



**Kyntronics**

*Innovation in Motion*

# Product / Application Overview

Rev 5.02

[kyntronics.com](http://kyntronics.com)



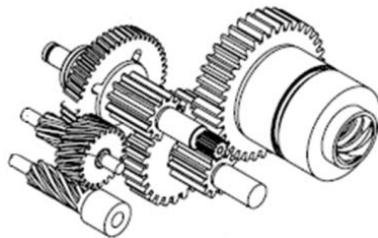
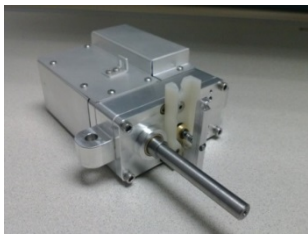
- **Kyntronics specializes in Actuation Solutions across many industries including Medical, Aerospace & Industrial.**
  - **The Kyntronics team has extensive Motion Control experience with Electrical, Software and Mechanical Engineers on staff.**
- 
- **Our business culture is customer focused, with an innovative design team, utilizing Lean Six Sigma concepts with a continuous improvement conviction.**
  - **AS9100D, ISO9001:2015 Certified Quality System**
  - **Kyntronics is located near Cleveland Ohio.**

**Our mission is to help customers solve Motion Control problems more effectively, using proven technologies in innovative ways.**

# Standard Actuator Offering

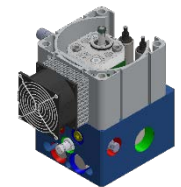
## EMA (Electro-Mechanical Actuation)

- 40-1200 lbf (5.3kN) – [linear]
- 5-2400 in-lbs (271N-m) – [rotary]
- Smart Actuation (integrated electronics)
- Ideal for OEMs
- Lighter Weight
- Easy Manual Release
- Motor / Brake
- Accurate Position Control



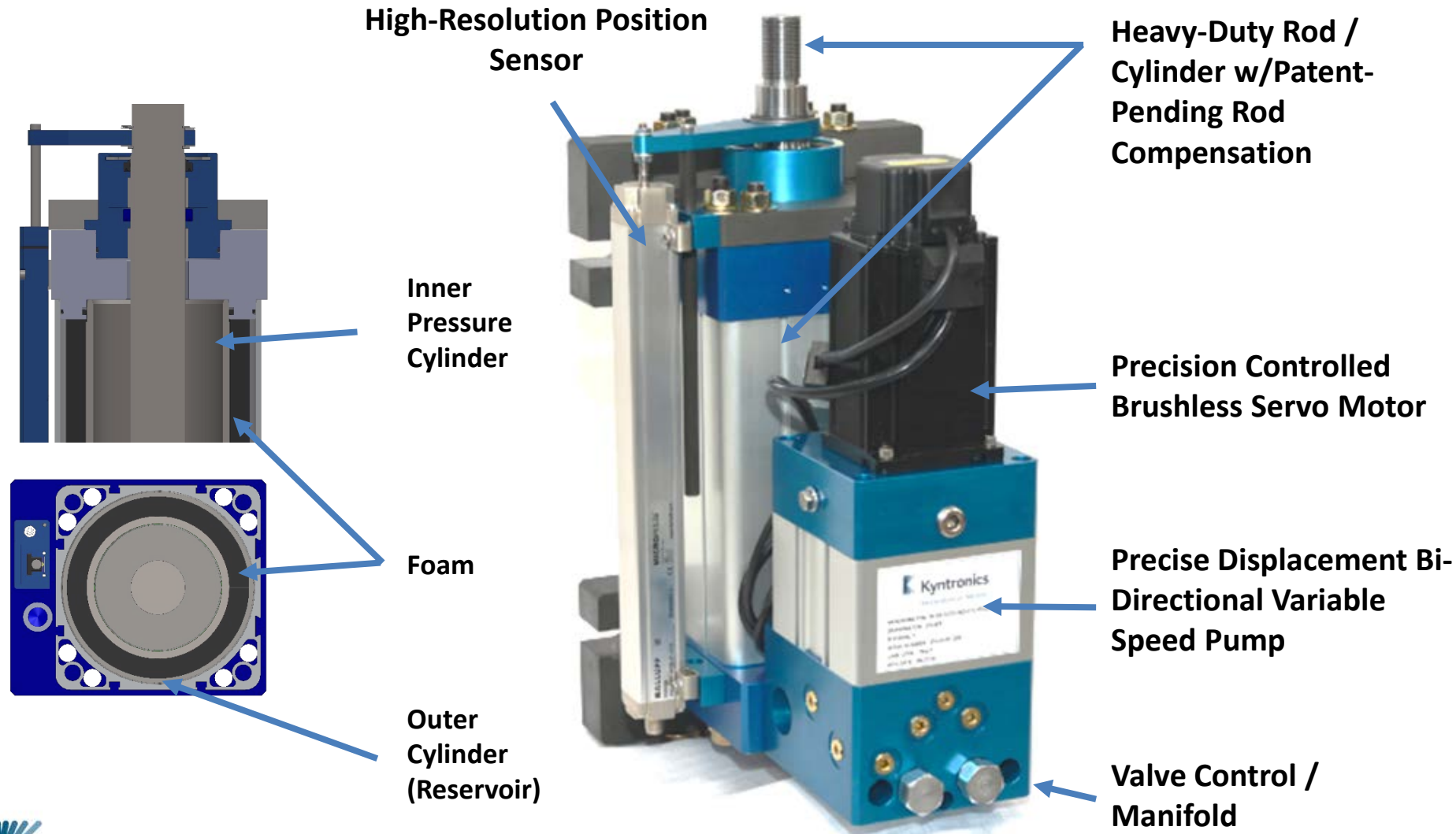
## SHA (SMART Hydraulic Actuation)

- 800 – 170,000 lbf (755kN) – [linear]
- High Efficiency
- Smart Actuation (integrated electronics)
- Accurate Position Control
- No Brake to Hold Position
- IP65 Rated
- High Shock Load Capable
- Field Bus Connectivity

