

GE Oil & Gas

Pressure Control

General Catalog

Table of Contents

Conventional Wellheads

Time-Saving Wellheads

Specialty Wellheads

Connectors

Flow Control

Shale 360™ Services

Other Products

Worldwide Locations



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11-19-14

General Catalog

Pressure Control Table of Contents

To access any technical bulletin or brochure, please click on its title.

Section 1: Conventional Wellheads

Wellhead Housings

- W2 Casing Head
- W2 Casing Spool
- T Tubing Head
- TD Tubing Head
- MTH2 Mini Tubing Head
- Integral Lockscrews

Casing Hangers

- W1 Slip Hanger and H Primary Seal
- W1-M Slip Hanger, Manual Seal
- W2 Slip Hanger, Automatic Seal
- 9F300 Slip Hanger, Automatic Seal

Secondary Seals

- Double O Elastomer Seal
- P Elastomer Seal
- EBS Elastomer Seal
- EBS and EBS-F Bushings
- RCS Metal Seal

Tubing Hangers/Adapters

- T-2W Wrap-Around Tubing Hanger
- O2 Coupling and Adapter
- O3 Coupling and Adapter
- T-EN Tubing Hanger/Adapter
- T-M Tubing Hanger/Adapter
- T-MS Tubing Hanger/Adapter
- TD-M Dual Tubing Hanger/Adapter

Control Line Exit Blocks

- Downhole Control Valve (DHCV) Exit Assembly

Section 2: Time-Saving Wellheads

- SCH1 Casing Head
- Surelok™ Bottom Casing Head
- S95 Safe, Time-Saver™ Wellhead System
- SH2 Split Speedhead™ System
- VetcoGray Multi-Bowl Wellhead System
- SH3 Speedhead™ System
- LSH Land Speedhead™ System
- OSH Offshore Speedhead™ System

Section 3: Specialty Wellheads

- ESP Completions
- SAGD Wellhead Systems
- Close-Proximity Wellhead (CPW) Systems

Section 4: Connectors

- LRC Lock-On Riser Connector
- LRC2 Wellhead Connector
- SRC Slip-On Riser Connector
- USC-1 Speed Clamp Connector

Section 5: Flow Control

Gate Valves

- Model 1000 Slab Gate Valve
- Model 1000XM Slab Gate Valve
- Model 2200T Slab Gate Valve
- Sandbuster® Slab Gate Valve
- Model 2200E Expanding Gate Valve
- Model 2300 and 2300LT Frac Valves

Actuators

- Dual Seal Pneumatic Actuator
- Model D Pneumatic Diaphragm Actuator
- Model P Pneumatic Piston Actuator
- Model RA Hydraulic Actuator
- Model RA-ESD Self-Contained Hydraulic Actuator
- Model HSRA-2 Hydraulic Actuator
- Model HDA-RS Hydraulic Actuator
- CHA Top Access Standard Hydraulic Actuator
- CHA-WLS Top Access Wireline Shearing Hydraulic Actuator
- CHA-C Classic Standard Hydraulic Actuator
- CHA-WLC Classic Wireline Shearing Hydraulic Actuator

Pressure Reduction Solutions

- MOS Multi-Orifice Sleeve Surface Choke
- PRS Pressure Reduction System
- SES Solids Extraction Spool

Presco-Pilots™ and Presco-Switches™

- 3-Line Presco-Pilot™
- Presco-Switch™
- Model "DHTE" High Temperature Presco-Switch™

Presco-Pumps™

- High Pressure Presco-Pump™ Module

Barber Safety Systems Brochure

Section 6: Shale 360™ Services

- Shale 360™ Services
- Modular Frac Manifold
- Frac Isolation System

Section 7: Other Products

- Slip Clamp, Temporary Landing Device

Section 8: Worldwide Locations



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Pressure Control

General Catalog

Conventional Wellheads *(Select a Category)*

Wellhead Housings

Casing Hangers

Secondary Seals

Tubing Hangers/Adapters

Control Line Exit Blocks



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General Catalog

Conventional Wellheads

Wellhead Housings *(Select a Product)*

W2 Casing Head

W2 Casing Spool

T Tubing Head

TD Tubing Head

MTH2 Mini Tubing Head

Integral Lockscrews



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Wellhead Housings

Pressure Control W2 Casing Head

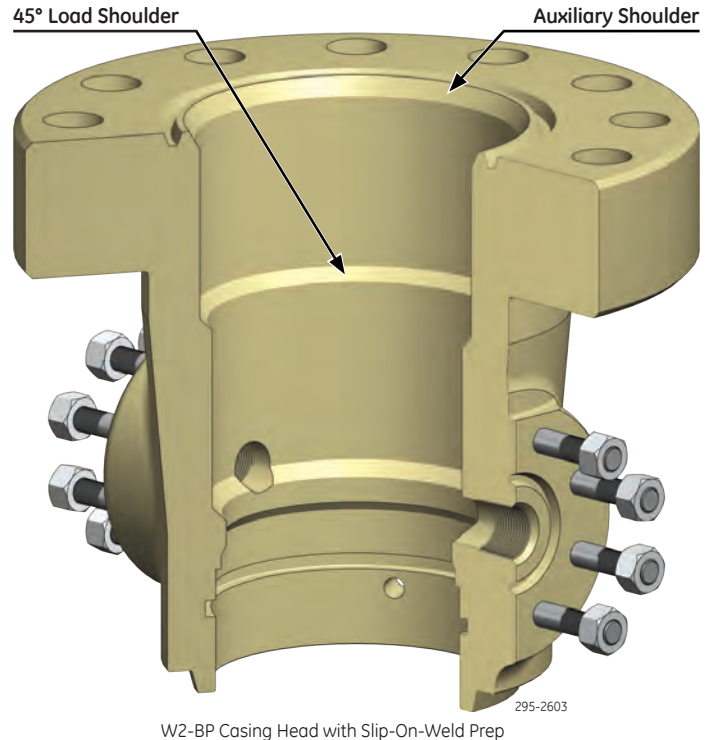
The W2 Casing Head has a straight bowl with a high capacity 45° load shoulder. W2 casing heads are available in top flange sizes from 9" through nominal 20" and pressure ratings from 2,000 psi through 10,000 psi.

Features —

- Large auxiliary shoulder at face of upper connection will support primary seal plates or RCS secondary seals
- Accepts the full line of slip type casing hangers including W1, W1-M and W2
- Available in a full range of trims that meet API 6A criteria for temperature, material and PSL
- Meets PR-2 test requirements
- Compatible with standard wear bushings and test plugs

Options —

- Bottom connection
 - Slip-on-weld
 - Slip-on-weld with o-ring
 - Threaded
 - S4 Surelok (PC #05-0224)
- Outlets
 - Line pipe
 - Studded flange (with valve removal threads PC #05-0383)
 - Extended flange (with valve removal threads PC #05-0383)
- Two opposing BP lockscrews (PC #05-0225)
 - Prevent the wear bushing (bowl protector) from rotating in the bowl
 - Name designation (W2-BP) denotes use of BP lockscrews

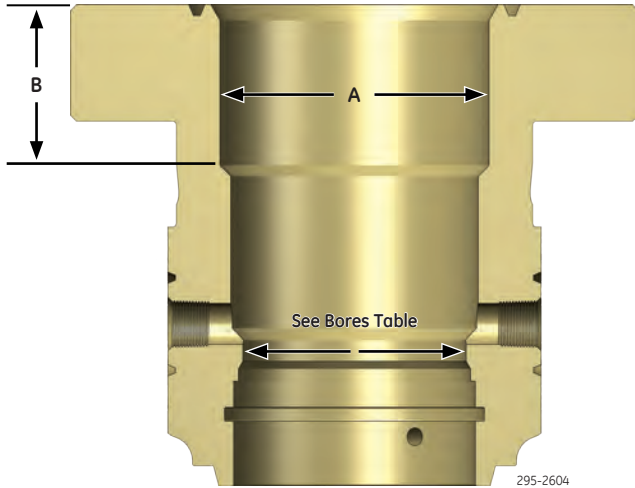


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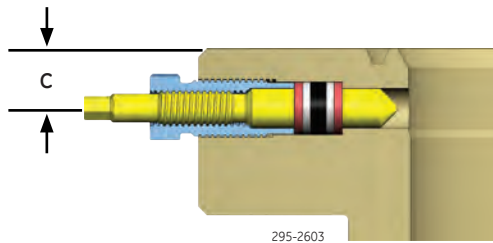
The W2-BP does not come with a full set of lockscrews. If a full set of lockscrews is required, please see the T Tubing Head Technical Bulletin (PC #05-0048).



W2 Casing Head



W2 Casing Head: For clearance bore dimensions, please refer to the "Clearance Bores Above Secondary Seals" table.



W2-BP Casing Head Lockscrew Detail

Availability –

Casing Size	Flange	psi	W2-BP			Lockscrew Diameter	Approx. Weight (lbs)
			A	B	C		
7"	9"	2,000	8.76"	7.12"	–	–	234
		3,000	8.76"	7.12"	1.58"	1-1/4"	325
		5,000	8.76"	7.12"	1.64"	1-1/8"	410
		10,000	8.76"	7.12"	1.64"	1-1/8"	495
7-5/8"	9"	2,000	10.88"	6.50"	1.76"	1"	450
		3,000	10.88"	6.50"	1.70"	1-1/8"	462
		5,000	10.88"	6.50"	1.70"	1-1/8"	480
		10,000	10.88"	6.50"	1.58"	1-3/8"	620
7-5/8"	11"	2,000	10.88"	6.50"	1.76"	1"	403
		3,000	10.88"	6.50"	1.70"	1-1/8"	457
		5,000	10.88"	6.50"	1.70"	1-1/8"	720
		10,000	10.88"	6.50"	1.58"	1-3/8"	659
8-5/8"	9"	2,000	8.76"	7.12"	–	–	230
		3,000	8.76"	7.12"	1.58"	1-1/4"	318
		5,000	8.76"	7.12"	1.64"	1-1/8"	403
		10,000	8.76"	7.12"	1.64"	1-1/8"	487
8-5/8"	11"	2,000	10.88"	6.50"	1.76"	1"	403
		3,000	10.88"	6.50"	1.70"	1-1/8"	457
		5,000	10.88"	6.50"	1.70"	1-1/8"	720
		10,000	10.88"	6.50"	1.58"	1-3/8"	659
9-5/8"	11"	2,000	10.88"	6.50"	1.76"	1"	398
		3,000	10.88"	6.50"	1.70"	1-1/8"	462
		5,000	10.88"	6.50"	1.70"	1-1/8"	667
		10,000	10.88"	6.50"	1.58"	1-3/8"	612
10-3/4"	11"	2,000	10.88"	6.50"	1.76"	1"	387
		3,000	10.88"	6.50"	1.70"	1-1/8"	426
		5,000	10.88"	6.50"	1.70"	1-1/8"	669
		10,000	10.88"	6.50"	1.58"	1-3/8"	601
11-3/4"	13-5/8"	2,000	13.51"	6.50"	1.82"	1"	495
		3,000	13.51"	6.50"	1.82"	1"	685
		5,000	13.51"	6.50"	1.70"	1-1/4"	645
		10,000	13.51"	6.50"	1.62"	1-1/2"	2,787
11-3/4"	16-3/4"	2,000	16.62"	8.50"	1.64"	1-1/8"	1,345
		3,000	16.62"	8.50"	1.64"	1-1/8"	1,467
		5,000	16.62"	8.50"	1.46"	1-1/2"	1,607
		10,000	13.51"	6.50"	1.82"	1"	480
13-3/8"	13-5/8"	2,000	13.51"	6.50"	1.82"	1"	603
		3,000	13.51"	6.50"	1.82"	1"	603
		5,000	13.51"	6.50"	1.70"	1-1/4"	1,081
		10,000	13.51"	6.50"	1.62"	1-1/2"	2,753
13-3/8"	16-3/4"	2,000	16.62"	8.50"	1.64"	1-1/8"	1,320
		3,000	16.62"	8.50"	1.64"	1-1/8"	1,455
		5,000	16.62"	8.50"	1.46"	1-1/2"	1,687
		10,000	16.62"	8.50"	1.64"	1-1/8"	686
16"	16-3/4"	2,000	16.62"	8.50"	1.64"	1-1/8"	765
		5,000	16.62"	8.50"	1.46"	1-1/2"	1,668
18-5/8"	20-3/4"	3,000	20.12"	8.50"	1.57"	1-1/4"	1,432
	21-1/4"	2,000	20.12"	8.50"	1.64"	1-1/8"	1,262
20"	21-1/4"	5,000	20.12"	8.50"	1.64"	1-1/8"	5,100
		3,000	20.12"	8.50"	1.57"	1-1/4"	1,336
20"	21-1/4"	2,000	20.12"	8.50"	1.64"	1-1/8"	1,207
		5,000	20.12"	8.50"	1.64"	1-1/8"	5,075

A = Bowl diameter
B = Bowl depth

C = Distance from flange face to center line of lock screw

Clearance Bores Above SOW Pockets –

Casing Size	Minimum Bore	Casing Size	Minimum Bore	Casing Size	Minimum Bore
7"	6.38"	10-3/4"	10.00"	16"	15.38"
7-5/8"	6.99"	11-3/4"	11.06"	18-5/8"	17.75"
7-3/4"	6.99"	11-7/8"	11.06"	18-3/4"	17.88"
8-5/8"	8.00"	12-3/4"	12.00"	20"	19.13"
9-5/8"	9.00"	13-3/8"	12.50"		
9-3/4"	9.00"	13-5/8"	12.50"		



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Wellhead Housings

Pressure Control W2 Casing Spool

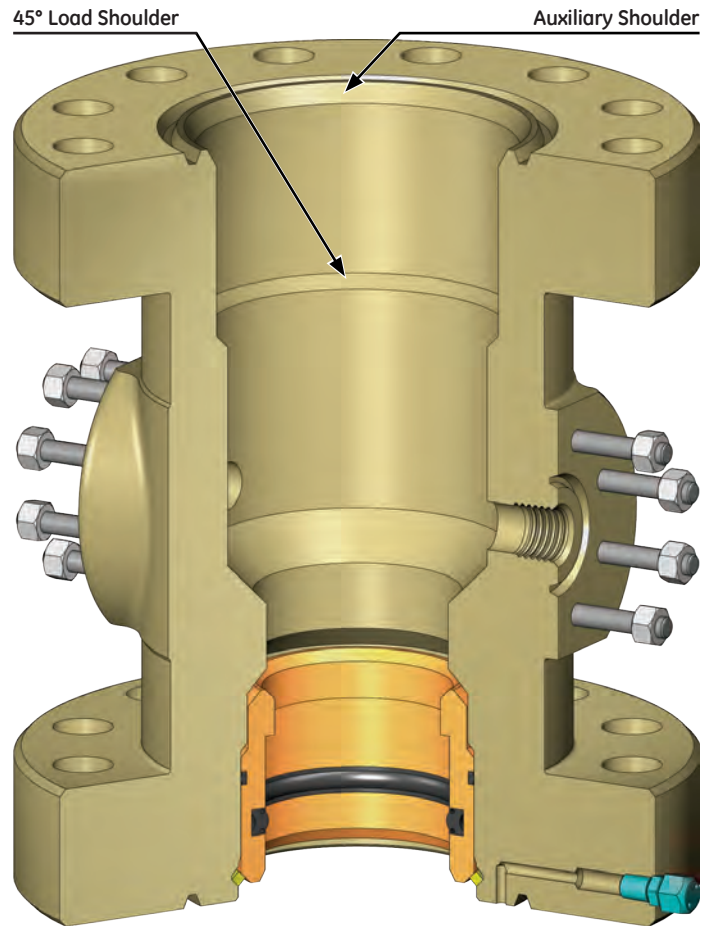
The W2 Casing Spool has a straight bowl with a high capacity 45° load shoulder. W2 casing spools are available with flanged top and bottom connections in sizes from 11" through nominal 20" and pressure ratings from 2,000 psi through 15,000 psi.

Features —

- Large auxiliary shoulder at face of upper connection will support primary seal plates or RCS secondary seals
- Accepts the full line of mandrel and slip type casing hangers including W1, W1-M and W2
- Available in a full range of trims that meet API 6A criteria for temperature, material and PSL
- Meets PR-2 test requirements
- Compatible with standard wear bushings and test plugs

Options —

- Secondary seal
 - EBS bushing (PC #05-0146)
 - Integral EBS seal (PC #04-0387)
 - Integral P seal (PC #04-0398)
 - Integral Double O seal (PC #05-0116)
 - RCS metal seal (PC #04-0388)
- End connections
 - API flanges
 - Other connections available upon request
- Outlets
 - Line pipe
 - Studded flange (with valve removal threads PC #05-0383)
 - Extended flange (with valve removal threads PC #05-0383)
- Two opposing BP lockscrews (PC #05-0225)
 - Prevent the wear bushing (bowl protector) from rotating in the bowl
 - Name designation (W2-BP) denotes use of BP lockscrews



W2 Casing Spool with EBS Bushing

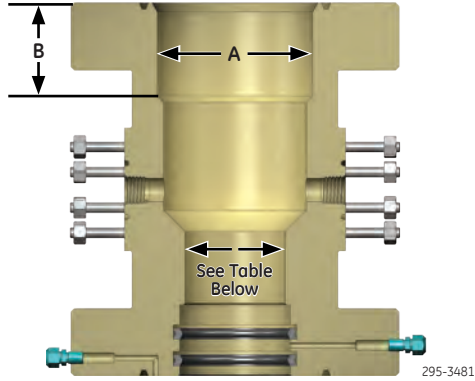
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NOTE

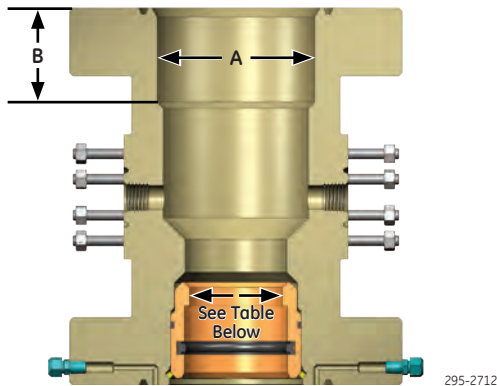
The W2-BP does not come with a full set of lockscrews. If a full set of lockscrews is required, please see the T Tubing Head Technical Bulletin (PC #05-0048).



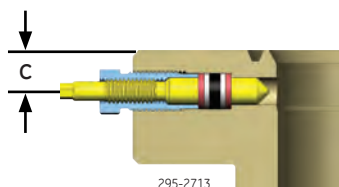
W2 Casing Spool



W2 Casing Spool with Integral Secondary Seal, such as "OO", "PP", or "EBS": Please refer to the table below for clearance bore dimensions.



W2 Casing Spool with EBS Bushing: Please refer to the table below for clearance bore dimensions.



W2-BP Casing Spool Lockscrew Detail

Availability –

Bottom Flange Size	psi	Top Flange		W2-BP			Lockscrew Diameter	Approx. Weight (lbs)
		Size	psi	A	B	C		
11"	2,000	11"	2,000	10.88"	6.50"	1.76"	1"	570
			3,000	10.88"	6.50"	1.70"	1-1/8"	600
	3,000	11"	3,000	10.88"	6.50"	1.70"	1-1/8"	710
			5,000	10.88"	6.50"	1.70"	1-1/8"	810
5,000	11"	5,000	10.88"	6.50"	1.70"	1-1/8"	1,284	
		10,000	10.88"	6.50"	1.58"	1-3/8"	1,700	
13-5/8"	2,000	11"	2,000	10.88"	6.50"	1.76"	1"	680
			3,000	10.88"	6.50"	1.70"	1-1/8"	740
		13-5/8"	2,000	13.51"	6.50"	1.82"	1"	825
			3,000	13.51"	6.50"	1.82"	1"	930
	3,000	11"	3,000	10.88"	6.50"	1.70"	1-1/8"	770
			5,000	10.88"	6.50"	1.70"	1-1/8"	1,168
		13-5/8"	3,000	13.51"	6.50"	1.82"	1"	920
			5,000	13.51"	6.50"	1.70"	1-1/4"	1,415
	5,000	11"	5,000	10.88"	6.50"	1.70"	1-1/8"	1,430
			10,000	10.88"	6.50"	1.58"	1-3/8"	1,948
		13-5/8"	5,000	13.51"	6.50"	1.70"	1-1/4"	1,715
			10,000	13.51"	6.50"	1.62"	1-1/2"	2,400
10,000	11"	10,000	10.88"	6.50"	1.58"	1-3/8"	2,930	
	13-5/8"	10,000	13.51"	6.50"	1.62"	1-1/2"	4,200	
16-3/4"	2,000	11"	2,000	10.88"	6.50"	1.76"	1"	855
			3,000	10.88"	6.50"	1.70"	1-1/8"	935
		13-5/8"	2,000	13.51"	6.50"	1.82"	1"	1,280
			3,000	13.51"	6.50"	1.82"	1"	1,355
	3,000	11"	3,000	10.88"	6.50"	1.70"	1-1/8"	1,400
			5,000	10.88"	6.50"	1.70"	1-1/8"	1,518
		13-5/8"	3,000	13.51"	6.50"	1.82"	1"	1,408
			5,000	13.51"	6.50"	1.70"	1-1/4"	1,750
	5,000	11"	5,000	10.88"	6.50"	1.70"	1-1/8"	2,145
			10,000	10.88"	6.50"	1.58"	1-3/8"	2,640
		13-5/8"	5,000	13.51"	6.50"	1.70"	1-1/4"	2,775
			10,000	13.51"	6.50"	1.62"	1-1/2"	2,850
10,000	13-5/8"	10,000	13.51"	6.50"	1.62"	1-1/2"	2,945	
	2,000	13-5/8"	2,000	13.51"	6.50"	1.82"	1"	1,825
3,000			13.51"	6.50"	1.82"	1"	2,063	
16-3/4"		2,000	16.62"	8.50"	1.64"	1-1/8"	2,180	
		3,000	16.62"	8.50"	1.64"	1-1/8"	2,405	
3,000	13-5/8"	3,000	13.51"	6.50"	1.82"	1"	2,050	
		5,000	13.51"	6.50"	1.70"	1-1/4"	2,450	
	20-3/4"	3,000	20.12"	8.50"	1.57"	1-1/4"	3,010	
	21-1/4"	5,000	20.12"	8.50"	1.64"	1-1/8"	3,250	
5,000	13-5/8"	5,000	13.51"	6.50"	1.70"	1-1/4"	2,530	
		10,000	13.51"	6.50"	1.62"	1-1/2"	5,175	
	16-3/4"	5,000	16.62"	8.50"	1.46"	1-1/2"	4,750	

A = Bowl diameter

C = Distance from flange face to center line of lockscrew

B = Bowl depth

Clearance Bores Above Secondary Seals –

Casing Size	Minimum Bore	Casing Size	Minimum Bore	Casing Size	Minimum Bore
4"	3.53"	7-3/4"	6.99"	13-3/8"	12.50"
4-1/2"	4.03"	8-5/8"	8.00"	13-5/8"	12.50"
5"	4.50"	9-5/8"	9.00"	16"	15.38"
5-1/2"	5.00"	9-3/4"	9.00"	18-5/8"	17.75"
6"	5.50"	10-3/4"	10.00"	18-3/4"	17.88"
6-5/8"	6.00"	11-3/4"	11.06"	20"	19.13"
7"	6.38"	11-7/8"	11.06"		
7-5/8"	6.99"	12-3/4"	12.00"		



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Wellhead Housings

Pressure Control T Tubing Head

The T Tubing Head, designed for single completions, has a straight bowl with a high capacity 45° load shoulder. T tubing heads are available with flanged top and bottom connections in sizes from 7-1/16" through nominal 20" and pressure ratings from 2,000 psi through 15,000 psi.

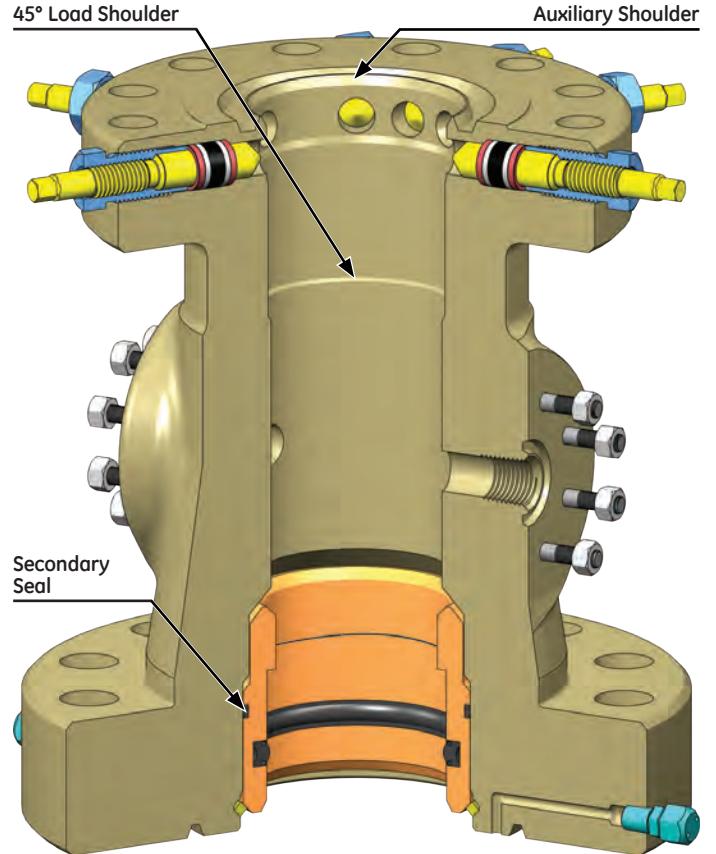
Due to GE Oil & Gas Pressure Control's design standard, casing heads and spools are not available with a full set of lockscrews. In those applications where a full set of lockscrews is required a T head can be used.

Features —

- Equipped with a full complement of integral lockscrews (PC #05-0225) for tubing hanger retention
- Accepts a full line of single completion tubing hangers
- Accepts W1-M and W2 slip type casing hangers
- Available in the full range of API 6A criteria for temperature, material and PSL
- Meets PR-2 requirements
- Compatible with standard wear bushings and test plugs
- When used as a casing head/spool the large auxiliary shoulder can support an RCS secondary seal

Options —

- Secondary seals
 - EBS bushing (PC #05-0146)
 - Integral EBS seal (PC #04-0387)
 - Integral P seal (PC #04-0398)
 - Double O seal (PC #05-0116)
 - RCS seal (PC #04-0388)
- Top and bottom connections
 - API flanges
 - Other connections available upon request
- Outlets
 - Line pipe
 - Studded flange (with valve removal threads PC #05-0383)
 - Extended flange (with valve removal threads PC #05-0383)

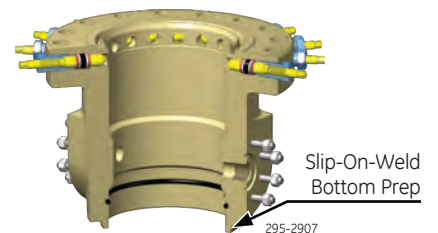


T Tubing Head Shown with EBS Bushing

295-2717

T Tubing Head Used as a Casing Head

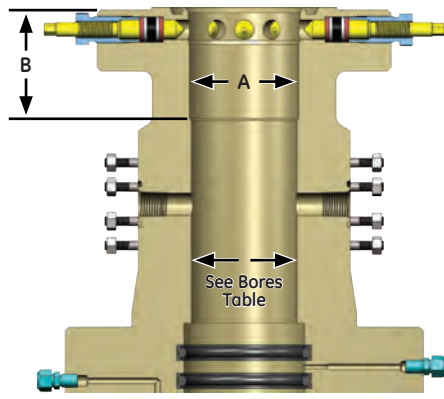
- Available with slip-on-weld or threaded bottom
- Accepts a full line of single completion tubing hangers



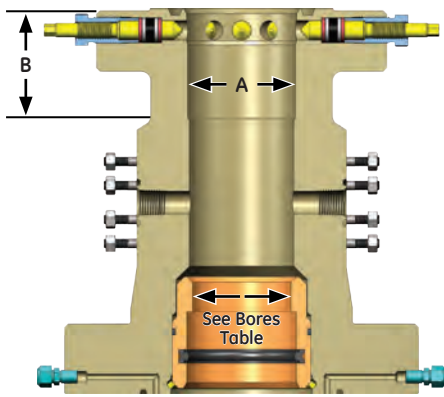
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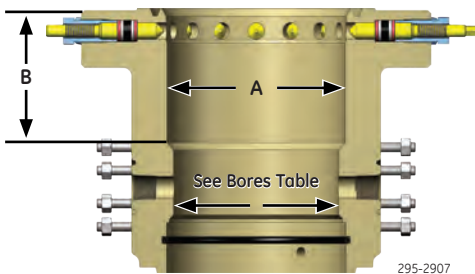
T Tubing Head



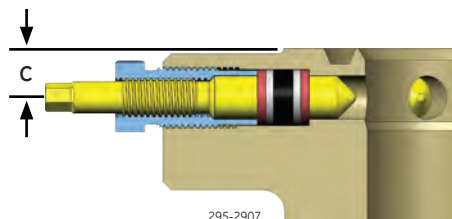
Flange by Flange Tubing Head with Integral Secondary Seal, such as "OO", "PP" or "EBS": For clearance bore dimensions, please refer to the "Clearance Bores Above Secondary Seals" table.



Flange by Flange Tubing Head with EBS Bushing: For clearance bore dimensions, please refer to the "Clearance Bores Above Secondary Seals" table.



Flange by Slip-On-Weld Tubing Head: For clearance bore dimensions, please refer to the "Clearance Bores Above Secondary Seals" table.



Lockscrew Measurement Detail

Flanged Bottom Prep Availability –

Bottom Flange Size	Top Flange		# of Lockscrews	Approx. Weight (lbs)				
	psi	Size			psi	Size		
11"	2,000	7-1/16"	2,000	7.01"	7.12"	1.54"	4	490
			3,000	7.01"	7.12"	1.54"	4	500
	3,000	7-1/16"	3,000	7.01"	7.12"	1.54"	4	545
			5,000	7.01"	7.12"	1.54"	8	599
	5,000	7-1/16"	5,000	7.01"	7.12"	1.54"	8	788
			10,000	7.01"	7.12"	1.42"	8	1,073
10,000	7-1/16"	10,000	7.01"	7.12"	1.42"	8	1,474	
		15,000	7.01"	7.12"	1.48"	16	1,667	
13-5/8"	2,000	11"	2,000	10.88"	10.00"	1.76"	8	1,275
			3,000	10.88"	10.00"	1.70"	8	1,440
	3,000	11"	3,000	10.88"	10.00"	1.70"	8	1,366
			5,000	10.88"	10.00"	1.70"	12	1,550
	5,000	11"	5,000	10.88"	10.00"	1.70"	12	1,366
			10,000	10.88"	10.00"	1.58"	16	1,890
10,000	11"	10,000	10.88"	10.00"	1.58"	16	3,850	
		15,000	10.88"	10.00"	1.56"	20	4,050	
16-3/4"	2,000	13-5/8"	2,000	13.51"	10.16"	1.82"	10	1,515
			3,000	13.51"	10.16"	1.82"	14	1,585
	3,000	13-5/8"	3,000	13.51"	10.16"	1.82"	14	1,620
			5,000	13.51"	10.16"	1.70"	16	1,725
	5,000	13-5/8"	5,000	13.51"	10.16"	1.70"	16	2,625
			10,000	13.51"	10.16"	1.62"	20	3,000
21-1/4"	2,000	13-5/8"	2,000	13.51"	10.16"	1.82"	10	3,274
			3,000	13.51"	10.16"	1.82"	14	3,405
20-3/4"	3,000	13-5/8"	3,000	13.51"	10.16"	1.82"	14	3,890
			5,000	13.51"	10.16"	1.70"	16	4,015
21-1/4"	5,000	13-5/8"	5,000	13.51"	10.16"	1.70"	16	4,875
			10,000	13.51"	10.16"	1.62"	20	5,200

SOW/Threaded Bottom Prep Availability –

Casing Size	Top Flange		# of Lockscrews	Approx. Weight (lbs)			
	Size	psi			A	B	C
4-1/2"	7-1/16"	2,000	7.01"	7.12"	1.54"	4	296
		3,000	7.01"	7.12"	1.54"	4	296
		5,000	7.01"	7.12"	1.54"	8	320
5-1/2"	7-1/16"	2,000	7.01"	7.12"	1.54"	4	287
		3,000	7.01"	7.12"	1.54"	4	287
		5,000	7.01"	7.12"	1.54"	8	300
7"	7-1/16"	2,000	7.01"	7.12"	1.54"	4	265
		3,000	7.01"	7.12"	1.54"	4	265
		5,000	7.01"	7.12"	1.54"	8	280
8-5/8"	11"	3,000	10.88"	10.00"	1.70"	8	620
		5,000	10.88"	10.00"	1.70"	12	700
9-5/8"	11"	3,000	10.88"	10.00"	1.70"	8	595
		5,000	10.88"	10.00"	1.70"	12	676
10-3/4"	11"	3,000	10.88"	10.00"	1.70"	8	575
		5,000	10.88"	10.00"	1.70"	12	655
13-3/8"	13-5/8"	3,000	13.51"	10.16"	1.82"	14	612
		5,000	13.51"	10.16"	1.70"	16	736

A = Bowl diameter

C = Distance from flange face to center line of lockscrew

B = Bowl depth

Clearance Bores Above Secondary Seals –

Casing Size	Minimum Bore	Casing Size	Minimum Bore	Casing Size	Minimum Bore
4"	3.53"	7-3/4"	6.99"	13-3/8"	12.50"
4-1/2"	4.03"	8-5/8"	8.00"	13-5/8"	12.50"
5"	4.50"	9-5/8"	9.00"	16"	15.38"
5-1/2"	5.00"	9-3/4"	9.00"	18-5/8"	17.75"
6"	5.50"	10-3/4"	10.00"	18-3/4"	17.88"
6-5/8"	6.00"	11-3/4"	11.06"	20"	19.13"
7"	6.38"	11-7/8"	11.06"		
7-5/8"	6.99"	12-3/4"	12.00"		



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Wellhead Housings

Pressure Control TD Tubing Head

The TD Tubing Head, designed for dual completions, has a straight bowl with a high capacity 45° load shoulder. TD tubing heads are available with flanged top and bottom connections in sizes from 7-1/16" through nominal 20" and pressure ratings from 2,000 psi through 15,000 psi.

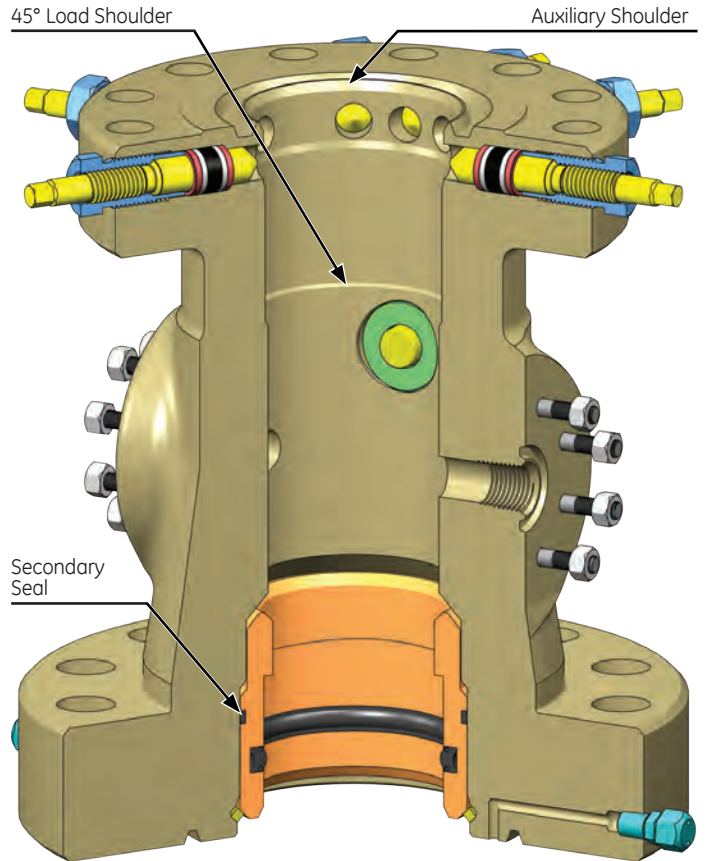
Due to GE Oil & Gas Pressure Control's design standard, casing heads and spools are not available with a full set of lockscrews. In those applications where a full set of lockscrews and a dual completion are planned a TD head can be used.

