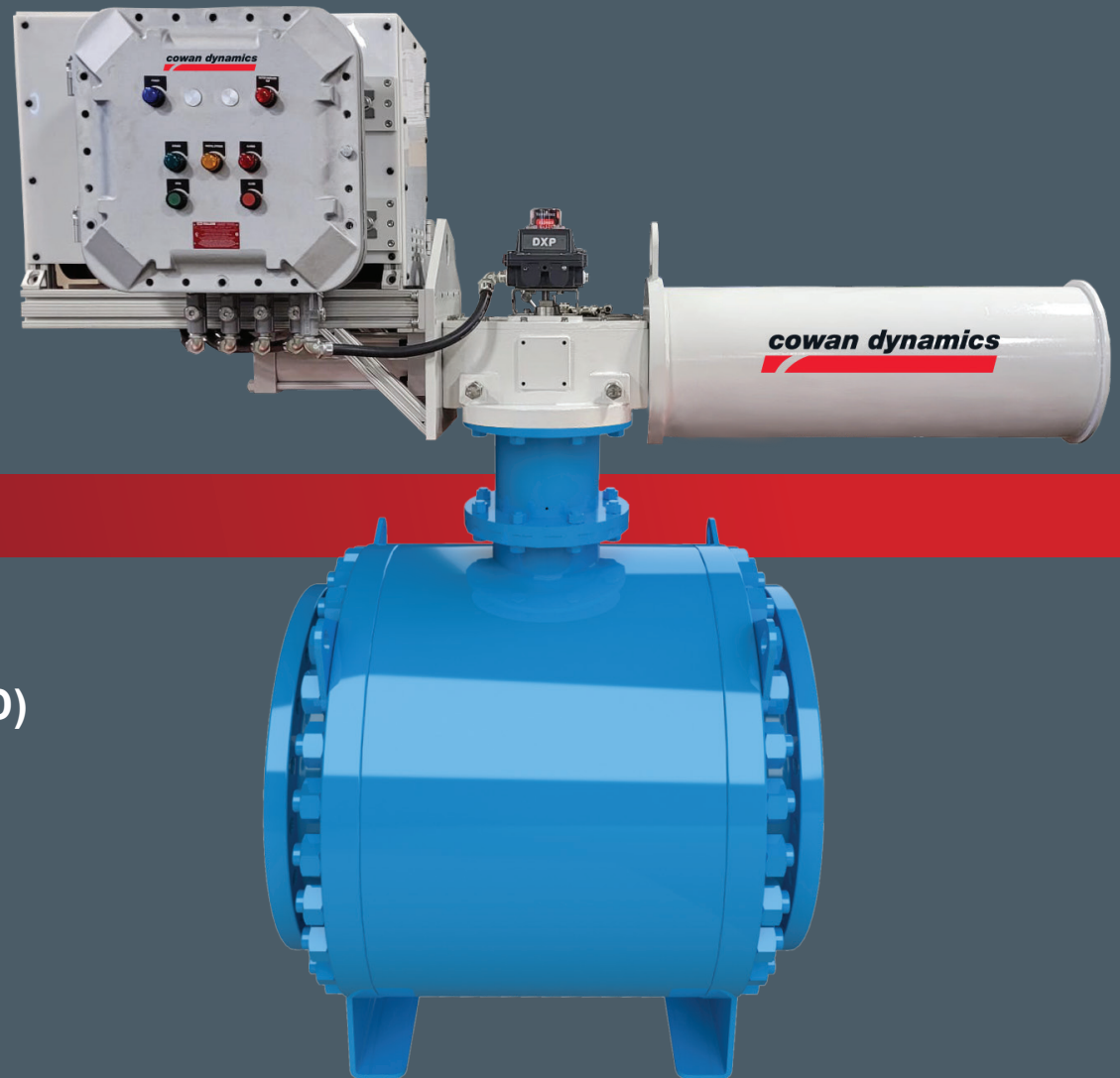


# E<sup>2</sup>H-ESD

## Electro-Hydraulic Actuator for Emergency Shutdown Valves

Durable, Accurate, Compact & Modular

- Fully Modular Design
- For Critical Emergency Shutdown (ESD)
- Torques up to 3,000,000 in-lbs.



# E2H-ESD Overview

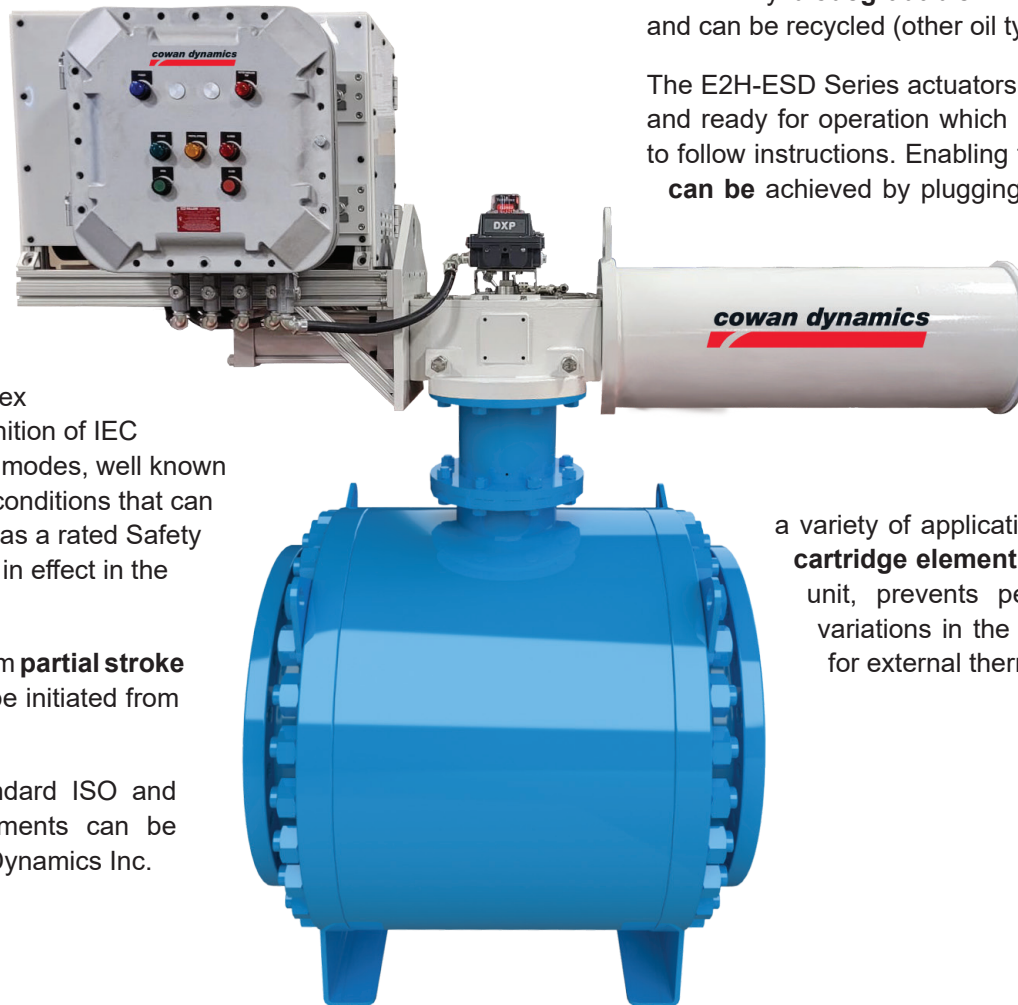
In the E2H-ESD actuators the motor stops when there is no movement required from the valve, this leads to a very **low power consumption** and an **increased life** of moving components.

Emergency shutdown signals (**ESD**) can be designed to perform desired action per application specifications and move the valve to the desired position (fully open/ close, last-locked) within specified time.