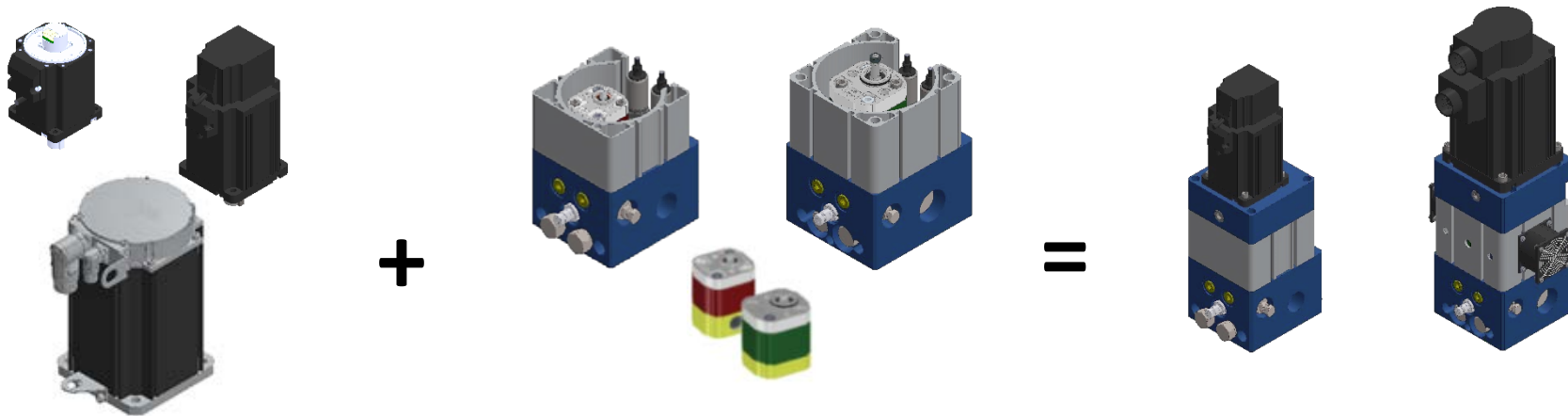


*Modularity*

# SHA Overview



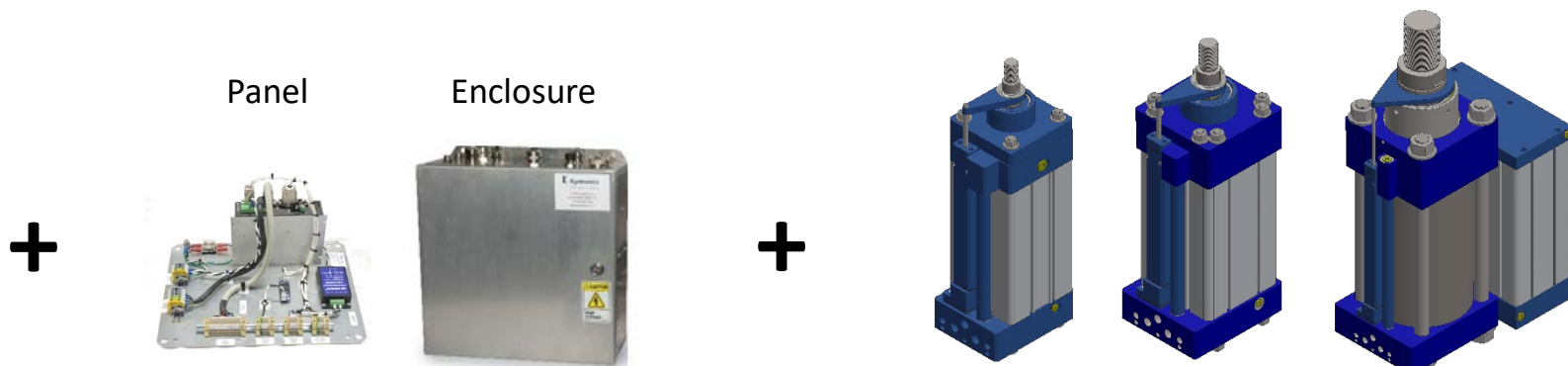
# SMART Hydraulic (SHA) – Modularity



60, 80, 120, 130,  
142, 160, 190mm

80, 120 Manifold  
Group 0, 1 Pumps

80, 120 Power Units



Panel

Enclosure

120 & 240Vac – 1ph,3ph  
12, 24, 48, 96Vdc

1, 1.5, 2in

2.5, 3.25in

4, 5, 6in

# Product Families

1 thru 3.25in  
120Vac/ 240Vac  
Up to 25,000lbf  
(111kN)



*'S' Models*

80 & 120  
Series

4,5 & 6in  
Up to 85,000lbf  
(377kN)

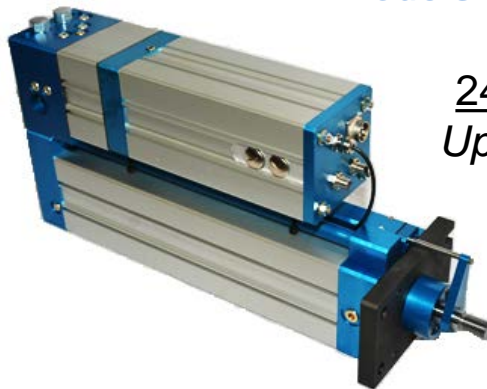


240, 250 &  
260 Series

*Inline Design*



*'E' Models*



24Vdc, IP68  
Up to 9,500lbf  
(42kN)

*'H' Models*



HSHF – Up to 170,000lbf (755kN)

# Example Product Configurations



Customer Supplied Motor & Drive

*Hexapod*

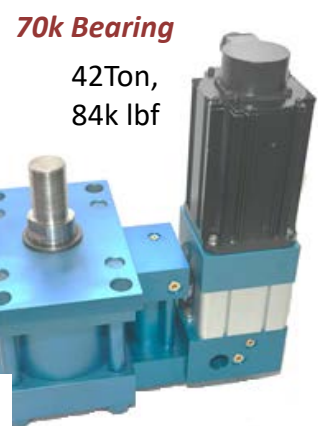


In-Line

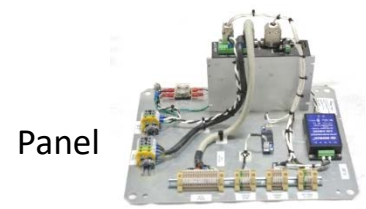
80k (40T)  
Coordinated  
Press



Flexible  
Installation &  
Fan Cooled



*70k Bearing*  
42Ton,  
84k lbf



Panel



*Suspension &  
Steering*  
Enclosure



24Vdc – IP68  
Totally Enclosed



Custom  
Mounting &  
Anti-Rotation  
*Gas Valve*



*F18 Damper* Feet Mount &  
High Precision FB



All-in-One

*Shock*



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# SMART-Hydraulic (SHA) – ‘S’ Models

- All Inclusive Solution
- On Demand Power
- Simple / Easy Setup
- Very Efficient
- Versatile Controls
- Modular