Features

- Equipped with a full complement of integral lockscrews (PC #05-0225) for tubing hanger retention
- Equipped with two alignment pins located 180° apart to ensure proper orientation of dual tubing hangers
- Accepts a full line of single and dual completion tubing hangers
- Accepts W1-M and W2 slip type casing hangers
- Available in the full range of API 6A criteria for temperature, material and PSL
- Meets PR-2 requirements
- Compatible with standard wear bushings and test plugs
- When used as a casing head/spool the large auxiliary shoulder can support an RCS secondary seal

Options

- Secondary seals
 - EBS bushing (PC #05-0146)
 - Integral EBS seal (PC #04-0387)
 - Integral P seal (PC #04-0398)
 - Double O seal (PC #05-0116)
 - RCS seal (PC #04-0388)
- Top and bottom connections
 - API flanges
 - Other connections available upon request



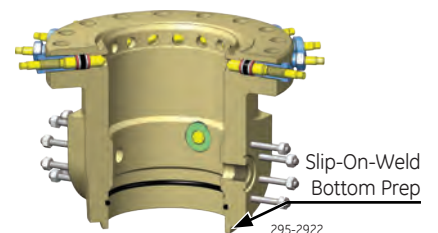
TD Tubing Head Shown with EBS Bushing

295-2718

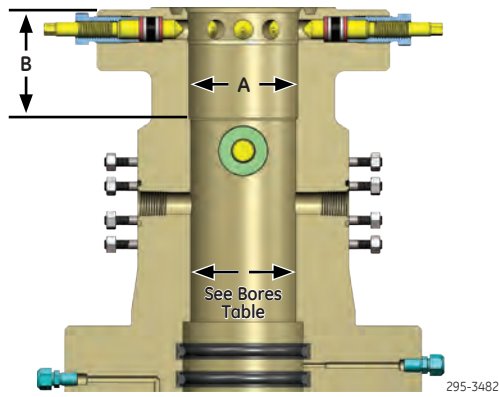
- Outlets
 - Line pipe
 - Studded flange (with valve removal threads PC #05-0383)
 - Extended flange (with valve removal threads PC #05-0383)

TD Tubing Head Used as a Casing Head

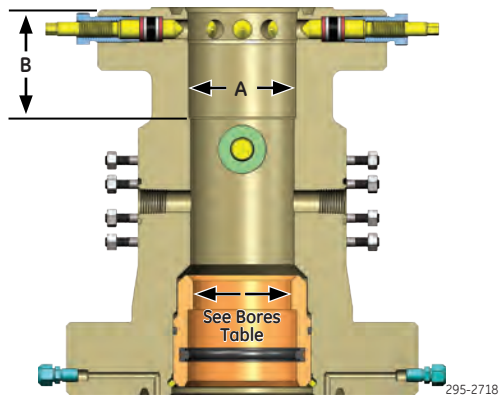
- Available with slip-on-weld or threaded bottom
- Accepts a full line of single and dual completion tubing hangers



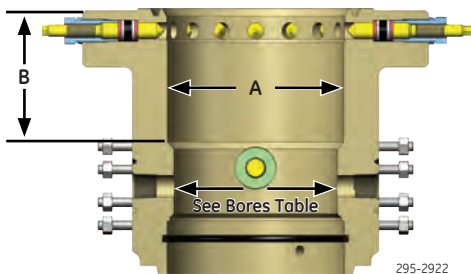
TD Tubing Head



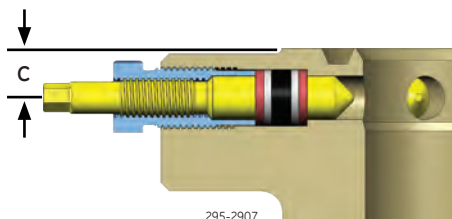
Flange by Flange Tubing Head with Integral Secondary Seal, such as "OO", "PP" or "EBS": For clearance bore dimensions, please refer to the "Clearance Bores Above Secondary Seals" table.



Flange by Flange Tubing Head with EBS Bushing: For clearance bore dimensions, please refer to the "Clearance Bores Above Secondary Seals" table.



Flange by Slip-On-Weld Tubing Head: For clearance bore dimensions, please refer to the "Clearance Bores Above Secondary Seals" table.



Lockscrew Measurement Detail

Flanged Bottom Prep Availability –

Bottom Flange Size	Top Flange			# of Lockscrews	Approx. Weight (lbs)			
	psi	Size	psi					
11"	2,000	7-1/16"	2,000	7.01"	7.12"	1.54"	4	490
			3,000	7.01"	7.12"	1.54"	4	500
	3,000	7-1/16"	3,000	7.01"	7.12"	1.54"	4	545
			5,000	7.01"	7.12"	1.54"	8	599
	5,000	7-1/16"	5,000	7.01"	7.12"	1.54"	8	788
			10,000	7.01"	7.12"	1.42"	8	1,073
10,000	7-1/16"	10,000	7.01"	7.12"	1.42"	8	1,474	
		15,000	7.01"	7.12"	1.48"	16	1,667	
13-5/8"	2,000	11"	2,000	10.88"	10.00"	1.76"	8	1,275
			3,000	10.88"	10.00"	1.70"	8	1,440
	3,000	11"	3,000	10.88"	10.00"	1.70"	8	1,366
			5,000	10.88"	10.00"	1.70"	12	1,550
	5,000	11"	5,000	10.88"	10.00"	1.70"	12	1,366
			10,000	10.88"	10.00"	1.58"	16	1,890
10,000	11"	10,000	10.88"	10.00"	1.58"	16	3,850	
		15,000	10.88"	10.00"	1.56"	20	4,050	
16-3/4"	2,000	13-5/8"	2,000	13.51"	10.16"	1.82"	10	1,515
			3,000	13.51"	10.16"	1.82"	14	1,585
	3,000	13-5/8"	3,000	13.51"	10.16"	1.82"	14	1,620
			5,000	13.51"	10.16"	1.70"	16	1,725
	5,000	13-5/8"	5,000	13.51"	10.16"	1.70"	16	2,625
			10,000	13.51"	10.16"	1.62"	20	3,000
21-1/4"	2,000	13-5/8"	2,000	13.51"	10.16"	1.82"	10	3,274
			3,000	13.51"	10.16"	1.82"	14	3,405
20-3/4"	3,000	13-5/8"	3,000	13.51"	10.16"	1.82"	14	3,890
			5,000	13.51"	10.16"	1.70"	16	4,015
21-1/4"	5,000	13-5/8"	5,000	13.51"	10.16"	1.70"	16	4,875
			10,000	13.51"	10.16"	1.62"	20	5,200

SOW/Threaded Bottom Prep Availability –

Casing Size	Top Flange			# of Lockscrews	Approx. Weight (lbs)		
	Size	psi					
4-1/2"	7-1/16"	2,000	7.01"	7.12"	1.54"	4	296
		3,000	7.01"	7.12"	1.54"	4	296
		5,000	7.01"	7.12"	1.54"	8	320
5-1/2"	7-1/16"	2,000	7.01"	7.12"	1.54"	4	287
		3,000	7.01"	7.12"	1.54"	4	287
		5,000	7.01"	7.12"	1.54"	8	300
7"	7-1/16"	2,000	7.01"	7.12"	1.54"	4	265
		3,000	7.01"	7.12"	1.54"	4	265
		5,000	7.01"	7.12"	1.54"	8	280
8-5/8"	11"	3,000	10.88"	10.00"	1.70"	8	620
		5,000	10.88"	10.00"	1.70"	12	700
9-5/8"	11"	3,000	10.88"	10.00"	1.70"	8	595
		5,000	10.88"	10.00"	1.70"	12	676
10-3/4"	11"	3,000	10.88"	10.00"	1.70"	8	575
		5,000	10.88"	10.00"	1.70"	12	655
13-3/8"	13-5/8"	3,000	13.51"	10.16"	1.82"	14	612
		5,000	13.51"	10.16"	1.70"	16	736

A = Bowl diameter

C = Distance from flange face to center line of lockscrew

B = Bowl depth

Clearance Bores Above Secondary Seals –

Casing Size	Minimum Bore	Casing Size	Minimum Bore	Casing Size	Minimum Bore
4"	3.53"	7-3/4"	6.99"	13-3/8"	12.50"
4-1/2"	4.03"	8-5/8"	8.00"	13-5/8"	12.50"
5"	4.50"	9-5/8"	9.00"	16"	15.38"
5-1/2"	5.00"	9-3/4"	9.00"	18-5/8"	17.75"
6"	5.50"	10-3/4"	10.00"	18-3/4"	17.88"
6-5/8"	6.00"	11-3/4"	11.06"	20"	19.13"
7"	6.38"	11-7/8"	11.06"		
7-5/8"	6.99"	12-3/4"	12.00"		



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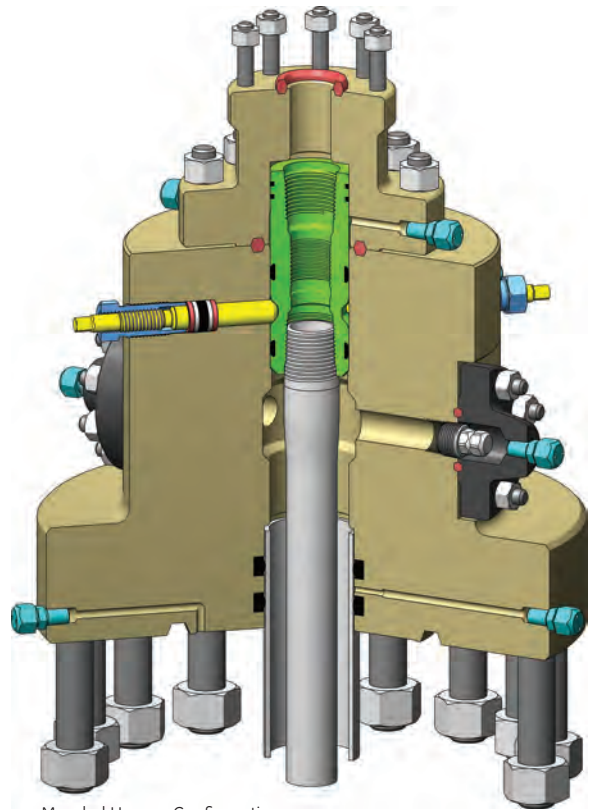
Wellhead Housings

Pressure Control MTH2 Mini Tubing Head

The MTH2 Tubing Head provides a low cost tubing support solution for fracturing and siphon string applications. The 4" tubing bowl gives full-bore access over 4-1/2" (or smaller) casing and accepts mandrel or slip type tubing hangers. These small diameter hangers can be snubbed in through 4" valves, thus eliminating the need for the larger 7" fracturing valves and BOP's. This saves both time and money.

Features

- Reduced equipment cost compared to conventional fracturing equipment
- Secondary casing seal
 - Is fully rated to the working pressure of the tubing head
 - Can be monitored through the seal test port
- Hanger availability
 - Mandrel hangers available up to 2-3/8"
 - Slip-type coil tubing hangers available up to 2"
- Studded outlets (with valve removal threads PC #05-0383)
- Available in the full range of API 6A criteria for temperature, material and PSL
- Meets PR-2 requirements



Mandrel Hanger Configuration

295-2719

Availability —

Production Casing	Bottom Flange		Top Flange	
	Size	psi	Size	psi
3-1/2"	11"	5,000	3-1/16"	10,000
		5,000	4-1/16"	10,000
		10,000	3-1/16"	10,000
4-1/2"	7-1/16"	3,000	4-1/16"	5,000
		5,000	4-1/16"	5,000
		5,000	4-1/16"	10,000
		10,000	4-1/16"	10,000
	9"	3,000	4-1/16"	5,000
		3,000	4-1/16"	10,000
		5,000	4-1/16"	5,000
		5,000	4-1/16"	10,000
	11"	3,000	4-1/16"	5,000
		3,000	4-1/16"	10,000
		5,000	4-1/16"	5,000
		5,000	4-1/16"	10,000
10,000		4-1/16"	10,000	
10,000		4-1/16"	15,000	
13-5/8"	10,000	4-1/16"	10,000	
	10,000	4-1/16"	15,000	



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Wellhead Housing Options

Pressure Control Integral Lockscrews

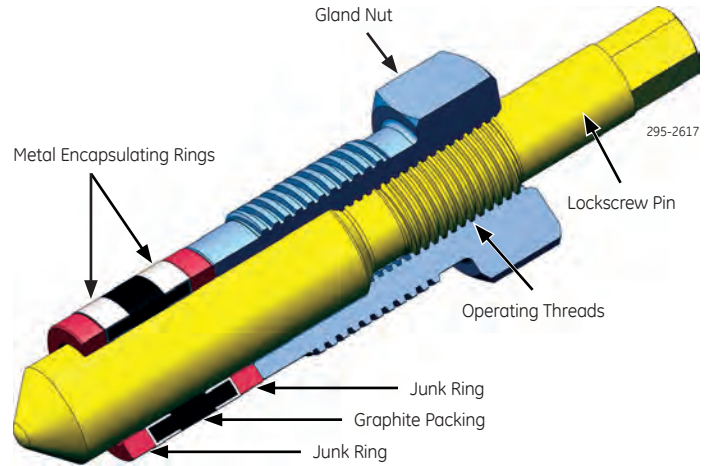
Lockscrews are used to hold down hangers, packoffs and wear bushings and to energize some compression seals. Graphite packing isolates the operating threads from the wellbore. This design helps prevent corrosion damage and/or wellbore fluid contamination to the threads, which reduces maintenance and increases equipment life.

Features —

- Metal encapsulated graphite packing
 - Is impervious to chemical attack and functions over the API temperature range, -75°F to +650°F (-60°C to +345°C)
 - Has a low coefficient of friction that helps reduce operating torque
- Lockscrew pin and gland nut are available in materials suitable for all API trims including H₂S and CO₂
- Rated for service pressures through 20,000 psi
- API 6A, PR2 Annex F tested

Applications —

- Type 'W2-BP' bowl
 - Uses two lockscrews to hold the wear bushing in place during the drilling process, but are not designed or intended to provide enough strength to retain a hanger or energize a seal
- Type 'T' bowl
 - Uses a full set of lockscrews to retain the tubing hanger and energize the annular seal where applicable
- SH2 (PC #04-0394), LSH (PC #05-0143) and OSH (PC #04-0396) wellhead systems
 - Retain annular seals and casing hangers
 - Retain the tubing hanger and energize the annular seal where applicable



Availability —

Flange Size	Flange psi	Number of Lockscrews		
		'W2-BP' Bowl	'T'/'TD' Bowl	Diameter
7-1/16"	3,000	-	4	1"
	5,000	-	6/8*	1"
	10,000	-	8	1-1/4"
	15,000	-	16	1-1/8"
	20,000	-	16	1-1/4"
9"	3,000	2	4	1-1/4"
	5,000	2	8	1-1/8"
	10,000	2	16	1-1/8"
	15,000	2	16	1-3/8"
	20,000	2	16	1-1/2"
11"	2,000	2	8	1"
	3,000	2	8	1-1/8"
	5,000	2	12	1-1/8"
	10,000	2	16	1-3/8"
	15,000	2	20	1-1/2"
13-5/8"	2,000	2	10	1"
	3,000	2	14	1"
	5,000	2	16	1-1/4"
	10,000	2	20	1-1/2"
16-3/4"	2,000	2	12	1-1/8"
	3,000	2	16	1-1/8"
	5,000	2	16	1-1/2"
20-3/4"	3,000	2	20	1-1/4"
21-1/4"	2,000	2	18	1-1/8"
	5,000	2	24	1-1/8"

* 'T' bowls use 6 lockscrews and 'TD' bowls use 8 lockscrews



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General Catalog

Conventional Wellheads

Casing Hangers *(Select a Product)*

W1 Slip Hanger and H Primary Seal

W1-M Slip Hanger, Manual Seal

W2 Slip Hanger, Automatic Seal

9F300 Slip Hanger, Automatic Seal



GE imagination at work

Casing Hangers

Pressure Control W1 Slip Hanger and H Primary Seal

The W1 Casing Hanger is the preferred standard slip-type casing hanger designed to suspend light to medium casing loads in the W2 and W2-BP casing heads and spools.

Features —

- Two-piece assembly bolts quickly and easily around the casing
- Each half is lighter weight, less cumbersome, and less awkward than manipulating a hinged hanger
- When an annular seal is required, a separate Type H primary seal plate (Type H-BP for BP bowl with lockscrews) can be positioned on a shoulder above the hanger
- Guide pins maintain alignment of slip segments during assembly and installation
- Designed in sizes to accommodate the full API tolerance range for casing OD

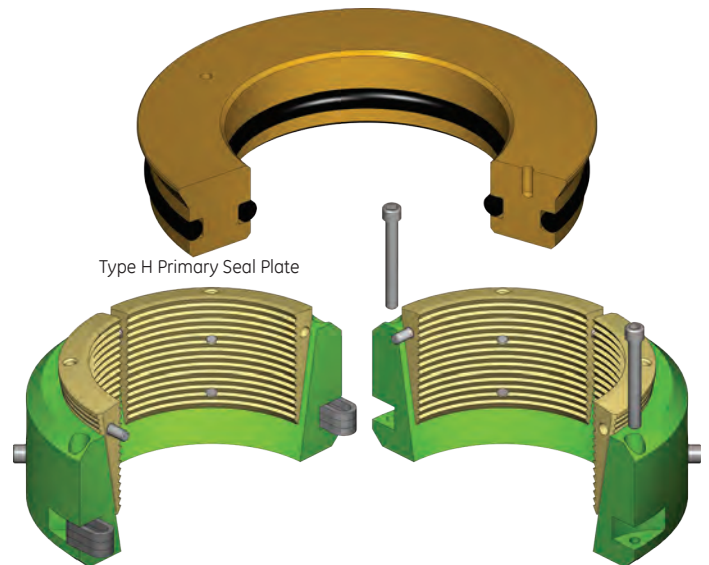
Hanging Capacity —

Hanging capacity is influenced by two factors which can combine to collapse the casing: pipe weight and pressure.

Since the slips are isolated from test pressures by the H Plate, pressure is not a factor. Capacity is 80% of pipe body yield (PBY).

Availability —

Bowl Size (Hanger OD)	Casing Size (Hanger ID)	W1 Hanger Part Number	Type H Plate Part Number	Type H-BP Plate Part Number
11"	2-7/8"	347081	336994	-
	3-1/2"	343984	311220	349920
	4-1/2"	340183	318580	333432
	5"	340185	342219	342221
	5-1/2"	340313	321464	324682
	7"	342722	323414	336689
13-5/8"	7-5/8"	340187	323413	342223
	3-1/2"	347014	327140	-
	4-1/2"	-	344354	-
	5-1/2"	346949	324648	-
	7"	340189	316716	-
	7-5/8"	340191	-	-
16-3/4"	8-5/8"	340193	323320	-
	9-5/8"	340195	323321	339088
	10-3/4"	340197	-	-
20"	11-7/8"	342963	-	-
	13-3/8"	340201	311069	-
	16"	340203	340927	-



W1 Casing Hanger

295-2126

Casing Hanger Specifications —

Naming Convention	CSGHGR,WG,W1,ODxID
API 6A Class	6A-KU-DD-NL-4-2
Temperature Range	-75°F to +250°F (-60°C to +121°C)
PR Test	2
Hanging Capacity	80% of PBY
Compatible Standard Bowls	W2, W2-BP
Compatible Non-Standard Bowls	WG-22, WG-22BP, WG-29, WG-29BP
Test Pressure	Either flange pressure rating or 80% of collapse resistance psi, whichever is less

Primary Seal Specifications —

Naming Convention	PRISEAL,WG,H, ODxID	PRISEAL,WG, H-BP,ODxID
API 6A Class	6A-PU-AA-1-2	6A-PU-AA-1-2
Temperature Range	-20°F to +250°F (-29°C to +121°C)	-20°F to +250°F (-29°C to +121°C)
Compatible Standard Bowls	W2	W2, W2-BP
Compatible Non-Standard Bowls	WG-22, WG-29	WG-22, WG-22BP, WG-29, WG-29BP



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Casing Hangers

Pressure Control W1-M Slip Hanger, Manual Seal

The W1-M Casing Hanger is the preferred standard manually energized slip-type casing hanger designed to suspend medium casing loads in the W2 and W2-BP casing heads and spools.

Features —

- Two-piece assembly bolts quickly and easily around the casing
- Each half is lighter weight, less cumbersome, and less awkward than manipulating a hinged hanger
- Packoff is manually energized as cap screws are tightened down to compress the seal
- Guide pins maintain alignment of slip segments during assembly and installation
- Designed in sizes to accommodate the full API tolerance range for casing OD

Hanging Capacity —

Hanging capacity is influenced by two factors which can combine to collapse the casing: pipe weight and pressure.

Since the slips are isolated from test pressures by the packoff, pressure is not a factor. Capacity is 80% of pipe body yield (PBV).

Availability —

Bowl Size (Hanger OD)	Casing Size (Hanger ID)	Part Number	Number of Cap Screws	Wrench Size
11"	4-1/2"	344536	14	1"
	5"	344540	14	1"
	5-1/2"	344544	14	1"
	7"	344548	12	7/8"
13-5/8"	7-5/8"	344315	12	7/8"
	5-1/2"	348593	12	3/4"
	7"	344750	18	1"
	7-5/8"	344754	18	1"
16-3/4"	8-5/8"	344758	14	1"
	9-5/8"	344278	12	1"
	9-5/8"	344762	10	3/4"
	10-3/4"	344766	10	3/4"
20"	11-7/8"	344320	14	3/4"
	13-3/8"	344770	14	3/4"
	16"	344774	20	1"



Specifications —

Naming Convention	CSGHGR,WG,W1M,OD×ID
API 6A Class	6A-L-DD-NL-3-2
Temperature Range	-50°F to +180°F (-46°C to +82°C)
PR Test	2
Hanging Capacity	80% of PBV
Compatible Standard Bowls	W2, W2-BP, SCH1
Compatible Non-Standard Bowls	WG-22, WG-22BP, WG-29, WG-29BP
Test Pressure	Either flange pressure rating or 80% of collapse resistance psi, whichever is less.



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Casing Hangers

Pressure Control W2 Slip Hanger, Automatic Seal

The W2 Casing Hanger is the preferred standard automatic slip-type casing hanger designed to suspend medium casing loads in the W2 and W2-BP casing heads and spools.

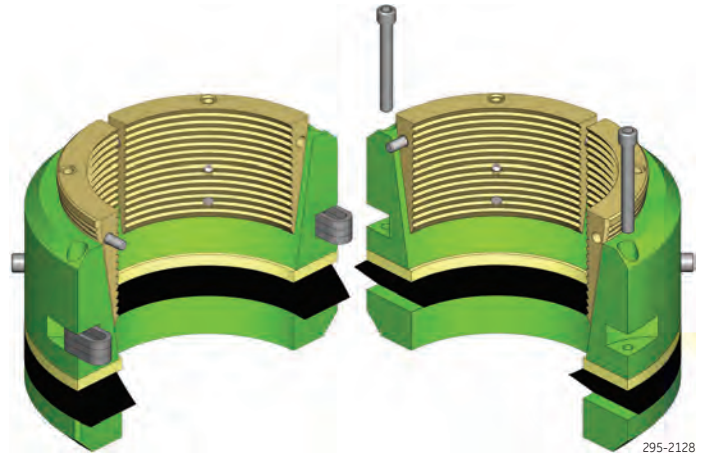
Features —

- Two-piece assembly bolts quickly and easily around the casing
- Each half is lighter weight, less cumbersome, and less awkward than manipulating a hinged hanger
- Packoff is automatically energized as casing weight is transferred through the slips to the support bowl
- Guide pins maintain alignment of slip segments during assembly and installation
- Designed in sizes to accommodate the full API tolerance range for casing OD

Hanging Capacity —

Hanging capacity is influenced by two factors which can combine to collapse the casing: pipe weight and pressure.

- Flange Test - Pipe weight combines with test pressure on the exposed slips to decrease capacity. Capacity is 50% of pipe body yield (PBY).
- During Fracturing - Pipe weight combines with internal casing pressure to resist casing collapse. Capacity is 80% of pipe body yield (PBY).



295-2128

Availability —

Bowl Size (Hanger OD)	Casing Size (Hanger ID)	Part Number	Minimum Casing Weight Required to Energize Seal	
			(lbs)	(kg)
11"	4-1/2"	341636	77,300	35,063
	5"	341990	73,600	33,384
	5-1/2"	341986	69,500	31,525
	7"	341889	54,800	24,857
13-5/8"	7-5/8"	341885	47,700	21,636
	7"	342070	105,100	47,673
	7-5/8"	342073	98,000	44,452
	8-5/8"	342503	85,300	38,691
16-3/4"	9-5/8"	341640	71,000	32,205
	9-5/8"	342526	145,100	65,816
	10-3/4"	342523	127,200	57,697
	11-3/4"	347617	109,600	49,714
20"	11-7/8"	347618	107,300	48,670
	13-3/8"	342495	228,300	103,555
	16"	342499	118,600	53,796

Specifications —

Naming Convention	CSGHGR,WG,W2, OD × ID
API 6A Class	6A-L-DD-NL-3-2
Temperature Range	-50°F to +180°F (-46°C to +82°C)
PR Test	2
Hanging Capacity During Flange Test	50% of PBY
Hanging Capacity During Fracturing	80% of PBY
Compatible Standard Bowls	W2, W2-BP, SCH1
Compatible Non-Standard Bowls	WG-22, WG-22BP, WG-29, WG-29BP
Test Pressure	Either flange pressure rating or 80% of collapse resistance psi, whichever is less



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Casing Hangers

Pressure Control 9F300 Slip Hanger, Automatic Seal

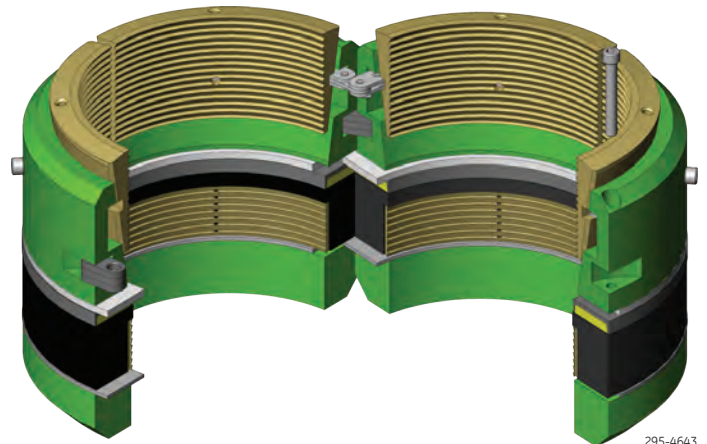
The 9F300 Casing Hanger is an automatic slip-type casing hanger designed to suspend high casing loads at high temperatures.

Features —

- Packoff is automatically energized as casing weight is transferred through the slips to the support bowl
- Guide pins maintain alignment of slip segments during assembly and installation
- Designed in sizes to accommodate the full API tolerance range for casing OD

Hanging Capacity —

The 9F300's lower set of parallel slips distributes the casing weight over a longer surface area thus reducing the likelihood of casing collapse and increasing the hanger's capacity. Capacity is 80% of pipe body yield (PBY).



295-4643

Availability —

Bowl Size (Hanger OD)	Casing Size (Hanger ID)	Minimum Casing Weight Required to Energize Seal	
		(lbs)	(kg)
11"	4-1/2"	77,400	35,108
	5"	73,700	33,430
	5-1/2"	69,600	31,570
	7"	55,050	24,970
	7-5/8"	47,950	21,750
13-5/8"	7-3/4"	46,450	21,069
	7"	105,350	47,786
	7-5/8"	98,250	44,565
	7-3/4"	95,900	43,620
	8-5/8"	85,600	38,828
	8-3/4"	83,000	37,650
	9-3/8"	73,275	33,237
16-3/4"	9-5/8"	71,400	32,386
	9-7/8"	67,650	30,686
	9-5/8"	145,450	65,975
	10-3/4"	127,600	57,878
	11-3/4"	110,100	49,941
20"	11-7/8"	107,800	48,897
	13-3/8"	228,000	103,419
	16"	119,500	54,204

Specifications —

Naming Convention	CSGHGR,WG,9F300, ODxID
API 6A Class	6A-U-DD-NL-3-2
Temperature Range	0°F to +250°F (-18°C to +121°C)
PR Test	2
Hanging Capacity	80% of PBY or 80% of casing collapse, whichever is less
Compatible Standard Bowl	T
Compatible Non-Standard Bowls	WG-29, WG-29BP
Test Pressure	Either flange pressure rating or 80% of collapse resistance psi, whichever is less



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GE Oil & Gas

Pressure Control

General Catalog

Conventional Wellheads

Secondary Seals *(Select a Product)*

Double O Elastomer Seal

P Elastomer Seal

EBS Elastomer Seal

EBS and EBS-F Bushings

RCS Metal Seal



GE imagination at work

Secondary Seals

Pressure Control Double O Elastomer Seal

The Double O Seal uses standard o-rings to provide a self-energized seal that does not require injection. Rated up to 5,000 psi, the Double O seal can be used as an integral secondary seal.

Features —

- Quick and easy to install
- Bidirectional seal
- Wedge shaped rings minimize extrusion of the o-rings when exposed to well pressure
- Available for casing sizes ranging from 4" to 20"
- Applicable for use in temperatures ranging from 0°F to +250°F (-18°C to +121°C)
- Available in standard trim materials*

Applications —

- Elastomer seal between casing and machined wellhead components
- Integral single and double secondary seal in casing or tubing spool

Availability —

Casing Size	Seal Part Number	Anti-Extrusion Ring Part Number
4"	83-000-841-86	315148
4-1/2"	83-000-802-86	83-910-306-91
5"	83-000-830-86	83-910-311-91
5-1/2"	83-000-805-86	83-910-341-91
7"	83-000-905-86	83-910-316-91
7-5/8"	83-000-906-86	83-910-318-91
8-5/8"	83-000-909-86	83-910-319-91
9-5/8"	83-000-912-86	83-910-321-91
10-3/4"	83-000-913-86	83-910-322-91
11-3/4"	83-000-926-86	327757
13-3/8"	83-000-917-86	311523
16"	83-000-937-86	331100
18-5/8"	83-000-936-86	-
20"	83-000-938-86	-

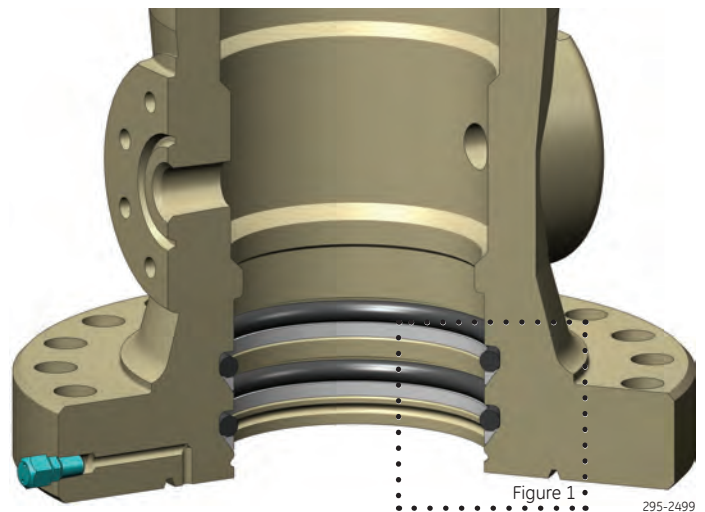


Figure 1 • 295-2499



Figure 1: Double O Seal Detail • 295-2499

NOTE

* For sour or corrosive applications, Pressure Control recommends the use of Double P Seals (PC #04-0398), EBS Seals (PC #04-0387) or RCS Seals (PC #04-0388). Refer to technical bulletins for further information.



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Secondary Seals

Pressure Control P Elastomer Seal

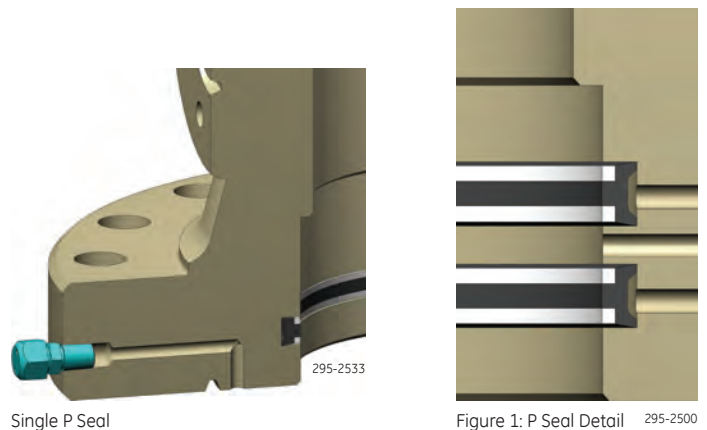
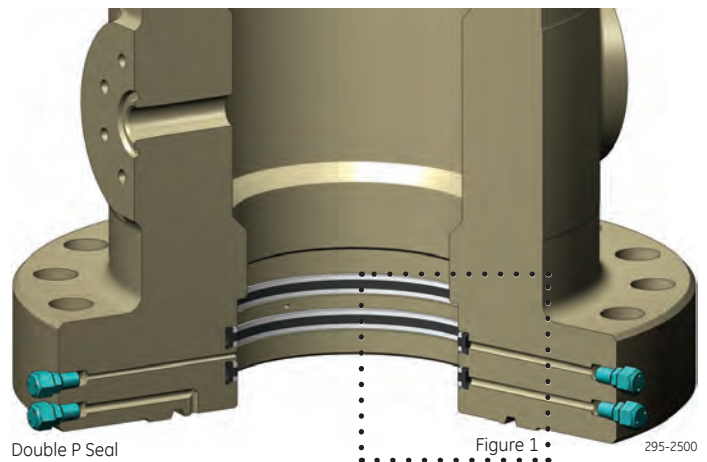
The P Seal is an elastomer seal comprised of an injectable, molded seal ring flanked by two anti-extrusion rings. A single seal is recommended for pressures up to 5,000 psi. In a double seal configuration, and depending on the size of the seal, the Double P seal can be rated up to 15,000 psi.

Features —

- Easy to install, reliable and field-proven
- Metal anti-extrusion rings on each side
 - Protect the seal from high pressure loads
 - Hold the ring in position for easy installation over casing
- Bidirectional seal
- Available for use over casing/tubing sizes ranging from 2-7/8" through 26"
- Suitable for use in temperatures ranging from 0°F to +250°F (-18°C to +121°C)
- Available in materials suitable for sour or corrosive service where high levels of CO₂ and H₂S are present

Availability —

Casing Size	Standard Trim		Sour/Corrosive (CO ₂ /H ₂ S) Trim	
	Seal Ring	Non Ext. Ring	Seal Ring	Non Ext. Ring
2-7/8"	-	-	357452	357453
3-1/2"	300145	363553	83-201-006-82H	363553
4"	307411	307416	-	-
4-1/2"	P Seals are available in these sizes and for these conditions; however, the preferred product for this size is the EBS Seal. Refer to PC #04-0387 for details on the EBS Seal.			
5"				
5-1/2"				
6-5/8"				
7"				
7-5/8"				
7-3/4"				
8-5/8"				
9-5/8"				
9-7/8"				
10-3/4"				
11-3/4"				
11-7/8"				
13-3/8"				
13-5/8"				
16"	83-201-023-86	83-202-023-01	-	-
18-5/8"	308900	304586	83-201-026-82H	311793
20"	301529	321831	-	-
24"	310087	310088	-	-
26"	310772	310773	-	-



Applications —

- As a secondary seal integral to a casing or tubing spool
 - Single P seal when the spool's top flange is rated to 5,000 psi
 - Double P seals when the spool's top flange is rated at 10,000 psi or 15,000 psi



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Secondary Seals

Pressure Control EBS Elastomer Seal

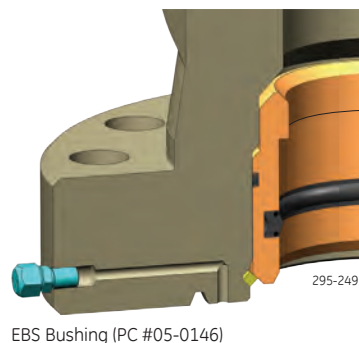
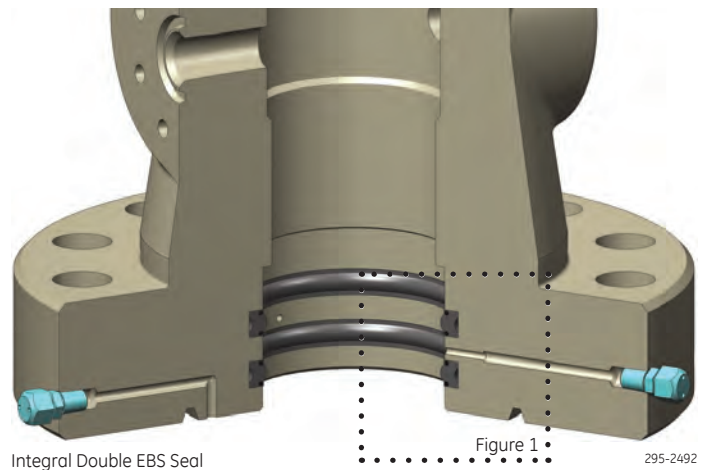
The EBS Seal is a self-energized, elastomer seal that requires no injection. The EBS seal element is used in both integral secondary seal and packoff bushing configurations (see PC #05-0146). The seal is rated up to 15,000 psi when used as an integral secondary seal, and up to 10,000 psi as a packoff bushing.