Understanding that emergency shutdown valves are critical parts of safe systems and therefore a reliable actuator is a must, the design of the E2H-ESD is a non-complex (Type A) component based on the definition of IEC 61508 (device with well-defined failure modes, well known failure rates, and behavior under fault conditions that can be completely determined), for which has a rated Safety Integrity Level. Components which are in effect in the fail-safe function are all SIL certified.

Actuators can be programmed to perform **partial stroke tests** (PST). The PST command can be initiated from the remote or local signal.

**Valve interface** comes per any standard ISO and MSS pattern. Other custom requirements can be accommodated by consulting Cowan Dynamics Inc.



Hydraulic **manual override** is a standard feature, integrated to the manifold block as a hydraulic hand pump.

Hydraulic fluid used to operate the E2H-ESD actuators is inherently and readily **biodegradable** which is non-toxic, free of heavy metals and can be recycled (other oil types available, consult factory).

The E2H-ESD Series actuators are shipped filled with oil, fully tested and ready for operation which is user friendly and comes with easy to follow instructions. Enabling the **quick and easy commissioning** can be achieved by plugging a single electric connection input to the supply.

If additional support is required, Cowan Dynamics Inc. service team is available to assist with commissioning and troubleshooting.

A wide range of **temperature ratings** make the E2H-ESD series actuators suitable for use in a variety of applications in all climates. Using an integral **cartridge element heater** in a **fully enclosed** hydraulic unit, prevents performance degradation caused by variations in the oil viscosity and eliminates the need for external thermal insulation (i.e., blankets).

# Product Introduction

## E2H-ESD SERIES

This actuator has been specifically designed for critical emergency shutdowns. Understanding how critical the proper operation of ESD valves is for safety systems, the E2H-ESD actuator provides a fast, safe, and reliable failure conditions on loss of power and/or ESD signals. Options for modulation are available within this product line, consult factory.



## Features

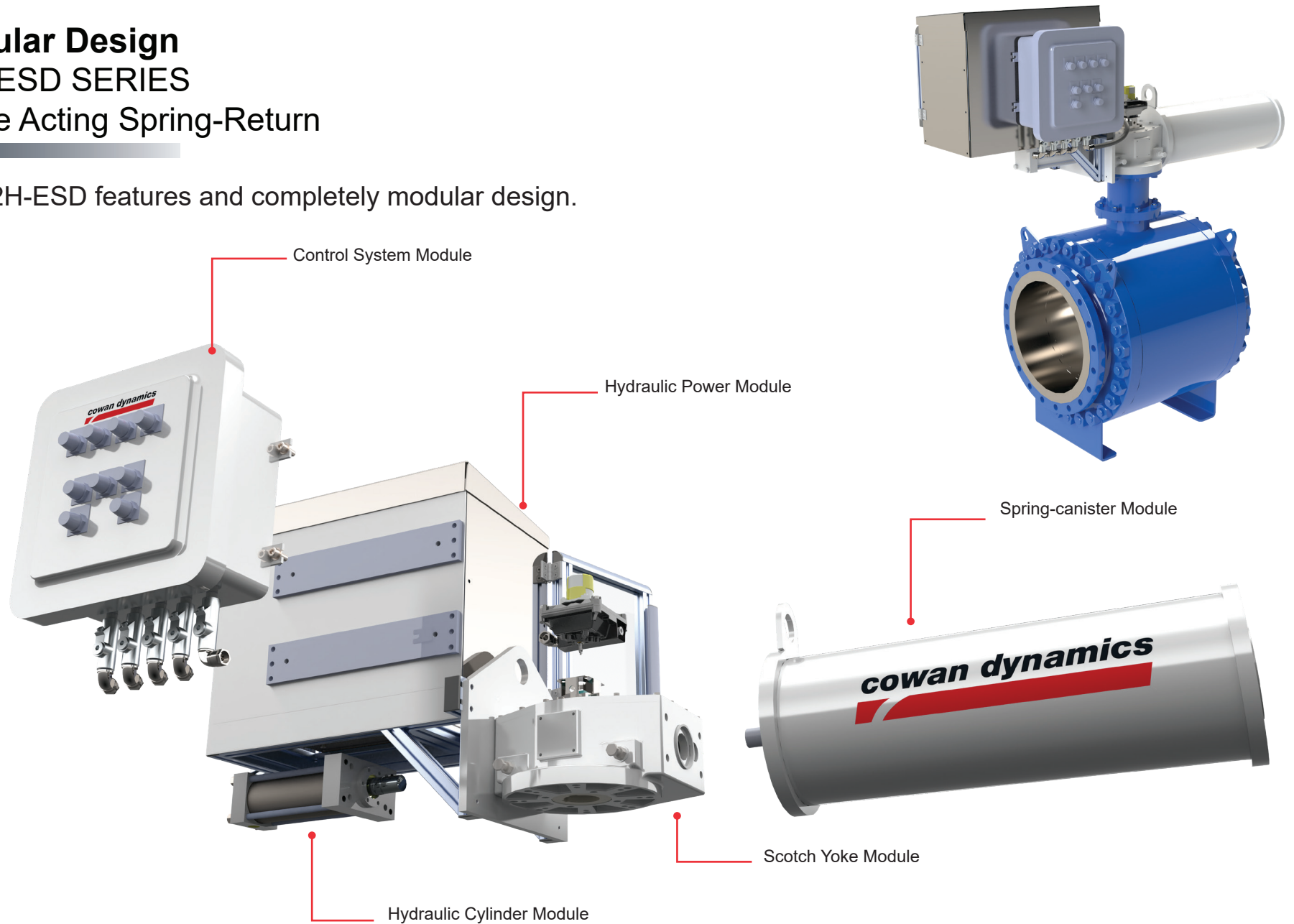
- Fully modular design
- Torques up to 3,000,000 in-lbs
- On/Off Service, Emergency shutdown valves (ESD). Option for modulation is available.
- Local and remote control
- Visual position indicators
- Explosion proof design
- SIL (Pending)
- Fast acting
- Fail Last, Fail Close or Fail Open
- Up to operating Pressure: 2,500 psi
- Partial stroke test (PST)
- Manual override, Hydraulic hand pump
- ETL Certified to CSA / cUL / ATEX Electrical Requirements

# Modular Design

## E2H-ESD SERIES

### Single Acting Spring-Return

The E2H-ESD features a completely modular design.