	Series	Continuous Duty @ 230Vac		Peak @ 230Vac		Series	Continuous Duty @ 230Vac		Peak @ 230Vac	
		Force-Lbf (N)	Avg-In/s (mm/s)	Force-Lbf (N)	Avg-In/s (mm/s)		Force-Lbf (N)	Avg-In/s (mm/s)	Force-Lbf (N)	Avg-In/s (mm/s)
Speed	S08C10-13	966 (4,299)	8.8 (225)	2,356 (10,481)	8.8 (225)	S08C32-13	10,208 (45,406)	0.7 (18)	24,887 (110,704)	0.7 (18)
	S13C10-36	732 (3,258)	45.6 (1,159)	2,197 (9,775)	45.6 (1,159)	S13C32-36	7,737 (34,415)	3.6 (92)	23,210 (103,245)	3.6 (92)
	S19C10-36	2,197 (9,775)	45.6 (1,159)	2,197 (9,775)	45.6 (1,159)	S19C32-36	23,210 (103,245)	3.6 (92)	23,210 (103,245)	3.6 (92)
	S08C15-13	2,174 (9,672)	3.3 (84)	5,301 (23,582)	3.3 (84)	S08C40-13	15,463 (68,781)	0.5 (12)	37,699 (167,694)	0.5 (12)
	S13C15-36	1,648 (7,331)	17.0 (431)	4,944 (21,993)	17.0 (431)	S13C40-36	11,720 (52,131)	2.5 (64)	35,159 (156,394)	2.5 (64)
	S19C15-36	4,944 (21,993)	17.0 (431)	4,944 (21,993)	17.0 (431)	S19C40-36	35,159 (156,394)	2.5 (64)	35,159 (156,394)	2.5 (64)
	S08C15-13	3,866 (17,195)	2.0 (50)	9,425 (41,924)	2.0 (50)	S08C50-13	24,160 (107,470)	0.3 (9)	58,905 (262,022)	0.3 (9)
	S13C15-36	2,930 (13,033)	10.1 (256)	8,790 (39,099)	10.1 (256)	S13C50-36	18,312 (81,455)	1.8 (45)	54,936 (244,366)	1.8 (45)
	S19C15-36	8,790 (39,099)	10.1 (256)	8,790 (39,099)	10.1 (256)	S19C50-36	54,936 (244,366)	1.8 (45)	54,936 (244,366)	1.8 (45)
	S08C25-13	6,040 (26,868)	1.3 (33)	14,726 (65,505)	1.3 (33)	S08C60-13	34,791 (154,757)	0.2 (6)	84,823 (377,312)	0.2 (6)
	S13C25-36	4,578 (20,364)	6.7 (171)	13,734 (61,091)	6.7 (171)	S13C60-36	26,369 (117,296)	1.2 (29)	79,107 (351,887)	1.2 (29)
	S19C25-36	13,734 (61,091)	6.7 (171)	13,734 (61,091)	6.7 (171)	S19C60-36	79,107 (351,887)	1.2 (29)	79,107 (351,887)	1.2 (29)
Force	S08C10-05	2,356 (10,481)	2.2 (56)	2,356 (10,481)	2.2 (56)	S08C32-05	24,887 (110,704)	0.2 (4)	24,887 (110,704)	0.2 (4)
	S13C10-21	2,356 (10,481)	12.0 (305)	2,356 (10,481)	12.0 (305)	S13C32-21	24,887 (110,704)	1.0 (24)	24,887 (110,704)	1.0 (24)
	S19C10-34	2,356 (10,481)	36.0 (915)	2,356 (10,481)	36.0 (915)	S19C32-34	24,887 (110,704)	2.9 (73)	24,887 (110,704)	2.9 (73)
	S08C15-05	5,301 (23,582)	0.8 (21)	5,301 (23,582)	0.8 (21)	S08C40-05	37,699 (167,694)	0.1 (3)	37,699 (167,694)	0.1 (3)
	S13C15-21	5,301 (23,582)	4.5 (113)	5,301 (23,582)	4.5 (113)	S13C40-21	37,699 (167,694)	0.7 (17)	37,699 (167,694)	0.7 (17)
	S19C15-34	5,301 (23,582)	13.4 (340)	5,301 (23,582)	13.4 (340)	S19C40-34	37,699 (167,694)	2.0 (51)	37,699 (167,694)	2.0 (51)
	S08C20-05	9,425 (41,924)	0.5 (12)	9,425 (41,924)	0.5 (12)	S08C50-05	58,905 (262,022)	0.1 (2)	58,905 (262,022)	0.1 (2)
	S13C20-21	9,425 (41,924)	2.7 (67)	9,425 (41,924)	2.7 (67)	S13C50-21	58,905 (262,022)	0.5 (12)	58,905 (262,022)	0.5 (12)
	S19C20-34	9,425 (41,924)	8.0 (202)	9,425 (41,924)	8.0 (202)	S19C50-34	58,905 (262,022)	1.4 (36)	58,905 (262,022)	1.4 (36)
	S08C25-05	14,726 (65,505)	0.3 (8)	14,726 (65,505)	0.3 (8)	S08C60-05	84,823 (377,312)	0.1 (1)	84,823 (377,312)	0.1 (1)
	S13C25-21	14,726 (65,505)	1.8 (45)	14,726 (65,505)	1.8 (45)	S13C60-21	84,823 (377,312)	0.3 (8)	84,823 (377,312)	0.3 (8)
	S19C25-34	14,726 (65,505)	5.3 (135)	14,726 (65,505)	5.3 (135)	S19C60-34	84,823 (377,312)	0.9 (23)	84,823 (377,312)	0.9 (23)

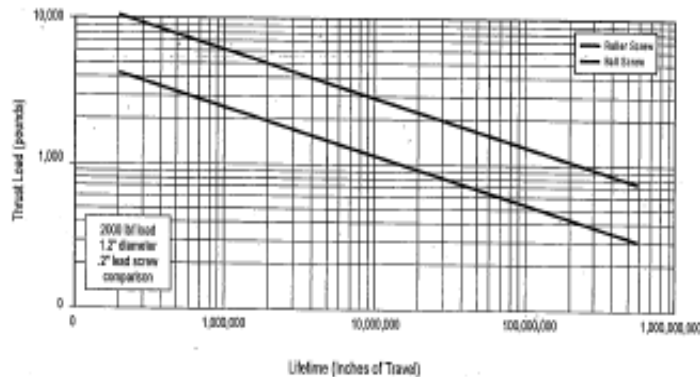
# Feature Comparison

Requirement	SHA	Central Hydraulic Cylinder	Electro-Mechanical Ball / Roller Screw (EMA)	Feature / Benefit
High Force Density / Small Footprint	X	X		Hydraulics provide the highest force density.
Variable Speed Servo Technology - Precise control of speed, force and position	X		X	Precise servo controlled solution (Force, Speed and Position).
Energy Efficiency	X			Hydraulics is the most efficient means of converting electrical power to linear power with the power on demand of the SHA.
All-In-One System	X		X	Servo Motor & Drive optimally sized for the application.
Ability to sustain "shock loading" conditions	X	X		Hydraulics is the ideal solution for repeat high impact loads.
Cost Effective / Lower Equipment Cost	X			Higher efficiency leads to reduced motor/drive sizes and lower costs.
Reliability / Low Maintenance	X			Hydraulics provide the highest reliability numbers of any technology. There are no metal to metal wear items.
Simple Fieldbus Control Connectivity, IoT integration	X		X	Easy to use control integration.
No Back driving	X			The SHA locks in place when power is removed. EMAs require a brake and are back-drivable.