Features —

- Quick to install
- Self-energized seals do not require injection
- Anti-extrusion barrier molded into the seal's body
- Bidirectional seal
- Available for use over casing sizes ranging from 4-1/2" through 13-5/8"
- Materials are suitable for CO₂ and H₂S service
 - Single EBS when temperatures range from 0°F to +250°F (-18°C to +121°C)
 - Double EBS when temperatures range from room temperature to +300°F (+149°C)
- API 6A, PR2 Annex F tested

Availability —

Casing Size	Part Number
4-1/2"	323969
5"	336308
5-1/2"	323970
7"	323971
7-5/8"	327027
7-3/4"	331678
8-5/8"	331946
8-3/4"	350110
9-5/8"	331137
10-3/4"	331947
11-3/4" / 11-7/8"	337692
13-3/8"	333107
13-5/8"	346761



Applications —

- Elastomer annular seal between casing and machined wellhead components
- Integral single and double secondary seal in casing or tubing spool
 - Single EBS when the spool's top flange is rated to 5,000 psi
 - Double EBS when the spool's top flange is rated at 10,000 psi or 15,000 psi



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Secondary Seals

Pressure Control EBS and EBS-F Bushings

The EBS Bushing uses self-energized elastomer rings to seal the casing spool or tubing spool to the casing below. The bushing is rated up to 10,000 psi.

EBS Bushing Features –

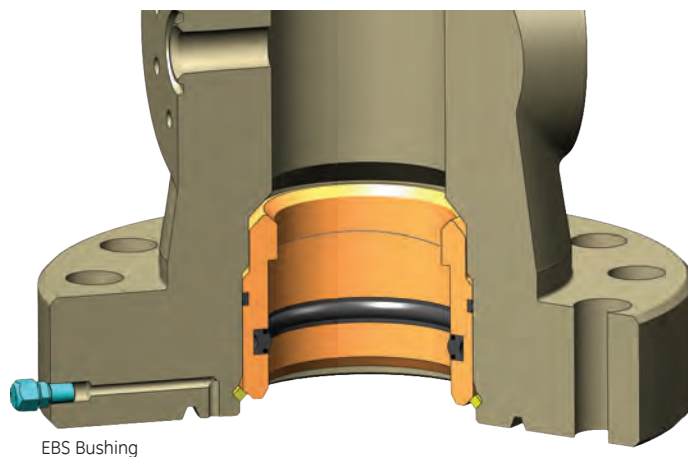
- Designed to adapt casing and tubing spools to a range of casing sizes
- Available for connection sizes ranging from 11” through 16-3/4” and casing sizes ranging from 4-1/2” through 13-3/8”
- Accommodates our standard 4-1/2” cutoff
- Also accommodates 3-1/2” to 5-1/2” cutoffs from OEM equipment (4-1/2” to 5-1/2” for EBS-F) for conversions
- Anti-extrusion barrier molded into both OD and ID seals
- Materials are suitable for CO₂ and H₂S service
- Applicable for use in temperature ranges from 0°F to +250°F (-18°C to +121°C)
- API 6A, PR2 Annex F tested

EBS-F Bushing Additional Feature –

- EBS-F bushing has double ID seals with a port to monitor between seals during frac operations

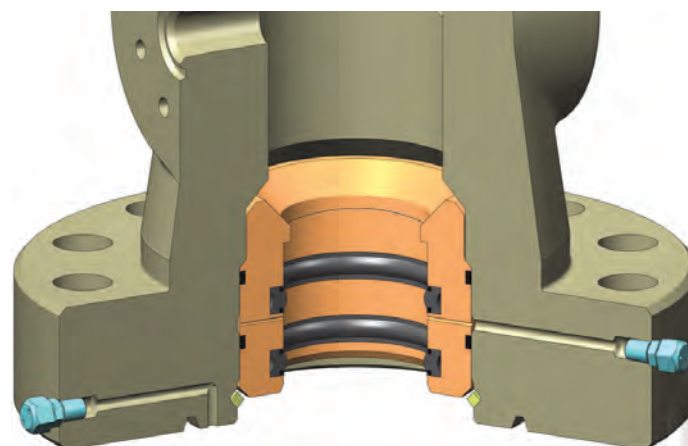
Availability –

Connection Size	Pocket Size	Casing Size	EBS		EBS-F	
			Part Number	Minimum Bore	Part Number	Minimum Bore
11”	9”	4-1/2”	344787	4.03”	350846	4.03”
		5”	344793	4.50”	-	-
		5-1/2”	344789	5.00”	350848	5.00”
		7”	344791	6.38”	350850	6.38”
		7-5/8”	344795	6.99”	350856	6.99”
13-5/8”	12-5/8”	7”	343179	6.38”	-	-
		7-5/8”	340271	6.99”	-	-
		7-3/4”	350113	6.99”	-	-
		8-5/8”	340272	8.00”	-	-
		8-3/4”	350111	8.00”	-	-
		9-5/8”	340273	9.00”	-	-
		10-3/4”	340288	10.00”	-	-
16-3/4”	16-1/2”	7-5/8”	341050	6.99”	-	-
		9-5/8”	340858	9.00”	-	-
		10-3/4”	340860	10.00”	-	-
		11-3/4”	340862	11.06”	-	-
		13-3/8”	340864	12.50”	-	-



EBS Bushing

295-2497



EBS-F Bushing: For frac operations; has additional ID seal and test capability

295-2512

Specifications –

Naming Convention for EBS	SECSEAL,WG,EBS, Pocket Size × Casing Size
Naming Convention for EBS-F	SECSEAL,WG,EBS-F, Pocket Size × Casing Size
Temperature Range	0°F to +250°F (-18°C to +121°C)
PR Test	2
Pressure Rating	10,000 psi



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Secondary Seals

Pressure Control RCS Metal Seal

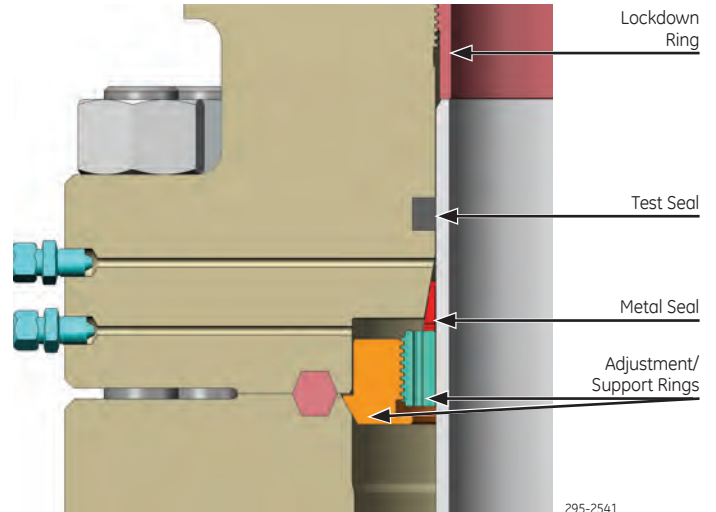
The RCS Metal Seal is a secondary seal that provides a gas-tight seal against non-machined casing surfaces. The RCS is easily energized by making up the flange and can be externally tested in the operating direction to the full working pressure. The adjustment/support rings rest on the entry taper of standard casing spools with the preferred W2 and T bowls. The RCS also can be provided to engage other bowl profiles, pack-off support flanges, or even non-Pressure Control equipment. The RCS is rated for applications up to 20,000 psi.

Features —

- Available for casing sizes ranging from 2-7/8" through 18-5/8" and in flange sizes ranging from 9" through 20"
- Energized by flange make-up
- Compatible with W2 bowl profile (others available upon request)
- Material suitable for API 6A trims (HH-NL available upon request)
- Can be externally tested to rated working pressure
- Lockdown ring prevents upward casing movement throughout life of well
- For applications from -50°F to +500°F (-46°C to +260°C). Ranges:
 - -50°F to +250°F (-46°C to +121°C)
 - -20°F to +350°F (-29°C to +177°C)
 - Room temperature to +500°F (+260°C)
- API 6A, PR2 Annex F tested

Specifications —

Naming Convention	SECSEAL KIT,RCS, Casing Size , Bowl Size
Temperature Range	-50°F to +500°F; (-46°C to +260°C)
PR Test	2
Pressure Rating	20,000 psi



RCS Detail

295-2541

Availability —

Connection Size	Casing Size	Upper Spool Trim	
		AA/BB & DD/EE Part Number	CC & FF Part Number
9"	4-1/2"	-	319887
	2-7/8"	-	347143
	3-1/2"	-	341146
	4-1/2"	341626	345511
	5"	-	313341
11"	5-1/2"	317977	-
	6-5/8"	-	332500
	7"	314288	-
	7-5/8"	313004	-
	7-3/4"	348848	-
	3-1/2"	-	347145
13-5/8"	4-1/2"	-	349493
	5"	346987	-
	7-5/8"	340180	-
	7-3/4"	340419	-
	9-5/8"	314939	-
	9-7/8"	326541	-
16-3/4"	11-7/8"	343449	-
20"	13-5/8"	344361	-



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General Catalog

Conventional Wellheads

Tubing Hangers/Adapters *(Select a Product)*

T-2W Wrap-Around Tubing Hanger

O2 Coupling Adapter

O3 Coupling Adapter

T-EN Tubing Hanger/Adapter

T-M Tubing Hanger/Adapter

T-MS Tubing Hanger/Adapter

TD-M Dual Tubing Hanger/Adapter



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Tubing Hangers

Pressure Control T-2W Wrap-Around Tubing Hanger

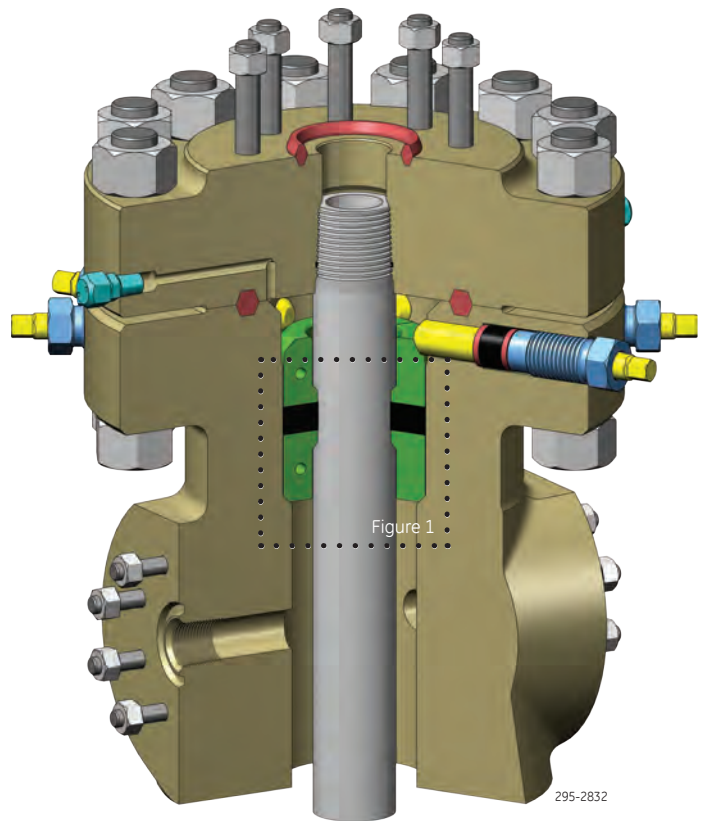
The T-2W Wrap-Around Tubing Hanger is designed to maintain control of the tubing/casing annulus while allowing reciprocation of the tubing.

Tubing Hanger Features —

- Available for bowl sizes ranging from 5-3/4" through 13-5/8" and tubing sizes ranging from 1-1/2" through 4-1/2"
- Rated for 2,000 psi through 10,000 psi
- Compatible with both 'T' and 'TD' bowls (also compatible with the earlier TCM bowl)
- Upper body counter-bored to clear tubing upset
- Can be used alone or in conjunction with O2 (PC #05-0396) and O3 (PC #05-0397) coupling completions
- Available for either standard or H₂S service
- Meets PR-2 test requirements

Tubing Adapter Features —

- Top and bottom connections are available in many sizes, but are normally configured with a flanged bottom and a studded top
- ID of the adapter can be threaded to match any standard or premium tubing threads
- Seal integrity of the flange connection, the T-2W hanger and the tubing threads can be verified through the test ports



T-2W Wrap-Around Tubing Hanger

Availability —

Bowl Size/ Hanger OD	Tubing Size	Part Numbers for Common API 6A Temperature/Material/PSL Classifications		
		6A-PU-AA-1-2 Part Number	6A-LU-DD-1-2 Part Number	6A-Y-AA-1-2 Part Number
5-3/4"	2-7/8"	-	341003	-
	1-1/2"	-	347851	-
	2-3/8"	309216	309086	-
7-1/16"	2-7/8"	-	309090	311871
	3-1/2"	311873	311877	311879
	4-1/2"	-	-	321680
9"	3-1/2"	-	-	326433
	2-3/8"	311898	311902	-
11"	2-7/8"	311889	311893	-
	3-1/2"	311866	311870	-
13-5/8"	2-7/8"	-	312873	-

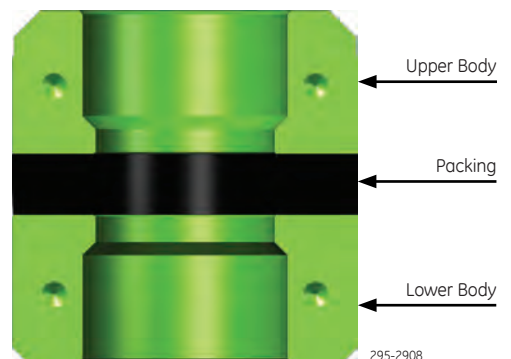


Figure 1: T-2W wrap-around tubing hanger detail



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Tubing Hangers

Pressure Control O2 Coupling and Adapter

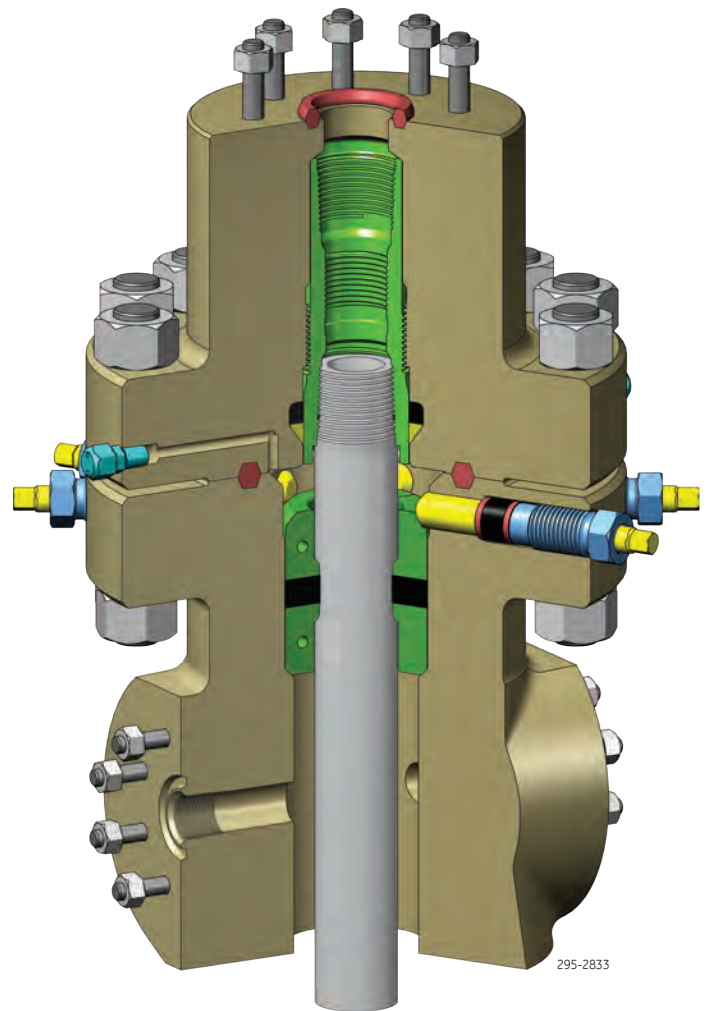
The O2 completion consists of a tubing hanger coupling, the tubing head adapter, and the T-2W wrap-around hanger. The O2 completion provides a simple tubing suspension system that is specifically designed for reciprocation of the tubing string to displace fluids or to set a downhole packer.

Features —

- Includes a back pressure valve preparation (Type H standard; others available upon request)
- Uses a coarse ACME OD thread for safe and easy make-up between the coupling and tubing adapter
- Available with standard API tubing threads or premium tubing threads per customer request
- Uses an o-ring and a wedge shaped anti-extrusion ring for sealing between the coupling and adapter
- Available in a full range of trims that meet API 6A criteria for temperature, material and PSL
- Meets PR-2 test requirements

Availability —

Bowl Size/Wrap-Around Hanger OD	ACME Suspension Threads	Tubing Size
7-1/16"	4"	1-1/2" 2-3/8" 2-7/8"
	5"	3-1/2"
9"	4"	1-1/2" 2-3/8" 2-7/8"
	5"	3-1/2"
	4"	1-1/2" 2-3/8" 2-7/8"
11"	4"	1-1/2" 2-3/8" 2-7/8"
	5"	3-1/2"
	4"	1-1/2" 2-3/8" 2-7/8"
13-5/8"	4"	1-1/2" 2-3/8" 2-7/8"
	5"	3-1/2"



O2 Coupling in a T Tubing Head

295-2833



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Tubing Hangers

Pressure Control O3 Coupling and Adapter

The O3 completion consists of a tubing hanger coupling, coupling nut, tubing head adapter, and the T-2W wrap-around hanger. The O3 completion provides a simple tubing suspension system that is specifically designed for reciprocation of the tubing string to displace fluids or to set a downhole packer. The primary difference between the O2 and the O3 is that the O3 offers:

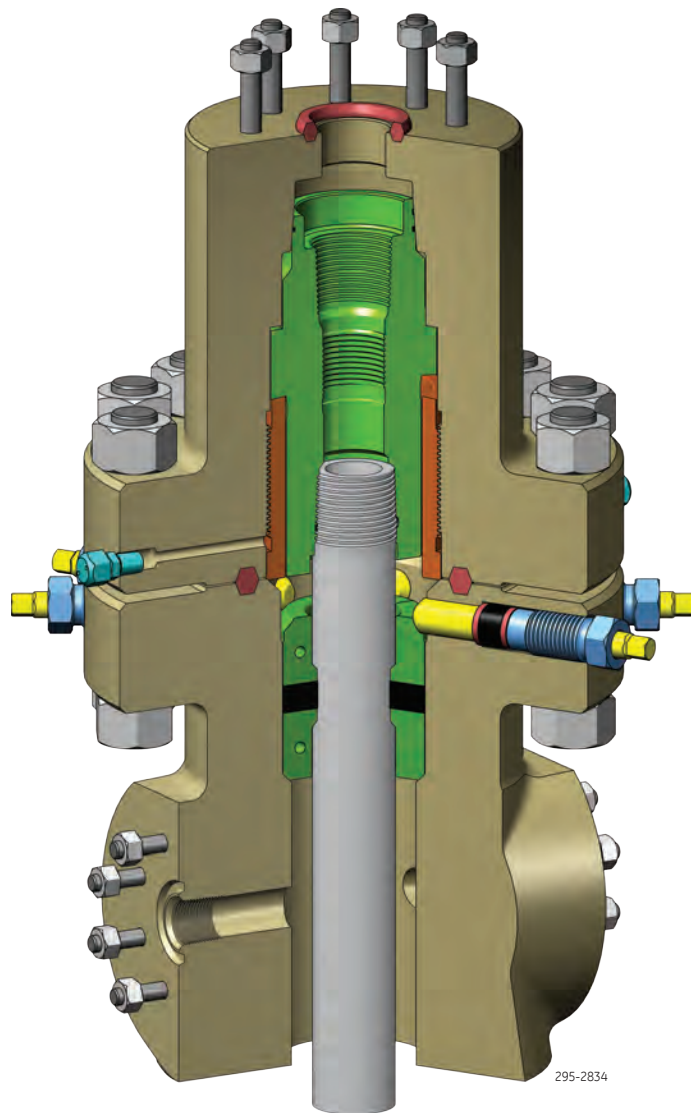
- a metal-to-metal neck seal for superior sealing, and
- a coupling nut for simplified make-up of the adapter and tree.

Features —

- Seal between the coupling and adapter is accomplished using a metal taper seal design
- Includes a back pressure valve preparation (Type H standard; others available upon request)
- Uses a coupling nut with coarse ACME OD threads for a safe and easy make-up
 - No rotation of the tree required
 - Retains coupling to ensure metal seal engagement
- Available with standard API tubing threads or premium tubing threads per customer request
- Available in a full range of trims that meet API 6A criteria for temperature, material and PSL
- Meets PR-2 test requirements

Availability —

Bowl Size/Wrap-Around Hanger OD	Coupling Neck Size	Tubing Size
7-1/16"	M40	2-3/8"
		2-7/8"
		3-1/2"
11"	M40	2-3/8"
		2-7/8"
	M56	3-1/2"
		4-1/2"



O3 Coupling in a T Tubing Head



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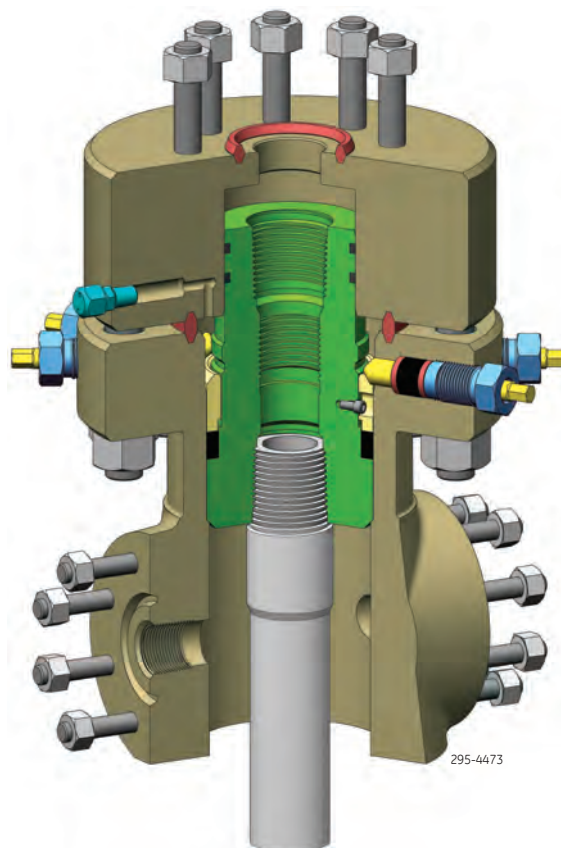
Tubing Hangers

Pressure Control T-EN Tubing Hanger/Adapter

The T-EN Tubing Hanger is a high capacity, mandrel tubing hanger pressure rated to 10,000 psi. To accommodate non-continuous control lines (CL), the T-EN-CL tubing hanger and tubing head adapter should be selected. To accommodate continuous control lines (CCL), the T-EN-CCL tubing hanger and tubing head adapter should be selected.

Tubing Hanger Features –

- Bowl seal
 - Elastomeric annular compression seal is energized by the tubing head lockscrews
- Neck seal
 - Elastomeric seals between the extended neck of the tubing hanger and the mating pocket in the T-EN tubing head adapter
- Options
 - Porting to accommodate one or more non-continuous control line (CL)
 - Porting to accommodate one or more continuous control lines (CCL)
- Other
 - Available in a full range of trims that meet API 6A criteria for temperature, material and PSL
 - Meets PR-2 test requirements
 - Available with standard API tubing threads or premium tubing threads
 - Includes a back pressure valve preparation



T-EN Tubing Hanger Shown in a T Tubing Head

Tubing Head Adapter Features –

- Available in a full range of trims that meet API 6A criteria for temperature, material and PSL
- Meets PR-2 test requirements
- Optional porting available for DHCV Assembly (PC #05-0097) to provide for downhole control line exit
- T-EN adapter can be integral to a block tree

Availability –

Bowl Size/Hanger OD	Tubing Size	Optional CCL
7-1/16"	2-3/8"	•
	2-7/8"	•
	3-1/2"	•
9"	2-3/8"	•
	2-7/8"	•
	3-1/2"	•
	4"	•
	4-1/2"	•
11"	2-3/8"	•
	2-7/8"	•
	3-1/2"	•
	4-1/2"	•
13-5/8"	2-3/8"	•
	2-7/8"	•
	4-1/2"	•
	5-1/2"	•



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Tubing Hangers

Pressure Control T-M Tubing Hanger/Adapter

The T-M Tubing Hanger is a high capacity, mandrel tubing hanger pressure rated to 15,000 psi. The design of the tubing hanger must be compatible with the bowl it lands in and the adapter to which it attaches.

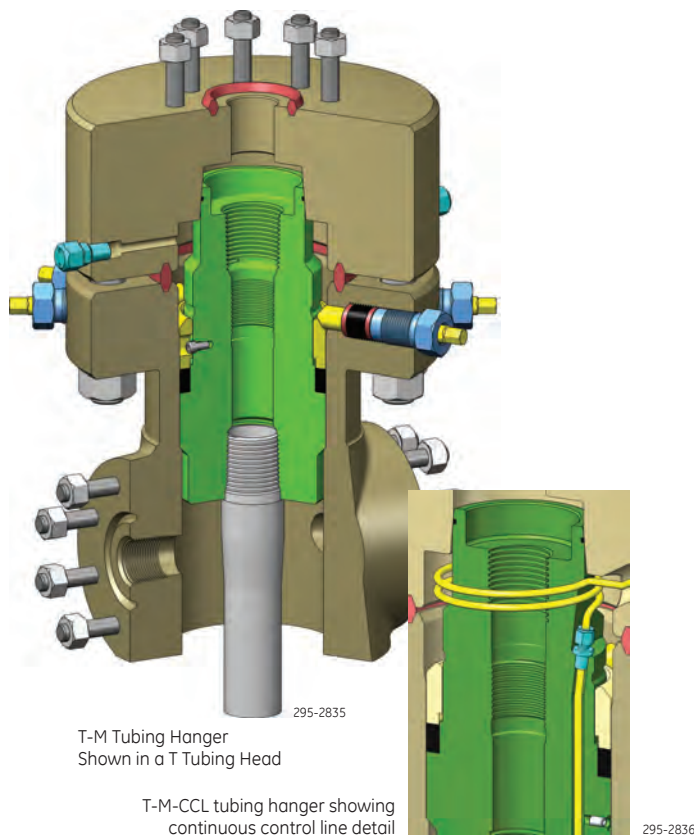
The tubing hangers and the tubing head adapters have been linked by nomenclature to make pairing them together easier. For the T-M model, the 'T' represents the tubing head bowl design and the 'M' represents the tubing hanger neck. To accommodate continuous control lines (CCL), the T-M-CCL tubing hanger and tubing head adapter can be selected.

Tubing Hanger Features —

- Bowl seal
 - Elastomeric annular compression seal is energized by the tubing head lockscrews
- Neck seal
 - Tapered metal seal between the extended neck of the tubing hanger and the mating pocket in the T-M tubing head adapter
 - Metal seal is self-energized and is enhanced by internal pressure
- Options
 - Porting to accommodate one or more continuous control lines (CCL)
- Other
 - Available in a full range of trims that meet API 6A criteria for temperature, material and PSL
 - Meets PR-2 test requirements
 - Available with standard API tubing threads or premium tubing threads
 - Includes a back pressure valve preparation (Type H standard; others available upon request)

Tubing Head Adapter Features —

- Available in a full range of trims that meet API 6A criteria for temperature, material and PSL
- Meets PR-2 test requirements
- Optional porting available for DHCV Assembly (PC #05-0097) to provide for downhole control line exit
- T-M adapter can be integral to a block tree



Availability —

Model	Bowl Size/Hanger OD	Tubing Size	Optional CCL
T-M40	7-1/16"	2-3/8"	•
		2-7/8"	•
		3-1/2"	•
	9"	2-3/8"	•
		2-7/8"	•
		3-1/2"	•
T-M56	9"	3-1/2"	•
		4"	•
		4-1/2"	•
	11"	3-1/2"	•
		4"	•
		4-1/2"	•
T-M68	13-5/8"	3-1/2"	•
		4"	•
		4-1/2"	•



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Tubing Hangers

Pressure Control T-MS Tubing Hanger/Adapter

The T-MS Tubing Hanger is a high capacity, mandrel tubing hanger pressure rated to 15,000 psi. The design of the tubing hanger must be compatible with the bowl it lands in and the adapter to which it attaches. The T-MS is generally used in high pressure applications where validation of the neck seal, independent from any other tests, is desired.

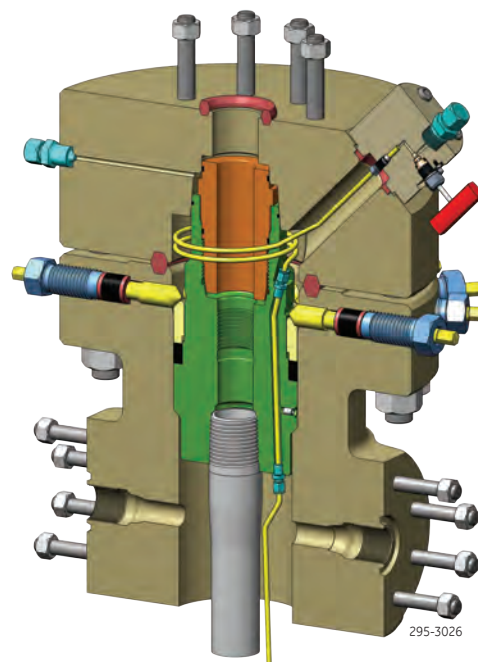
The tubing hangers and the tubing adapters have been linked by nomenclature to make pairing them together easier. For the T-MS model, the 'T' represents the tubing head bowl design model and the 'MS' represents the tubing hanger neck. To accommodate continuous control lines, the T-MS-CCL tubing hanger and tubing head adapter can be selected.

Tubing Hanger Features —

- Bowl seal
 - Elastomeric annular compression seal is energized by the tubing head lockscrews
- Neck seal
 - Tapered metal seal between the extended neck of the tubing hanger and the mating pocket in the T-MS tubing head adapter
 - Metal seal is self-energized and is enhanced by internal pressure
 - T-MS seal sleeve enables internal testing of the M neck seal for pressures above 10,000 psi
- Options
 - Porting to accommodate one or more continuous control lines
 - Control line connections may be tested prior to landing
- Other
 - Available in a full range of trims that meet API 6A criteria for temperature, material and PSL
 - Meets PR-2 test requirements
 - Available with standard API tubing threads or premium tubing threads
 - Includes a back pressure valve preparation (Type H standard; others available upon request)

Tubing Head Adapter Features —

- Available in a full range of trims that meet API 6A criteria for temperature, material and PSL



T-MS with Continuous Control Line

- Meets PR-2 test requirements
- Optional porting available for DHCV assembly (PC #05-0097) to provide for downhole control line exit
- T-MS adapter can be integral to a block tree

Availability —

Model	Bowl Size/Hanger OD	Tubing Size	Optional CCL
T-M40S	7-1/16"	2-3/8"	•
		2-7/8"	•
		3-1/2"	•
	9"	2-3/8"	•
		2-7/8"	•
		3-1/2"	•
T-M56S	9"	4"	•
		4-1/2"	•
	11"	4"	•
		4-1/2"	•
		4"	•
		4-1/2"	•
T-M68S	13-5/8"	5-1/2"	•



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Tubing Hangers

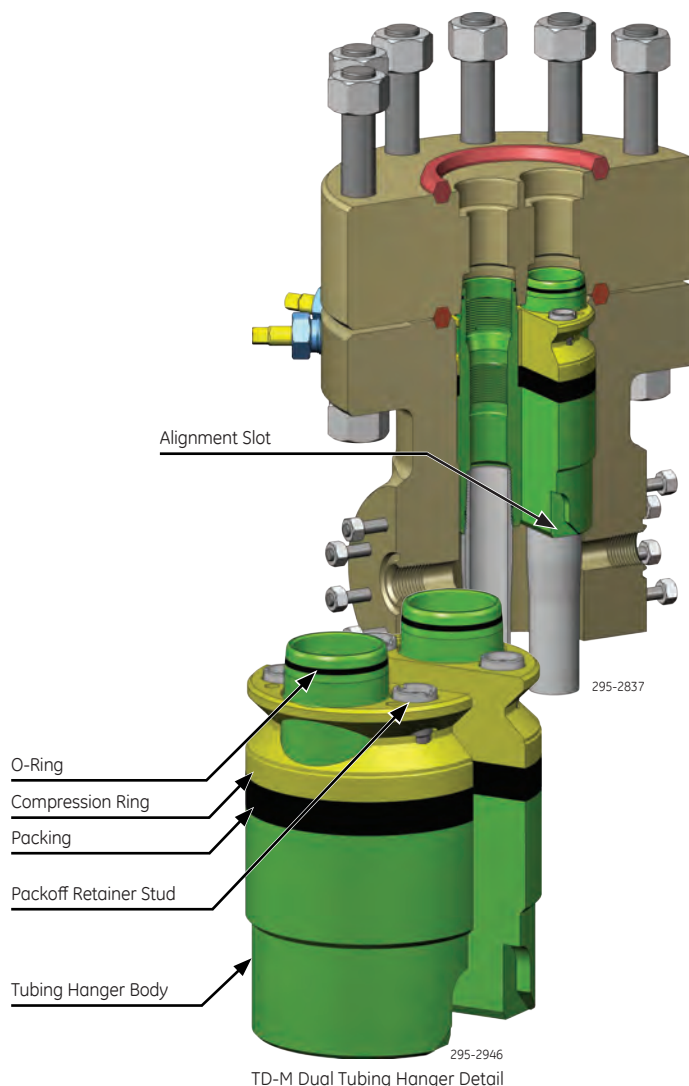
Pressure Control TD-M Dual Tubing Hanger/Adapter

The TD-M Dual Tubing Hanger is a high capacity, dual mandrel tubing hanger pressure rated to 15,000 psi. The design of the tubing hanger must be compatible with the bowl it lands in and the adapter to which it attaches. To accommodate downhole control lines use a TD-M-CCL tubing hanger and tubing head adapter.

The tubing hangers and the tubing head adapters have been linked by nomenclature to make pairing them together easier. For the TD-M model, the 'TD' represents the dual tubing head bowl design and the 'M' represents the tubing hanger neck.

Tubing Hanger Features —

- Tapered metal neck seal
 - Between the extended neck of the tubing hanger and the mating pocket in the TD-M tubing head adapter
 - Self-energized metal seal is enhanced by internal pressure
- Elastomeric annular compression seal is energized by the tubing head lockscrews
- Alignment slots engage the two alignment pins in the TD tubing head to ensure the proper positioning of the hanger segments
- Available with standard API tubing threads or premium tubing threads
- Includes a back pressure valve preparation (Type H standard; others available upon request)
- Continuous control line option
 - Model TD-M-CCL hangers/adapters have porting for sealing around a continuous downhole control line
 - Seal may be tested prior to landing
- TD-M adapter can be integral to a block tree
- Available in a full range of trims that meet API 6A criteria for temperature, material and PSL
- Meets PR-2 test requirements



Availability —

Bowl Size/Hanger OD	Tubing Size	Center Line
7-1/16"	2-3/8" x 2-3/8"	3-35/64"
	2-3/8" x 2-7/8"	3-35/64"
9"	2-3/8" x 2-3/8"	3-35/64"
	2-3/8" x 2-7/8"	3-35/64"
11"	2-7/8" x 2-7/8"	4"
	2-3/8" x 2-3/8"	3-35/64"
	2-3/8" x 2-7/8"	3-35/64"
	2-7/8" x 2-7/8"	4"
	3-1/2" x 3-1/2"	5-3/64"



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GE Oil & Gas

Pressure Control

General Catalog

Conventional Wellheads

Control Line Exit Blocks *(Select a Product)*

Downhole Control Valve (DHCV) Exit Assembly



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Control Line Exit Blocks

Pressure Control Downhole Control Valve (DHCV) Exit Assembly

The Downhole Control Valve Exit Assembly provides a rugged termination point for continuous downhole safety valve control lines.

