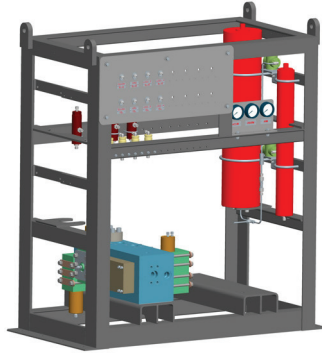


## EHBS Description

The National Oilwell Varco (NOV) Koomey® Emergency Hydraulic Back-up System (EHBS) is an independent hydraulic control pod mounted on the lower BOP stack. When armed, the EHBS pod performs automatically in the event main conduit hydraulic pressure and electric power to the BOP control system 112-line MUX pod are disconnected or lost. The EHBS is a reliable safety system that activates customer-specified functions in the event of power failure, riser string disconnect or Lower Marine Riser Package disconnect.



## Adjustable Timing Circuit Actuator



The Adjustable Timing Circuit Actuator provides a mechanical method for providing a time delay between two hydraulic functions on an (EHBS).

The Adjustable Timing Circuit Actuator is easily adjusted to provide a **time delay range of 18 to 52 seconds** (when supplied with 5,000 psi [345 bar]).

## Key Benefits:

- No nitrogen pre-charging for time delay.
- No temperature or depth variables or pre-charge calculations.
- Rugged and reliable.
- Easily adjustable.
- Corrosion resistant.
- Existing timing circuits are easily upgraded.

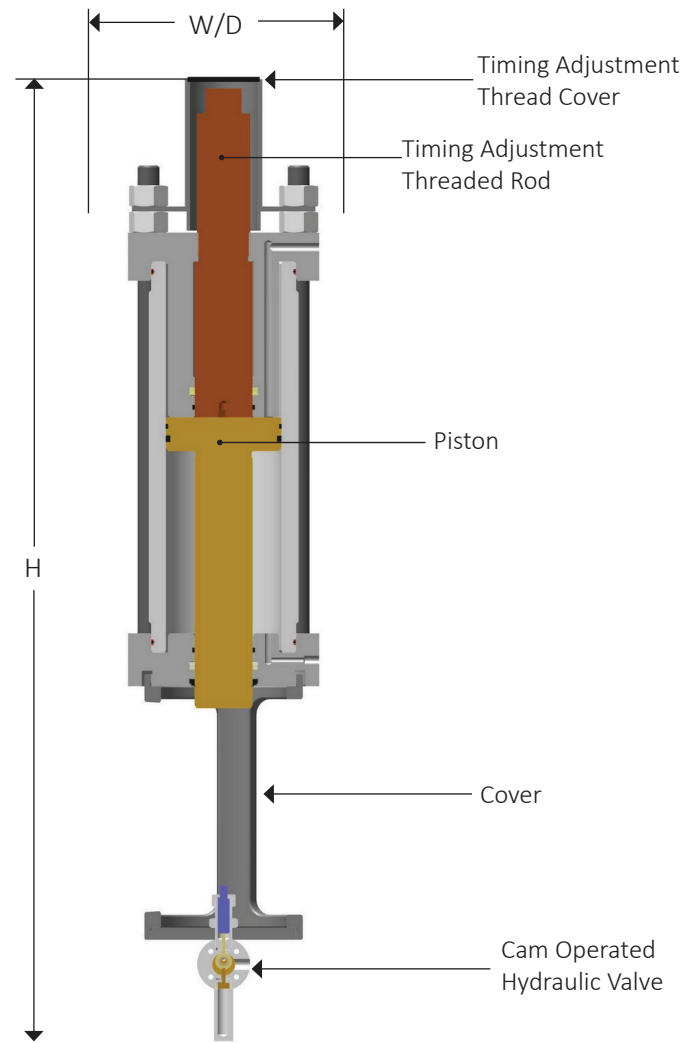
## Operating Principles:

Previous time delay circuits required an accumulator pre-charged for specific depth and water temperature variables. With the Adjustable Timing Circuit Actuator, a timing circuit accumulator and variable dependent precharges are no longer necessary. The timing setting used for surface testing is the same timing setting used for subsea operation.

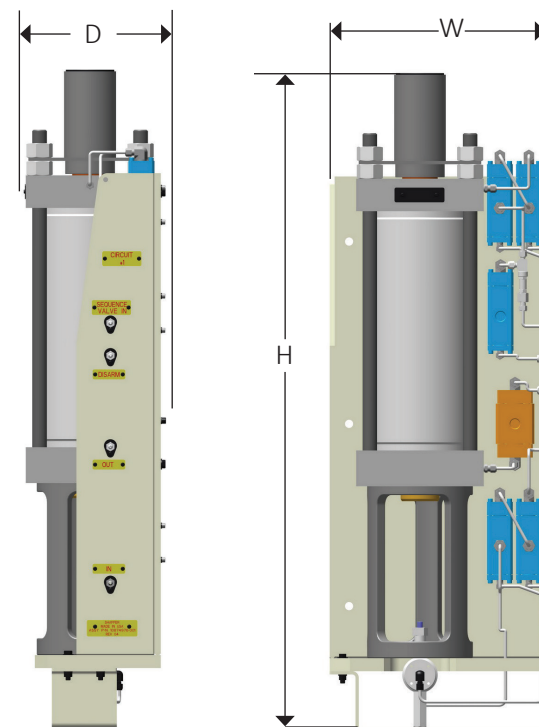
**The system can be deployed as tested.**