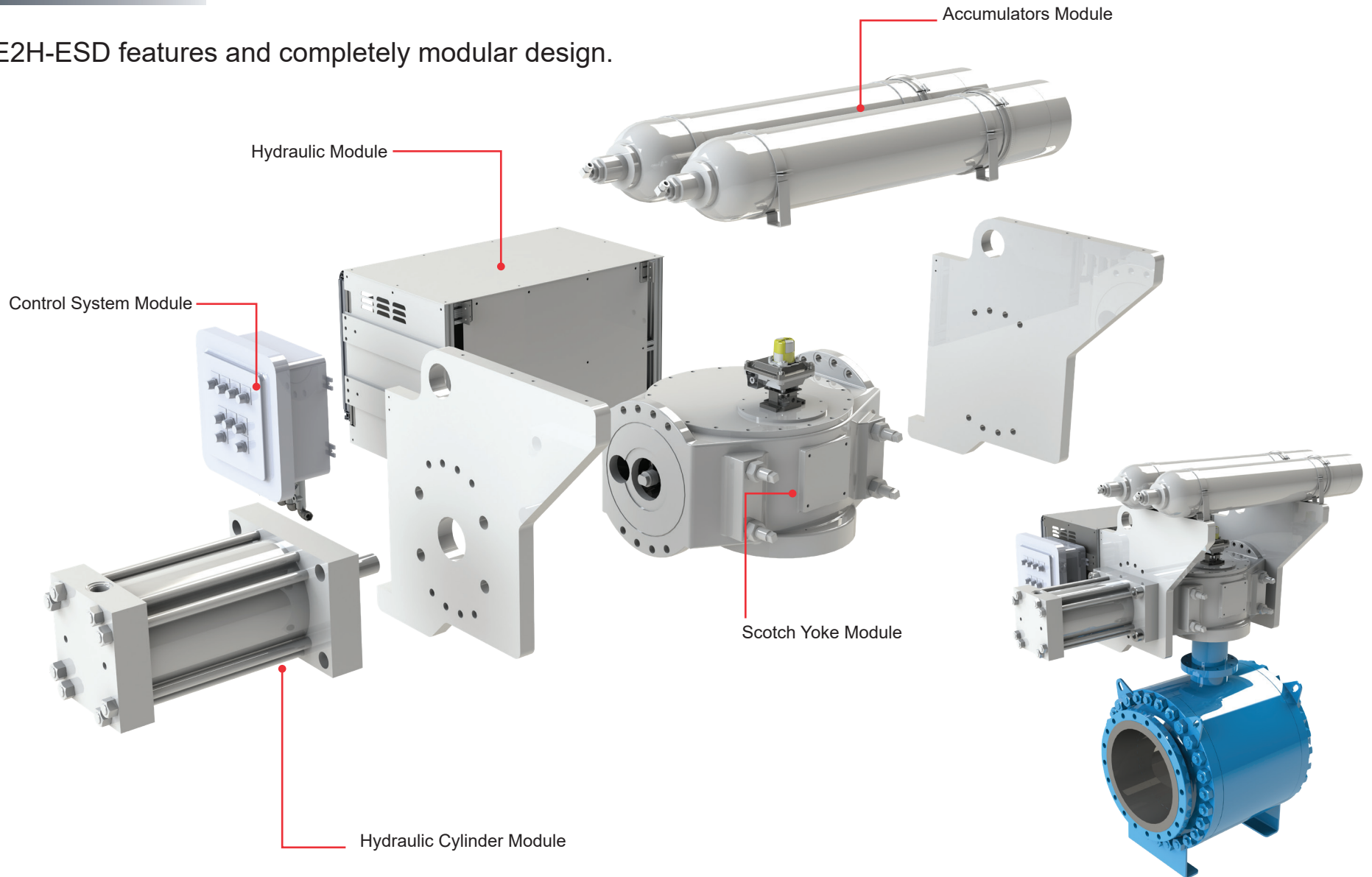


# Modular Design

## E2H-ESD SERIES

### Single Acting with Accumulators

The E2H-ESD features and completely modular design.



# Modular Design

## E2H-ESD SERIES



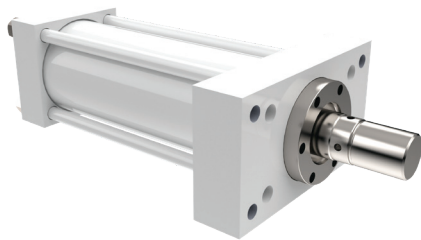
### Control System Module

The electrical control panel can be mounted directly on the unit providing a self-contained compact design leading to space saving. When required, the panel can be mounted remotely or in addition to the local integrated panel a remote station with control panel can be added in the areas where the unit cannot be accessed easily due to installation or environmental conditions. Moreover, to provide cost savings and ease of status monitoring for operators in case of multiple actuators, a central control panel can be mounted remotely to control multiple units.

Push buttons and LEDs are available on the electrical control panel for sending local commands and quick status monitoring.

### Hydraulic Cylinder Module

The E2H-ESD uses a hydraulic cylinder from Cowan's own series of heavy-duty 3000 psi rated linear actuator, ML, to transform the hydraulic energy provided by the hydraulic power module into thrust. This cylinder is also fully modular and field replaceable.



### Scotch Yoke Module

The E2H-ESD uses a Scotch Yoke mechanism to transform the output thrust from the hydraulic cylinder into torque to action the rotary valve. This module is completed with mechanical travel stops and a rotary beacon with position feedback for end-to-stroke and partial stroke set points. This Scotch Yoke mechanism is also fully modular and field replaceable.



### Spring-canister

To ensure a safe and reliable failure condition regardless of the operation status, the power-fail-safe model of the E2H-ESD is completed with a spring that is fully sealed in a compact canister all Welding is Certified to CSA 47.1 Division 2. This spring canister is also fully modular and field replaceable.

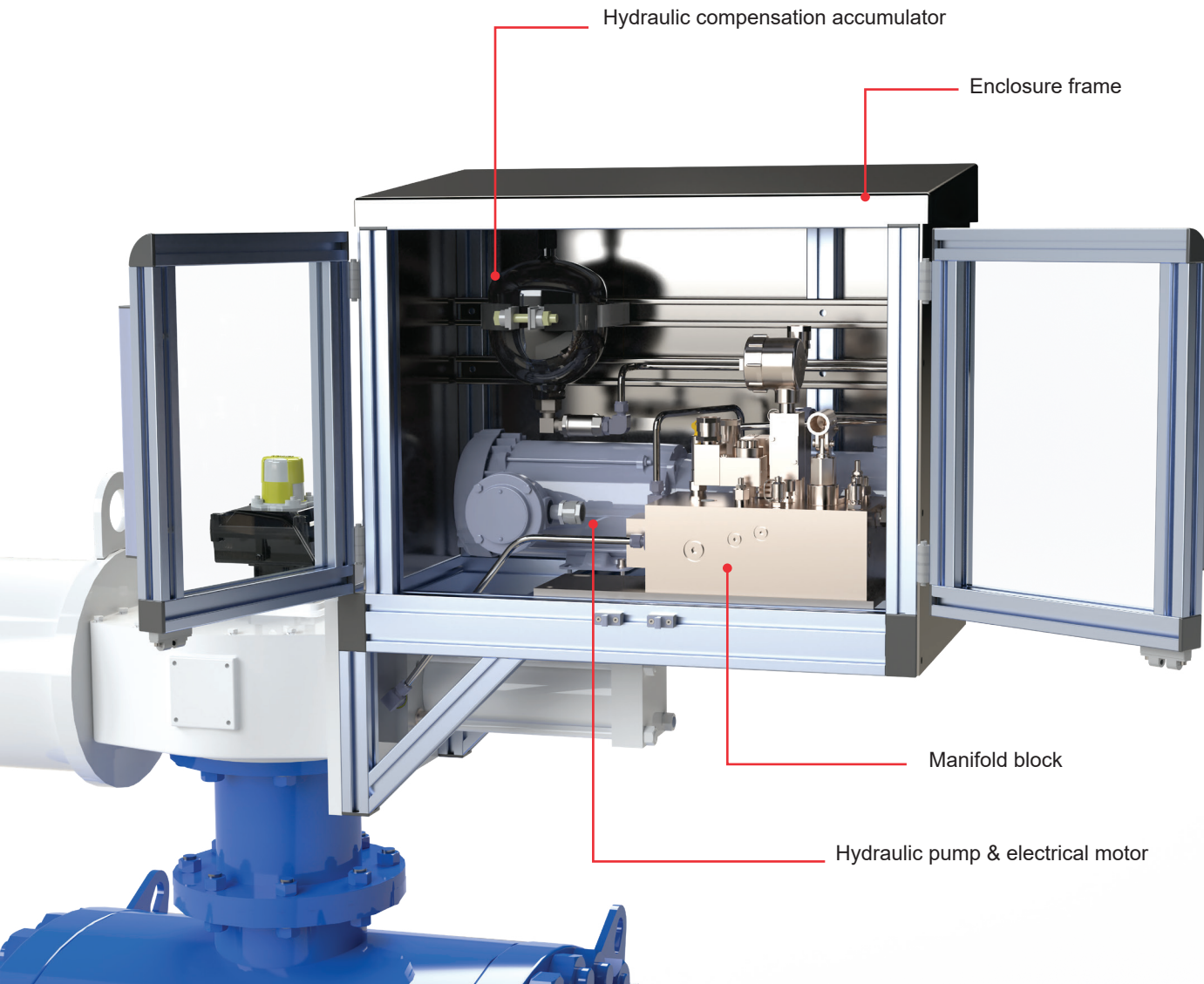
### Accumulators

To ensure a safe and reliable failure condition regardless of the operation status, the power-fail-safe model of the E2H-ESD is completed with hydraulic accumulators for its D06 to D08 modules. Accumulators hold a Canadian registration numbers (CRN) and are installed directly on the unit or remotely depending on customers requirements and models.