Features —

Nipple Style:

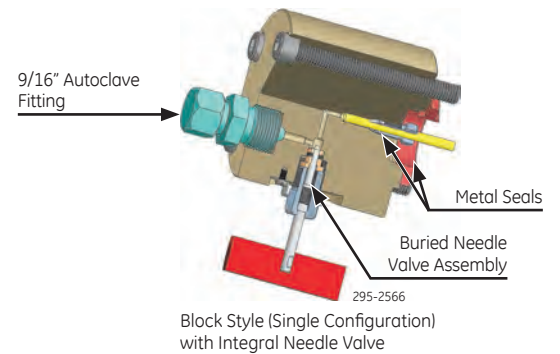
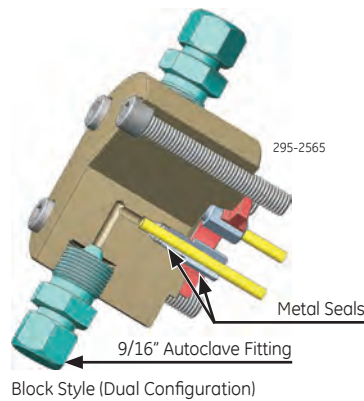
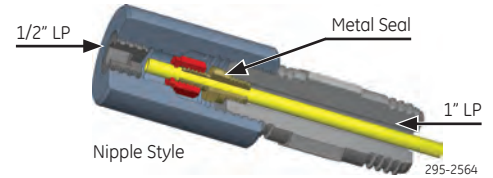
- 1" LP connection to wellhead port
- 1/2" LP box outlet
- Configurations available for hydraulic tubing or electrical lines

Block Style:

- Metal seals between control line and DHCV block and between DHCV block and wellhead port
- 1/2" LP or 9/16" autoclave outlets available
- Dual configuration option provides for two control lines in one DHCV block/body
- Designed for hydraulic tubing only or in combination with electrical lines
- Includes all seals and bolting required to fit standard preparations
- Alternate trims available upon request

Block Style with Integral Needle Valve:

- Compact design
- Minimal leak paths
- Buried needle valve
- Protection plate shields needle valve handle from dropped objects
- Available in both single and dual configuration



Specifications —

Naming Convention	DHCV KIT,WG, Configuration
API 6A Class	6A-PU-FF-NL-1-2
Temperature Range	-20°F to +250°F (-29°C to +121°C)
Compatible Equipment	Tubing head adapters designated "-CCL"

Standard Blocks/Nipples —

Pressure Rating	Type	Configuration	Integral Needle Valve	Control Line Size	Inlet	Part Number
5,000	Nipple	Single	N/A	1/4"	1/2" LP	350605
	Nipple	Single	N/A	3/8"	1/2" LP	350606
10,000	Block	Single	No	1/4"	9/16"	350607
	Block	Dual	No	1/4"	9/16"	350608
	Block	Single	Yes	1/4"	9/16"	331315
15,000	Block	Single	No	3/8"	1/2" LP	350664
	Block	Single	No	1/4"	9/16"	304564



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Pressure Control

General Catalog

Time-Saving Wellheads *(Select a Product)*

SCH1 Casing Head

W2 Casing Head with S4 Surelok™ Connector

S95 Safe, Time-Saver™ Wellhead System

SH2 Split Speedhead™ System

VetcoGray Multi-Bowl Wellhead System

SH3 Speedhead™ System

LSH Land Speedhead™ System

OSH Offshore Speedhead™ System



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Time-Saving Wellheads

Pressure Control SCH1 Casing Head

Where risers or rig floor limitations drive you to welding on a conventional casing head, the SCH1 Casing Head is a cost-effective alternative. Run with the surface casing string through the riser and using normal cementing operations, the SCH1 casing head is immediately available for BOP nipple-up when the riser is removed. Eliminating the casing head weld:

- improves safety,
- saves valuable rig time, and
- facilitates multi-well drilling programs from a common location by eliminating “hot” operations.

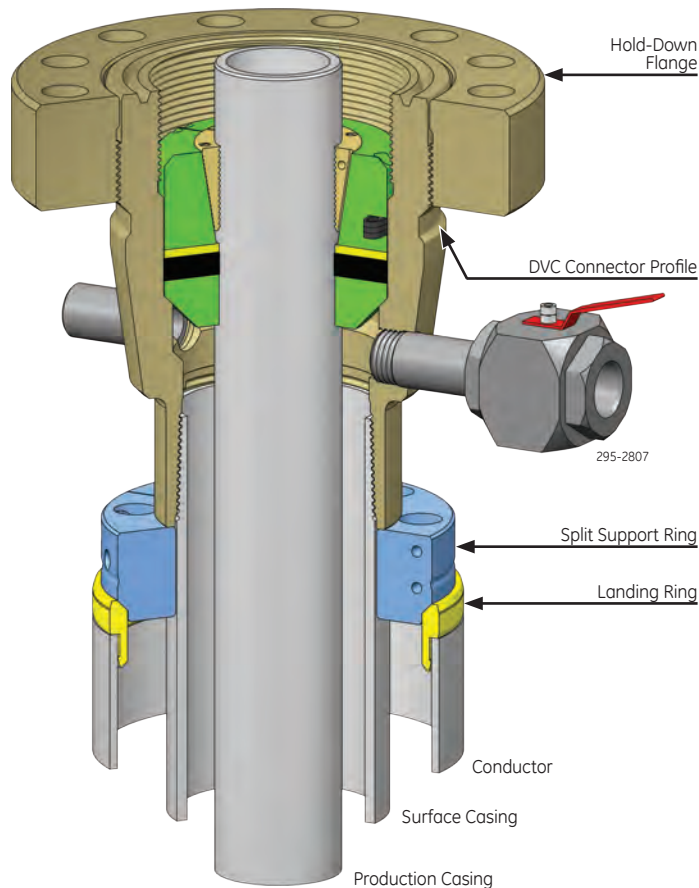
By installing the support ring below the SCH1, the surface casing is supported by the conductor casing, eliminating the wait-on-cement (WOC) time associated with conventional equipment.

More time can be saved by removing the riser and attaching the BOP stack to the casing head with the optional DVC speed connector. The use of the DVC connector saves additional nipple-up time during drilling. If the DVC speed connector is not used, the threaded-on hold-down flange can be attached to the casing head and the BOP will be made up with a traditional flange. Once the hold-down flange is installed, this head has the same profile as a conventional head, allowing the use of standard components above it.

With the pre-installed pup joint (nipple), no WOC time, and the use of the DVC speed connector, our customers can expect to save in excess of 10 hours of valuable rig time, per well.

Features —

- No welding required to install riser on conductor
- No waiting on cement required when running surface casing
- Installed through drilling riser as part of surface casing string
- No welding required to install the casing head
- Allows normal cementing operations including “top-off”



- Field-proven DVC adapter provides safe BOP nipple-up and nipple-down in a few minutes
- Standard W2 bowl profile accepts entire family of W casing hangers for a wide range of production casing sizes
- Accepts all T and MTH2 tubing heads for 3,000, 5,000 or 10,000 psi working pressures

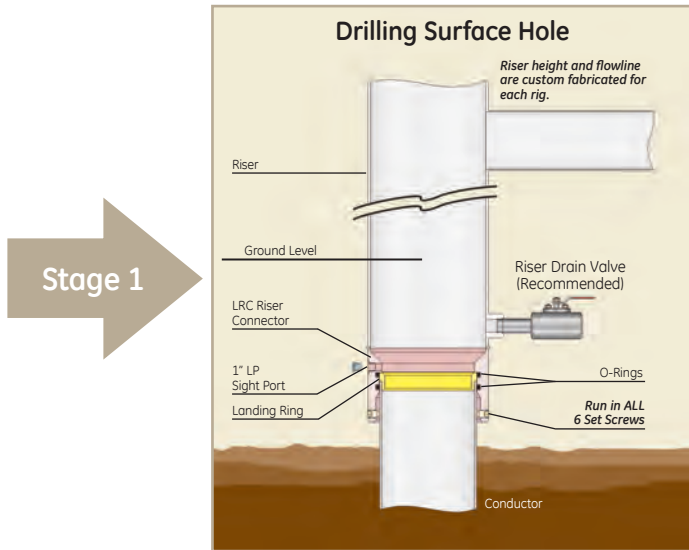
Availability —

Top Flange Size	Top Flange Pressure (psi)	Surface Casing	Production Casing or Tubingless Completion (TLC)	Minimum Riser ID
9"	3,000	7-5/8"	2-7/8" thru 5"	13-5/8"
		8-5/8"	2-7/8" thru 5-1/2"	
	5,000	7-5/8"	2-7/8" thru 5"	
		8-5/8"	2-7/8" thru 5-1/2"	
11"	3,000	8-5/8"	2-7/8" thru 5-1/2"	15-3/8"
		9-5/8"	2-7/8" thru 7"	
	5,000	8-5/8"	2-7/8" thru 5-1/2"	
		9-5/8"	2-7/8" thru 7"	



SCH1 Casing Head

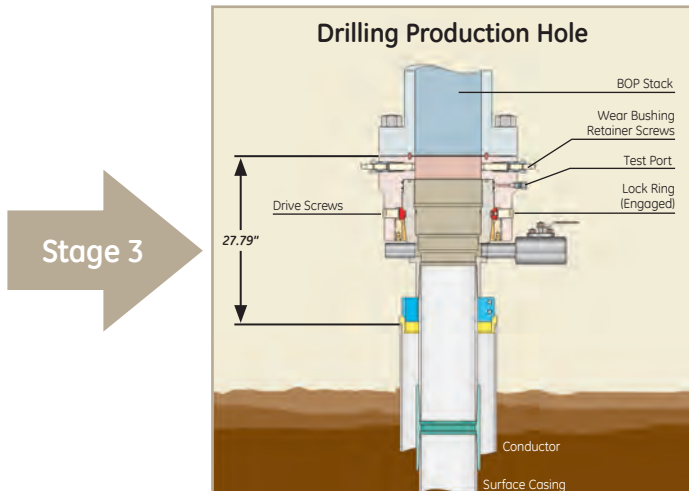
Key Stages of SCH1 Installation –



No Welding Needed

295-3535_1

- Riser assembly is made up or removed in five minutes, without welding or cutting torches
- The diverter adapter remains on the riser assembly from well to well



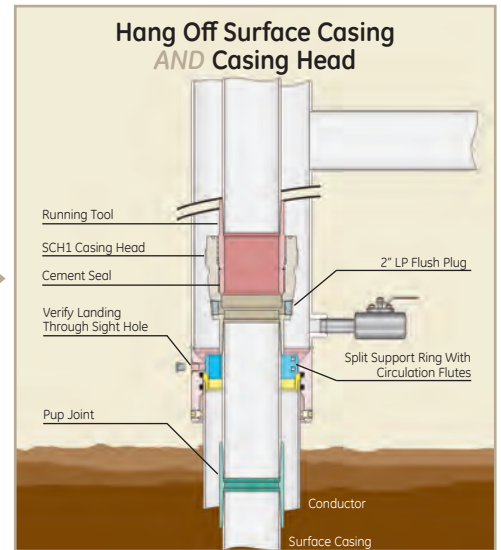
Time Saving and Improved Safety

295-3535_3

- Outlet valves, etc. are installed
- DVC adapter attached to the BOP is made up or removed in 10 minutes, without studs or hammer wrenches
- The DVC adapter remains on the BOP stack from well to well



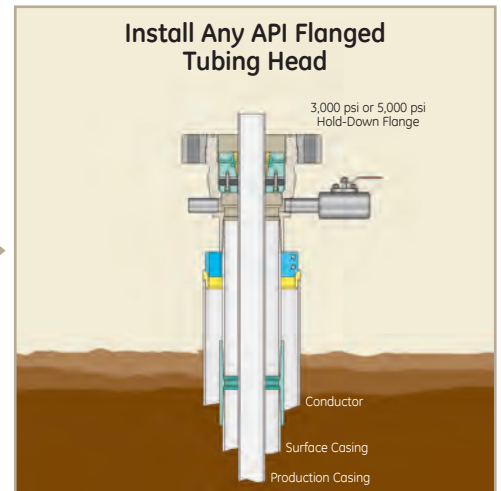
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Time Saving

295-3535_2

- No "wait-on-cement" time
- Riser assembly lifts off quickly
- Cement can be "topped off"
- No welding time to install casing head



Variety of Options for Fracturing and Completion

295-3535_4

- For 9" SCH1 casing head, any tubing head with 9" 3,000 or 9" 5,000 API bottom can be installed
- For 11" SCH1 casing head, any tubing head with 11" 3,000 or 11" 5,000 API bottom can be installed
- Tubing heads may be
 - Type 'T'
 - Type 'T' prep for fracturing sleeve
 - MTH2

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Time-Saving Wellheads

Pressure Control W2 Casing Head with S4 Surelok™ Connector

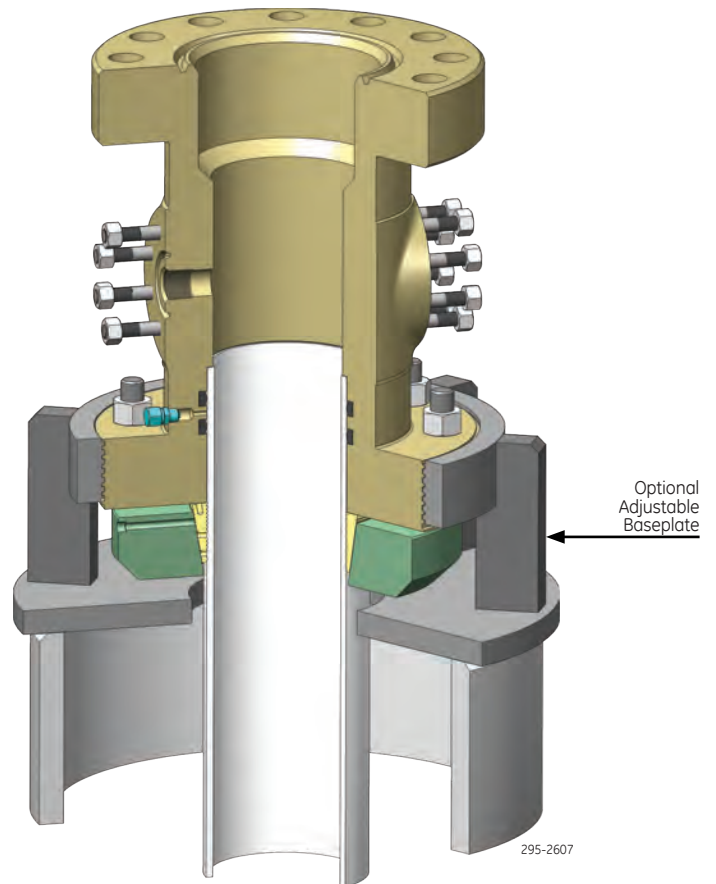
The S4 Surelok™ weldless casing connection offers a simple and quick alternative to welded bottom casing heads. With the ability to be installed without welding, this connector is ideal for applications where an open flame is a safety or time lost concern. Most sizes can be safely installed in less than 60 minutes.

Rated for the loads imposed by the casing head and BOP operations, this readily reversible connection is ideal for the most demanding temporary or permanent wellhead installations. Field-proven, API qualified elastomer seals on the casing stub are externally testable. The slip system is easily activated to provide full locking engagement with the casing stub even under tension, compression and/or bending loads.

With the use of the optional adjustable baseplate, subsequent casing and drilling loads can be transferred to the larger conductor pipe.

Features —

- Simple installation
 - No welding required
 - No special tools or services required
 - Seals tested externally
- Rated for full casing head load (subject to casing limitations)
 - Load transfers to conductor pipe
 - API 6A, PR2 qualified
- Reversible and reusable
- Optional configurations
 - Adjustable baseplate



Availability —

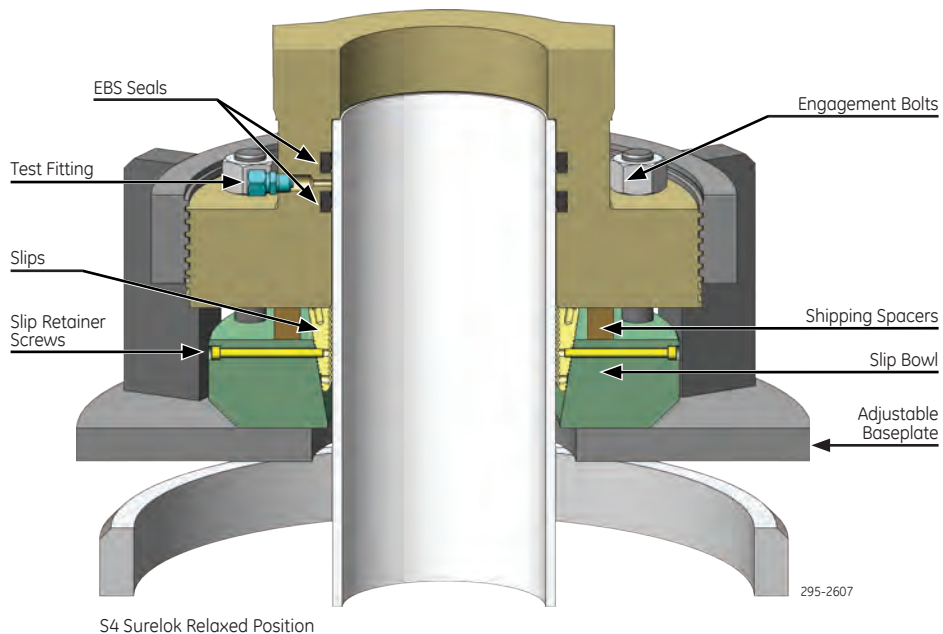
Top Flange Size	Top Flange psi	Bottom Prep. Casing Size
11"	2,000 thru 10,000	8-5/8"
		9-5/8"
		10-3/4"
13-5/8"	2,000 thru 10,000	11-3/4"
		13-3/8"
16-3/4"	2,000 thru 5,000	13-3/8"
20-3/4"	2,000 thru 5,000	16"
		18-5/8"
		20"
21-1/4"	2,000 thru 5,000	18-5/8"
		20"



W2 Casing Head with S4 Surelok™ Connector

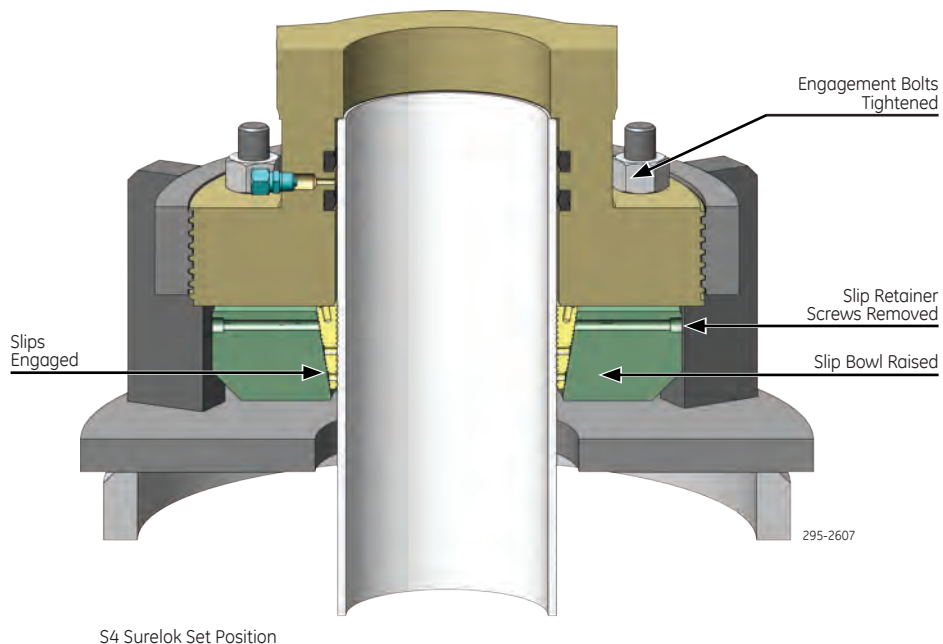
Attachment Steps —

1. Stab the casing head over the casing stub.
2. Test the EBS seals (PC #04-0387).
3. Loosen the engagement bolts slightly and remove the shipping spacers.
4. Remove all the slip retainer screws. The slips should settle around the casing.



Engagement Steps —

1. Tighten the engagement bolts to raise the slip bowl and force the slips to engage the casing.
2. Lift the casing head to set the slips.
3. Release the casing head and retighten the engagement bolts.
4. Rotate the adjustable baseplate to bottom out on the outer conductor.



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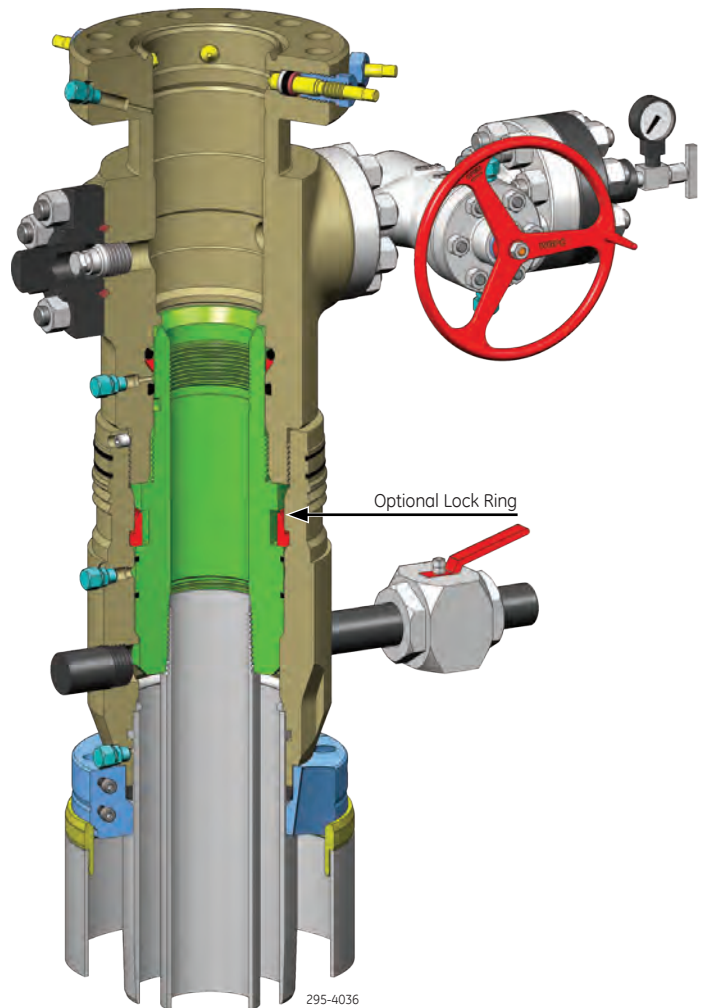
Time-Saving Wellheads

Pressure Control S95 Safe, Time-Saver™ Wellhead System

The S95 Safe, Time-Saver™ Wellhead System is an economical solution for applications with drilling working pressures up to 5,000 psi, and frac pressures up to 10,000 psi. Its field-proven design is ideal for development programs running 9-5/8" or smaller surface casing. Well cost is reduced with rig time savings of 18 to 31 hours, and safety is improved by eliminating field welding and flange nipple up. A choice of fluted or solid hangers for production casing is available to suit well characteristics, and a variety of frac and completion configurations will accommodate any stimulation or completion method. The S95 system offers the utmost flexibility and ease of use in the industry for maximum efficiency in drilling, fracturing, and production operations.

Features —

- Time saving
 - No waiting on cement because the surface casing is run and cemented with the head installed
 - No field welding
 - Quick connect BOP adapter reduces nipple-up and nipple-down time
 - Ideal for programs running 9-5/8" or smaller surface casing
- Well control
 - Back pressure valve preparation is standard in casing hangers
 - Lock ring is available for casing hanger retention before removing the BOP
- Improved safety
 - No field welding
 - Mandrel hangers run through the BOP, reducing risk of injury
 - Quick connect BOP adapter makes up easily without the use of hammer wrenches or special tools
 - All seals can be tested externally
- Choice of casing hangers
 - One-piece mandrel casing hanger
 - Fluted casing hanger with separate packoff
- Choice of tubing heads and completions
 - T (PC #05-0048) tubing head
 - TD (PC #05-0049) dual completion tubing head
 - MTH2 (PC #04-0397) tubing head



Related Systems —

- S95-SH safe, time-saver multi-bowl system (PC #07-0362) for programs running 9-5/8" surface casing with intermediate AND production casing

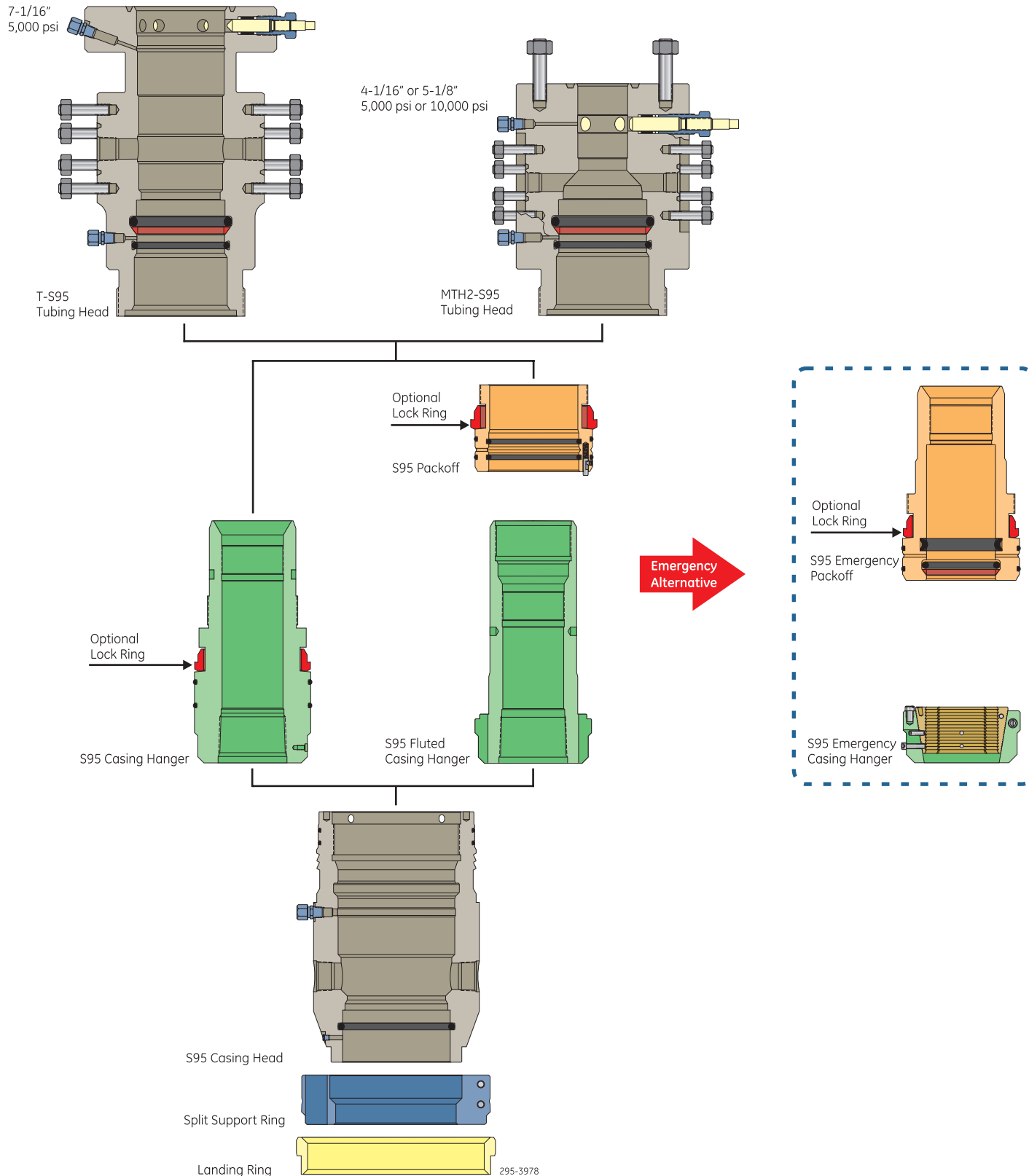
Availability —

Surface Casing	Production Casing
8-5/8"	4-1/2"
	5"
	5-1/2"
9-5/8"	4-1/2"
	5"
	5-1/2"
	7"



S95 Safe, Time-Saver™ Wellhead System

Equipment Options —



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www.dmliefer.ru

Time-Saving Wellheads

Pressure Control SH2 Split Speedhead™ System

The SH2 Split Speedhead™ System offers significant time-saving and safety-enhancing advantages over conventional wellheads and is compatible with today's advanced drilling methods. The speedhead is a multi-bowl system, supporting and sealing two strings of pipe in a single head. Safety is improved and installation time reduced by running, landing and sealing the two strings without removing the BOP stack. The system will save approximately 17 hours of rig time: 12 hours of BOP manipulation and 5 hours by using a mandrel hanger/packoff rather than a slip hanger. By using a weldless casing connector (Surelok or LRC), an additional 8 hours can be saved.

The difference between a conventional multi-bowl and an SH2 speedhead system is the wellhead housing. The SH2 housing consists of two pieces — a lower housing and an upper housing — installed as one unit. If the intermediate casing becomes stuck, preventing the mandrel hanger from landing in the bowl, then the two housings can be separated. Then the emergency slip-style casing hanger can be easily installed and the casing cut using conventional installation methods.

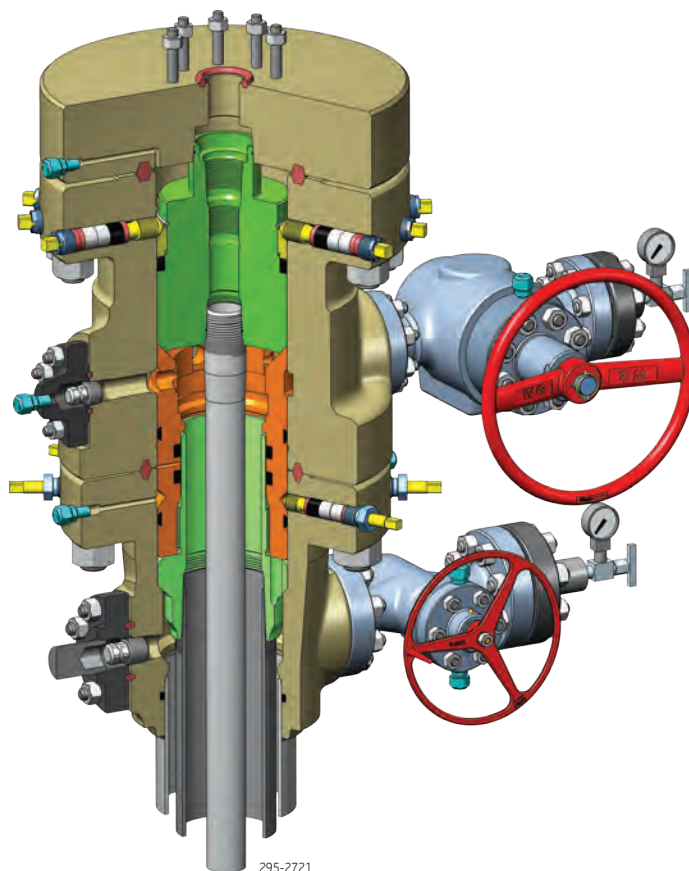
Features —

- Field-proven
- Increases safety
- Saves installation time
- Reduces BOP/diverter handling
- Flexible system
 - Emergency equipment
 - Alternate casing programs

Typical Time Savings with SH2 System —

Operation	Conventional	SH2 System
Cut Pipe and Weld on Starting Head	As Required	As Required
Wait-on-Cement Intermediate Casing	As Required	As Required
Release Hanger Running Tool and Wash Out	N/A	1 Hour
Install and Test Annular Seal	N/A	1 Hour
Break Connection and Lift BOP Stack	4 Hours	N/A
Install Slip Hanger and Rough Cut Casing	3 Hours	N/A
Final Cut Casing and Install Intermediate Spool	4 Hours	N/A
Nipple-Up BOP Stack	8 Hours	N/A
Test BOP Stack	As Required	As Required
Tubing Completion	As Required	As Required
Totals	19 Hours	2 Hours

Time Saved (17 Hours) x Hourly Rig Rate = Money Saved



- Accepts standard completion equipment
- Mandrel hangers rated to joint strength of suspended casing
- Fluted mandrel casing hanger allows cement returns up through BOP stack

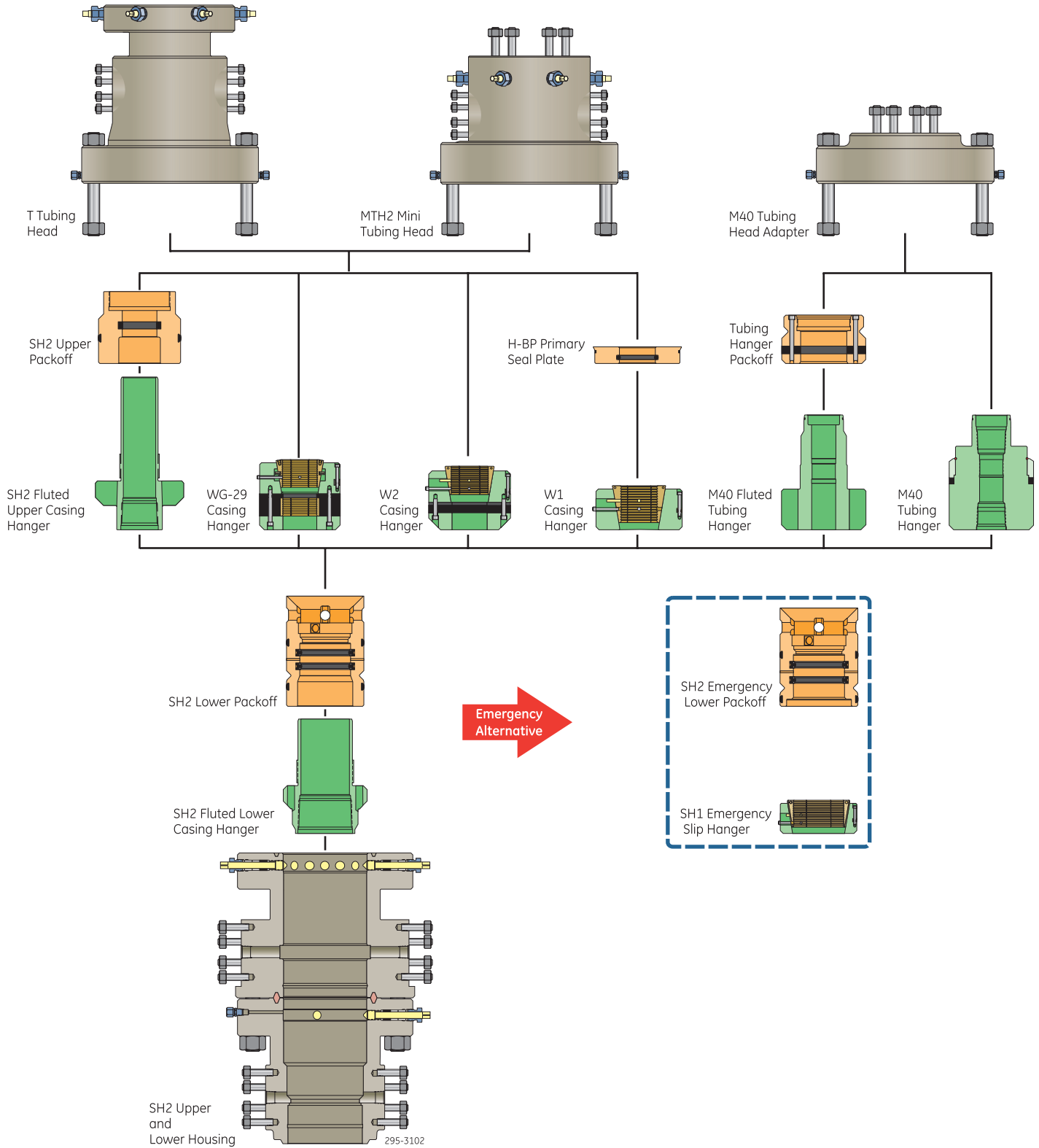
Availability —

Top Flange Size	Top Flange Pressure (psi)	Surface Casing	Casing for Lower Hanger	Casing or Tubing for Upper Hanger
11"	3,000/5,000/ 10,000	9-5/8"	7"	2-3/8" thru 4-1/2"
			7-5/8"	2-3/8" thru 5-1/2"
13-5/8"	3,000/5,000/ 10,000	13-3/8"	7"	2-3/8" thru 4-1/2"
			7-5/8"	2-3/8" thru 5"
			8-5/8"	2-7/8" thru 5-1/2"
			9-5/8"	2-7/8" thru 7"
16-3/4"	5,000	16"	10-3/4"	2-3/8" thru 7-5/8"
			10-3/4"	2-3/8" thru 7-7/8"
			11-3/4"	2-3/8" thru 7-3/4"



SH2 Split Speedhead™ System

Equipment Options —



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Time-Saving Wellheads

VetcoGray Multi-Bowl Wellhead System

GE Oil & Gas provides a wide range of VetcoGray multi-bowl wellhead systems for applications ranging from the most common to the most challenging. For more than 50 years, these technologies have provided our customers with a safer, faster and more reliable solution for their surface-drilling and production requirements.

The VetcoGray multi-bowl technology allows multiple casing strings to be suspended within one wellhead component. This achieves significant time and cost savings by reducing the number of times the BOP connection is broken — while achieving much greater safety than conventional wellhead systems.