# Reliability vs. EMA

## From Exlar Catalog

Lifetime Comparison (Roller vs Ball Screws)



**(load dependent)**

## EMA (Electro-Mechanical Actuation)

- At 10,000lbf (44kN) EMA is at 100,000 inches (254,000 cm) of travel
- At 1,000lbf (4.4kN), EMA is at 10,000,000 inches (25,400,000 cm) of travel

**Kyntronics SHA:** No metal to metal contact leads to increased reliability  
**(load independent)**

## SHA (SMART Hydraulic Actuator)

- Exceeds 50,000,000 in (127,000,000 cm) of travel with no Maintenance
- Exceeds 100,000,000 in (254,000,000 cm) of travel with a simple Rod Seal Cartridge change

# SHA Advantages - *summary*

- Cost effective – no hydraulic infrastructure
- All-in-One Solution
- Energy Efficiency
  - Smaller motor & drive – more compact
- High-Shock & Vibration Capability
- No Brake Required
- No Back-Drive or Backlash
- No Maintenance
- Precise Control
- Drop in – Simple to connect and setup
  - Connectivity (Ethernet, CanBus etc)
- Environmentally Tough – IP65



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ADVANCED ACTUATION | ADVANCED ACTUATION | ADVANCED ACTUATION | ADVANCED ACTUATION



**Kyntronics**

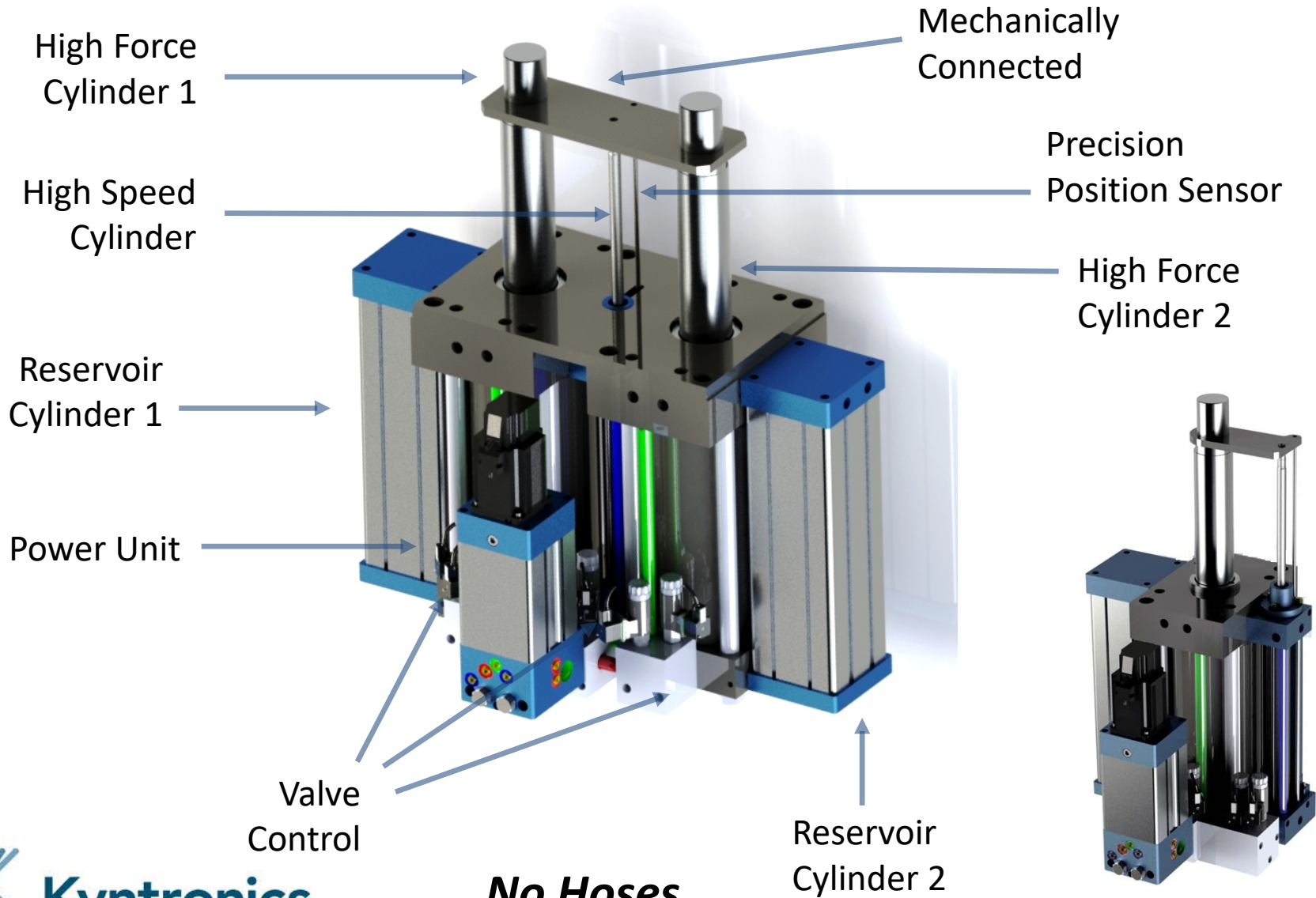
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# HSHF Technology

RESPONSIVE | INNOVATIVE AND RESPONSIVE | INNOVATIVE AND RESPONSIVE | INNOVATIVE  
Technology Solutions | Actuation Technology Solutions | Actuation Technology Solutions

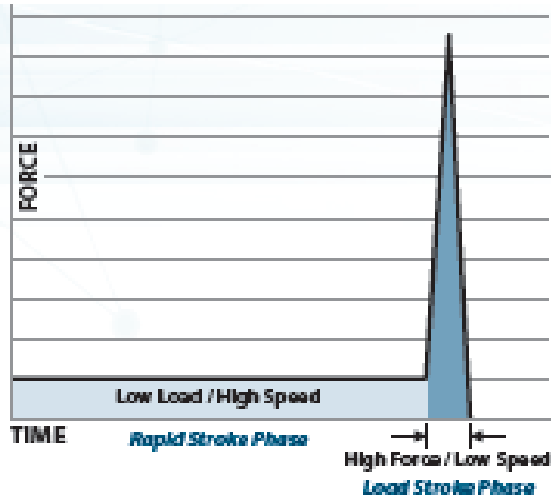
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# HSHF – Design