# Modular Design

## E2H-ESD SERIES



Hydraulic compensation accumulator

Enclosure frame

Manifold block

Hydraulic pump & electrical motor

### Hydraulic Power Module

The hydraulic power module of the E2H-ESD contains all hydraulic components to transform the supplied electric energy into the required hydraulic power supply.

### Manifold Block

In E2H-ESD series actuators, all hydraulic components and sensors are **integrated** into a **compact manifold block**. This results in space saving, ease of installation and elimination of leaks and break points by removing all hoses which leads to reduction in down time required for service.

This design feature also allows the actuator to achieve fast failure or safe position speeds by incorporating an **exchangeable secondary manifold** designed for the needed flow to achieve the required failure speed. Failure speeds are adjustable via tamper-proof flow controls. This solution replaces the old conventional style bulky hydraulic power units by eliminating the need for any hoses or tubing with an all-in-one design.

# Modular Design

## E2H-ESD SERIES

All components in the manifold block come standard with **explosion proof rated** to hazardous area classifications with the complete hydraulic system enclosed to be **fully protected** against extreme weather conditions.

To increase the reliability of the system and the time interval between services, hydraulic oil passes through an **integrated cartridge filter** in the hydraulic manifold block in every cycle. This also eliminates the need for traditional methods such as external kidney loop filtration systems. Hydraulic circuit design and filter type selection ensure there is no pressure drop or back pressure.

### Hydraulic Pump and Electrical Motor

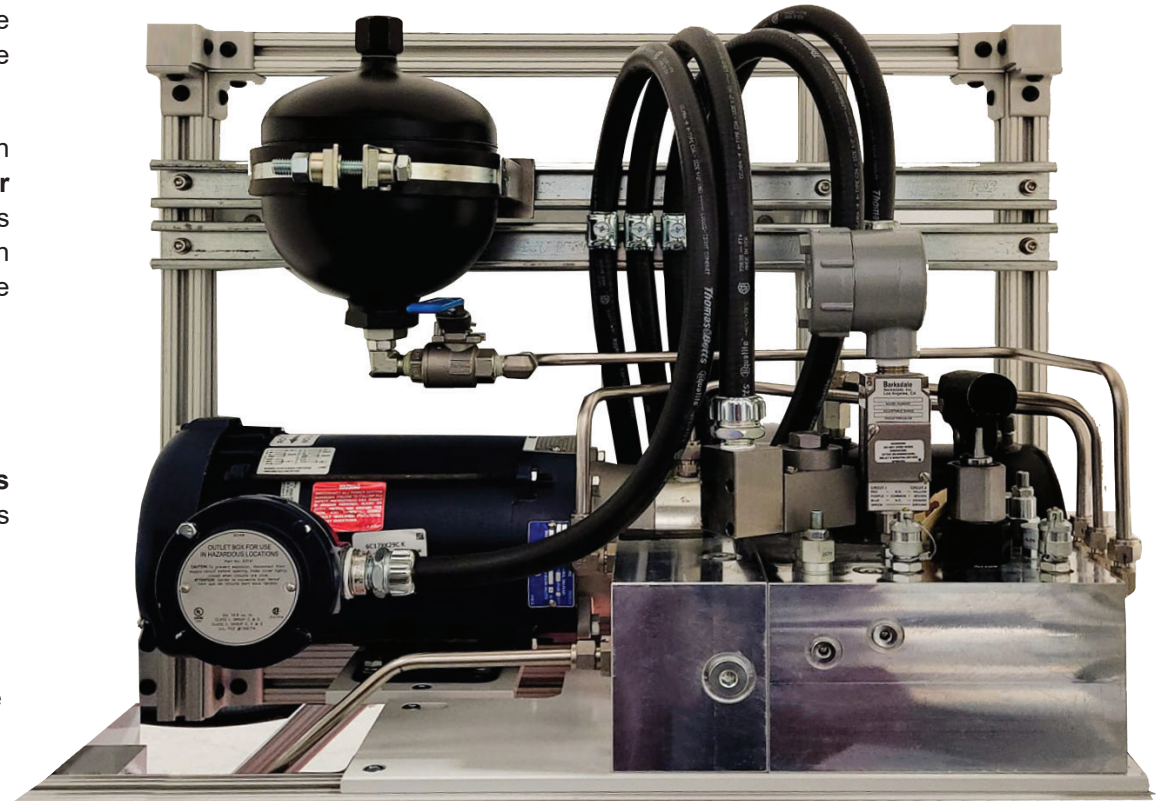
Standard units offer an **explosion proof pump-motor assemblies** for on/off operation, options for inverter motor for variable speeds available for control applications.

### Hydraulic Compensation Accumulator

Designed to compensate inherent hydraulic leakage through the components to minimize pump operation.

### Enclosure frame

The hydraulic power module of the E2H-ESD has been engineered to be **fully modular** and field replaceable. Even when all components within this module are rated to hazardous areas, the module is fully enclosed and **pad-lockable** for additional protection to environmental conditions and to operators.





# Single Acting Spring Return Clockwise ('CLOSE')

**Torques Data:** E2H-ESD series actuators provide a wide range of torques as summarized below using a scotch yoke mechanism. *Please consult Cowan Dynamics Inc for a customized option if required speed is not listed below.*

**Actuators can be selected to fail clockwise or counterclockwise depending on the needed failure position and the valve operation.**

Model	Scotch Yoke Module	Actuator Bore	Spring Can Size	Maximum available 'OPEN' Torque BTO	Mid travel 'OPEN' Torque RTO (90 DEG)***	Minimum Available 'OPEN' torque ETO	Maximum Available Spring 'CLOSE' Torque BTC	Mid Travel Available Spring 'CLOSE' Torque RTC (90 DEG)***	Minimum Available Spring 'CLOSE' Torque ETC (PRELOAD)	Approx. 'OPEN' Time**	Approx. Fail 'CLOSE' Time*
		(in)	(#)	(in-lbs)	(in-lbs)	(in-lbs)	(in-lbs)	(in-lbs)	(in-lbs)	(sec)	(sec)
E2H-ESD1AD...	D01	2.00	6	11,690	6,960	7,998	7,222	3,801	3,530	4.44	0.48
E2H-ESD1BG...	D01	3.25	8	25,000	16,041	20,377	12,055	6,889	7,432	12.84	1.38
E2H-ESD1CG...	D01	3.25	10A	27,084	17,191	21,547	22,448	13,914	16,911	12.84	1.38
E2H-ESD1DH...	D01	4.00	12B	33,034	20,515	25,001	31,530	19,452	20,834	20.89	2.24
E2H-ESD2CG...	D02	3.25	10A	37,601	23,223	28,094	29,555	17,535	20,048	16.82	1.80
E2H-ESD2DH...	D02	4.00	12B	50,000	30,474	36,207	41,522	24,480	27,729	27.37	2.93
E2H-ESD2EH...	D02	4.00	12C	59,622	35,431	40,607	53,190	30,883	34,175	27.37	2.93
E2H-ESD2FK...	D02	5.00	12D	81,691	46,552	49,999	87,463	50,633	41,666	42.56	4.56
E2H-ESD3FK...	D03	5.00	12D	121,374	68,307	71,856	110,440	60,576	59,880	53.19	5.70
E2H-ESD3GL...	D03	6.00	12E	175,787	97,491	100,000	172,973	95,501	83,333	79.87	8.56
E2H-ESD4FK...	D04	5.00	12D	164,808	89,513	88,410	138,021	70,574	61,622	66.07	7.08
E2H-ESD4GL...	D04	6.00	12E	240,741	128,870	123,815	216,154	111,487	99,228	99.20	3.72
E2H-ESD4HP...	D04	10.00	22	390,995	208,917	200,000	479,040	271,164	166,666	151.65	5.42
E2H-ESD5GN...	D05	8.000	12E	626,556	380,562	450,000	269,146	127,874	92,590	112.10	8.01
E2H-ESD5HP...	D05	10.00	22	738,400	420,099	450,000	594,407	318,296	306,007	195.66	6.51

Torques are available up to 3,000,000 Lbs-in. For higher torques please contact the factory.