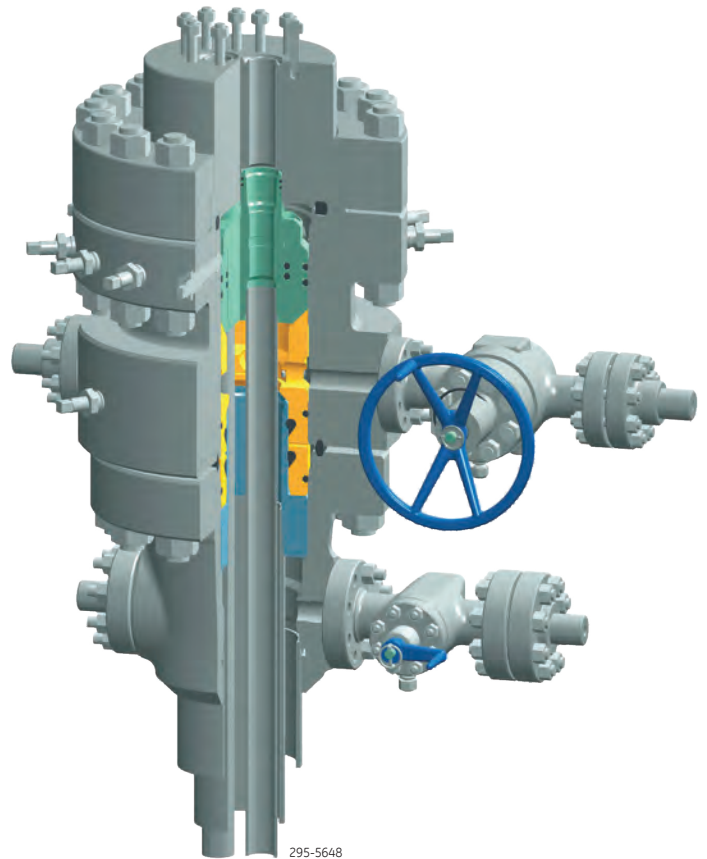
The multiple-string capability also decreases the system's overall size and weight, making it an ideal solution where there are space or weight limitations.

Features —

- Able to suspend multiple strings of casing or tubing within a single wellhead component
- 50 years of evolving field-proven technology
- Elastomer or metal-to-metal sealing available
- Adaptable to our other VetcoGray connection and wellhead technologies

Benefits —

- Increased operational reliability
- Increased valve durability
- Reduced refurbishment cost



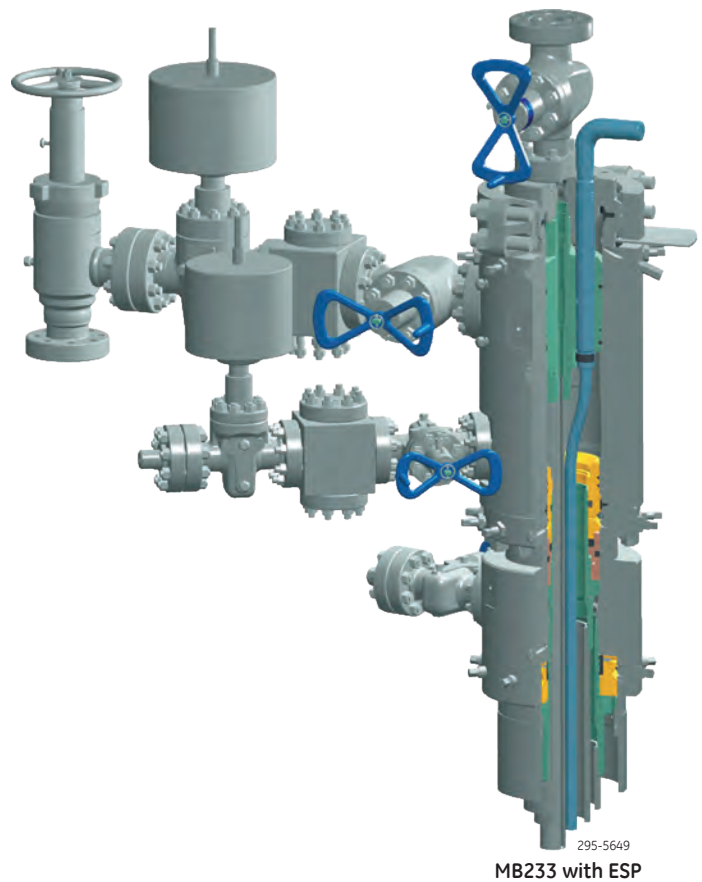
295-5648



Multi-Bowl Wellhead System

Multi-Bowl Experience —

- North Morecambe Bay
 - First multi-bowl system with NT-2 connections and MS-1 seal technology
- South Texas tubingless multi-bowl system
 - 10,000 psi, 350°F system
 - Speed drilling competition
 - Saved 5% of total well cost
- World record water depth
 - Platform multi-bowl system
- Industry's first true 18-3/4" 10M single-stack multi-bowl system
- First 18-3/4" surface MS700 application system
- First 21-1/4" surface MS700 system



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Time-Saving Wellheads

Pressure Control SH3 Speedhead™ System

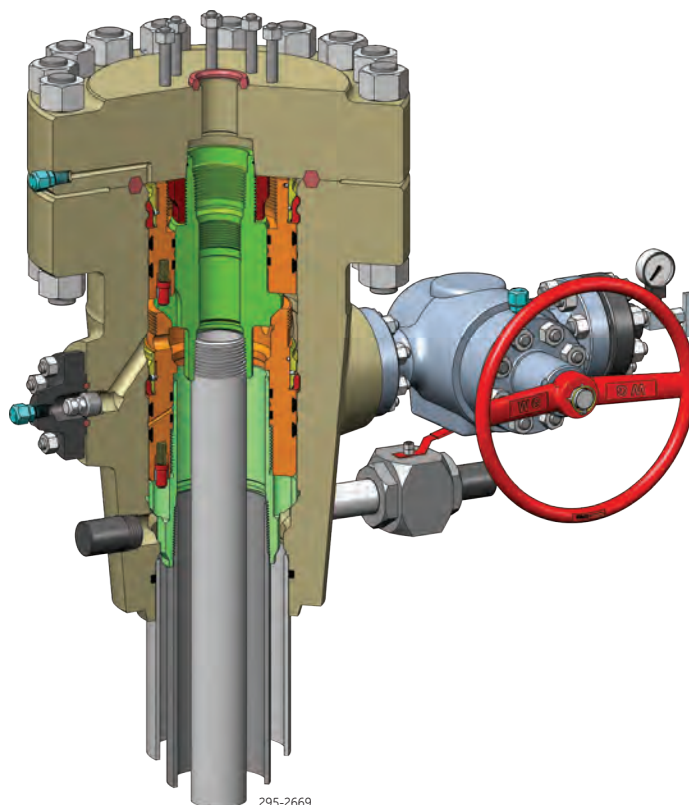
The SH3 Speedhead™ System takes multi-bowl technology one step further than ever before. By landing two strings of pipe in one compact forged housing, the SH3 system eliminates one complete BOP nipple-down/nipple-up thereby saving significant rig time. Additionally, specially designed service tools can reduce installation time even further. The time saved (estimated at approximately 17 hours) makes this product a cost-effective alternative to conventional spool type surface wellheads.

Compared to conventional wellheads, the SH3 wellhead improves safety by reducing the number of potential leak paths. The system completely eliminates one major flange connection and replaces all external lockdown screws with internal retaining rings similar to those used on subsea systems.

In order to take full advantage of the time-saving capabilities of this system, the SH3 system is normally recommended for applications where the risk of a casing becoming stuck is very low.

Features —

- Improved safety
 - Eliminates one flange
 - Eliminates all lockdown screws
- Time savings
 - Reduced BOP/diverter handling
 - Replaces lockdown screws with lock rings
- Flexible system
 - Emergency equipment
 - Alternate casing programs
 - Adapts to conventional equipment for extended casing programs



Availability —

Top Flange Size	Top Flange Pressure (psi)	Surface Casing	Casing for Lower Hanger	Casing or Tubing for Upper Hanger
11"	5,000/10,000	9-5/8"	7"	2-3/8" thru 4-1/2"
		10-3/4"	7-5/8"	2-3/8" thru 4-1/2"
13-5/8"	5,000/10,000	13-3/8"	8-5/8"	2-3/8" thru 5-1/2"
			9-5/8"	2-3/8" thru 7"
			10-3/4"	2-7/8" thru 7-5/8"

Typical Time Savings with SH3 System —

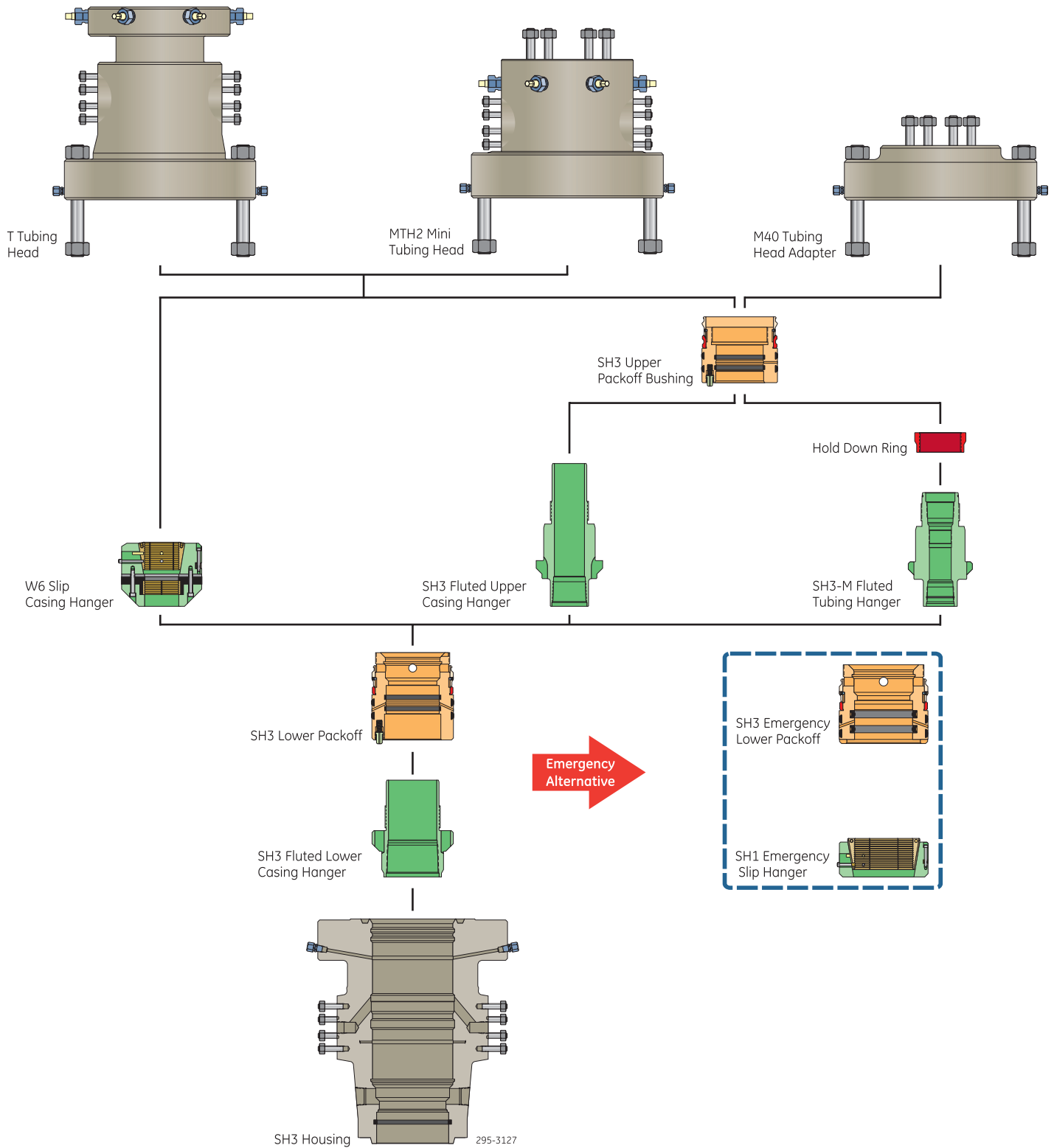
Operation	Conventional	SH3 System
Cut Pipe and Weld on Starting Head	As Required	As Required
Wait-on-Cement Intermediate Casing	As Required	As Required
Release Hanger Running Tool and Wash Out	N/A	1 Hour
Install and Test Annular Seal	N/A	1 Hour
Break Connection and Lift BOP Stack	4 Hours	N/A
Install Slip Hanger and Rough Cut Casing	3 Hours	N/A
Final Cut Casing and Install Intermediate Spool	4 Hours	N/A
Nipple-Up BOP Stack	8 Hours	N/A
Test BOP Stack	As Required	As Required
Tubing Completion	As Required	As Required
Totals	19 Hours	2 Hours

Time Saved (17 Hours) x Hourly Rig Rate = Money Saved



SH3 Speedhead™ System

Equipment Options —



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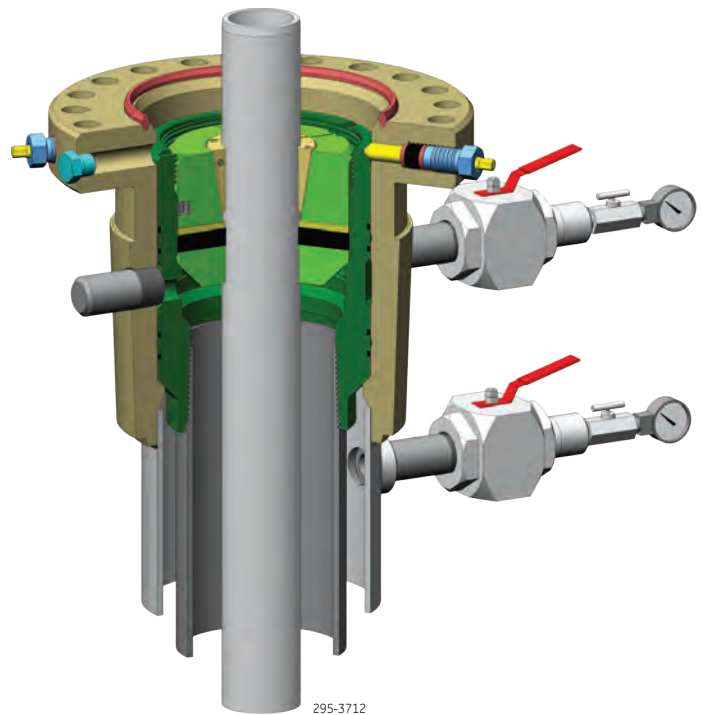
Time-Saving Wellheads

Pressure Control LSH Land Speedhead™ System

The LSH Land Speedhead™ System is designed for use as a two-stage starting head, combining the casing head and casing spool into a single housing. The BOP stack is made up to the starting head before drilling commences and is not removed until two strings of casing have been run. This technique impacts both rig costs and safety. By landing two casing strings in one compact forged housing, the LSH system eliminates one complete BOP nipple-down/nipple-up thereby saving significant rig time. By reducing handling of wellhead and BOP equipment and by minimizing potential wellhead leak paths, safety is substantially improved. The LSH system offers an economical alternative to the SH2 or SH3 speedhead systems for less demanding applications.

Features —

- Improved safety
 - Field-proven
 - Intermediate casing landed, locked down and external seal tested without lifting BOP
- Time saving
 - Estimated 17 hours per well compared to conventional
 - Eliminates wait-on-cement time
 - Light weight/low height
- Flexible system
 - Standard interface with completion equipment
 - Alternate casing programs
 - Optional hangers for intermediate casing
 - Emergency hangers for intermediate casing strings available
 - Optional back pressure valve preparation available in the upper LSH mandrel casing hanger
 - Available with the S4 Surelok (PC #05-0224) bottom



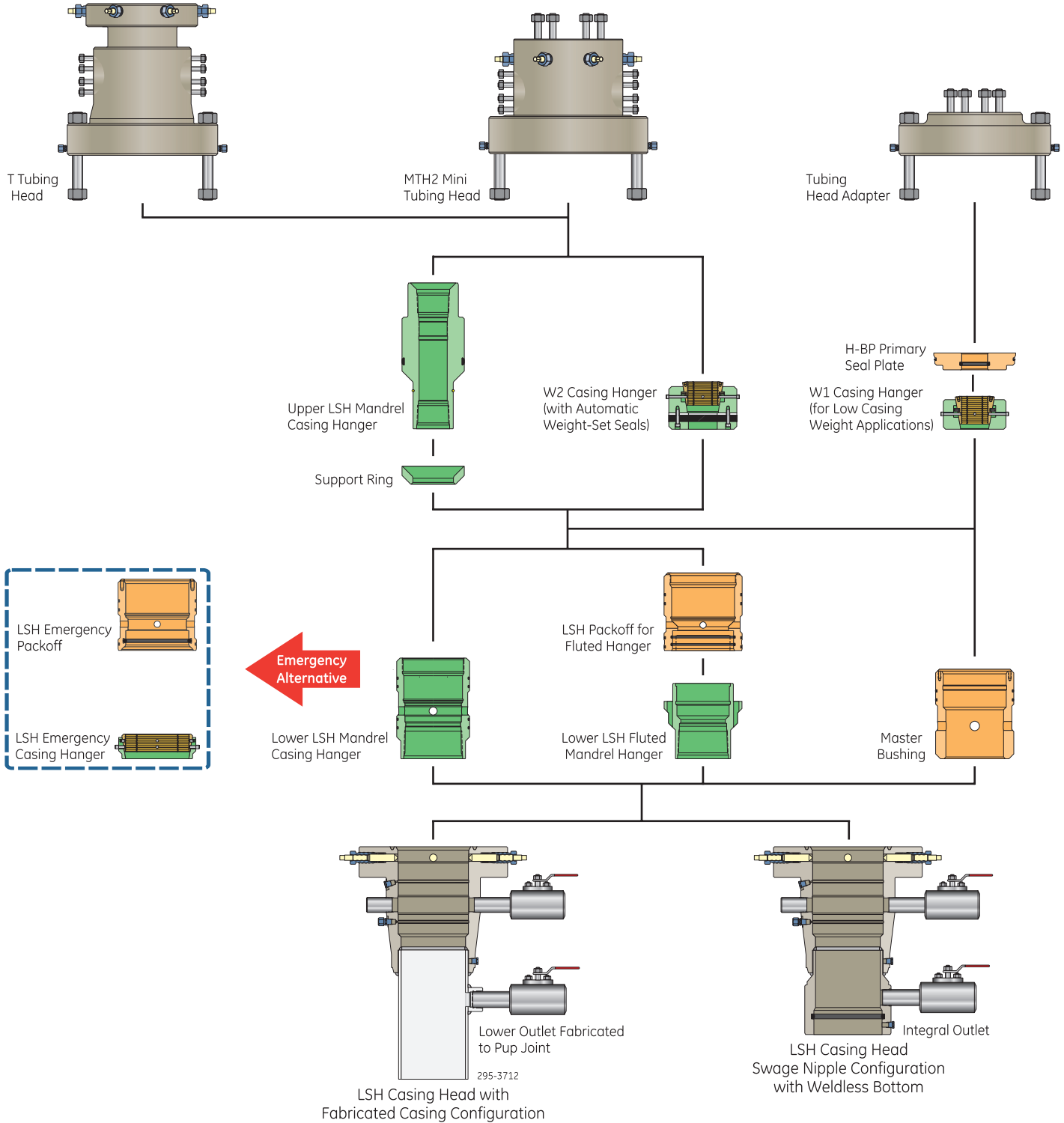
Typical Casing Programs Available —

Top Flange Size	Top Flange Pressure (psi)	Surface Casing	Intermediate Casing	Production Casing or Tubingless Completion (TLC)
11"	3,000/5,000	9-5/8"	7"	2-7/8" thru 4-1/2"
			7"	2-7/8" thru 4-1/2"
		10-3/4"	7-5/8"	2-7/8" thru 5"
			8-5/8"	2-7/8" thru 5-1/2"
13-5/8"	3,000/5,000	11-3/4"	8-5/8"	2-7/8" thru 5-1/2"
			9-5/8"	2-7/8" thru 7"
		13-3/8"	8-5/8"	2-7/8" thru 5-1/2"
			9-5/8"	2-7/8" thru 7"



LSH Land Speedhead™ System

Equipment Options —



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Time-Saving Wellheads

Pressure Control OSH Offshore Speedhead™ System

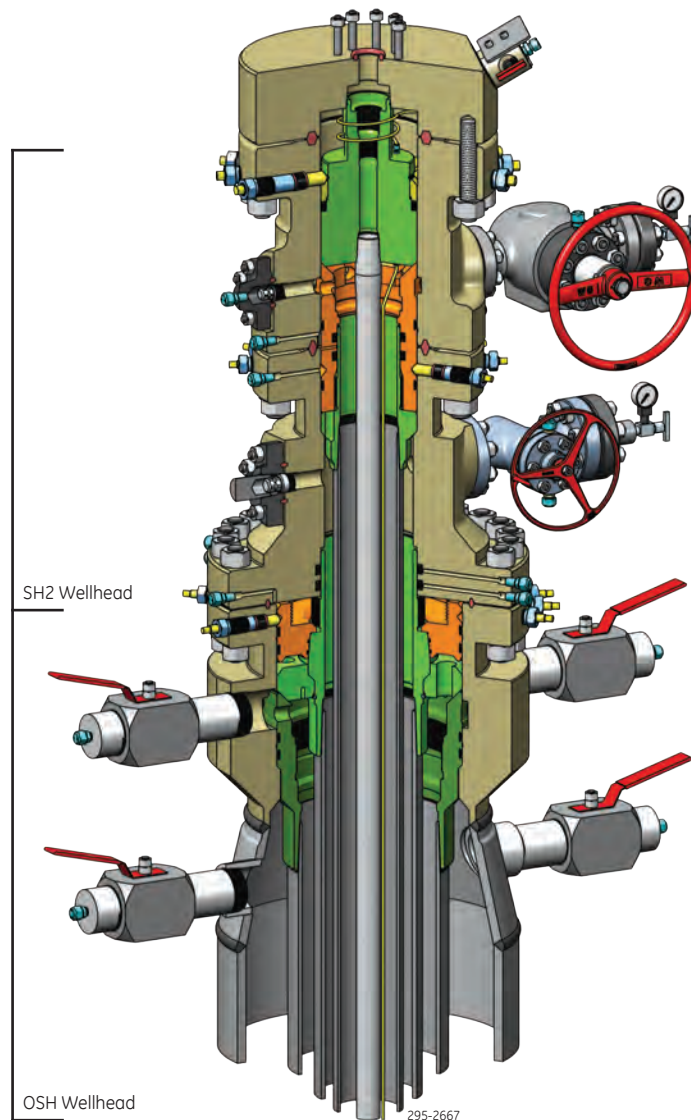
The OSH Offshore Speedhead™ System is specifically designed to be compatible with the drilling methods commonly used in the Gulf of Mexico. It has a two-stage starting head, combining the casing head and casing spool into a single housing. The diverter or BOP stack is made up to the starting head before drilling commences and is not removed until two strings of casing have been run.

This technique impacts both rig costs and safety. By landing two casing strings in one compact forged housing, the OSH system eliminates one complete BOP nipple-down/nipple-up thereby saving significant rig time. By reducing handling of wellhead and BOP equipment and minimizing potential wellhead leak paths, the OSH system substantially improves safety.

When combined with the SH2 split speedhead system, this package can save from 24 to 40 hours of valuable rig time.

Features —

- Improved safety
 - Field-proven
 - Weldless attachment option to drive pipe
 - Run annular seals through BOP
 - External seal testing/monitoring capability
- Time saving
 - Reduces BOP/diverter handling
 - Eliminates wait-on-cement time
 - Uses simple emergency procedure
 - Installs tubing spool with casing spool
- Flexible system
 - Allows alternate casing programs
 - Has pressure ratings up to 15,000 psi
 - Accepts standard tubing hangers with continuous control lines
 - Accepts standard casing hangers in the upper bowl and will connect to a conventional tubing head spool for extended casing program
 - Accepts conventional casing spool/tubing spool



OSH Casing Programs —

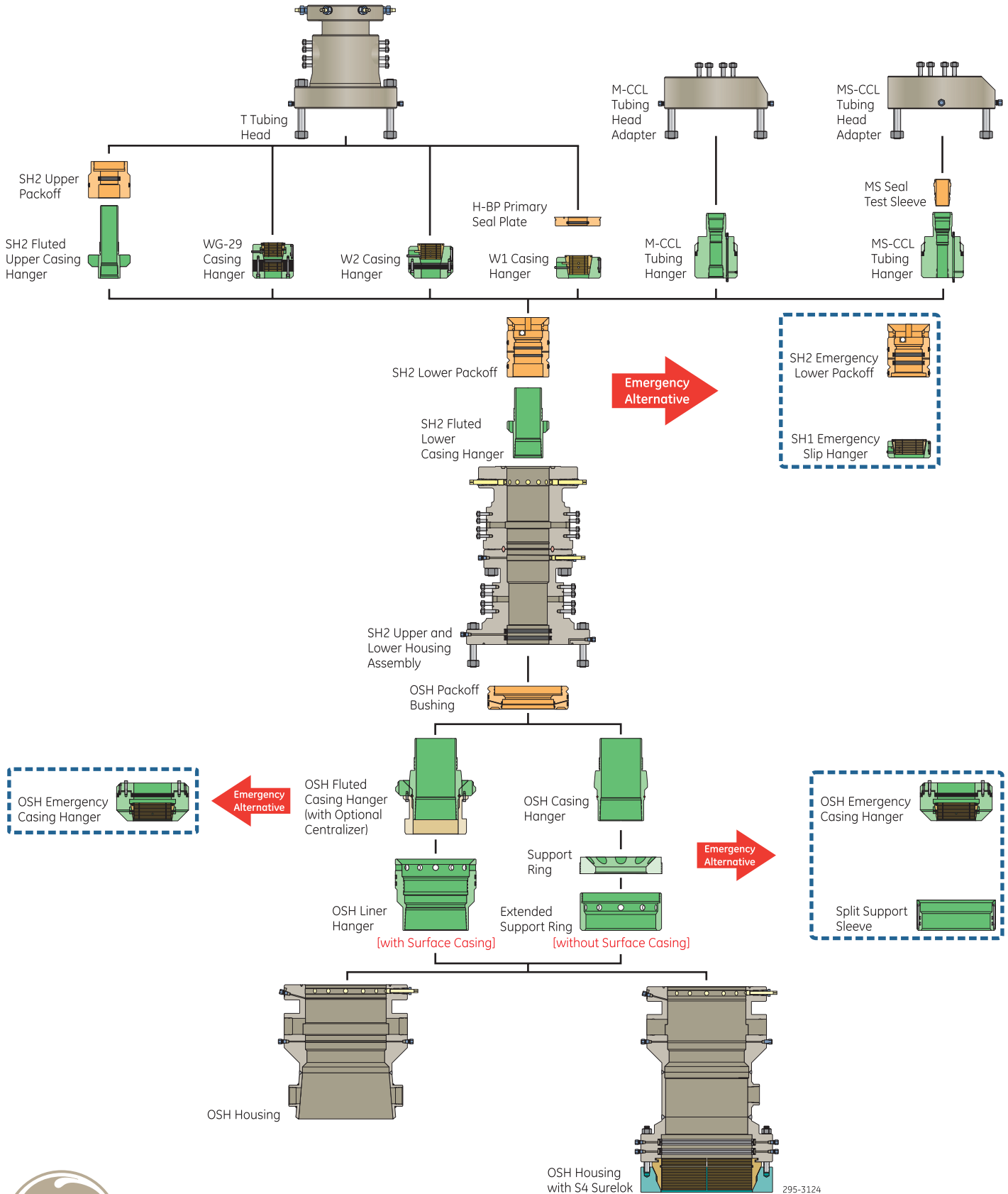
Conductor Pipe	Surface Casing	Intermediate Casing	Production Casing	Tubing
20" - 36"	16"	10-3/4"	7"	2-3/8"
				2-7/8"
				3-1/2"
20" - 36"	16"	10-3/4"	7-5/8"	2-3/8"
				2-7/8"
				3-1/2"
24" - 36"	18-5/8"	13-3/8"	9-5/8"	2-3/8"
				2-7/8"
				3-1/2"
				4-1/2"

These are standard casing programs for the OSH. If others are desired, please contact GE Oil & Gas Pressure Control Engineering.



OSH Offshore Speedhead™ System

Equipment Options —



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GE Oil & Gas

Pressure Control

General Catalog

Specialty Wellheads *(Select a Product)*

ESP Completions

SAGD Wellhead Systems

Close-Proximity Wellhead (CPW) Systems



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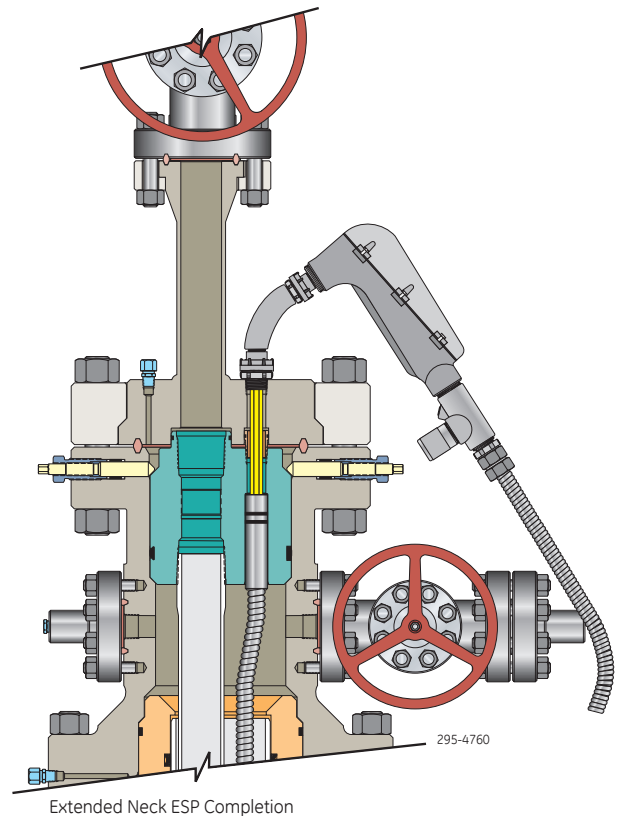
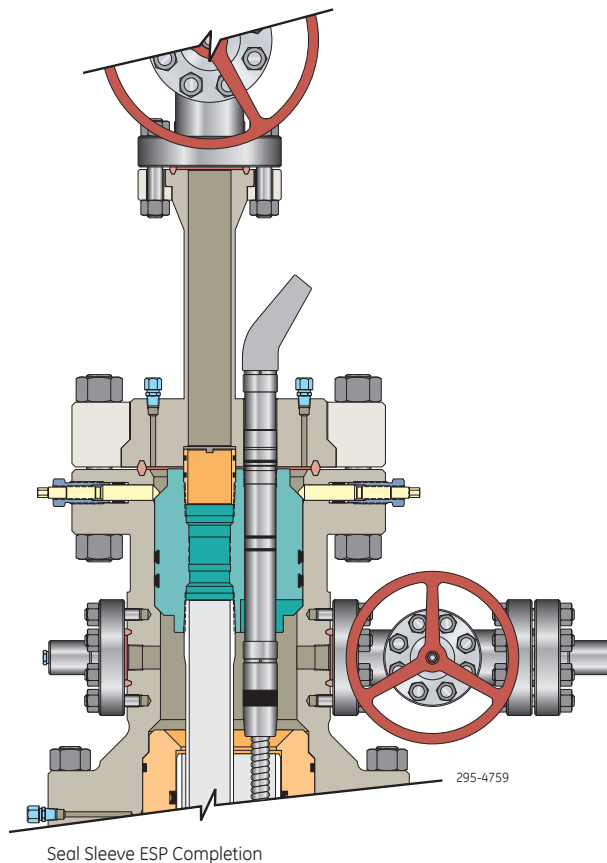
Specialty Wellheads

Pressure Control Electric Submersible Pump (ESP) Completions

Special wellhead completion equipment is required when using an Electric Submersible Pump (ESP) to provide artificial lift. This equipment must isolate the power cable from the wellbore and pass it through both the tubing hanger and adapter to the exterior of the wellhead. GE Oil & Gas Pressure Control, a long-time manufacturer of tubing heads and hangers, offers a wide range of solutions to match your preferred ESP requirements.

Features —

- Field-proven design
- Available in pressure ratings up to 5,000 psi
- Equipped with a full complement of integral lockscrews (PC #05-0225) for tubing hanger retention



- Tubing head adapters available with rotating flange to simplify equipment make up and tree orientation by eliminating the requirement to align the tubing hanger
- Interfaces with most manufacturers' wellhead penetrators
- Designed to your ESP manufacturer's specifications
- Accommodates concentric or eccentric hanger applications
- Available with or without control line exit blocks
- Includes a back pressure valve preparation
- Meets API 6A, 19th Edition requirements
- Meets PR-2 requirements



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Specialty Wellheads

SAGD Wellhead Systems

Prior to acquisition by GE Oil & Gas, VetcoGray partnered with customers to develop Steam Assist Gravity Drain (SAGD) wellhead systems. Utilizing our extensive equipment portfolio and surface knowledge, current wellhead designs can be utilized in innovative ways to decrease overall design costs while delivering the performance our customers have come to expect. The ability to work closely with our customers to meet all their specific needs is how GE Oil & Gas is able to provide the most value.

Features —

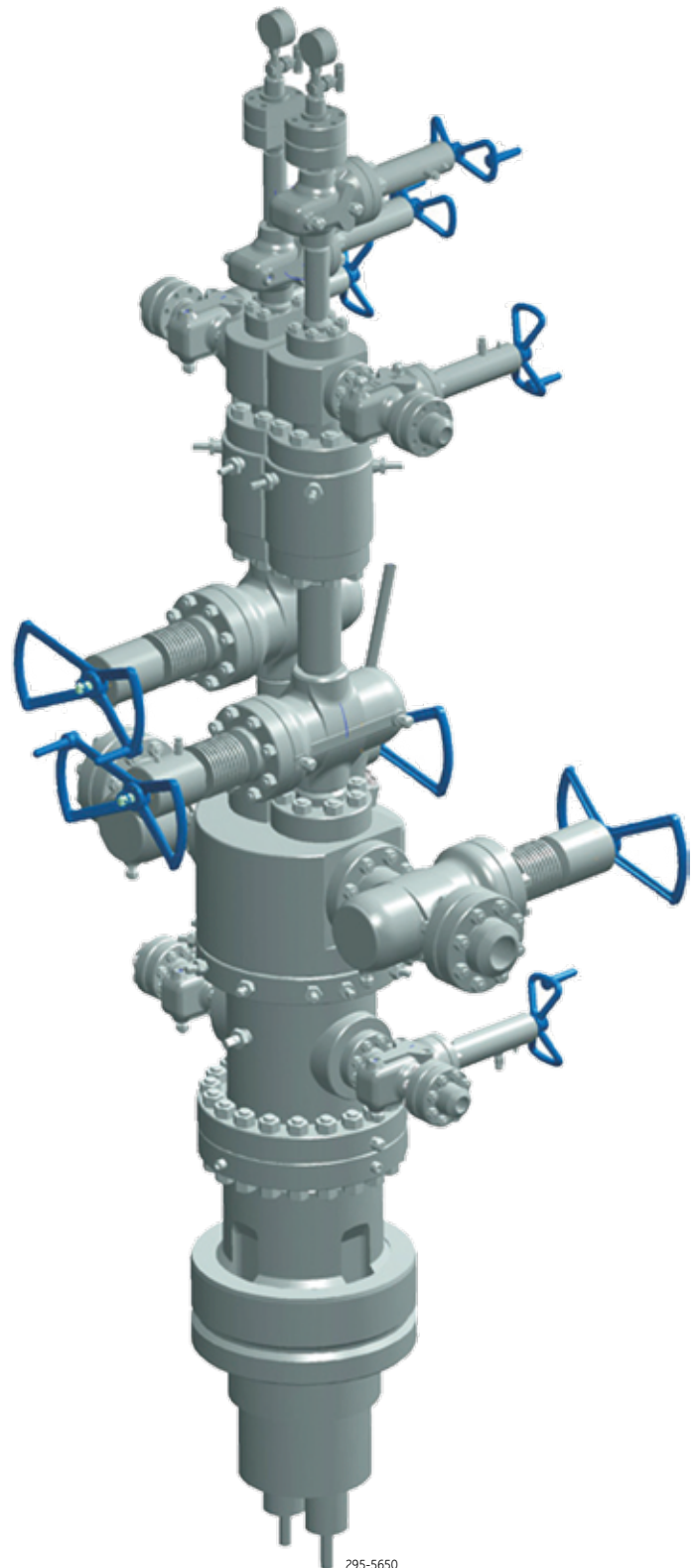
- Tubing hanger to production tree metal-to-metal seal
- Able to deploy short and long strings independently
- SAGD, VAPEX, SW-SAGD, UTF
- Configurations for Gas Lift, ESP or PCP completions
- Metal-to-metal sealing available
- Material class AA-HH
- Designed to API latest edition

Benefits —

- Economical custom designs
- Single source supplier for wellhead and production tree
- Ability to deploy short and long strings independently
- Use of current equipment in innovative applications

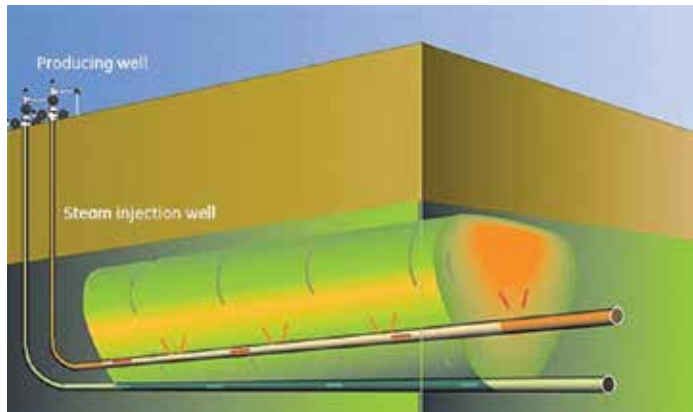
Gate Valves —

- Certified to API 6A annex F
- Steam service
- Sour service



SAGD Wellhead Systems

SAGD Diagram



295-5652



295-5658



295-5657



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Specialty Wellheads

Close-Proximity Wellhead (CPW) Systems

Close-proximity wellhead systems enable two or more wellbores to be placed within a single conductor or caisson with production through adjacent independent wellhead systems. Each CPW system is customized to meet specific criteria supplied by our clients.