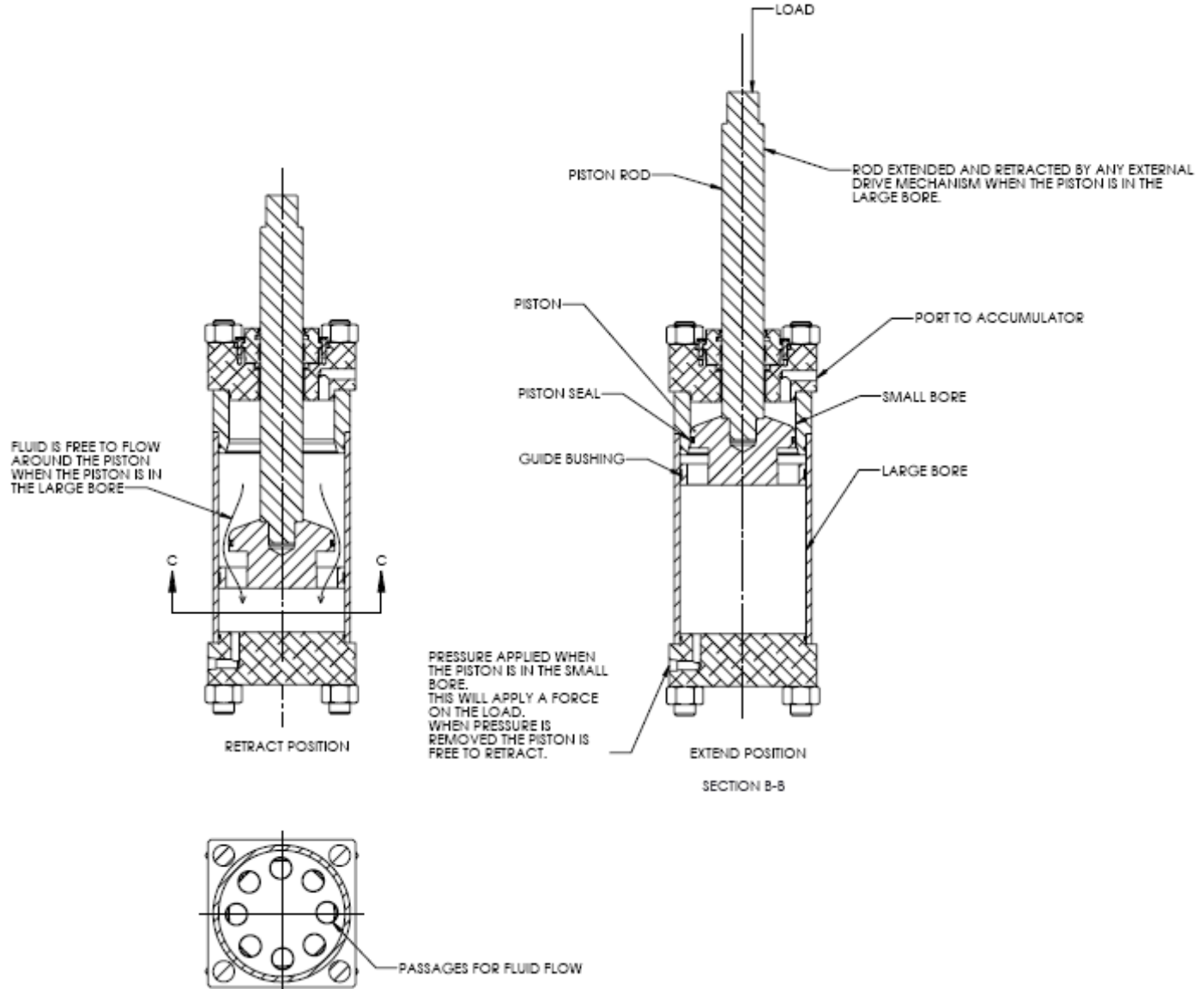
# High Speed-High Force Press / Clamp

- Multi-Cylinder design
- High Speed - - up to 45in/sec
- High Load - - >50tons for <2sec
- Single Pump & Motor
- Coordinated Motion
- Position and Force Control
- Servo Drive with integral motion control
- Versatile Control
  - Fieldbus
  - I/O (Selectable indexes)
  - Analog (0-10vdc or 4-20ma)



		Rapid Stroke Phase		Load Stroke Phase	
		Avg HS in/sec (cm/sec)	Maximum HS Force lbf (N)	Avg HF Speed in/sec (cm/sec)	Maximum HF lbf [Ton] (kN)
Single HF Cylinder	'H' Models				
	H1-10-32-36	45.6 (115.9)	1,261 (5,608)	3.3 (8.3)	24,887 [24.9] (111)
	H1-10-40-36	45.6 (115.9)	1,236 (5,497)	2.2 (5.5)	37,699 [37.7] (168)
	H1-10-50-36	45.6 (115.9)	1,186 (5,275)	1.4 (3.5)	58,905 [58.9] (262)
	H1-10-60-36	45.6 (115.9)	1,186 (5,275)	1.0 (2.4)	84,823 [84.8] (377)
2x HF Cylinder	H2-10-32-36	45.6 (115.9)	1,086 (4,830)	1.6 (4.2)	49,775 [24.9] (221)
	H2-10-40-36	45.6 (115.9)	1,036 (4,607)	1.1 (2.7)	75,398 [37.7] (335)
	H2-10-50-36	45.6 (115.9)	936 (4,163)	0.7 (1.8)	117,810 [58.9] (524)
	H2-10-60-36	45.6 (115.9)	936 (4,163)	0.5 (1.2)	169,646 [84.8] (755)
	H2-15-32-36	21.5 (54.6)	4,031 (17,931)	1.6 (4.2)	49,775 [24.9] (221)
	H2-15-40-36	21.5 (54.6)	3,981 (17,709)	1.1 (2.7)	75,398 [37.7] (335)
	H2-15-50-36	21.5 (54.6)	3,881 (17,264)	0.7 (1.8)	117,810 [58.9] (524)
	H2-15-60-36	21.5 (54.6)	3,881 (17,264)	0.5 (1.2)	169,646 [84.8] (755)

# Unique Technology – Patent Pending



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ADVANCED ACTUATION | ADVANCED ACTUATION | ADVANCED ACTUATION | ADVANCED ACTUATION



# Kyntronics

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## Tools

RESPONSIVE | INNOVATIVE AND RESPONSIVE | INNOVATIVE AND RESPONSIVE | INNOVATIVE  
Technology Solutions | Actuation Technology Solutions | Actuation Technology Solutions