\*Failure times shown are the shortest time achieved with 'fail' line flow control completely open. 'fail' times can be slowed down.

\*\* Open times are calculated based on the operating pressure at a temperature of +25 Deg C.

\*\*\* Running times are calculated at mid travel of the hydraulic cylinder.

# Single Acting Spring Return Counterclockwise ('OPEN')

**Torques Data:** E2H-ESD series actuators provide a wide range of torques as summarized below using a scotch yoke mechanism. *Please consult Cowan Dynamics Inc for a customized option if required speed is not listed below.*

**Actuators can be selected to fail clockwise or counterclockwise depending on the needed failure position and the valve operation.**

Model	Scotch Yoke	Actuator	Spring Can	Maximum	Mid travel 'CLOSE'	Minimum Avail-	Maximum Available	Mid Travel Available	Minimum Available	Approx.	Required
	Module	bore	Size	Available 'CLOSE'	Torque RTC (90	able 'CLOSE'	Spring 'OPEN' Torque	Spring 'OPEN' Torque	Spring 'OPEN' Torque	'CLOSE'	Fail 'OPEN'
		(in)	(#)	Torque BTC	DEG)***	Torque ETC	BTO	RTO (90 DEG)***	ETO (PRELOAD)	Time**	Time*
				(in-lbs)	(in-lbs)	(in-lbs)	(in-lbs)	(in-lbs)	(in-lbs)	(sec)	(sec)
E2H-ESD1AD...	D01	2.00	6	11,690	6,960	7,998	7,222	3,801	3,530	4.44	2.00
E2H-ESD1BG...	D01	3.25	8	36,564	24,216	31,940	12,055	6,889	7,432	12.84	3.50
E2H-ESD1CG...	D01	3.25	10A	27,084	17,191	21,547	22,448	13,914	16,911	12.84	1.70
E2H-ESD1DH...	D01	4.00	12B	33,033	20,515	25,000	31,530	19,452	20,834	20.89	2.40
E2H-ESD2CG...	D02	3.25	10A	37,601	23,223	28,094	29,555	17,535	20,048	16.82	4.00
E2H-ESD2DH...	D02	4.00	12B	63,793	40,226	50,000	41,522	24,480	27,729	27.37	4.00
E2H-ESD2EH...	D02	4.00	12C	59,622	35,431	40,607	53,190	30,883	34,175	27.37	4.00
E2H-ESD2FK...	D02	5.00	12D	81,692	46,553	50,000	87,463	50,633	41,666	42.56	6.00
E2H-ESD3FK...	D03	5.00	12D	121,374	68,307	71,856	110,440	60,576	59,880	53.19	10.00
E2H-ESD3GL...	D03	6.00	12E	175,787	97,491	100,000	172,973	95,501	83,333	79.87	10.00
E2H-ESD4FK...	D04	5.00	12D	164,808	89,513	88,410	138,021	70,574	61,622	66.07	10.00
E2H-ESD4GL...	D04	6.00	12E	240,741	128,870	123,815	216,154	111,487	99,228	99.20	10.00
E2H-ESD4HP...	D04	10.00	22	390,995	208,917	200,000	479,040	271,164	166,666	151.65	10.00
E2H-ESD5GN...	D05	8.000	12E	626,556	380,562	450,000	269,146	127,874	92,590	112.10	10.00
E2H-ESD5HP...	D05	10.00	22	738,400	420,099	450,000	594,407	318,296	306,007	195.66	10.00

Torques are available up to 3,000,000 Lbs-in. For higher torques please contact the factory.

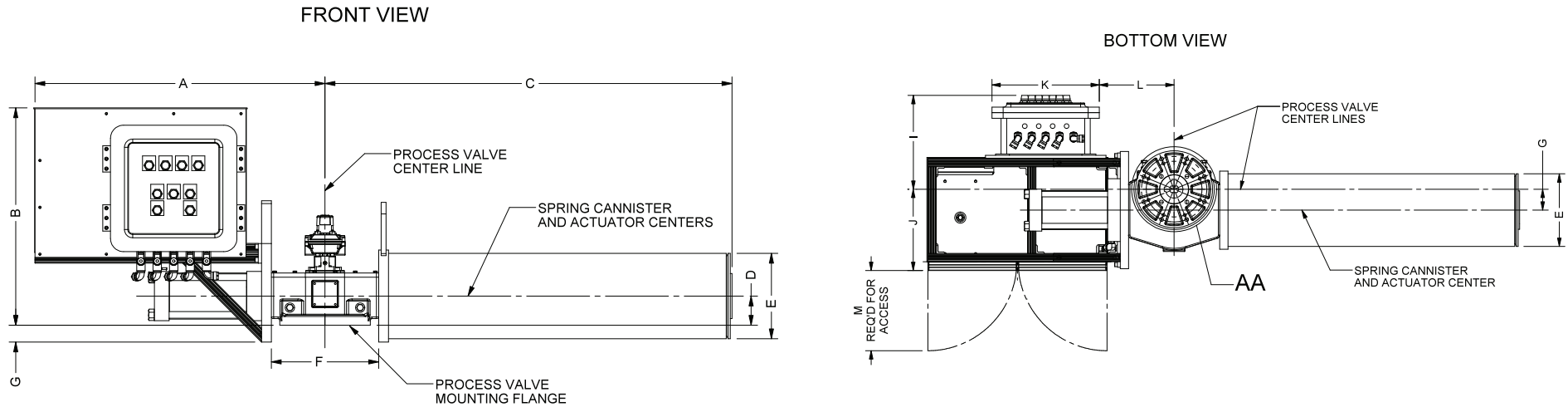
\*Failure times shown are the shortest time achieved with 'fail' line flow control completely open. 'fail' times can be slowed down.

\*\* Open times are calculated based on the operating pressure at a temperature of +25 Deg C.

\*\*\* Running times are calculated at mid travel of the hydraulic cylinder.