Platforms with available slots are often seen as the first candidates for incorporating a CPW. When combined with 3D seismic, extended-reach drilling, horizontal drilling and multilateral completions, a few well-placed additional completions can have a dramatic positive effect on field production economics.

Additional benefits can be derived by reducing the overall height and size of new structures or by eliminating the need for additional structures to develop existing fields.

Features —

- When compared to systems with multiple strings of casing or tubing suspended in a single wellhead component, completely independent adjacent wellhead systems:
 - Allow the use of smaller BOP stacks,
 - Eliminate communication between wellbores, and
 - Allow easier workover or repair.
- Whenever possible, minimum clearance wellhead equipment connector technology is included.
- Conventional or multi-bowl wellhead options are available.
- Pressure ratings up to 15,000 psi can be accommodated.
- Field-proven designs have been used on projects involving 2, 3, 5, 6, 11, and 12 close proximity wells with inside casing and conductor strings ranging from 13-3/8" to 120".

Experience —

- Angola - 2 in a leg
- Egypt - 2 in a leg
- Main Pass - 3, 11 and 12 in a leg
- North Sea - 2 and 3 in a leg
- Qatar - 8 and 12 in a leg
- South Pass 40 - 6 in a leg
- Trinidad - 2 in a leg
- West Cameron 294 - 4 in a leg



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GE Oil & Gas

Pressure Control

General Catalog

Connectors *(Select a Product)*

LRC Lock-On Riser Connector

LRC2 Wellhead Connector

SRC Slip-On Riser Connector

USC-1 Speed Clamp Connector



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Connectors

Pressure Control LRC2 Wellhead Connector

The LRC2 Wellhead Connector is a more robust version of the field-proven LRC Lock-On Riser Connector. The LRC was designed as a low-pressure method for quick, weldless attachment of a riser or diverter, but it was soon used as a weldless attachment mechanism between wellheads and small diameter surface casing. The LRC2 connector expands the wellhead connection applications to larger casing sizes and higher pressures. The LRC2 eliminates the cost of welding services and saves hours of preparation, preheating, welding, and post-heating — up to four hours of valuable rig time.

Although it was specifically designed for wellhead applications, the LRC2 can also be used as a lock-on riser connector when pipe sizes and/or pressure ratings require the extra capacity. With the LRC2, the connector can be quickly installed, removed and reused without special tools.

The LRC2's taller slip ring with spiral ramp back design provides a larger gripping surface area which:

- is less likely to collapse the casing when being made up to the wellhead, and
- evenly and safely transfers high loads generated by internal casing pressure back into the wellhead without risk of collapsing the casing

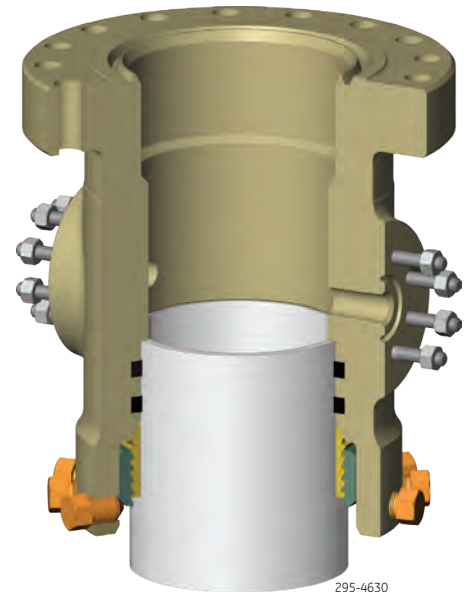
The LRC2 can be used at pressures up to 5,000 psi* and is a lower cost alternative to the S4 Surelok™ Connector that has been the standard offering for larger casings and higher pressure applications.

Features —

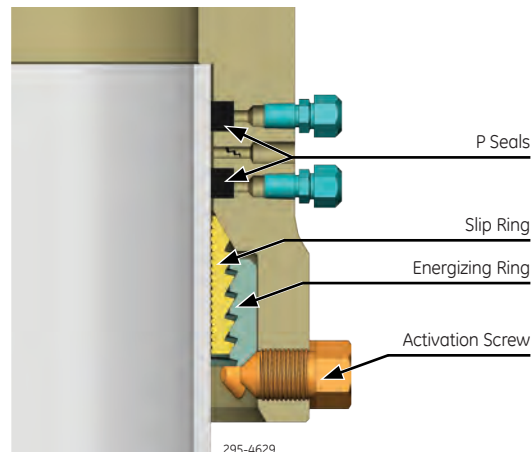
- Installed and tested in less than an hour
- No special tools required
- Eliminates field welding operations
- Casing seals can be tested externally prior to setting slips

Applications —

- Casing head applications available up to 5,000 psi* on the following casing sizes:
 - 9-5/8"
 - 10-3/4"
 - 13-3/8"
- Contact Engineering for other sizes and applications



LRC2 Wellhead Connector Installed on Conductor Casing



LRC2 Wellhead Connector Detail

* NOTE

The actual pressure rating and load capacity of the LRC2 Connector will be limited by the capabilities of the casing or conductor to which it is attached.



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Connectors

Pressure Control SRC Slip-On Riser Connector

The SRC Slip-On Riser Connector offers a cost-effective alternative to the traditional method of welding a riser to the conductor. The connector saves hours of valuable rig time and eliminates the cost of additional services and equipment. The riser connector can be quickly installed, removed and reused without special tools.

This value added product is not limited to use with any particular wellhead product line and is offered as a stand-alone tool to speed up our customers' drilling process.

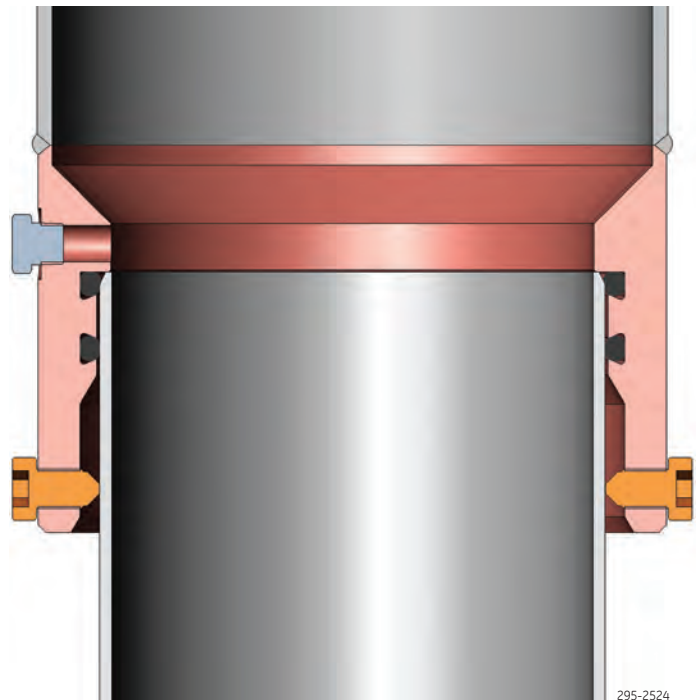
When used with the optional landing ring shown, the system offers the benefits of simple installation combined with an ability to suspend the next casing string while cement is setting, again eliminating down time from the drilling program.

Features —

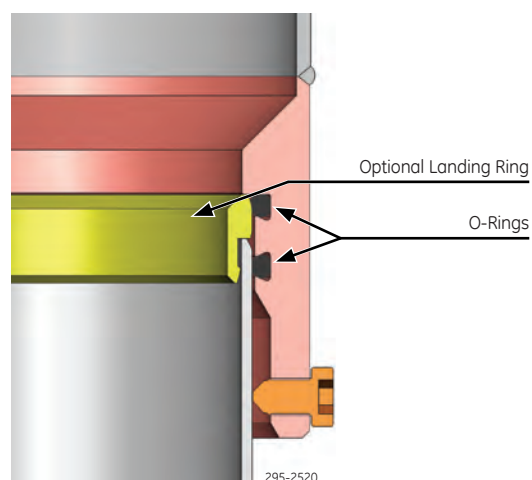
- Installed in less than 20 minutes
- No special tools or services
- Eliminates welding operations

Applications —

- Riser applications range from 13-3/8" through 20" pipe
- The SRC connector is designed to hold pressure from the hydrostatic head only. To accommodate more pressure, the LRC (PC #05-0236) can be selected.
- Commonly used in conjunction with the SCH1 casing head



SRC Riser Connector Installed on Casing



SRC Riser Connector Installed with Optional Landing Ring



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Connectors

Pressure Control USC-1 Speed Clamp Connector

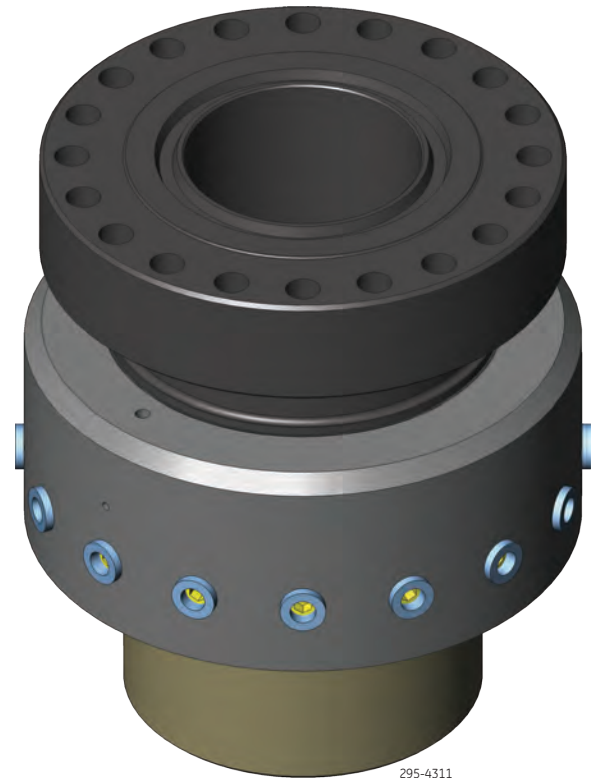
The USC-1 Speed Clamp Connector is a cost-effective alternative to conventional flanged connections on wellheads and BOP stacks. The connector consists of a series of individual clamp segments, each attached to a drive screw. As the drive screws are tightened, the clamp segments pull the hub connections together. The connector can be quickly installed, removed and reused without special tools. The speed clamp connector is available in sizes from 11" through 21-1/4" and pressure ratings from 2,000 psi through 10,000 psi.

Features —

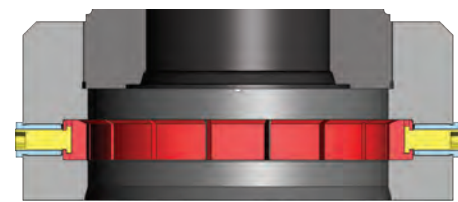
- Time saving
 - One person can install and test the connection in less than 20 minutes compared to three to four hours for a similarly sized flange
 - Drive screws are quickly made-up with the use of a simple Allen wrench
 - No special tools required
- Improved safety
 - Drive screws do not require the use of more dangerous tools, such as hammer wrenches
 - Speed clamp provides 360° contact with the hub connection
 - Emergency release glands can retract the drive screws if the drive screw threads become damaged
 - Sight port allows verification of proper face-to-face make up
- Meets API and NACE requirements for H₂S applications
- Can be used with all API ring grooves or Pressure Control universal seal rings

Availability —

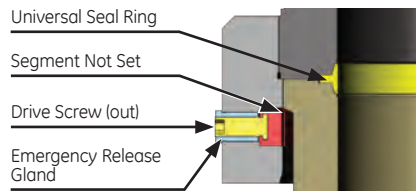
- USC-1 speed clamp connector designs are compatible with either CIW or API hub connections
- USC-2 speed clamp
 - Used for high pressure or large bore applications
 - Provides maximum strength while minimizing connector diameter



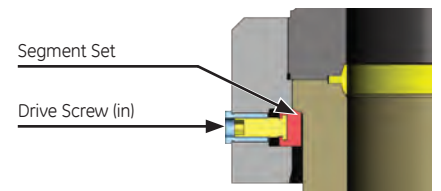
Drilling Adapter with USC-1 Speed Clamp Connector Bottom



USC-1 Speed Clamp Connector Detail



Released Position 295-4311



Engaged Position 295-4311



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GE Oil & Gas

Pressure Control
General Catalog

Flow Control *(Select a Category)*

Gate Valves

Actuators

Pressure Reduction Solutions

Presco-Pilots™ and Presco-Switches™

Presco-Pump™ Modules

Barber Safety Systems Brochure



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GE Oil & Gas

Pressure Control

General Catalog

Flow Control

Gate Valves *(Select a Product)*

Model 1000 Slab Gate Valve

Model 1000XM Slab Gate Valve

Model 2200T Slab Gate Valve

Sandbuster® Slab Gate Valve

Model 2200E Expanding Gate Valve

Model 2300 and 2300 LT Frac Valve



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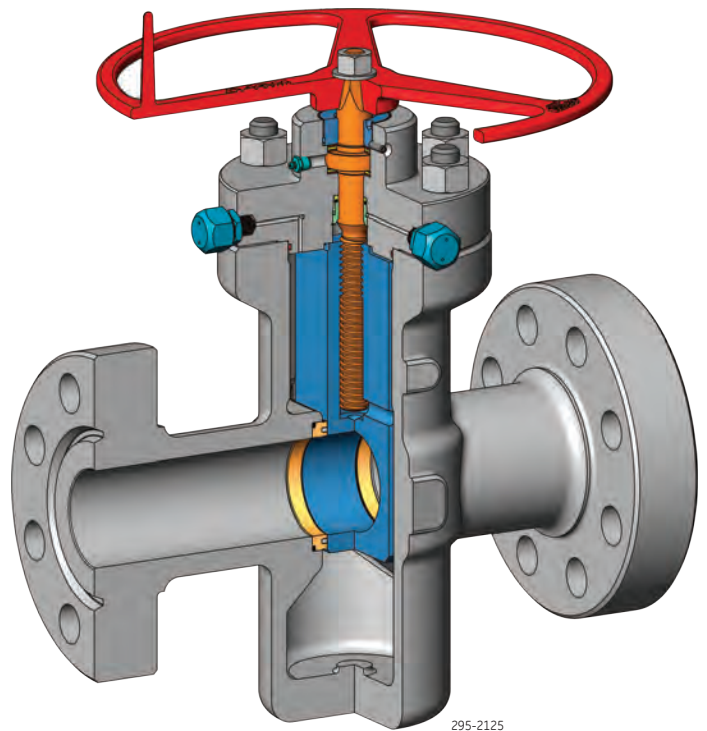
Gate Valves

Pressure Control Model 1000 Slab Gate Valve

The Model 1000 Gate Valve is a cast body, slab gate design ideally suited to providing customers with proven operating features in a product that is focused on meeting the requirements of lower pressure applications. Commonly used for both wellhead annulus outlets and production trees, this gate valve meets industry standards and does not compromise strength or seal integrity.

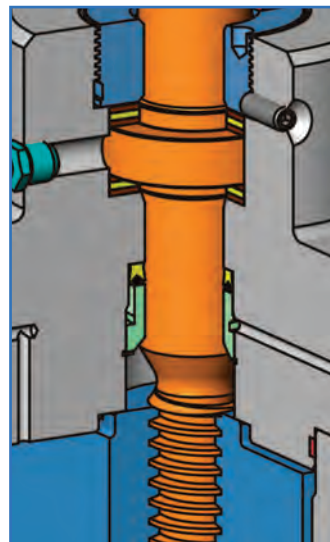
Features —

- Light weight
- Simple design
- Easily repaired
- Incorporates proven design elements
 - Slab gate with floating seats
 - Self-energized stem packing
 - Full-bore
 - Non-rising stem
- Available in both flanged and threaded end connections
- Complies with industry specifications
- Available as API 6A, PSL 1 and PSL 2
- Available in API 6A material class AA, BB, CC, DD, EE and FF
- PR2 Appendix F qualified

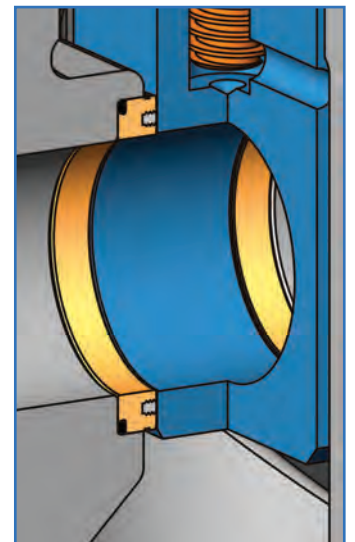


Availability —

Nominal Size	Working Pressure		
	2,000	3,000	5,000
2-1/16"	•	•	•
2-9/16"	-	•	•
3-1/8"	-	•	•
4-1/16"	-	•	•



Model 1000
Stem Packing Detail

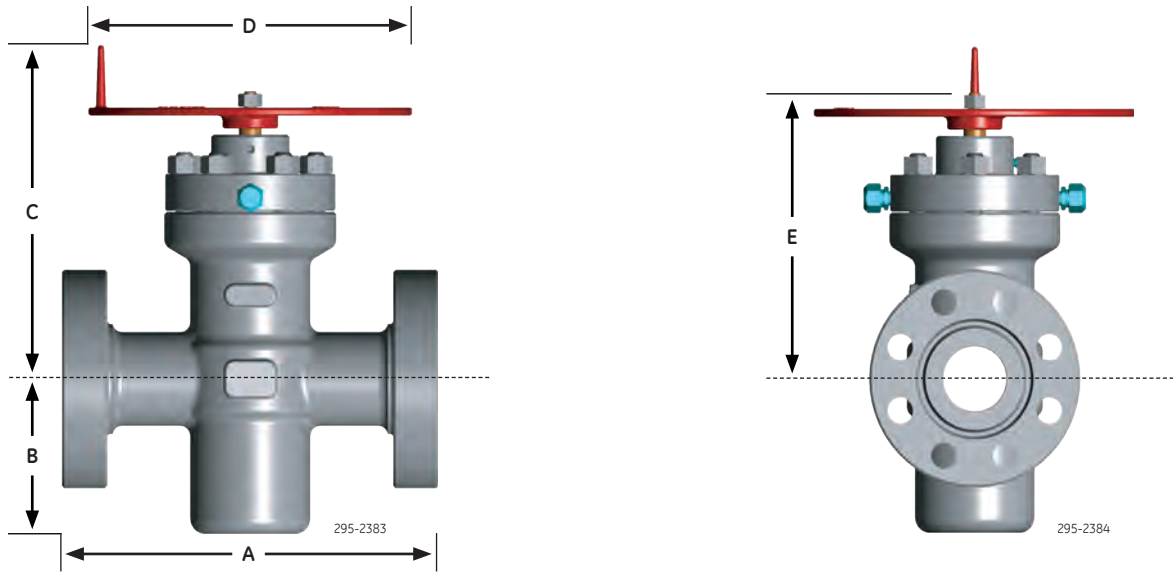


Model 1000
Gate/Seat Interface Detail



Model 1000 Slab Gate Valve

Standard Operating and Dimensional Data —



Nominal Size	Working Pressure (psi)	Dimensions (in/mm)						Weight (lbs/kg)		Number of Turns
		A - Threaded	A - Flanged	B	C	D	E	Threaded	Flanged	
2-1/16"	2,000	-	11.62"/295.15	5.13"/130.30	12.75"/323.85	12.50"/317.50	10.38"/263.65	-	85.00/38.56	13
	3,000/5,000	9.62"/244.35	14.62"/371.35	5.13"/130.30	12.75"/323.85	12.50"/317.50	10.38"/263.65	69.00/31.30	117.00/53.07	13
2-9/16"	3,000/5,000	10.25"/260.35	16.62"/422.15	6.09"/154.69	13.88"/352.55	12.50"/317.50	11.50"/292.10	98.00/44.45	166.00/15.30	15
	3,000	11.38"/289.05	17.12"/434.85	7.44"/188.98	16.02"/406.91	16.00"/406.40	13.80"/350.52	161.00/73.03	219.00/99.34	19
3-1/8"	5,000	11.38"/289.05	18.62"/472.95	7.44"/188.98	16.02"/406.91	16.00"/406.40	13.80"/350.52	161.00/73.03	249.00/112.95	19
	3,000	13.00"/330.20	20.12"/511.05	9.31"/236.47	19.88"/504.95	18.00"/457.20	16.89"/429.01	288.00/130.64	396.00/179.62	24
4-1/16"	5,000	13.00"/330.20	21.62"/549.15	9.31"/236.47	19.88"/504.95	18.00"/457.20	16.89"/429.01	288.00/130.64	432.00/195.95	24



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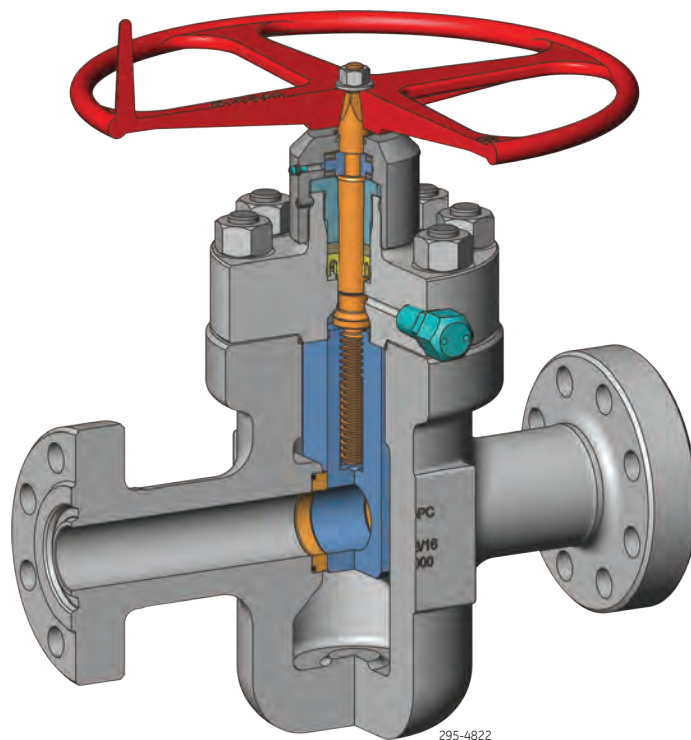
Gate Valves

Pressure Control Model 1000XM Slab Gate Valve

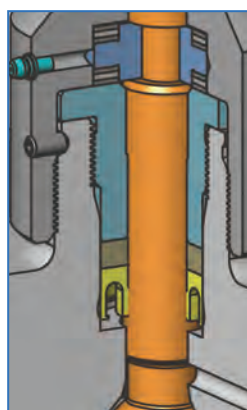
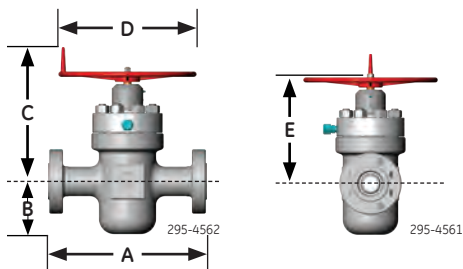
The Model 1000XM Gate Valve uses a cast body, slab gate construction similar to the Model 1000 and the identical stem packing as the Model 2200T. Designed specifically for 1-13/16" 10,000 psi applications, the Model 1000XM is ideally suited for customers who want the many proven operating features of the Model 1000 in a cost effective product that meets the requirements of higher pressure demands. Commonly used for wellhead annulus outlets, this gate valve meets industry standards and does not compromise strength or seal integrity.

Features —

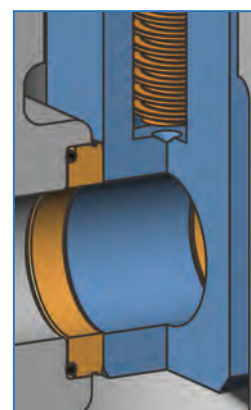
- Light weight
- Simple design
- Easily repaired
- Incorporates proven design elements
 - Slab gate with floating seats
 - Self-energized stem packing
 - Full-bore
 - Non-rising stem
- Metal-to-metal sealing
 - Stem backseat seal
 - Body to bonnet seal
 - Gate to seat seal
- Available in flanged end configuration
- Complies with industry specifications
- Available as API 6A, PSL 1
- Available in API 6A material class AA



Standard Operating and Dimensional Data —



Model 1000XM
Stem Packing Detail



Model 1000XM
Gate/Seat Interface Detail

Nominal Size	Working Pressure (psi)	Dimensions (in/mm)					Weight (lbs/kg)	Number of Turns
		A	B	C	D	E		
1-13/16"	10,000	18.25"/463.55	6.03"/153.16	15.36"/390.14	16.00"/406.40	13.09"/332.49	202.00/91.63	13



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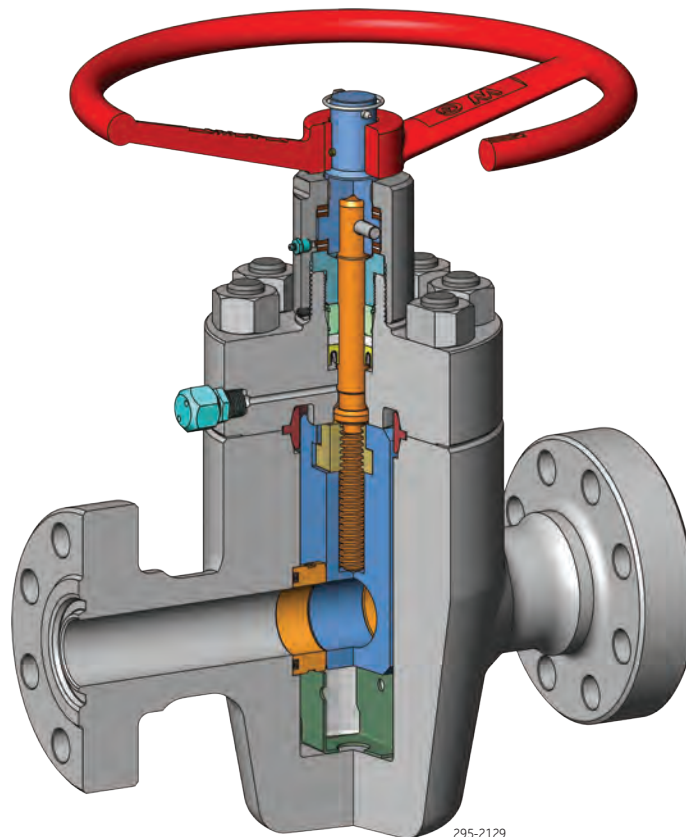
Gate Valves

Pressure Control Model 2200T Slab Gate Valve

The Model 2200T high-performance, bidirectional slab gate valve is ideal for high pressure, critical service applications of 2,000 through 20,000 psi on wellheads, production trees and manifolds.

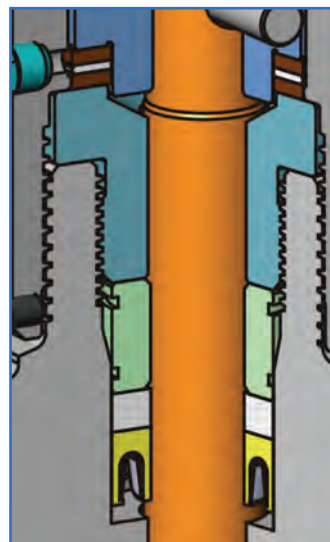
Features —

- Incorporates proven design elements
 - Slab gate with floating seats
 - Self-energized stem packing
 - Full-bore
- Stem availability
 - Non-rising stem
 - Balanced rising stem
- Metal-to-metal sealing
 - Gate to seat seal
 - Stem backseat seal
 - Body to bonnet seal
- Gate guides
- End configuration options
 - Flanged ends
 - Threaded ends
 - Studded ends for larger bores
- Complies with industry specifications
- Available as API 6A, PSL 1 through 4
- Available in API 6A material class AA, BB, CC, DD, EE, FF and HH
- PR2 Appendix F qualified
- Available in both pneumatic/hydraulic actuated configurations



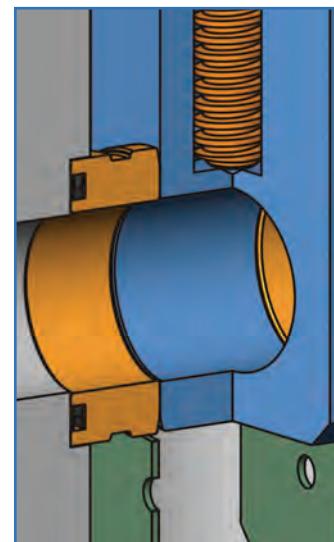
Availability —

Nominal Size	Working Pressure				
	3,000	5,000	10,000	15,000	20,000
1-13/16"	-	-	•	•	•
2-1/16"	•	•	•	•	-
2-9/16"	•	•	•	•	•
3-1/16"	-	-	•	•	•
3-1/8"	•	•	-	-	-
4-1/16"	•	•	•	•	•
5-1/8"	•	•	•	•	-
7-1/16"	•	•	•	•	-



Model 2200T
Stem Packing Detail

295-2129

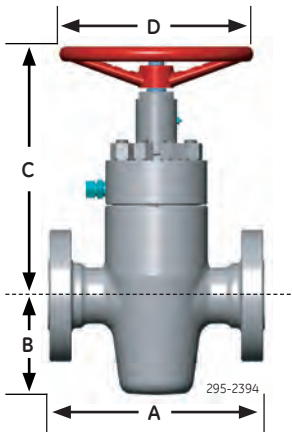


Model 2200T
Gate/Seat Interface Detail

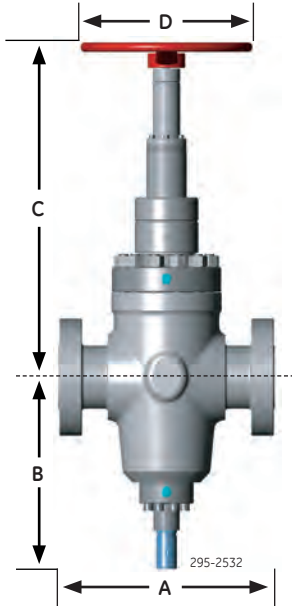
295-2129

Model 2200T Slab Gate Valve

Standard Operating and Dimensional Data —



Nominal Size	Working Pressure (psi)	Dimensions (in/mm)					Weight (lbs/kg)		Number of Turns
		A - Threaded	A - Flanged	B	C	D	Threaded	Flanged	
1-13/16"	10,000	-	18.26"/463.8	6.44"/163.6	16.25"/412.8	17.00"/431.8	-	308.0/139.7	12
	15,000	-	18.00"/457.2	6.44"/163.6	16.25"/412.8	17.00"/431.8	-	279.0/126.6	12
	20,000	-	21.00"/533.4	7.28"/184.9	18.31"/465.1	18.75"/476.3	-	487.0/220.9	13
2-1/16"	2,000	9.70"/246.4	11.62"/295.1	5.28"/134.1	16.52"/419.6	10.00"/254.0	156.0/70.8	166.0/75.3	13
	3,000/5,000	9.70"/246.4	14.63"/371.6	6.45"/163.8	16.41"/416.8	13.50"/342.9	156.0/70.8	222.0/100.7	13
	10,000	-	20.50"/520.1	7.94"/201.7	16.53"/419.8	17.00"/431.8	-	383.0/173.7	13
	15,000	-	19.00"/482.6	6.61"/167.9	16.53"/419.8	17.00"/431.8	-	325.0/147.4	13
2-9/16"	3,000/5,000	-	16.62"/422.1	7.91"/200.9	17.28"/438.9	13.50"/342.9	-	299.0/135.6	14
	10,000	-	22.25"/565.2	8.08"/205.2	18.03"/458.0	18.75"/476.3	-	456.0/206.8	16
	15,000	-	21.00"/533.4	9.68"/245.9	18.03"/458.0	18.75"/476.3	-	621.0/281.7	16
3-1/16"	10,000	-	24.40"/619.8	10.10"/256.5	18.86"/479.0	18.75"/476.3	-	602.0/273.1	19
	15,000	-	23.56"/598.4	8.38"/212.9	18.86"/479.0	18.75"/476.3	-	595.0/269.9	19
3-1/8"	3,000	12.56"/319.0	17.12"/434.8	8.15"/207.0	18.43"/468.1	17.00"/431.8	252.0/114.3	396.0/179.6	19
	5,000	-	18.62"/472.9	8.15"/207.0	18.43"/468.1	17.00"/431.8	-	428.0/194.1	19
4-1/16"	3,000	-	20.12"/511.0	9.67"/245.6	20.26"/514.6	18.75"/476.3	-	655.0/297.1	22
	5,000	-	21.62"/549.1	9.67"/245.6	20.26"/514.6	18.75"/476.3	-	697.0/316.2	22
	10,000	-	26.38"/670.1	12.99"/329.9	25.12"/638.0	24.00"/609.6	-	1,229.0/557.5	22
5-1/8"	5,000	-	28.62"/726.9	13.00"/330.2	26.90"/683.3	24.00"/609.6	-	1,407.0/638.2	27
7-1/16" x 6-3/8"	3,000	-	24.12"/612.6	15.01"/381.3	28.32"/719.3	24.00"/609.6	-	1,207.0/547.5	35



Balanced Stem/Ball Screw Operating and Dimensional Data —

Nominal Size	Working Pressure (psi)	Dimensions (in/mm)					Weight (lbs/kg)		Number of Turns
		A - Threaded	A - Flanged	B	C	D	Threaded	Flanged	
2-9/16"	20,000	-	26.50"/673.1	10.60"/269.2	22.30"/566.4	23.00"/584.2	-	1,058.0/479.9	17
3-1/16"	20,000	-	30.50"/774.7	21.60"/548.6	41.31"/1,049.3	24.00"/609.6	-	2,429.0/1,101.8	17
4-1/16"	15,000	-	29.00"/736.6	23.23"/590.0	40.58"/1,030.7	24.00"/609.6	-	1,554.0/704.9	20
	20,000	-	20.50"/520.7	27.63"/701.8	45.50"/1,155.7	42.00"/1,066.8	-	4,728.0/2,144.6	23
5-1/8"	10,000	-	29.00"/736.6	13.00"/330.2	27.90"/708.7	23.00"/584.2	-	1,546.0/701.3	23
	15,000	-	19.50"/495.3*	30.38"/771.7	54.48"/1,383.8	42.00"/1,066.8	-	4,042.0/1,833.4	26
7-1/16"	3,000	-	28.12"/714.2	28.59"/726.2	50.93"/1,293.6	23.00"/584.2	-	2,200.0/997.9	31
	5,000	-	32.00"/812.8	28.59"/726.2	50.93"/1,293.6	23.00"/584.2	-	2,407.0/1,091.8	31
	10,000	-	20.00"/508.0*	32.80"/833.1	55.66"/1,413.8	42.00"/1,066.8	-	4,318.0/1,958.6	33
	15,000	-	23.00"/584.2*	37.75"/958.9	61.83"/1,570.5	42.00"/1,066.8	-	6,357.0/2,883.5	36

* Studded end connections



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Gate Valves

Pressure Control Sandbuster® Slab Gate Valve

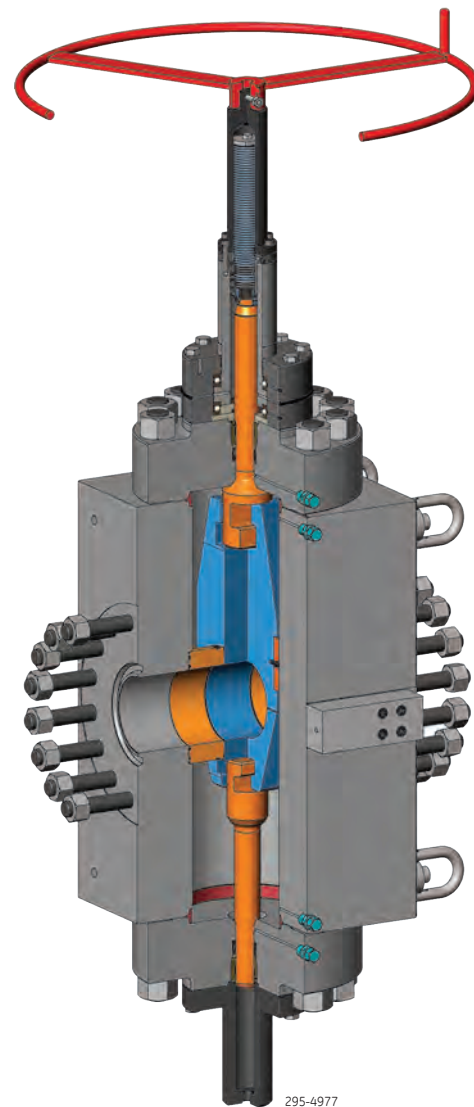
The Sandbuster® Slab Gate Valve is a high-performance, bidirectional slab gate valve ideal for fracturing service operations with working pressures of 10,000 psi through 15,000 psi. The unique, angled corner design (patent pending) of the slab gate assembly prevents sand and other abrasive materials in fracturing fluids from accumulating in the gate cavity of the valve, which both extends service life and reduces maintenance costs.