Adjustable Actuator Properties	
(H)eight	50.2" (127.51 cm)
(W)idth	9.9" (25.15 cm)
(D)epth	9.9" (25.15 cm)
Weight	410 lb (185.0 kg)

\*Reference 10856492-ASM

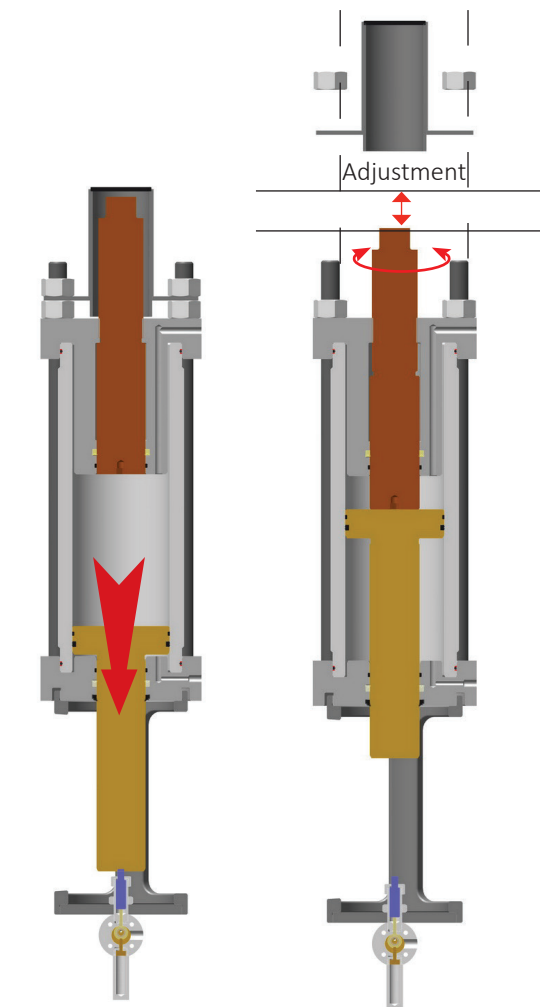


Adjustable Actuator—Cross Section



Stack Mounted Timing Circuit Properties	
(H)eight	50.64" (128.63 cm)
(W)idth	20.8" (52.83 cm)
(D)epth	10.96" (27.84 cm)
Weight	1,720 lb (780.2 kg)

\*Reference 10874976-ASM



Piston Closing

Timing Adjusted with Threaded Rod

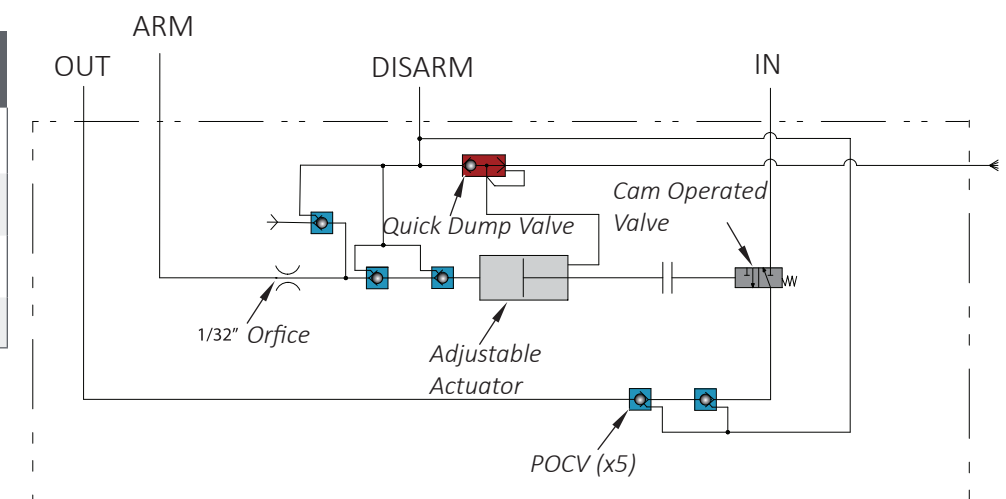
Adjustment Range
Min: 18-22 Seconds
Max: 48- 52 Seconds

Adjustment
1 inch of adjustment = ± 5 seconds

## Adjustment Procedure

To adjust the timing delay of the circuit:

1. Remove the timing adjustment thread cover.
2. Using a socket wrench, thread the adjustment screw inward (shorter delay) or outward (longer delay).
3. Replace the timing adjustment thread cover.



Schematic-Adjustable Actuator Timing Circuit