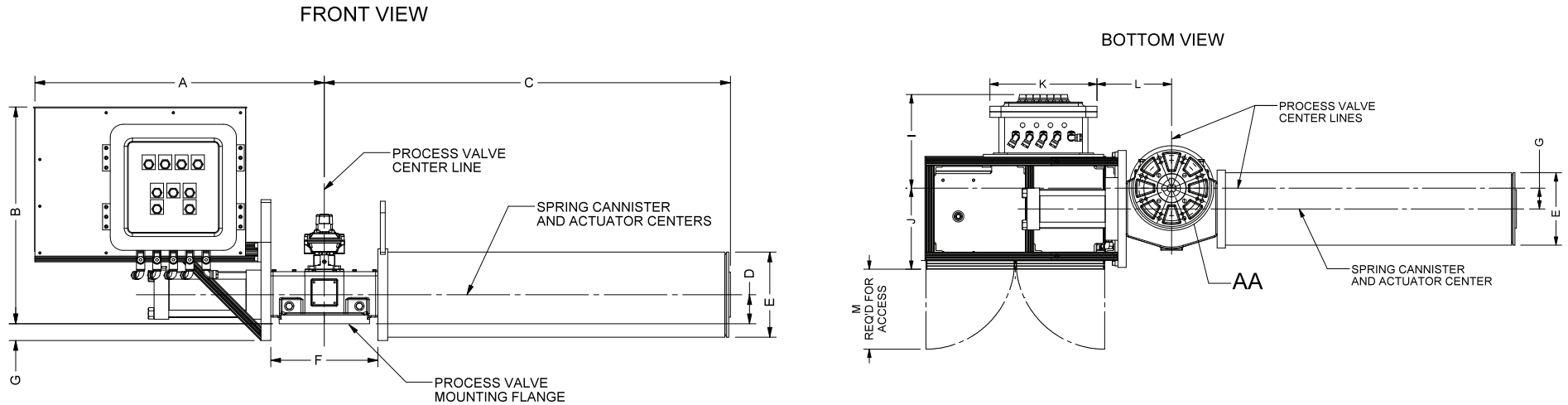
# Single Acting Spring Return

## Dimension Data: Metric



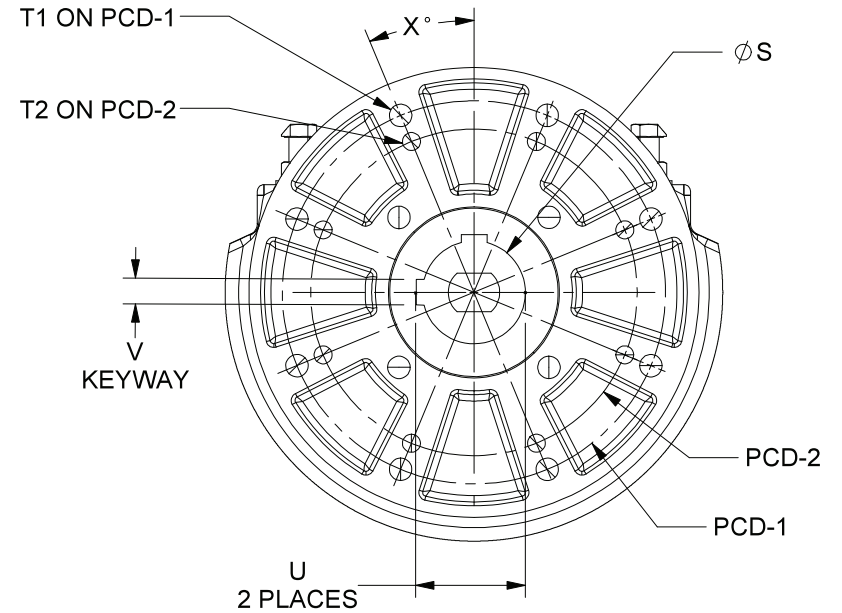
Model No.	Overall Dimensions: Metric											
	A	B	C	D	E	F	G	I	J	K	L	M
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
E2H-ESD1AD	1039.81	814.39	615.95	87.31	184.15	254.00	52.39	463.55	333.38	488.95	254.00	366.71
E2H-ESD1BG	1039.81	814.39	714.38	87.31	228.60	254.00	52.39	463.55	333.38	488.95	254.00	366.71
E2H-ESD1CG	1039.81	814.39	922.34	87.31	266.70	254.00	52.39	463.55	333.38	488.95	260.35	366.71
E2H-ESD1DH	1039.81	814.39	912.02	87.31	342.90	254.00	90.49	464.34	332.58	488.95	260.35	366.71
E2H-ESD2CG	1093.79	823.91	1015.21	96.84	266.70	349.25	80.96	446.09	350.84	488.95	307.98	366.71
E2H-ESD2DH	1093.79	823.91	960.44	96.84	342.90	349.25	80.96	446.09	350.84	488.95	307.98	366.71
E2H-ESD2EH	1093.79	823.91	1027.11	96.84	342.90	349.25	80.96	446.09	350.84	488.95	307.98	366.71
E2H-ESD2FK	1093.79	823.91	1250.16	96.84	342.90	349.25	80.96	446.09	350.84	488.95	307.98	366.71
E2H-ESD3FK	1127.13	839.79	1328.74	112.71	330.20	414.34	65.09	427.04	369.89	488.95	341.31	366.71
E2H-ESD3GL	1127.13	839.79	1574.80	112.71	330.20	414.34	65.09	427.04	369.89	488.95	341.31	366.71
E2H-ESD4FK	1184.28	884.24	1443.04	157.16	330.20	530.23	20.64	404.81	393.70	488.95	398.46	366.71
E2H-ESD4GL	1184.28	884.24	1687.51	157.16	330.20	530.23	20.64	404.81	393.70	488.95	398.46	366.71
E2H-ESD4HP	1316.83	1008.86	2008.98	157.16	596.90	530.23	20.64	462.76	448.47	488.95	369.89	366.71
E2H-ESD5GN	1392.24	1092.20	1832.77	164.31	330.20	659.61	16.67	435.77	475.46	488.95	445.29	366.71
E2H-ESD5HP	1392.24	1092.20	2182.81	164.31	596.90	659.61	16.67	435.77	475.46	488.95	445.29	366.71

# Single Acting Spring Return Dimension Data: Imperial



Model No.	Overall Dimensions : Imperial											
	A	B	C	D	E	F	G	I	J	K	L	M
	in	in	in	in	in	in	in	in	in	in	in	in
E2H-ESD1AD	41	32 1/16	24 1/4	3 4/9	7 1/4	10	2	18 1/4	13 1/8	19 1/4	10	14 4/9
E2H-ESD1BG	41	32 1/16	28 1/8	3 4/9	9	10	2 1/16	18 1/4	13 1/8	19 1/4	10	14 4/9
E2H-ESD1CG	41	32 1/16	36 5/16	3 4/9	10 1/2	10	2 1/16	18 1/4	13 1/8	19 1/4	10 1/4	14 4/9
E2H-ESD1DH	41	32 1/16	35 29/32	3 4/9	13 1/2	10	3 9/16	18 9/32	13 3/32	19 1/4	10 1/4	14 4/9
E2H-ESD2CG	43 1/16	32 7/16	39 31/32	3 13/16	10 1/2	13 3/4	3 3/16	17 9/16	13 13/16	19 1/4	12 1/8	14 4/9
E2H-ESD2DH	43 1/16	32 7/16	37 13/16	3 13/16	13 1/2	13 3/4	3 3/16	17 9/16	13 13/16	19 1/4	12 1/8	14 4/9
E2H-ESD2EH	43 1/16	32 7/16	40 7/16	3 13/16	13 1/2	13 3/4	3 3/16	17 9/16	13 13/16	19 1/4	12 1/8	14 4/9
E2H-ESD2FK	43 1/16	32 7/16	49 7/32	3 13/16	13 1/2	13 3/4	3 3/16	17 9/16	13 13/16	19 1/4	12 1/8	14 4/9
E2H-ESD3FK	44 3/8	33 1/16	52 5/16	4 7/16	13	16 5/16	2 9/16	16 13/16	14 9/16	19 1/4	13 7/16	14 4/9
E2H-ESD3GL	44 3/8	33 1/16	62	4 7/16	13	16 5/16	2 9/16	16 13/16	14 9/16	19 1/4	13 7/16	14 4/9
E2H-ESD4FK	46 5/8	34 13/16	56 13/16	6 3/16	13	20 7/8	4/5	16	15 1/2	19 1/4	15 11/16	14 4/9
E2H-ESD4GL	46 5/8	34 13/16	66 7/16	6 3/16	13	20 7/8	4/5	16	15 1/2	19 1/4	15 11/16	14 4/9
E2H-ESD4HP	51 27/32	39 23/32	79 3/32	6 3/16	23 1/2	20 7/8	4/5	18 7/32	17 21/32	19 1/4	14 9/16	14 4/9
E2H-ESD5GN	54 13/16	43	72 5/32	6 15/32	13	25 31/32	2/3	17 5/32	18 23/32	19 1/4	17 17/32	14 4/9
E2H-ESD5HP	54 13/16	43	85 15/16	6 15/32	23 1/2	25 31/32	2/3	17 5/32	18 23/32	19 1/4	17 17/32	14 4/9