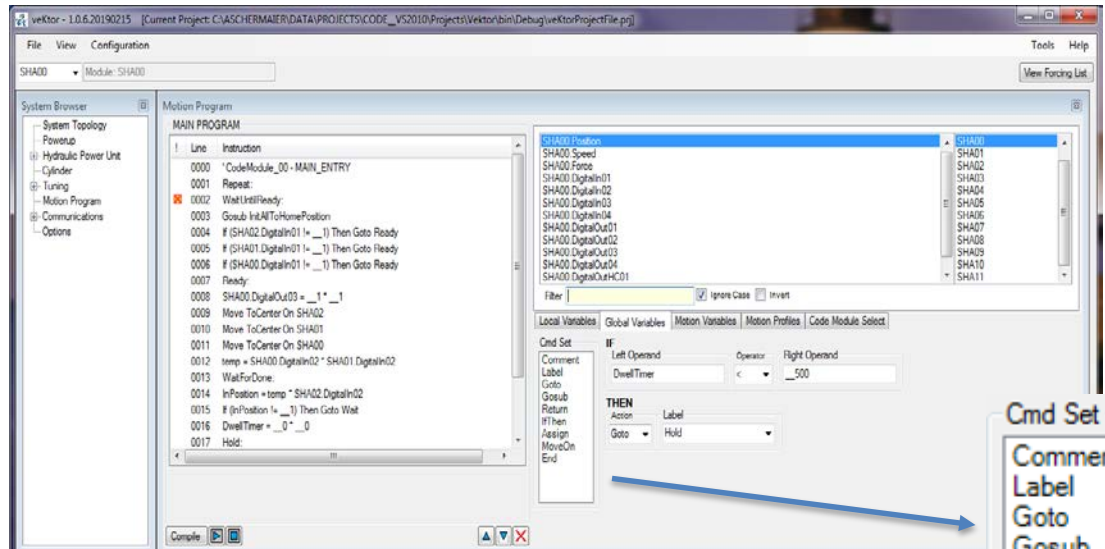
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# Kyntronics Controller (veKtor) – Overview

## Features:

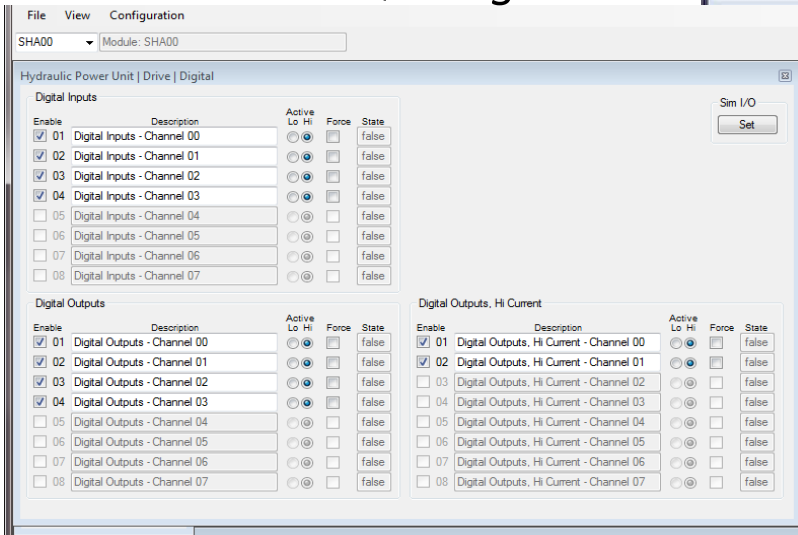
- Robust GUI
  - Easy to setup & startup
  - Auto Tuning, Logging etc
- Programmable motion control
- Coordinated motion
- Digital / Analog I/O
- Position and Force control
- Modbus RTU as standard (Robust)
- Fieldbus control (Optional)

*Phase I – Q2 target*



**Cmd Set**

Comment  
Label  
Goto  
Gosub  
Return  
IFThen  
Assign  
MoveOn  
End



# Product Configurator & Pricing



- Easily configure your product
- Auto generated P/N
- Provides pricing / quote information
- Works off-line
- Syncs & provides updates when you are connected

EHA Configurator - 1.3.52.20180709 Authorized User: [Sales] - Expiration in 30 Days.

**Desired Performance**

Nominal Force 4000 lbf  N

Rod Speed 1.000 in/s  cm/s  
 Use Average Rod Speed

Rod Stroke 1.0 in  mm  
 Press/Clamp/Shear Application

**Configuration**

Attached Drive  Motor/Manifold  Cylinder

Customer Supplied Drive  Motor  **A**

**Drive/Motor Utilization**

Run Time Loaded No Load

00:02.00 00:00.00

Rest Time  Duty Cycle (%)

Continuous Load 50.00

Partial Load 50.00

Average 50.00

50% 100%

**Peak 02**

**Input Voltage**

AC  DC

120  12

240  24

480  48

60

75

**Phases**

1  3

**Search Using**

Extend Only

Retract Only

Both

**Options**

0 Degrees  Motor Orientation

Clevis  Rod End

Front Flange / Plate  Actuator Mount

No lbf Feedback  Pressure Sensor

No Lock Valve  Lock Valve

No Manual Release  Manual Release

Position Mode, Standard (0.010)  Control Input &

Modbus RTU  Field Bus

Advanced

**Selection Summary**

	STANDARD UNITS		SI UNITS		
	Extend	Retract	Extend	Retract	
Nominal Force	4000	2560	17793	11387	kN
Rod Speed	0.78	1.22	1.98	3.10	cm/s
Est Run Cycle Time	2.0		2.0		s
Pump Displacement	0.360		5.899		cc/rev
Pump Size	Size 31		Size 31		
Output Pressure	204		1405		kPa
Cylinder	5.00		12.70		cm
Input Voltage	120AC		120AC		V
Input Phases	1		1		
Est Motor Current	4.9		4.9		A
Est Output Power, max	352.8		352.8		W
Motor Speed	2838		2838		rpm
Max Shaft Torque	378.8		42.80		N-m
Required Motor Torque	18.0		2.04		N-m
Column Safety Factor	176.743		176.743		

Part Number 2A1A-1FS6-P8G-31A-0025

**Part List**

[000-00]	TOT:\$0,000.00	RT:018.0	C[6]:5.00	P[18]:31	DV[00]	M[2]:120	Ld:
[001-00]	TOT:\$0,000.00	RT:019.4	C[1]:1.50	P[03]:05	DV[00]	M[0]:80	Ld:
[002-00]	TOT:\$0,000.00	RT:020.5	C[5]:4.00	P[16]:27	DV[00]	M[2]:120	Ld:
[003-00]	TOT:\$0,000.00	RT:021.0	C[7]:6.00	P[21]:36	DV[00]	M[2]:120	Ld:
[004-00]	TOT:\$0,000.00	RT:023.2	C[4]:3.25	P[14]:23	DV[00]	M[2]:120	Ld:
[005-00]	TOT:\$0,000.00	RT:023.9	C[6]:5.00	P[20]:34	DV[00]	M[2]:120	Ld:
[006-00]	TOT:\$0,000.00	RT:028.1	C[3]:2.50	P[08]:13	DV[00]	M[0]:80	Ld:
[007-00]	TOT:\$0,000.00	RT:028.2	C[5]:4.00	P[18]:31	DV[00]	M[2]:120	Ld:
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Program Is Ready.  
Found 95 Matching Configurations.  
Finging Succeeded.  
Requesting Renewal...  
Renewal Granted.  
Finging Succeeded.  
Program Version Validated.  
Finging Succeeded.  
Found 95 Matching Configurations.