Features —

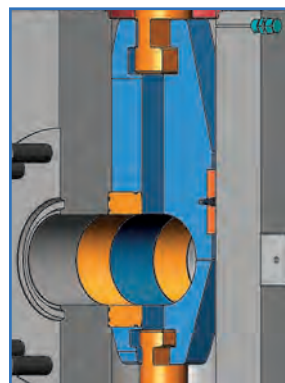
- Incorporates proven design elements
 - Slab gate with floating seats
 - Self-energized stem packing
 - Full-bore
 - Non-rising stem and balanced rising stem available, depending on valve size
- Metal-to-metal sealing
 - Gate to seat
 - Stem backseat
 - Body to bonnet
- Flanged end connections and studded outlets available, depending on valve size
- Two body washout ports to flush sand from the body cavity
- Complies with industry specifications
- Available as API 6A, PSL 1 through 4
- Available in API 6A material class AA, BB, CC, DD, EE, FF and HH
- PR2 Appendix F qualified
- Available in handwheel operated and hydraulic actuated configurations

Availability —

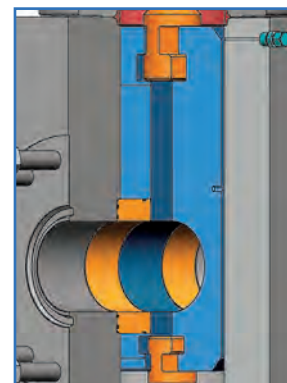
Nominal Size	Working Pressure	
	10,000	15,000
4-1/16"	•	-
5-1/8"	•	•
7-1/16"	•	•



295-4977
7-1/16" 15M Sandbuster Slab Gate Valve



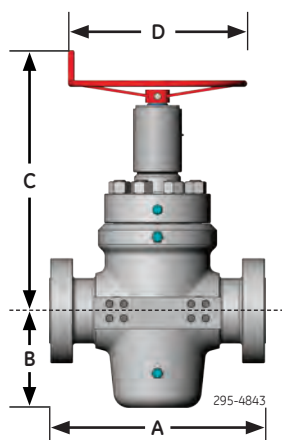
Sandbuster Gate Assembly Detail 295-4980



Model 2200T Gate Assembly Detail 295-4979

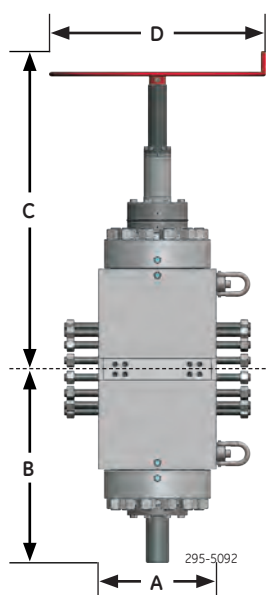


Sandbuster® Slab Gate Valve



Standard Operating and Dimensional Data —

Nominal Size	Working Pressure (psi)	Dimensions (in/mm)					Weight (lbs/kg)		Number of Turns
		A - Threaded	A - Flanged	B	C	D	Threaded	Flanged	
4-1/16"	10,000	-	26.38"/670.1	12.99"/329.9	25.12"/638.0	24.00"/609.6	-	1,229.0/557.5	23
5-1/8"	10,000	-	29.00"/736.6	13.00"/330.2	34.84"/884.9	24.00"/609.6	-	1,521.0/689.9	23



Balanced Stem/Ball Screw Operating and Dimensional Data —

Nominal Size	Working Pressure (psi)	Dimensions (in/mm)					Weight (lbs/kg)		Number of Turns
		A - Threaded	A - Flanged	B	C	D	Threaded	Flanged	
5-1/8"	10,000	-	29.00"/736.6	26.65"/676.9	47.88"/1,216.2	24.00"/609.6	-	1,640.0/743.9	23
	15,000	-	19.50"/495.3*	30.38"/771.7	54.48"/1,383.8	42.00"/1,066.8	-	4,042.0/1,833.4	26
7-1/16"	10,000	-	20.00"/508.0*	32.80"/833.1	55.66"/1,413.8	42.00"/1,066.8	-	4,318.0/1,958.6	33
	15,000	-	23.00"/584.2*	37.75"/958.9	61.83"/1,570.5	42.00"/1,066.8	-	6,284.0/2,850.0	36

* Studded end connections



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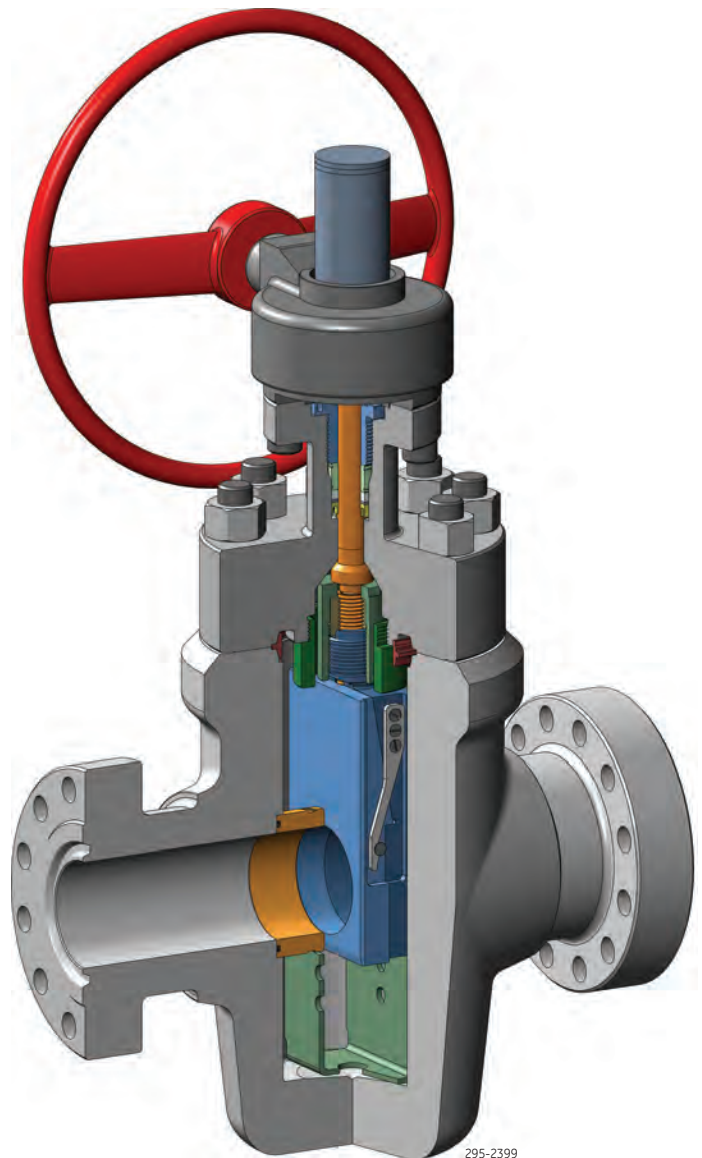
Gate Valves

Pressure Control Model 2200E Expanding Gate Valve

The Model 2200E Gate Valve provides the customer with a mechanical expanding gate design that ensures metal-to-metal contact between the valve gate, seats and body with or without line pressure being present. As an extension of the field-proven Model 2200T gate valve production line, the 2200E is available in a variety of end connections, pressure ratings, product specification levels (PSL), material classes and temperature classes in accordance with API 6A requirements. The 2200E valve is recommended for high-performance, critical service applications on wellhead production trees and manifolds where the benefits of the expanding gate principle are desired.

Features —

- Incorporates proven design elements
 - Expanding gate
 - Self-energized stem packing
 - Full-bore
 - Non-rising stem
- Metal-to-metal seals
- Gate/seat seal
- Stem backseat seal
- Body/bonnet seal
- Both in-line and bevel gear manual handwheel operators are available to meet your operational load



Open Position Detail



Closed Position Detail



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Gate Valves

Pressure Control Model 2300 and 2300LT Frac Valves

The Model 2300 and Model 2300LT Frac Valves share a bidirectional flow design. The full-bore through-conduit design virtually eliminates turbulence and pressure drop across the seats, minimizes the collection of destructive particulates and maximizes the valve life.

The floating gate and seats create a positive, pressure-energized seal. Body pressure equalization occurs between the seat ring/body bushing interface, thus eliminating body erosion in the seat pockets.

The equalization manifold (standard on the 2300 and available on the 2300LT) is used to reduce wear and opening torque of the valve. When an upstream closure can be obtained, the equalization needle valves may be opened to equalize pressure across the gate of the valve. This increases the life of the valve components by helping to reduce wear due to the high velocity flow created at the break open point. A lower operating torque is achieved due to the reduction in friction between the gate and seat, which increases the safety of operation.

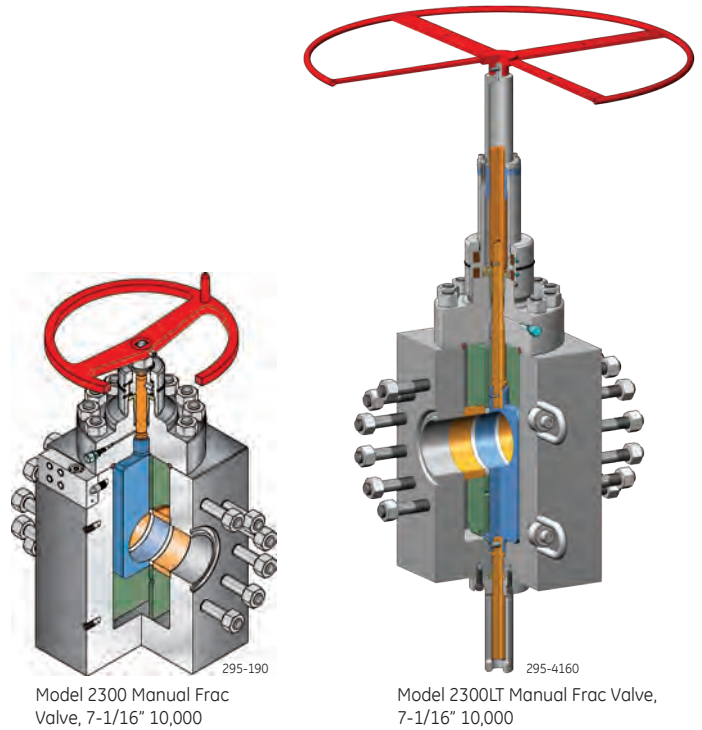
The 2300 and 2300LT are only available in a 7-1/16" bore size with a pressure rating of 10,000 psi. For high pressure, critical service applications requiring additional sizes ranging from 1-13/16" through 7-1/16", and with pressure ratings ranging from 2,000 psi to 20,000 psi, please see the 2200T valve technical bulletin (PC #04-0401).

Features —

- Metal-to-metal contact between the gate, body and bonnet seals ensures external seal integrity
- Single fitting in bonnet above backseat increases safety
- Retainer plates retain body lubricants and protect gate surface
- Minimizes maintenance costs by facilitating the field replacement of seats, gate, stem and other working parts

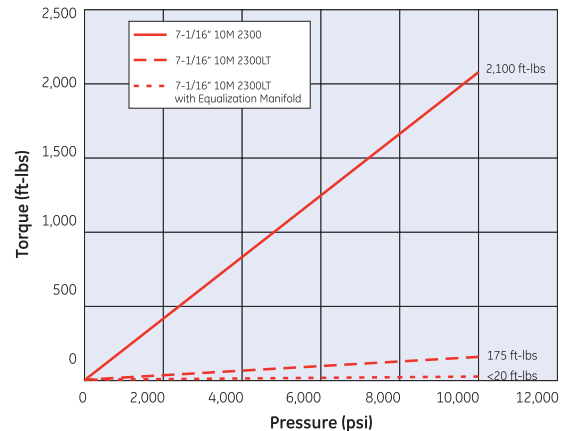
Model 2300LT Additional Feature —

Ball screw with balanced stem design provides lower coefficient of friction and ease of use under full differential pressure.



Torque Comparison —

In the chart below, the operating torque for a 2300 frac valve without an equalization manifold is compared to a 2300LT. The advantage of the low torque design is very evident in that the torque for the 2300 valve is 2,100 ft-lbs while the 2300LT valve drops to only 175 ft-lbs — a more than 90% reduction in torque. If the equalization manifold is used, then the torque drops to under 20 ft-lbs.



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General Catalog

Flow Control

Actuators *(Select a Product)*

Dual Seal Pneumatic Actuator

Model D Pneumatic Diaphragm Actuator

Model P Pneumatic Piston Actuator

Model RA Hydraulic Actuator

Model RA-ESD Self-Contained
Hydraulic Actuator

Model HSRA-2 Hydraulic Actuator

Model HDA-RS Hydraulic Actuator

CHA Top Access Standard
Hydraulic Actuator

CHA-WLS Top Access Wireline
Shearing Hydraulic Actuator

CHA-C Classic Standard
Hydraulic Actuator

CHA-WLC Classic Wireline
Shearing Hydraulic Actuator



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Actuators

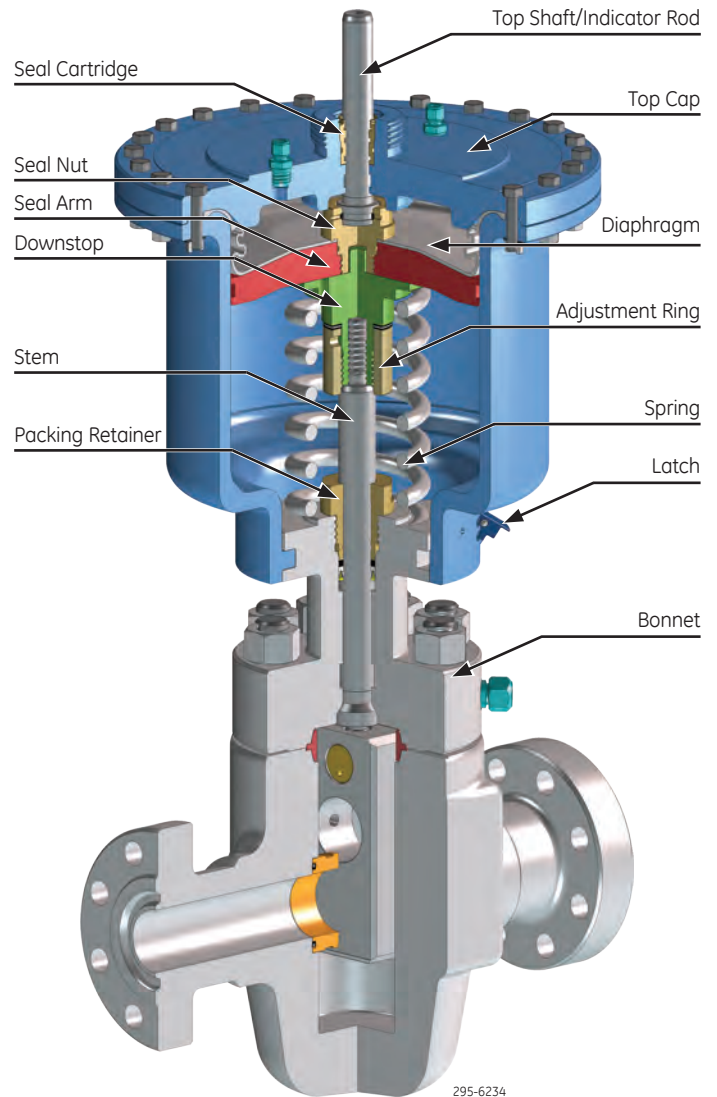
Pressure Control Dual Seal Pneumatic Actuator

The Dual Seal Pneumatic Actuator helps operators reduce unplanned production downtime and risk by utilizing an innovative dual sealing system. While the redundant sealing system extends service life for improved reliability, the patent pending bonnet connection substantially reduces make-up time for improved installation speed and maintenance. Its distinctive modular design allows decisions to be driven by valve size and pressure, and available supply pressures rather than actuator size.

Suitable for both onshore and offshore applications, the Dual Seal Pneumatic Actuator delivers reliable open/close performance for control of wellbore or pipeline fluids and hydrocarbons. Sufficient supply pressure up to 250 psi is applied through the actuator supply port onto an internal flexible diaphragm where it forces a downward movement that compresses a coil spring and generates sufficient actuator force to open the valve. Valve closure is obtained when the supply pressure is vented from the actuator.

Features —

- Improved reliability
 - Redundant seal technology provides secondary seals allowing uninterrupted production
 - No welded components are used, providing uniform material integrity
 - Robust design ensures reliability in a variety of environments
 - Extended cycle testing/validation exceeds standard industry requirements
 - Maximum operating temperature ranges from -20°F to +250°F (-29°C to +121°C)
- Improved efficiency
 - Patent pending bonnet connection allows easy assembly and removal of actuator from valve
 - Innovative design allows for higher supply pressures, creating smaller, more cost effective actuator applications
 - Universal bonnet and spring assembly design allows for actuator interchangeability
 - Reduced closing time due to increased backseat spring force
 - Visible indicator to confirm open/close position
- Improved maintainability
 - Patent pending top shaft technology allows for easy replacement without disturbing diaphragm/piston sealing mechanism
 - Increased maintenance interval due to redundant seal arrangement
 - NACE compliant options available
 - Improved coating system on spring provides enhanced corrosion resistance



Dual Seal Pneumatic Actuator



Accessories —

- Electric valve position indicator
- Fusible lock open device
- Lock open cap
- Stem guard
- Clear stem protectors
- Manual hold open devices
- Hydraulic override

Specifications —

Model Dual Seal Pneumatic Actuator	
Models	DS11, DS14, DS18
Applicable Valve Sizing	1-13/16" thru 6-3/8" (2,000 psi thru 15,000 psi)
API Specification	API 6A
Pneumatic Actuator	Standard Service
PR2	Annex F
Temperature	-20°F to +250°F (-29°C to +121°C)
Maximum Supply Pressure	250 psi (17 bar)
Maximum Test Pressure	375 psi (25.85 bar)

Actuator Sizing Chart —

Valve		Actuator			
Bore	psi	Model	Size	Operating Pressure	Volume Displacement
1-13/16"	10,000	DS11	1102	.020 x WP + 11 psi (211 psi/15 bar)	218 in ³
		DS14	1402	.012 x WP + 7 psi (127 psi/9 bar)	354 in ³
	15,000	DS14	1402	.012 x WP + 7 psi (187 psi/13 bar)	354 in ³
		DS18	1802	.008 x WP + 4 psi (124 psi/9 bar)	587 in ³
2-1/16"	3,000	DS11	1102	.020 x WP + 11 psi (71 psi/5 bar)	231 in ³
	5,000	DS11	1102	.020 x WP + 11 psi (111 psi/8 bar)	231 in ³
		DS14	1402	.013 x WP + 7 psi (72 psi/5 bar)	375 in ³
	10,000	DS11	1102	.022 x WP + 11 psi (231 psi/16 bar)	237 in ³
		DS14	1402	.013 x WP + 7 psi (137 psi/9 bar)	386 in ³
	15,000	DS14	1402	.014 x WP + 7 psi (217 psi/15 bar)	386 in ³
		DS18	1802	.008 x WP + 4 psi (124 psi/9 bar)	640 in ³
2-9/16"	3,000	DS11	1103	.024 x WP + 11 psi (83 psi/6 bar)	285 in ³
	5,000	DS11	1103	.024 x WP + 11 psi (131 psi/9 bar)	285 in ³
		DS14	1403	.015 x WP + 7 psi (82 psi/6 bar)	464 in ³
	10,000	DS14	1403	.018 x WP + 7 psi (187 psi/13 bar)	485 in ³
		DS18	1403	.011 x WP + 4 psi (114 psi/8 bar)	802 in ³
15,000	DS18	1803	.011 x WP + 4 psi (169 psi/12 bar)	802 in ³	
3-1/16"	10,000	DS14	1403	.022 x WP + 7 psi (227 psi/16 bar)	565 in ³
		DS18	1803	.014 x WP + 4 psi (144 psi/10 bar)	937 in ³
	15,000	DS18	1803	.014 x WP + 4 psi (214 psi/15 bar)	937 in ³
3-1/8"	3,000	DS11	1103	.034 x WP + 11 psi (113 psi/8 bar)	333 in ³
	5,000	DS14	1403	.021 x WP + 7 psi (70 psi/5 bar)	542 in ³
		DS11	1103	.034 x WP + 11 psi (181 psi/12 bar)	333 in ³
	DS14	1403	.021 x WP + 7 psi (112 psi/8 bar)	542 in ³	
4-1/16"	3,000	DS11	1104	.056 x WP + 11 psi (179 psi/12 bar)	424 in ³
		DS14	1404	.035 x WP + 7 psi (112 psi/8 bar)	690 in ³
	5,000	DS14	1404	.034 x WP + 7 psi (177 psi/12 bar)	690 in ³
		DS18	1804	.021 x WP + 4 psi (109 psi/8 bar)	1,144 in ³
10,000	DS18	1804	.021 x WP + 4 psi (214 psi/15 bar)	1,193 in ³	
5-1/8"	3,000	DS14	1405	.050 x WP + 10 psi (160 psi/11 bar)	887 in ³
		DS18	1805	.029 x WP + 6 psi (93 psi/6 bar)	1,471 in ³
	5,000	DS18	1805	.034 x WP + 6 psi (176 psi/12 bar)	1,471 in ³
6-3/8"	3,000	DS14	1406	.077 x WP + 10 psi (241 psi/17 bar)	1,070 in ³
		DS18	1806	.046 x WP + 6 psi (144 psi/10 bar)	1,772 in ³
	5,000	DS18	1806	.046 x WP + 6 psi (236 psi/16 bar)	1,772 in ³

Other sizes available upon request.



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Actuators

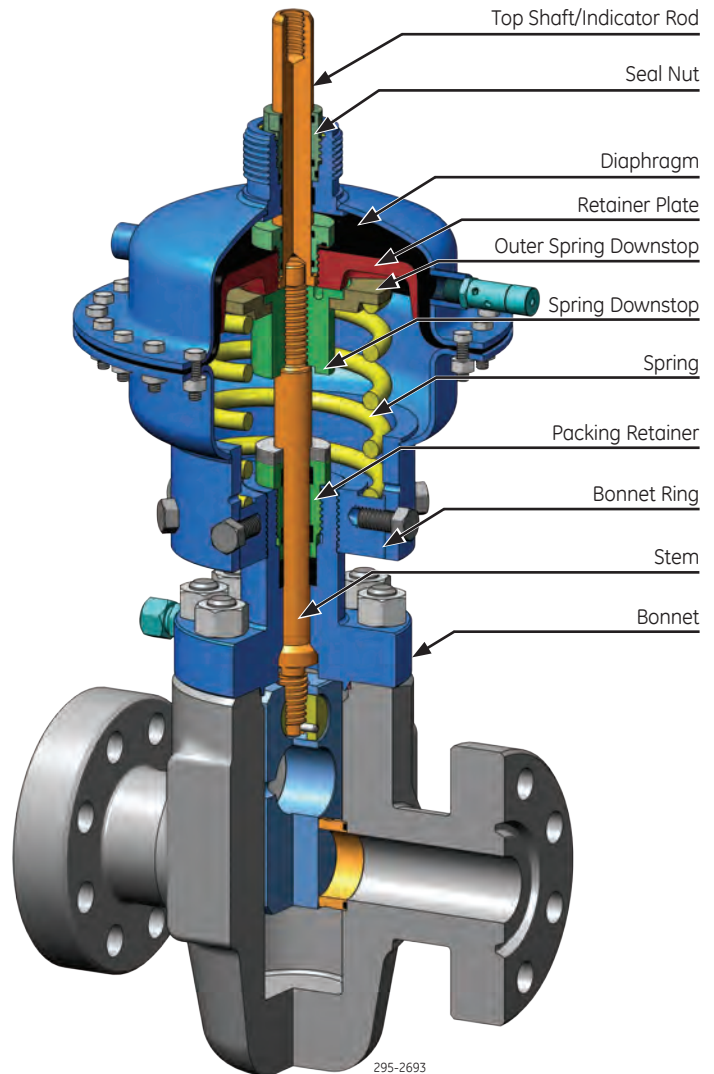
Pressure Control Model D Pneumatic Diaphragm Actuator

The Model D Pneumatic Diaphragm Actuator is designed for use on reverse-acting or direct-acting gate valves. The actuator functions as a fail-safe closed device when mounted on a reverse-acting gate valve and as a fail-safe open device when mounted on a direct-acting gate valve. Suitable for use in onshore and offshore applications, Model D diaphragm actuators deliver reliable open/close performance for control of wellbore or pipeline fluids and hydrocarbons.

When used as a fail-safe closed shutdown valve (SDV), the actuator will require sufficient supply pressure to open the valve. Refer to the actuator sizing chart on the reverse side to determine applicable actuator opening pressure. Supply pressure is applied to the actuator supply port onto an internal flexible diaphragm where it forces a downward movement, compressing a coil spring and generating sufficient actuator forces to open the valve. Valve closure is obtained when the supply pressure is vented from the actuator. Tandem or stacked diaphragm actuators are used to increase actuator opening forces to open high pressure valves, while requiring a minimum amount of actuator supply pressure.

Features —

- Simplicity
 - Lightweight
 - Compact
 - Easy to install and maintain
 - Seal nut elastomers can be replaced without removal of actuator indicator rod or upper/lower case disassembly
 - Shims allow for permanent drift adjustment
 - No special tools required
- Long service life
 - Non-stainless components are coated with Xylan to provide corrosion resistance in harsh environments
 - Aluminum bronze material used for seal and diaphragm nut to minimize wear
 - Wear bearings in bonnet packing retainer eliminate metal-to-metal contact with bonnet stem
 - Actuator top shaft/indicator rod is free-floating, thus eliminating torque transfer when using manual hold open device
- Designed for safety
 - Actuator external relief valve protects equipment and personnel from overpressurization
 - Heavy-duty actuator compression spring ensures engagement of metal-to-metal fire-safe bonnet stem backseat and valve closure
 - Design of actuator seal nut allows for venting of internal actuator pressure during removal and alerts service technician of an unsafe condition that pressure remains in actuator
 - Actuator seal nut elastomers accessed and easily replaced without removal of actuator top shaft/indicator rod or upper/lower case disassembly
 - Bonnet communication port is located above bonnet stem metal-to-metal fire seal and below stem packing



Model D Pneumatic Diaphragm Actuator

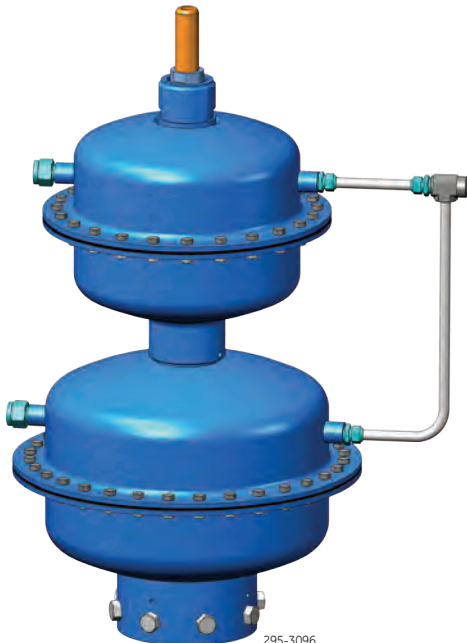


Diaphragm Actuator Sizing Chart –

Valve		Actuator			
Bore	psi	Model	Size	Operating Pressure	Volume Displacement
1-13/16"	10,000	D15	1502	.012 x WP (120 psi/8 bars)	800 in ³
	15,000	D18	1802	.008 x WP (120 psi/8 bars)	1,050 in ³
2-1/16"	2,000	D10	10C2	.027 x WP (54 psi/4 bars)	365 in ³
		D12	1202	.024 x WP (48 psi/3 bars)	425 in ³
	3,000	D10	10C2	.027 x WP (81 psi/6 bars)	365 in ³
		D12	1202	.024 x WP (72 psi/5 bars)	425 in ³
	5,000	D10	10C2	.027 x WP (135 psi/9 bars)	365 in ³
		D12	1202	.024 x WP (120 psi/8 bars)	425 in ³
2-9/16"	10,000	D15	1502	.013 x WP (130 psi/9 bars)	800 in ³
		D18	1802	.009 x WP (90 psi/6 bars)	1,050 in ³
	15,000	D18	1802	.009 x WP (135 psi/9 bars)	1,050 in ³
		D12	1202	.025 x WP (50 psi/3 bars)	425 in ³
	2,000	D12	1202	.025 x WP (75 psi/5 bars)	425 in ³
		D12	1202	.025 x WP (125 psi/9 bars)	425 in ³
3-1/8"	2,000	D12	1203	.037 x WP (74 psi/5 bars)	450 in ³
		D15	1503	.021 x WP (42 psi/3 bars)	900 in ³
	3,000	D12	1203	.037 x WP (111 psi/8 bars)	450 in ³
		D15	1503	.021 x WP (63 psi/4 bars)	900 in ³
	5,000	D15	1503	.021 x WP (105 psi/7 bars)	900 in ³
		D18	1803	.014 x WP (140 psi/10 bars)	1,150 in ³
4-1/16"	2,000	D15	1504	.033 x WP (66 psi/5 bars)	1,000 in ³
	3,000	D15	1504	.033 x WP (99 psi/7 bars)	1,000 in ³
	5,000	D18	1804	.023 x WP (115 psi/8 bars)	1,250 in ³
5-1/8"	2,000	D15	1505	.046 x WP (92 psi/6 bars)	1,100 in ³
		D18	1805	.033 x WP (66 psi/5 bars)	1,350 in ³
	3,000	D18	1805	.033 x WP (99 psi/7 bars)	1,350 in ³

Specifications –

Model D	
Models	D10, D12, D15, D18
Applicable Valve Sizing	1-13/16" thru 5-1/8"
API Specification	API 6A
Pneumatic Actuator	Standard Service
PR2	Annex F
Temperature	-20°F to +180°F (-29°C to +82°C)
Maximum Working Pressure	150 psi (10 bars)
Maximum Test Pressure	225 psi (16 bars)



Tandem Diaphragm Actuator

Tandem Diaphragm Actuator Sizing Chart –

Valve		Actuator		
Bore	psi	Size	Operating Pressure	Volume Displacement
1-13/16"	15,000	D 1512-2	.007 x WP (105 psi/7 bars)	1,225 in ³
2-1/16"	15,000	D 1512-2	.008 x WP (120 psi/8 bars)	1,336 in ³
		D 1512-2	.011 x WP (110 psi/8 bars)	1,225 in ³
2-9/16"	15,000	D 1515-2	.008 x WP (120 psi/8 bars)	1,600 in ³
		D 1818-2	.006 x WP (90 psi/6 bars)	2,300 in ³
3-1/8"	10,000	D 1512-3	.012 x WP (120 psi/8 bars)	1,350 in ³
		D 1818-3	.007 x WP (105 psi/7 bars)	2,300 in ³
4-1/16"	10,000	D 1818-4	.012 x WP (120 psi/8 bars)	2,500 in ³
5-1/8"	5,000	D 1515-5	.024 x WP (120 psi/8 bars)	2,200 in ³
		D 1815-5	.020 x WP (100 psi/7 bars)	2,450 in ³



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Actuators

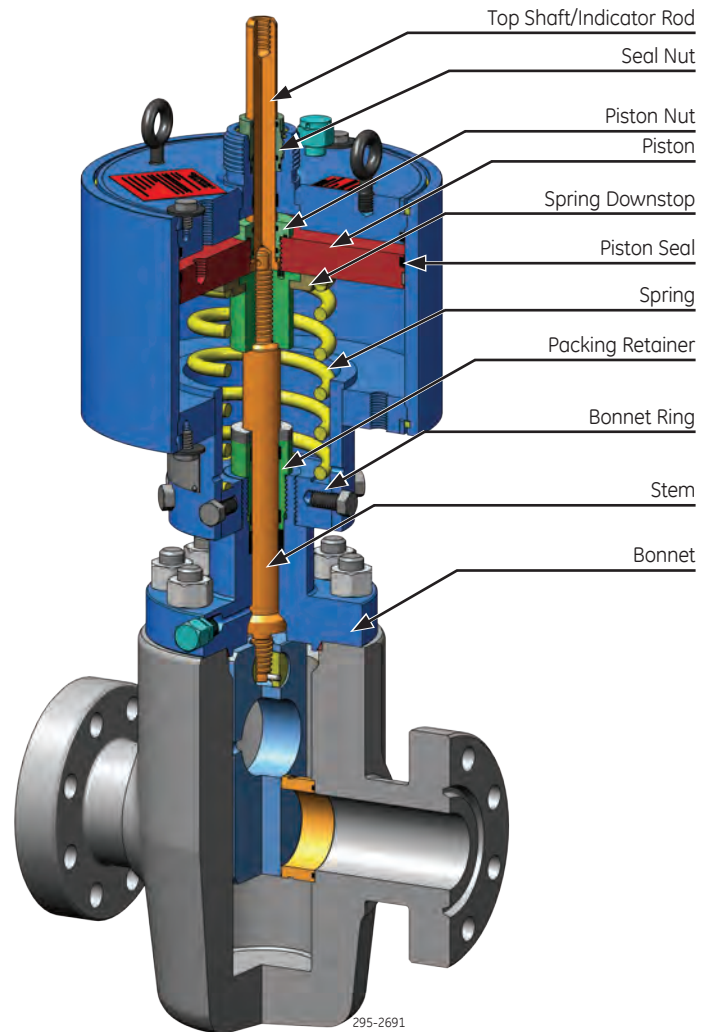
Pressure Control Model P Pneumatic Piston Actuator

The Model P Pneumatic Piston Actuator is designed for use on reverse-acting or direct acting gate valves. The actuator functions as a fail-safe closed device when mounted on a reverse-acting gate valve and as a fail-safe open device when mounted on a direct acting gate valve. Suitable for use in onshore and offshore applications, Model P pneumatic piston actuators deliver reliable open/close performance for control of wellbore or pipeline fluids and natural gas.

When used as a fail-safe closed shutdown valve (SDV), the actuator will require sufficient supply pressure to open the valve. Refer to the actuator sizing chart on the reverse side to determine applicable actuator opening pressure. Supply pressure is applied to the actuator supply port onto an internal piston where it forces a downward movement, compressing an actuator coil spring and generating sufficient actuator forces to open the valve. Valve closure is obtained when supply pressure is vented from actuator. Rugged in design, Model P piston actuators may be used in applications where diaphragm actuators are not desirable.