# Mounting Flange Data



Model	Outer Bolting Pattern T1				Inner Bolting Pattern T2											
	Thread Size	Bolt Circle		No. of Bolt Holes	Thread Size	Bolt Circle		No. of Bolt Holes	Drive	X	V		U		S	
		mm	in			Deg	mm			in	mm	in	mm	in		
E2H-ESD1AD	N/A	N/A	N/A	N/A	M16	140	5.51	4	Key	45	CF	CF	CF	CF	CF	CF
E2H-ESD1BG	N/A	N/A	N/A	N/A	M16	140	5.51	4	Key	45	CF	CF	CF	CF	CF	CF
E2H-ESD1CG	N/A	N/A	N/A	N/A	M16	140	5.51	4	Key	45	CF	CF	CF	CF	CF	CF
E2H-ESD1DH	N/A	N/A	N/A	N/A	M16	140	5.51	4	Key	45	CF	CF	CF	CF	CF	CF
E2H-ESD2CG	N/A	N/A	N/A	N/A	M20	165	6.50	4	Key	45	14	5/9	53.8	2.12	50	2
E2H-ESD2DH	N/A	N/A	N/A	N/A	M20	165	6.50	4	Key	45	14	5/9	53.8	2.12	50	2
E2H-ESD2EH	N/A	N/A	N/A	N/A	M20	165	6.50	4	Key	45	14	5/9	53.8	2.12	50	2
E2H-ESD2FK	N/A	N/A	N/A	N/A	M20	165	6.50	4	Key	45	14	5/9	53.8	2.12	50	2
E2H-ESD3FK	M20	298	11 3/4	8	M16	254	10.00	8	Key	22.5	20	4/5	84.9	3.34	80	3 1/7
E2H-ESD3GL	M20	298	11 3/4	8	M16	254	10.00	8	Key	22.5	20	4/5	84.9	3.34	80	3 1/7
E2H-ESD4FK	M30	356	14	8	M20	298	11.73	8	Key	22.5	25	1	95.4	3.76	90	3 1/2
E2H-ESD4GL	M30	356	14	8	M20	298	11.73	8	Key	22.5	25	1	95.4	3.76	90	3 1/2
E2H-ESD4HP	M30	356	14	8	M20	298	11.73	8	Key	22.5	25	1	95.4	3.76	90	3 1/2
E2H-ESD5GN	M30	356	14	8	NA	NA	NA	NA	Key	22.5	32	812.80	127.4	5.02	120	4 5/7
E2H-ESD5HP	M30	356	14	8	NA	NA	NA	NA	Key	22.5	32	812.80	127.4	5.02	120	4 5/7

# Single Acting with Accumulators

**Torques Data:** E2H-ESD series actuators provide a wide range of torques as summarized below using a scotch yoke mechanism. *Please consult Cowan Dynamics Inc for a customized option if required speed is not listed below.*

Actuators can be selected to fail clockwise or counterclockwise depending on the needed failure position and the valve operation.

## Clockwise ('CLOSE')

Model	Scotch Yoke Module	Actuator Bore	Available 'Open' torque BTO @ Min operating temperature	Available 'Open' torque BTO @ Max operating temperature	Available 'Open' torque ETO @ Max operating temperature	Available 'Open' torque ETO @ Min operating temperature	Available 'Close' torque ETC @ Max operating temperature	Minimum available 'Close' torque ETC @ Min operating temperature
		(in)	(in-lbs)	(in-lbs)	(in-lbs)	(in-lbs)	(in-lbs)	(in-lbs)
E2H-ESD6ACP	D06	10	1 280 582	1 064 344	600 000	934 921	846 033	629 794
E2H-ESD6ACR	D06	12	1 791 073	1 483 641	900 000	1 356 605	1 202 826	895 395
E2H-ESD7ACR	D07	12	2 642 594	2 333 581	1 442 494	1 979 261	1 209 013	900 000
E2H-ESD7ACS	D07	14	3 967 122	3 644 366	2 651 673	3 228 153	1 262 783	940 027
E2H-ESD8ACR	D08	12	3 773 459	3 447 279	2 597 455	3 140 842	1 276 180	950 000
E2H-ESD8ACS	D08	14	4 818 260	4 226 121	3 000 000	3 905 525	2 316 744	1 724 605

## Counterclockwise ('OPEN')

Model	"Scotch Yoke Module"	"Actuator Bore"	Available 'Close' torque BTC @ Min operating temperature	Available 'Close' torque BTC @ Max operating temperature	Available 'Close' torque ETC @ Max operating temperature	Available 'Close' torque ETC @ Min operating temperature	Available 'Open' torque ETO @ Max operating temperature	Minimum available 'Open' torque ETO @ Min operating temperature
		(in)	(in-lbs)	(in-lbs)	(in-lbs)	(in-lbs)	(in-lbs)	(in-lbs)
E2H-ESD6ACP	D06	10	1 280 582	1 064 344	600 000	934 921	846 033	629 794
E2H-ESD6ACR	D06	12	1 791 073	1 483 641	900 000	1 356 605	1 202 826	895 395
E2H-ESD7ACR	D07	12	2 642 594	2 333 581	1 442 494	1 979 261	1 209 013	900 000
E2H-ESD7ACS	D07	14	3 967 122	3 644 366	2 651 673	3 228 153	1 262 783	940 027
E2H-ESD8ACR	D08	12	3 773 459	3 447 279	2 597 455	3 140 842	1 276 180	950 000
E2H-ESD8ACS	D08	14	4 818 260	4 226 121	3 000 000	3 905 525	2 316 744	1 724 605

Torques are available up to 3,000,000 Lbs-in. For higher torques please contact the factory.

\* Temperatures used for accumulator calculations are: Max Temp (DegC) = +40C, Min Temp (DegC) = -40C. Output torques will change with changes in the ambient temperature.

# General Specifications

<b>Local Operation Communication</b>			
<b>Standard Display</b>	Power/Overload/Open/Closed & PST light indicators. Local/Remote selector		
	Open/Close/push buttons		
<b>Smart Display*</b>	Multi-color HMI touch screen		
<b>Remote Operation Communication</b>			
<b>Standard Inputs</b>	Discrete Open/Close/PST/ESD signals		
<b>Standard Outputs</b>	Discrete open/close limit positions/PST		
<b>Smart Inputs*</b>	PST signal- 4-20mA position set point		
<b>Smart Outputs*</b>	Programable PLC, 4-20 mA position feedback		
<b>Environmental Protection</b>			
<b>Environmental Protection</b>	NEMA 4X/IP66		
<b>Operational Ambient Temperature</b>			
<b>Operational Ambient Temperature</b>	Standard - (-20C to +40C)		
	High - (-20C to +55C**)		
	Low - (-40C to +40C)		
	Standard HMI - (0C to +40C)*		
	Low Temp HMI - (-30C to +40C)*		
<b>Input Power Supply</b>			
<b>Input Power Supply</b>	Voltage	Phase	Hz
	115-120VAC	1	50/60
	240VAC	1	50/60
	460VAC	3	60
	575VAC	3	60
	208VAC	3	50