# Increasing Sales – Minimize Time

*Inquiry from the Customer... Identify Needs: (Force / Speed / Control...)*

## Existing Methodology

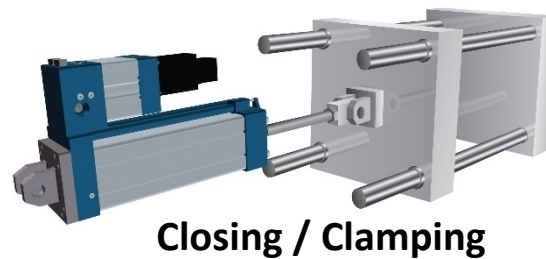
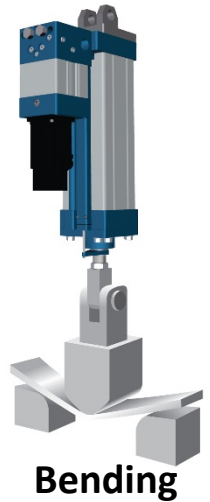
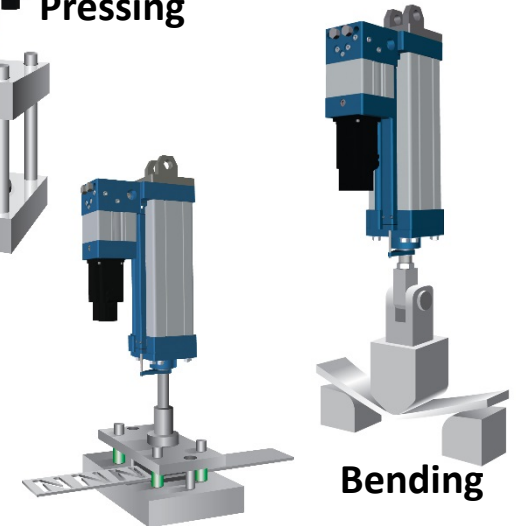
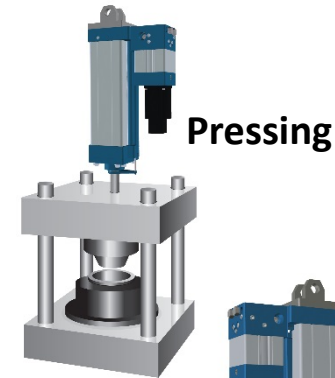
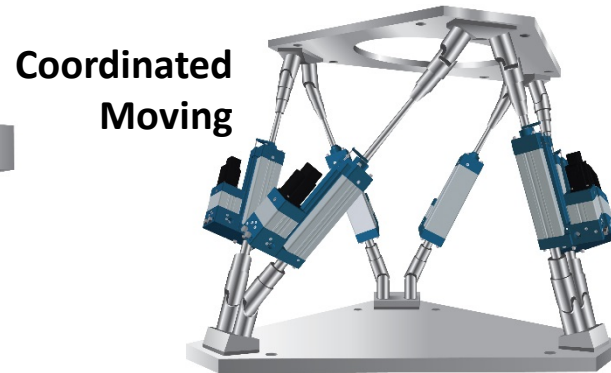
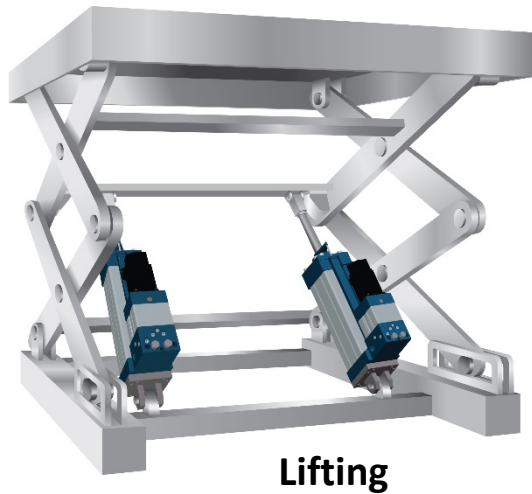
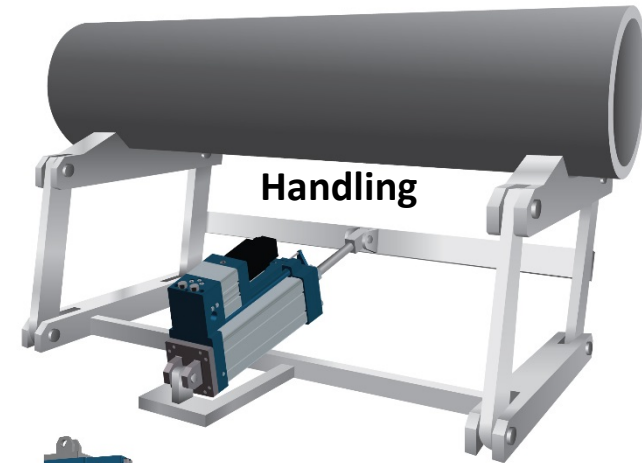
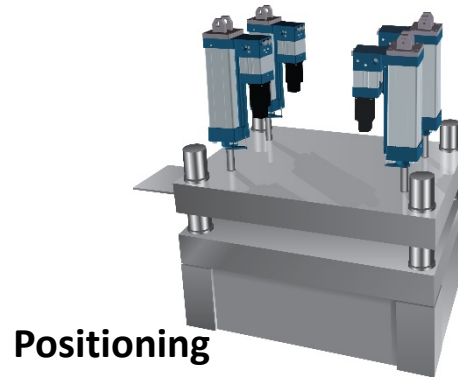
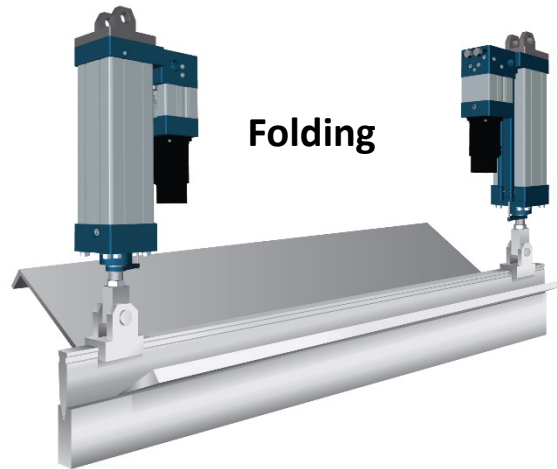
1. Draw system diagram
2. Select pump
3. Select motor
4. Select appropriate hose sizes
5. Select appropriate hose lengths
6. Select appropriate connectors
7. Select necessary control valves
8. Decide on space / layout
9. Decide on mounting
10. Conduit runs / wiring
11. Etc...
12. Quote

## Using Kyntronics

1. Open Configurator
2. Select Options
3. Quote

*% wins increase – time is minimized*

# SHA Applications



# Successes

## Central Hydraulic System Replacement – (*requiring motion control*)

- Saves time and money designing a system
- Easy to setup (saving time)
- Versatile force and position control (ranges)

## Presses / Clamping

- Take advantage of hydraulics (HSHF)
  - High speeds with low force & High force at low speeds
- Significant power, replacing the large HPU
- Locks into position, no brake

## Testing Applications

- Versatile control
- Simple setup

## Replacing Electro-Mechanical Actuators

- Very cost effective, especially with higher forces
- Significant increase in reliability 2-3x more uptime (no metal to metal contact)



# F18 Damper Test – HPU replacement

## Advantages per the Customer:

- Self-contained system with all functionality we need for this test. As an alternate, we would've had to design our own mini load control system with either servo proportional valve + external motion controller OR a gamut of manual hydraulic valves for precise load control.
- It saved us many days of assembly/set-up/testing/tuning and cost as well.
- The biggest challenge with these kind of systems is force control at low ends. With conventional hydraulic components, tuning takes majority of the testing time.
- Also, this system gives the customer ability to test the unit without using external hydraulic power which makes it very portable and manageable.



