5,301	24	2,945	13	15.4	391	27.6	701
2.00	50.80	1.00	25.40	9,425	42	7,069	31	8.6	218	11.5	292
2.50	63.50	1.38	34.93	14,726	66	10,272	46	5.5	140	7.9	201
3.25	82.55	1.38	34.93	24,887	111	20,433	91	3.3	84	4	102
4.00	101.60	2.00	50.80	37,699	168	28,274	126	2.2	56	2.9	74
5.00	127.00	3.00	76.20	58,905	262	37,699	168	1.4	36	2.2	56
6.00	152.40	3.50	88.90	84,823	377	55,960	249	1	25	1.5	38
8.00	203.20	4.00	101.60	150,796	671	113,097	503	0.5	13	0.7	18

*Note: Maximum Force and Maximum Speed may not be available in the same model. Consult Kyntronics.com CAD Models and Specifications for more information.

H-Series High-Speed/High-Force Actuators

*High Force Segment Maximum Force		*High Speed Segment Maximum Extend Force		*High Speed Segment Maximum Retract Force		*High Force Segment Maximum Speed		*High Speed Segment Maximum Extend Speed		*High Speed Segment Maximum Retract Speed		
*Model Series	lbf	kN	lbf	kN	lbf	kN	in/s	mm/s	in/s	mm/s	in/s	mm/s
1H19C15-32-34	24,765	110	4,232	19	151	1	2.5	64	11.7	298	21.1	536
1H19C15-40-34	37,514	167	4,399	20	1,182	5	1.7	42	11.7	298	21.1	536
1H19C15-50-34	58,616	261	3,055	14	710	3	1.1	27	10.0	254	10.0	254
1H19C15-60-34	84,407	375	603	3	241	1	0.7	19	10.5	267	7.5	191
1H19C20-32-34	24,765	110	8,930	40	6,361	28	2.5	64	6.6	167	8.8	223
1H19C20-40-34	37,514	167	8,723	39	6,038	27	1.7	42	6.6	167	8.8	223
1H19C20-50-34	58,616	261	8,212	37	5,225	23	1.1	27	6.6	167	8.8	223
1H19C20-60-34	84,407	375	7,184	32	3,557	16	0.7	19	6.6	167	8.8	223

*Note: This is a Representative Sample of the High Speed / High Force Actuator Product Series, Consult Factory for Additional Models
For Additional Information on the Operational Performance of H-Series Actuators, consult www.kyntronics.com/products/smart-hydraulic-actuator-h-series/overview or sales@Kyntronics.com to speak with an Engineer.



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About Kyntronics

All Kyntronics actuation products are made in the USA. With vast knowledge in industrial, aerospace and medical industries, our in-house team of mechanical, electronics 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 speak with an Engineer and discuss your application, please contact us at sales@kyntronics.com and discover how the SMART Electro-Hydraulic Actuator can improve your machines and processes.

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