<b>Hazardous Area Classification</b>	General purposes (CSA/cUL)
	Class 1, Division 1 & 2, Gr C&D (CSA/cUL)
	ATEX, II 2G EEx d IIB
<b>Certifications</b>	CSA/cUL - General purposes
	CSA/cUL - Class 1, Division 1 & 2, Gr C&D
	ATEX - II 2G EEx d IIB
	SIL Certification (Pending)
<b>Partial Stroke Device</b>	
<b>Standard</b>	3rd limit switch, set position
<b>Smart option</b>	Configurable to any position
<b>Conduit Entries</b>	
<b>Standard</b>	Imperial or Metric, To be specified
<b>Duty Cycle</b>	
<b>Standard</b>	On/Off Applications. 100% duty at max. 40DegC ambient
<b>Inverter Duty Motor</b>	Modulating duty. 100% duty at max. 40DegC ambient

\*Smart display available only for general purposes application and at operational temperature range of -30C to +40C

\*\* Based on 100 continuous cycles

# How to Order - Reference Table

	Code	Description
<b>Series</b>	E2H-ESD	Rotary Electro-Hydraulic actuator
<b>Scotch Yoke Module</b>		Pre-selected based on torque - See Torque Chart
<b>Single acting - Springs</b>	{AS CAN #}	PRESELECTED BASED ON TORQUE - SEE TORQUE CHART
<b>Double Acting - Fail last</b>	DA	Double Acting - Fail last lock on loss of power- No ESD signal
<b>Double Acting - Fail safe</b>	SA	Double Acting - Fail last lock on loss of power- Fail safe on loss on ESD signal
<b>Single acting - Accumulators</b>	AC	Single Acting - Fail safe on loss of power and ESD signal via accumulators
<b>AS CAN #</b>		Pre-selected based on torque - See Torque Chart
<b>Hydraulic Actuator Bore (in)</b>		Pre-selected based on torque - See Torque Chart
<b>Fail Rotation</b>	1	Clockwise
	2	Counterclockwise
<b>Fail Function</b>	0	"Fail rotation (Loss of power) Fail rotation (Loss of ESD signal)"
	A	"Fail last-locked (Loss of power) Fail rotation (Loss of ESD signal)"
	B	"Fail rotation (Loss of power) No ESD signal"
<b>Operational Ambient Temperature</b>	S	Standard - (-20C to +40C)
	H	High - (-20C to +55C)
	L	Low - (-50C to +40C)
	HS	Standard HMI - (0C to +40C)*
	HL	Low Temp HMI - (-30C to +40C)*
<b>Hazardous Area Class</b>	G	General purposes (CSA/CUL)
	X	CSA C11, Div1&2, Gr C&D
	A	ATEX, II 2G EEx d IIB
<b>Power Supply Voltage</b>	0	115-120VAC/1 Phase/60-50 HZ
	A	240VAC/1 Phase/60-50 HZ
	B	460VAC/3 Phase/60 HZ
	C	575VAC/3 Phase/60 HZ
	D	208-220VAC/3 Phase/50 HZ
	X	Special
<b>Control Panel</b>	0	Standard
	R	Remote

	Code	Description
<b>Interface</b>	0	Standard-Power/Overload/Open/Closed & PST light indicators.Open/Close/push buttons
	H	Smart* HMI-Multi Color Touch Screen
<b>Communication</b>	0	Standard Discrete
	A	4-20 mA PST
	B	4-20mA c/w HART PST
	P	Smart* PLC 4-20mA
	H	Smart* PLC 4-20mA c/w HART
	U	Smart PLC PROFIBUS
<b>Environmental Protection</b>	E	Smart PLC PROFINET
	X	NEMA 4X/IP66- Corrosion resistant

	Code	Description	Code	Description
<b>Mountings</b>	I07	F07	M07	FA07
	I10	F10	M10	FA10
	I14	F14	M14	FA14
	I16	F16	M16	FA16
	I25	F25	M25	FA25
	I30	F30	M30	FA30
	I35	F35	M35	FA35
	I40	F40		

	Code	Description
<b>Manual Override</b>	0	None
	M	Hydraulic hand pump
<b>Partial Stroke</b>	0	None
	P	YES
<b>Panel Orientation</b>	0	Standard- Front- Hydraulic side
	A	180- Back- Hydraulic side
<b>Specials</b>	Z	Special configuration



# How to Order

See "How To Order - Reference Table" on Previous Page for All Codes  
 Select your requirements and email the form to: [quotes@cowandynamics.com](mailto:quotes@cowandynamics.com)



## Example: Single Acting Spring-return

<p><i>Pre-selected based on Torque See Torque Chart</i></p> <p>Size: D01 (5000-25000 lbs-inch)   <b>Scotch Yoke Module</b>                  Size: 6   <b>AS CAN #</b>                  Size: 2   <b>Hydraulic Actuator</b>                  Clockwise   <b>Fail Rotation</b></p> <p>Fail rotation (Loss of power)   Fail rotation (Loss of ESD signal)   <b>Fail Function</b>                  Standard - (-20C to +40C)   <b>Operational temperature rating</b>                  General purposes (CSA/CUL)   <b>Hazardous Area Class</b>                  240VAC/1 Phase/60 HZ   <b>Power Supply Voltage</b></p>	<p><b>E2H-ESD 1 A D 1 0 S G A 0 H A X I14 M P 0 0</b></p>	<p><b>Specials</b>   Special configuration: None  <b>Panel Orientation</b>   Standard- Front- Hydraulic side  <b>Partial Stroke</b>   Yes  <b>Manual Override</b>   Hydraulic hand pump  <b>Mounting</b>   F14  <b>Environmental Protection</b>   NEMA 4X/IP66- Corrosion resistant  <b>Communication</b>   4-20 mA PST  <b>Interface</b>   Smart* HMI-Multi Color Touch Screen  <b>Control Panel</b>   Standard</p>
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**Final Part Number Order Example:** E2H-ESD1AD10SGA0HAXI14MP00

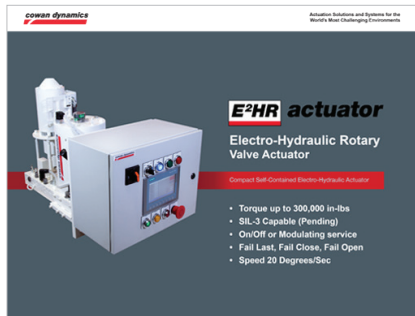
## Single Acting with Accumulators

<p><i>Pre-selected based on Torque See Torque Chart</i></p> <p>Size: D06 (450K-950K lbs-inch)   <b>Scotch Yoke Module</b>                  Accumulator                  Size: 2   <b>Hydraulic Actuator</b>                  Clockwise   <b>Fail Rotation</b></p> <p>Fail rotation (Loss of power)   Fail rotation (Loss of ESD signal)   <b>Fail Function</b>                  Standard - (-20C to +40C)   <b>Operational temperature rating</b>                  General purposes (CSA/CUL)   <b>Hazardous Area Class</b>                  240VAC/1 Phase/60 HZ   <b>Power Supply Voltage</b></p>	<p><b>E2H-ESD 6 A C P 1 0 S G A 0 H A X I40 M P 0 0</b></p>	<p><b>Specials</b>   Special configuration: None  <b>Panel Orientation</b>   Standard- Front- Hydraulic side  <b>Partial Stroke</b>   Yes  <b>Manual Override</b>   Hydraulic hand pump  <b>Mounting</b>   F40  <b>Environmental Protection</b>   NEMA 4X/IP66- Corrosion resistant  <b>Communication</b>   4-20 mA PST  <b>Interface</b>   Smart* HMI-Multi Color Touch Screen  <b>Control Panel</b>   Standard</p>
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**Final Part Number Order Example:** E2H-ESD6ACP10SGA0HAXI40MP00

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