***Replaced central hydraulic system***

# Presses



## Advantages

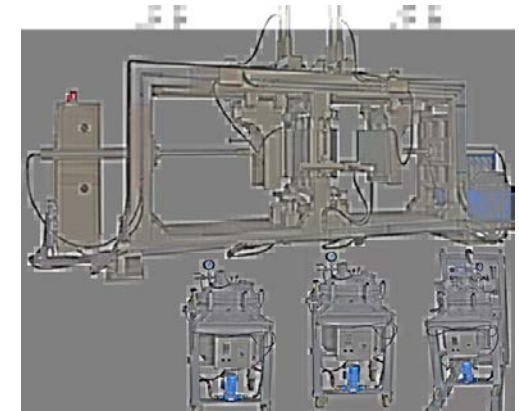
- Needs higher speeds at a low force most of the stroke, high force at low speed for a small segment of the stroke
- Take advantage of hydraulics (HSHF)
  - High speeds with low force & High force at low speeds
- Significant power, replacing the large HPU
- HPUs are oversized, constantly running with large hoses
- No hoses, no leaks
- Versatile control capabilities
- Position and Force control
- Easy to install, saves time and money

## Industries

- Automotive
- Assembly
- Press Braking
- Metal Bending



# Clamping



## Advantages

- Needs higher speeds at a low force the entire stroke
- Locks into position when stopped
- Take advantage of hydraulics (HSHF)
  - High speeds with low force
- Solves many existing issues / clamping techniques
  - Mechanical locking devices, large hoses etc
- Electro-mechanical actuators are constantly stopping at the same position significantly reducing the life
- HPU's are oversized, constantly running with large hoses
- No hoses, no leaks
- Versatile control capabilities
- Easy to install, saves time and money

## Industries

- Injection Molding
- Metal Fabricating
- Wire Clamping



# Clamping / Force Control



(4) Coordinated SHA Systems



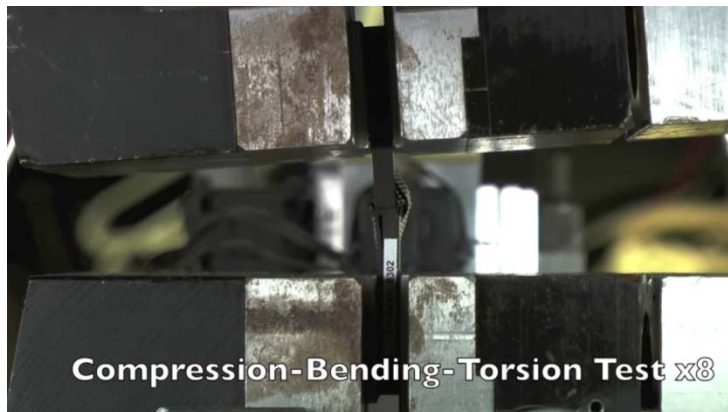
SHA Assembly

## Kyntronics Advantages:

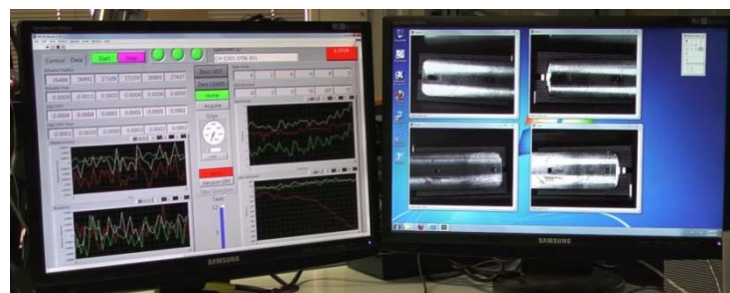
- Replaced an HPU (more eff)
- Added Ethernet comms
- Increased product test quality



# Navy Hexapod Application



Material testing



Multiple modes, with one actuator design

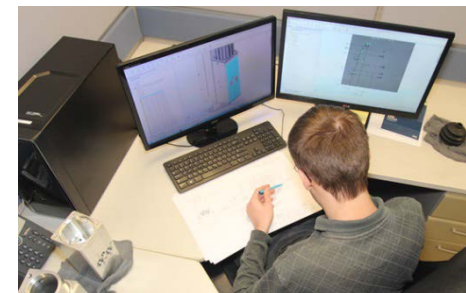
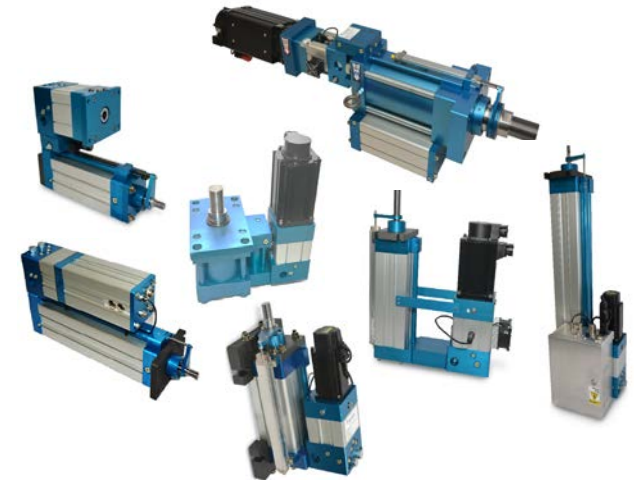
- 2in/sec (5cm/s) at 900lbf (4kN)
- 0.5in/min (1.3cm/m) at 4200lbf (18.7kN)

*A Single SHA Provides:*

- 240x speed change
- 4.7x load change

# Kyntronics – Who We Are...

- ***We are* Solution Oriented – Innovative**
- ***We are* Passionately Customer Focused**
- ***We are* Actuation and Motion Control Experts**
- ***We have* a Continuous Improvement Culture**
- ***We are* Manufacturing & Quality Focused – OTD driven**



Innovation In Motion | Innovation In Motion | Innovation In Motion | Innovation In Motion  
ADVANCED ACTUATION | ADVANCED ACTUATION | ADVANCED ACTUATION | ADVANCED ACTUATION



# Kyntronics

*Innovation in Motion*

## Contact Kyntronics

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