Features —

- Simplicity
 - Compact
 - Easy to install and maintain — lifting eyes standard on all models
 - Seal nut elastomers can be replaced without removal of actuator indicator rod or upper/lower case disassembly
 - Drift spacers allow for permanent drift adjustment
 - No special tools required for repair
- Long service life
 - Non stainless components are coated with Xylan to provide corrosion resistance in harsh environments
 - Aluminum bronze material used for seal and diaphragm nut to minimize wear
 - Wear bearings in bonnet packing retainer eliminate metal-to-metal contact with bonnet stem
 - Actuator top shaft/indicator rod is free-floating, thus eliminating torque transfer when using manual hold open device
 - Floating piston travels on wear bearing, eliminating internal metal-to-metal contact
- Designed for safety
 - Actuator external relief valve protects equipment and personnel from overpressurization
 - Heavy-duty actuator compression spring ensures engagement of metal-to-metal fire-safe bonnet stem backseat and valve closure
 - Design of actuator seal nut allows for venting of internal actuator pressure during removal and alerts service technician of an unsafe condition that pressure remains in actuator
 - Actuator seal nut elastomers accessed and easily replaced without removal of actuator top shaft/indicator rod or upper/lower case disassembly
 - Bonnet communication port is located above bonnet stem metal-to-metal fire seal and below stem packing



Model P Pneumatic Piston Actuator

Specifications —

Model P	
Models	P13, P18, P20, P26
Applicable Valve Sizing	1-13/16" thru 7-1/16"
API Specification	API 6A
Pneumatic Actuator	Standard Service
PR2	Annex F
Temperature	0°F to +150°F (-18°C to +66°C)
Maximum Working Pressure	150 psi (10 bars)
Maximum Test Pressure	225 psi (16 bars)



Pneumatic Actuator Sizing Chart —

Valve Bore	Actuator					
	psi	Model	Size	Operating Pressure	Volume Displacement	
1-13/16"	10,000	P13	P 1301	.014 x WP (140 psi/10 bars)	308.2 in ³	
	15,000	P18	P 1801	.007 x WP (110 psi/8 bars)	846.0 in ³	
2-1/16"	2,000	P13	P 1302	.015 x WP (35 psi/2 bars)	370.0 in ³	
	3,000	P13	P 1302	.015 x WP (50 psi/3 bars)	370.0 in ³	
	5,000	P13	P 1302	.015 x WP (80 psi/6 bars)	370.0 in ³	
	10,000	P13	P 1302	.015 x WP (150 psi/10 bars)	370.0 in ³	
	15,000	P18	P 1802	.008 x WP (120 psi/8 bars)	714.0 in ³	
			P20	P 2002	.006 x WP (90 psi/6 bars)	1,089.3 in ³
2-9/16"	2,000	P13	P 1302	.019 x WP (40 psi/3 bars)	437.1 in ³	
	3,000	P13	P 1302	.019 x WP (55 psi/4 bars)	437.1 in ³	
	5,000	P13	P 1302	.019 x WP (90 psi/6 bars)	437.1 in ³	
	10,000	P18	P 1802	.010 x WP (100 psi/7 bars)	846.0 in ³	
	15,000	P18	P 1802	.010 x WP (150 psi/10 bars)	846.0 in ³	
			P20	P 2002	.008 x WP (120 psi/8 bars)	1,089.3 in ³
3-1/8"	2,000	P13	P 1303	.026 x WP (50 psi/3 bars)	519.1 in ³	
	3,000	P13	P 1303	.026 x WP (75 psi/5 bars)	519.1 in ³	
	5,000	P13	P 1303	.026 x WP (125 psi/9 bars)	519.1 in ³	
	10,000	P18	P 1803	.012 x WP (125 psi/9 bars)	978.0 in ³	
			P20	P 2003	.010 x WP (100 psi/7 bars)	1,297.0 in ³
			P20	P 2003	.010 x WP (150 psi/10 bars)	1,297.0 in ³
4-1/16"	2,000	P18	P 1804	.021 x WP (42 psi/3 bars)	1,245.0 in ³	
	3,000	P18	P 1804	.021 x WP (63 psi/4 bars)	1,245.0 in ³	
			P18	P 1804	.021 x WP (105 psi/7 bars)	1,245.0 in ³
	5,000	P20	P 2004	.016 x WP (80 psi/6 bars)	1,599.9 in ³	
5-1/8"	2,000	P18	P 1805	.030 x WP (60 psi/4 bars)	1,350.0 in ³	
			P18	P 1805	.030 x WP (90 psi/6 bars)	1,350.0 in ³
	3,000	P20	P 2005	.024 x WP (75 psi/5 bars)	1,978.3 in ³	
			P18	P 1805	.030 x WP (150 psi/10 bars)	1,536.0 in ³
	5,000	P20	P 2005	.024 x WP (120 psi/8 bars)	1,978.3 in ³	



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Actuators

Pressure Control Model RA Hydraulic Actuator

The Model RA (Reverse-Acting) Hydraulic Actuator is available in sizes ranging from 1-13/16" through 7-1/16" and pressure ratings ranging from 2,000 psi through 15,000 psi. The RA is designed with safety in mind and is adaptable to all major manufacturers' gate valves. In addition, self-contained systems are available.

The RA actuator is designed to operate when hydraulic pressure is applied between a stationary piston and a movable cylinder tube, causing the tube and spring to move downward, while opening a reverse-acting gate valve. When hydraulic pressure is vented or lost, the helical spring returns the actuator to the fully up (closed) position. This fail-safe return action occurs independent of valve pressurization. The actuator spring housing is a sealed unit which eliminates internal corrosion caused by atmospheric contamination, thereby:

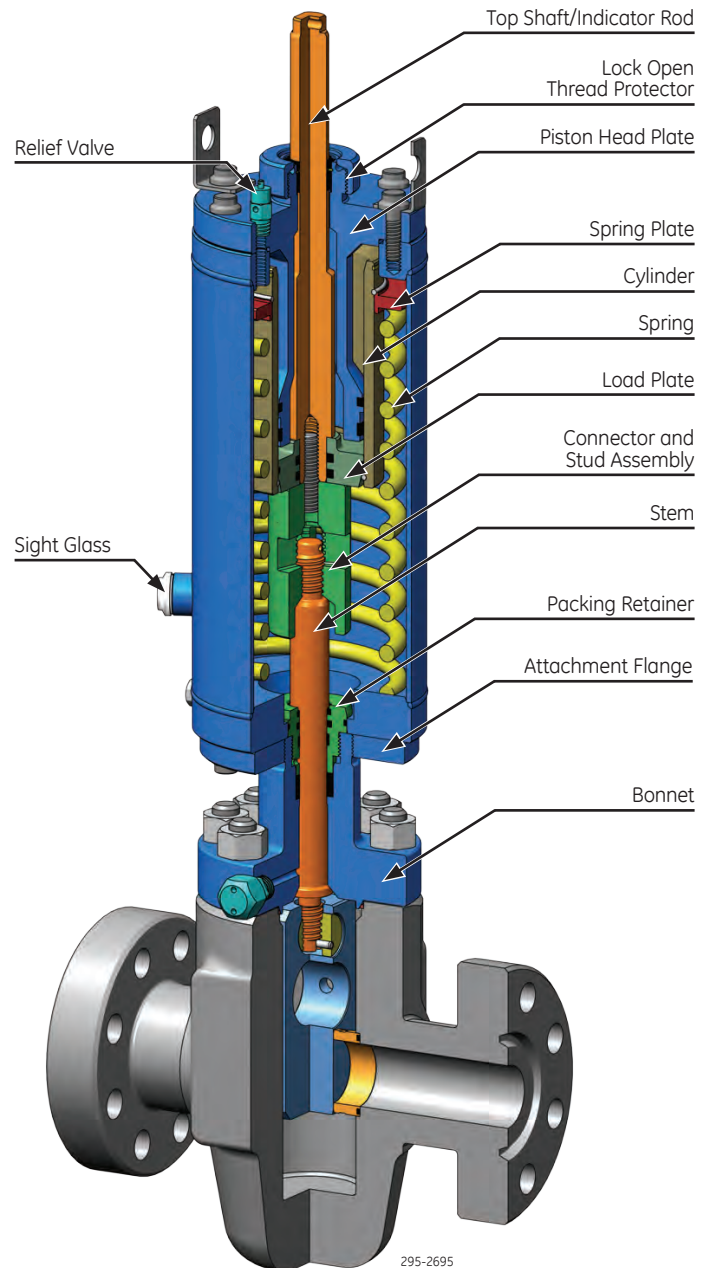
- Reducing costly down time,
- Reducing related maintenance, repair and spare parts costs, and
- Significantly extending actuator life

Features —

- Safety
 - Spring housing is a welded construction that prevents release of preloaded spring
 - Visual position indicator rod
 - No harmful emissions
- Designed for long service life
 - Containment protection for longer service life
- Modular design
 - Easy to maintain

Accessories —

- Manual self-contained control system for remote applications (PC #04-0403)
- Hold open devices available in both manual and positive configurations with non-fusible, fusible and high thrust fusible options
- Hydraulic override
- Electric limit switches
- Clear stem protectors



- Electric powered control system
- Fusible plug accessory available to close valve in case of fire



Model RA Hydraulic Actuator



Specifications –

Model RA	
Models	RA-3, RA-4, RA-6, RA-8, RA-12
Applicable Valve Sizing	1-13/16" thru 7-1/16"
API Specification	API 6A
Hydraulic Actuator	Standard Service
PR2	Annex F
Temperature*	-50°F to +150°F (-46°C to +66°C)
Maximum Working Pressure**	3,500 psi (241 bars)
Maximum Test Pressure	5,250 psi (362 bars)

* Temperature: -75°F (-59°C) upon request

** Maximum Working Pressure: Higher pressures available upon request

Hydraulic Actuator Sizing Chart –

Valve Bore	psi	Model	Actuator	
			Operating Pressure	Volume Displacement
1-13/16"	10,000	RA-3-11	.147 x WP + 183 psi (1,653 psi/115 bars)	29.77 in ³
	15,000	RA-3-11	.147 x WP + 189 psi (2,394 psi/165 bars)	29.77 in ³
2-1/16"	3,000	RA-3-11	.159 x WP + 172 psi (649 psi/45 bars)	29.77 in ³
	5,000	RA-3-11	.159 x WP + 176 psi (971 psi/67 bars)	29.77 in ³
	10,000	RA-3-11	.159 x WP + 183 psi (1,773 psi/122 bars)	31.20 in ³
2-9/16"	15,000	RA-3-11	.159 x WP + 189 psi (2,574 psi/177 bars)	32.61 in ³
	3,000	RA-3-11	.186 x WP + 172 psi (730 psi/50 bars)	35.44 in ³
	5,000	RA-3-11	.186 x WP + 176 psi (1,106 psi/76 bars)	35.44 in ³
	10,000	RA-3-11	.186 x WP + 183 psi (2,043 psi/141 bars)	36.86 in ³
3-1/8"	15,000	RA-4-18	.130 x WP + 177 psi (2,127 psi/147 bars)	64.44 in ³
	3,000	RA-3-11	.276 x WP + 188 psi (1,016 psi/70 bars)	42.53 in ³
	5,000	RA-3-11	.276 x WP + 193 psi (1,573 psi/108 bars)	42.53 in ³
3-1/16"	10,000	RA-4-18	.182 x WP + 185 psi (2,005 psi/138 bars)	71.34 in ³
	15,000	RA-6-29	.134 x WP + 167 psi (2,177 psi/150 bars)	115.64 in ³
4-1/16"	3,000	RA-4-18	.347 x WP + 190 psi (1,231 psi/85 bars)	89.75 in ³
	5,000	RA-4-18	.347 x WP + 193 psi (1,928 psi/133 bars)	89.75 in ³
	10,000	RA-4-18	.302 x WP + 201 psi (3,221 psi/222 bars)	89.75 in ³
	15,000	RA-6-29	.185 x WP + 171 psi (2,946 psi/203 bars)	148.17 in ³
	3,000	RA-4-18	.457 x WP + 202 psi (1,573 psi/108 bars)	104.94 in ³
5-1/8"	5,000	RA-4-18	.457 x WP + 207 psi (2,492 psi/172 bars)	104.94 in ³
	10,000	RA-6-29	.291 x WP + 177 psi (3,087 psi/213 bars)	259.77 in ³
	15,000	Consult Engineering		
6-3/8"	3,000	RA-6-22	.608 x WP + 234 psi (2,058 psi/142 bars)	156.68 in ³
	5,000	RA-6-29	.463 x WP + 181 psi (2,496 psi/172 bars)	205.77 in ³
	10,000	Consult Engineering		
	15,000	Consult Engineering		
7-1/16"	3,000	RA-6-22	.735 x WP + 239 psi (2,444 psi/169 bars)	173.18 in ³
	5,000	RA-6-29	.559 x WP + 186 psi (2,981 psi/206 bars)	227.67 in ³
	10,000	Consult Engineering		
	15,000	Consult Engineering		



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Actuators

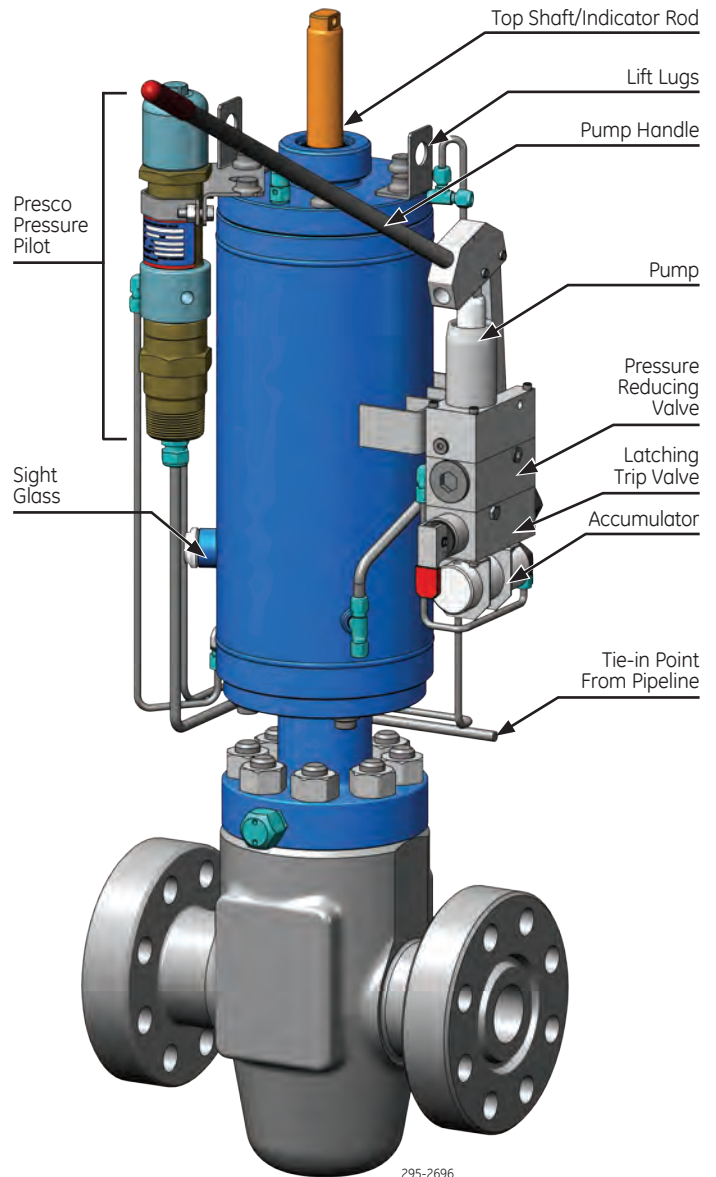
Pressure Control Model RA-ESD Self-Contained Actuator

The Model RA-ESD (Emergency Shutdown System) Self-Contained Actuator is a Model RA actuator fitted with the self-contained hydraulic control system. The ESD system provides immediate shutdown of a well or pipeline under any climatic conditions even in remote locations where no external power source is available.

The RA-ESD actuator consists of three basic components: the RA actuator, the hydraulic hand pump and the high-low pressure pilot. Hydraulic fluid is pumped into the actuator piston chamber to operate the valve. The high-low pressure pilot is a sensor, which can be adjusted to detect pressures in the well or pipeline that vary from the set values. The lower portion of the actuator housing acts as a convenient hydraulic fluid reservoir. This makes the system more compact and also lubricates the internals of the actuator to prolong service life.

Features —

- Fail-safe valve shutdown
- Totally self-contained
 - No flowline pressure required
 - No compressed gas required
 - No electricity required
 - No nitrogen required
 - Uses clean hydraulic fluid in a closed circuit
- Simple and safe
 - All components can be independently replaced (if necessary)
 - Spring housing is a welded construction that prevents release of preloaded spring
- High initial closing force
- Modular design
 - Easy to maintain
- Visual position indicator rod for positive valve status
- Horizontal or vertical actuator orientation



Model RA-ESD Self-Contained Actuator

Accessories —

- Manual accessories
 - Hold open devices available in both manual and positive configurations with non-fusible, fusible and high thrust fusible options
 - Hydraulic override
 - Clear polymer stem protector
 - Desert service manual self-contained hydraulic ESD control package
- Electric accessories
 - Electric limit switches
 - Electric-hydraulic powered ESD control system
 - Solar powered ESD control system
 - Solenoid for remote closing
- Overpressure protection
- Remote Presco-Tee with high-low pilot for monitoring pressure in the well or pipeline
- Telemetry application systems
- Dump valve for quick closing
- Pressure pilots

Specifications —

Model RA-ESD	
Models	RA-3, RA-4, RA-6, RA-8, RA-12
Applicable Valve Sizing	1-13/16" thru 7-1/16"
API Specification	API 6A
Hydraulic Actuator	Standard Service
PR2	Annex F
Temperature*	-50°F to +150°F (-46°C to +66°C)
Maximum Working Pressure**	3,500 psi (241 bars)
Maximum Test Pressure	5,250 psi (362 bars)

* Temperature: -75°F (-59°C) upon request

** Maximum Working Pressure: Higher pressures available upon request

Hydraulic Actuator Sizing Chart —

Valve		Actuator		
Bore	psi	Model	Operating Pressure	Volume Displacement
1-13/16"	10,000	RA-3-11	.147 x WP + 183 psi (1,653 psi/115 bars)	29.77 in ³
	15,000	RA-3-11	.147 x WP + 189 psi (2,394 psi/165 bars)	29.77 in ³
2-1/16"	3,000	RA-3-11	.159 x WP + 172 psi (649 psi/45 bars)	29.77 in ³
	5,000	RA-3-11	.159 x WP + 176 psi (971 psi/67 bars)	29.77 in ³
	10,000	RA-3-11	.159 x WP + 183 psi (1,773 psi/122 bars)	31.20 in ³
	15,000	RA-3-11	.159 x WP + 189 psi (2,574 psi/177 bars)	32.61 in ³
2-9/16"	3,000	RA-3-11	.186 x WP + 172 psi (730 psi/50 bars)	35.44 in ³
	5,000	RA-3-11	.186 x WP + 176 psi (1,106 psi/76 bars)	35.44 in ³
	10,000	RA-3-11	.186 x WP + 183 psi (2,043 psi/141 bars)	36.86 in ³
3-1/8"	15,000	RA-4-18	.130 x WP + 177 psi (2,127 psi/147 bars)	64.44 in ³
	3,000	RA-3-11	.276 x WP + 188 psi (1,016 psi/70 bars)	42.53 in ³
3-1/8"	5,000	RA-3-11	.276 x WP + 193 psi (1,573 psi/108 bars)	42.53 in ³
	10,000	RA-4-18	.182 x WP + 185 psi (2,005 psi/138 bars)	71.34 in ³
3-1/16"	15,000	RA-6-29	.134 x WP + 167 psi (2,177 psi/150 bars)	115.64 in ³
	3,000	RA-4-18	.347 x WP + 190 psi (1,231 psi/85 bars)	89.75 in ³
4-1/16"	5,000	RA-4-18	.347 x WP + 193 psi (1,928 psi/133 bars)	89.75 in ³
	10,000	RA-4-18	.302 x WP + 201 psi (3,221 psi/222 bars)	89.75 in ³
	15,000	RA-6-29	.185 x WP + 171 psi (2,946 psi/203 bars)	148.17 in ³
	3,000	RA-4-18	.457 x WP + 202 psi (1,573 psi/108 bars)	104.94 in ³
5-1/8"	5,000	RA-4-18	.457 x WP + 207 psi (2,492 psi/172 bars)	104.94 in ³
	10,000	RA-6-29	.291 x WP + 177 psi (3,087 psi/213 bars)	259.77 in ³
	15,000	Consult Engineering		
6-3/8"	3,000	RA-6-22	.608 x WP + 234 psi (2,058 psi/142 bars)	156.68 in ³
	5,000	RA-6-29	.463 x WP + 181 psi (2,496 psi/172 bars)	205.77 in ³
	10,000	Consult Engineering		
	15,000	Consult Engineering		
7-1/16"	3,000	RA-6-22	.735 x WP + 239 psi (2,444 psi/169 bars)	173.18 in ³
	5,000	RA-6-29	.559 x WP + 186 psi (2,981 psi/206 bars)	227.67 in ³
	10,000	Consult Engineering		
	15,000	Consult Engineering		



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Actuators

Pressure Control Model HSRA-2 Hydraulic Actuator

Like the Model RA-ESD (Emergency Shutdown System) Actuator, the Model HSRA-2 Hydraulic Self-Contained ESD System is designed to provide immediate shutdown of a well or pipeline even in the most remote locations. The major difference is that this actuator has been designed specifically for 2-1/16" 2,000 to 5,000 psi applications. As a result, the actuator design is smaller, lighter and more compact than any comparable actuator on the market. This compact system consists of a streamlined reduced volume hydraulic actuator, a pump module, and a sensing pilot.

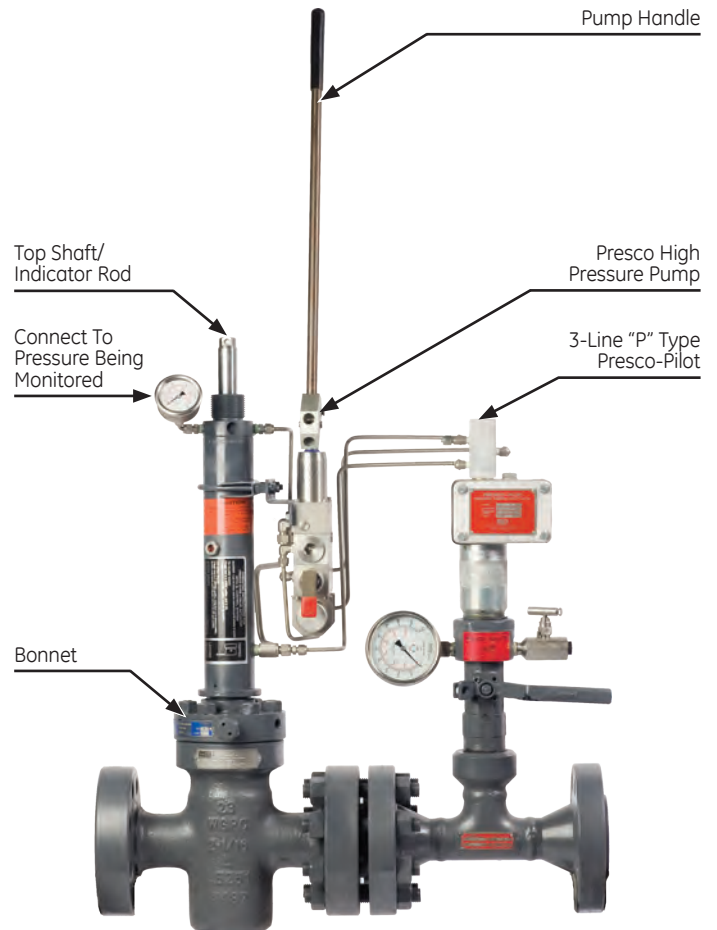
The HSRA-2 system is armed by first determining the criteria for shutdown. With the pilot set to sense the shutdown criteria, the gate valve is ready to be opened. The hand pump transfers hydraulic fluid from the reservoir below the actuator piston into the actuator cylinder, compressing the preloaded spring and opening the valve. When the valve is fully opened, the latching trip valve is automatically engaged and the system is armed.

If, during normal operation, the predetermined shutdown criteria is sensed by the pilot valves or other signal, the latching trip valve is automatically "tripped", causing the control circuit to vent. The pressurized hydraulic fluid in the actuator cylinder, assisted by the preloaded spring below the actuator piston and the process fluid, flows back to the reservoir. The gate valve returns to the closed position.

Remote shutdown or automatic trip control for other monitoring devices, such as pressure pilots, liquid levels and detected leaks is available.

Features —

- Totally manual and requires no external power source — no electricity, no pipeline pressurized gas, no nitrogen gas bottles, etc. — to operate
- Completely self-contained to prevent contaminants from entering and causing internal corrosion that could damage the system
- Two distinct pressures from a single pump module: high pressure for the actuator circuit and low pressure for the control circuit
- High spring pre-load ensures enough force to close the gate valve at zero flowline pressures
- Reduced volume minimizes closing time



3-Line "P" Type Presco-Pilot on an Assembly with a Model 1000 Valve, Model HSRA-2 Actuator and Presco High Pressure Pump



Model HSRA-2 Hydraulic Actuator

Accessories —

- Manual accessories
 - Lock open devices available in both manual and positive configurations with non-fusible and fusible options
 - Clear polymer stem protector
- Electric accessories
 - Electric limit switches
 - Electric-hydraulic powered ESD control system
 - Solar-powered ESD control system
 - Solenoid for remote closing
- Remote Presco-Tee with high-low pilot for monitoring pressure in the well or pipeline
- Telemetry application systems
- Pressure pilots

Specifications —

Model HSRA-2	
Valve Size	2-1/16" (2,000 psi thru 5,000 psi)
API Specification	API 6A
Hydraulic Actuator	Standard Service
PR2	Annex F
Temperature	-50°F to +150°F (-46°C to +66°C)
Maximum Working Pressure	5,000 psi (345 bars)
Maximum Test Pressure	7,500 psi (517 bars)



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Actuators

Pressure Control Model HDA-RS Hydraulic Actuator

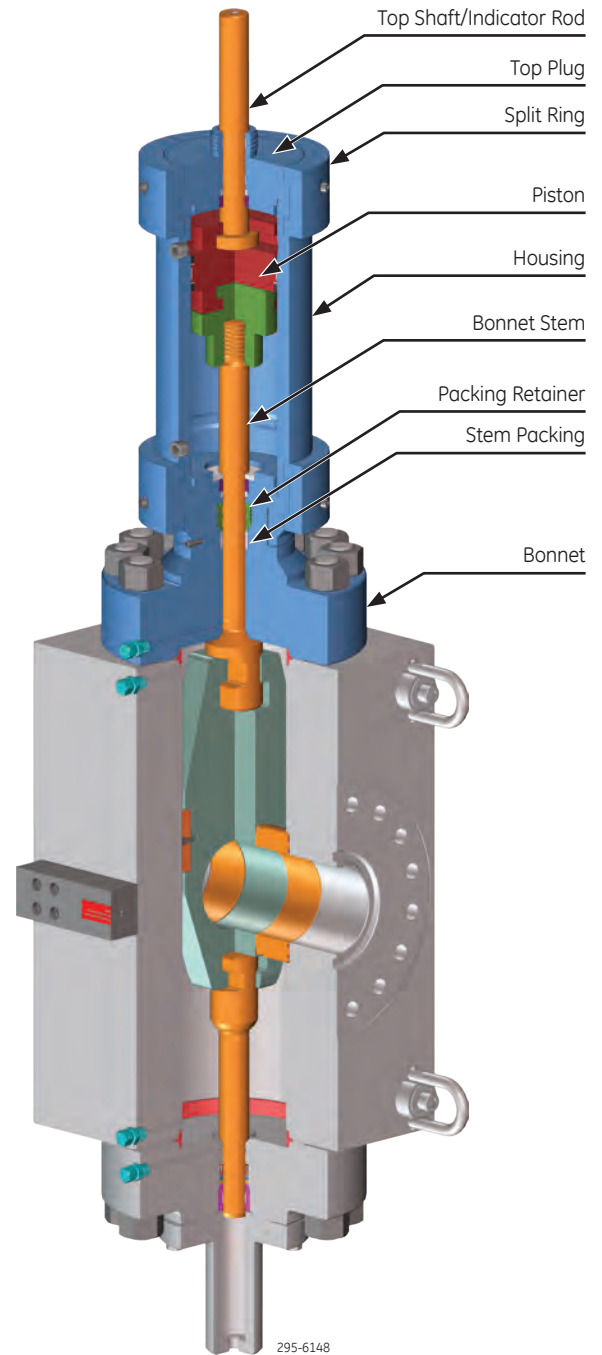
The Model HDA-RS (Hydraulic Double-Acting - Rising Stem) Actuator is available for valve sizes from 2-1/16" through 7-1/16" with pressure ratings from 3,000 psi up to 20,000 psi. The actuator operates as a 'pressure to open and pressure to close' device under severe operating conditions. Model HDA-RS actuators deliver reliable performance for control of wellbore fluids and are intended for use on frac applications, choke, kill and mudline manifolds, as well as other critical applications.

The HDA-RS is operated by applying adequate hydraulic pressure to either the top side or the bottom side of a piston in the actuator housing. Hydraulic pressure will force the bonnet stem to either open or close the gate valve, depending on which side of the piston is pressurized.

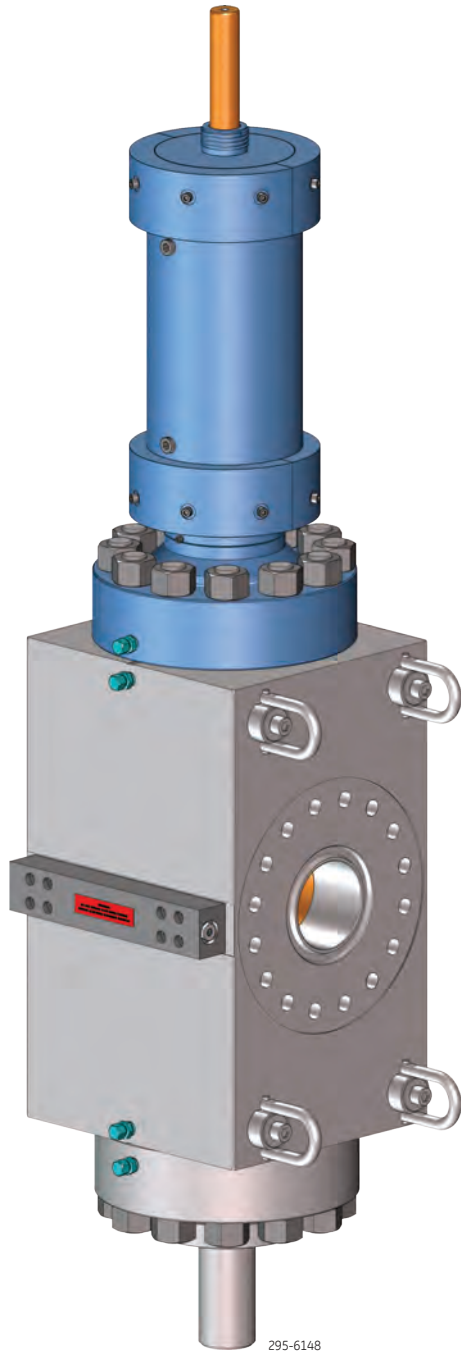
The gate is in the full-open position when the indicator rod is fully extended at the top of the actuator and is in the full-closed position when the indicator rod is fully depressed into the top of the actuator. Since no internal springs are involved, upon loss of pressure to either side of the piston, the valve will remain in its current position.

Features —

- Indicator rod provides visual confirmation of the valve's position
- No internal springs
- Easy to maintain
 - No special tools required
- Suitable for a wide variety of applications
 - Drilling
 - Choke and kill manifolds
 - Fracturing
 - Mudline systems



Model HDA-RS Hydraulic Actuator



Specifications —

Model HDA-RS	
Models	H3025, H4530, H6540, H6550, H9550, H9570, H14570
Applicable Valve Sizing	2-1/16" thru 7-1/16"
API Specification	API 6A
Hydraulic Actuator	Standard Service
PR2	Annex F
Temperature	-50°F to +180°F (-46°C to +82°C)
Maximum Working Pressure	3,000 psi (206 bars)
Maximum Test Pressure	4,500 psi (310 bars)



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Actuators

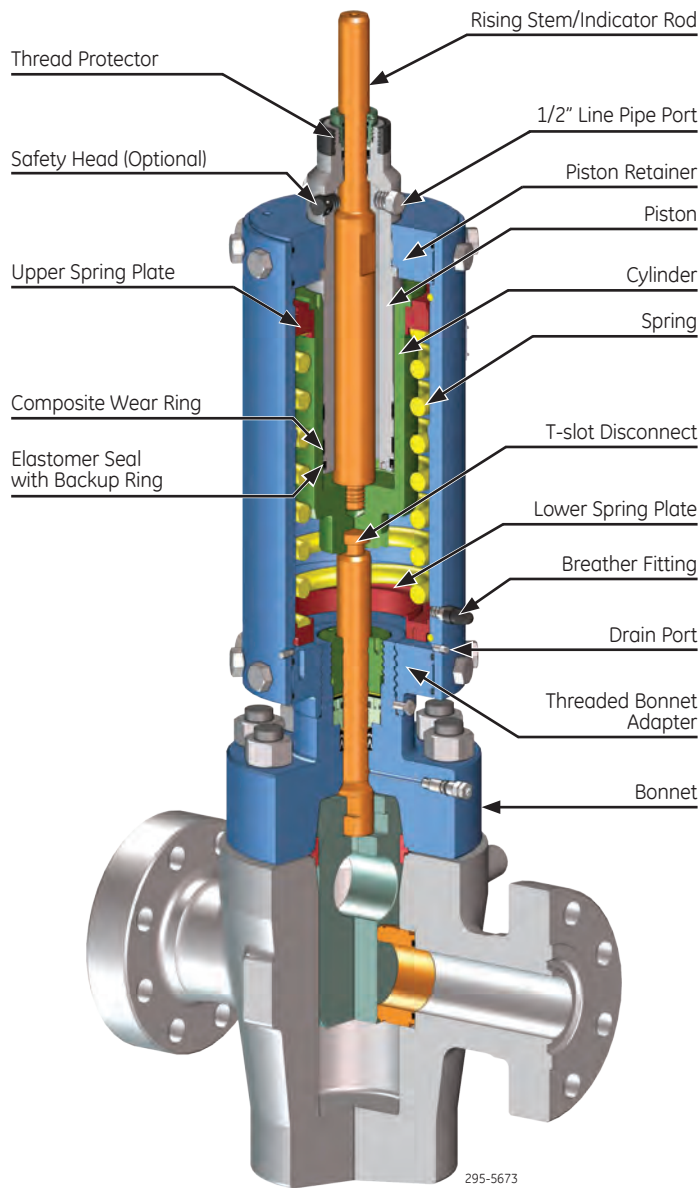
Pressure Control CHA Top Access Standard Hydraulic Actuator

The CHA Top Access Standard Hydraulic Actuator is available for valve sizes from 1-13/16" through 7-1/16" and wellhead pressure ratings from 2,000 psi through 15,000 psi and operates at a maximum supply pressure of 6,000 psi. Based on the field-proven CH actuator, the CHA's enhanced unitized construction and T-slot quick-disconnect enable it to be safely and quickly removed from the bonnet. It also features a rising stem for visual confirmation of the valve's position. Easy seal replacement minimizes downtime during maintenance.

The CHA actuator is designed to operate when hydraulic pressure is applied between a stationary piston and a movable cylinder, causing the cylinder and spring to move downward, while opening a reverse-acting gate valve. When hydraulic pressure is vented or lost, the helical spring returns the actuator to the fully up (closed) position. This fail-safe return action occurs independent of valve pressurization.

Features —

- Improved safety
 - Quick-disconnect allows for removal of actuator from bonnet within the valve operating stroke without depressurizing the valve and releasing of hydrocarbons
 - Powerful coil spring allows valve closure
 - Captured spring designed to prevent release of preloaded spring during repair or actuator removal
 - Top access rising stem provides both a visual confirmation of the valve's position and an interface for the use of accessories
- Designed for long life and enhanced efficiency
 - 6,000 psi maximum supply pressure allows use of smaller actuator and greater control system flexibility
 - Hard chrome plated cylinder resists wear and extends elastomer life
 - Optimized coatings on internal metallic components provide enhanced corrosion resistance
 - Optional safety head protects actuator from overpressure



- Easy to maintain
 - No special tools required
 - External drift adjustment is permanently set within bonnet before installation and remains set regardless of work performed
 - Actuator piston seals can be replaced without removal or complete disassembly while mounted onto pressurized gate valve
 - Two 1/2" LP actuator ports minimize closure time, eliminate debris buildup, and provide easy alignment for supply line installation



CHA Top Access Standard Hydraulic Actuator

Optional Configurations –

- CHA-WLS Top Access Wireline Shearing Design (PC #12-0341) capable of shearing standard 7/32" braided wire
- CHA-C Classic Standard Design (PC #12-0336) has no rising stem or top access
- CHA-WLC Classic Wireline Shearing Design (PC #12-0342) has no rising stem or top access and is capable of shearing standard 7/32" braided wire

Accessories –

- Integral electric valve position indicator
- Electric valve position indicator
- Fusible lock open device
- Lock open cap
- Stem guard
- Clear stem protectors
- Manual and hydraulic overrides

Specifications –

Model CHA Top Access Standard	
Models	CHA-38, CHA-48, CHA-55
Valve Size	1-13/16" thru 7-1/16" (2,000 psi thru 15,000 psi)
API Specification	API 6A
Hydraulic Actuator	Standard Service
PR2	Annex F
Temperature	-20°F to +150°F (-29°C to +66°C)
Maximum Supply Pressure	6,000 psi (414 bars)
Maximum Test Pressure	9,000 psi (621 bars)

Hydraulic Actuator Sizing Charts –

3,000 psi Maximum Hydraulic Supply Pressure Systems					
Valve		Actuator			
Bore	psi	Model	Piston Eff. Area	Maximum Actuator Stroke	Volume Displacement
1-13/16"	10,000	CHA-38/400	10.27 in ²	4.00"	27.28 in ³
	15,000	CHA-48/400	15.97 in ²	4.00"	42.42 in ³
2-1/16"	3,000	CHA-38/400	10.27 in ²	4.00"	27.28 in ³
	5,000	CHA-38/400	10.27 in ²	4.00"	27.28 in ³
	10,000	CHA-38/400	10.27 in ²	4.00"	28.56 in ³
	15,000	CHA-48/400	15.97 in ²	4.00"	46.41 in ³
2-9/16"	3,000	CHA-38/400	10.27 in ²	4.00"	32.41 in ³
	5,000	CHA-38/400	10.27 in ²	4.00"	32.41 in ³
	10,000	CHA-38/400	10.27 in ²	4.00"	33.70 in ³
3-1/8"	3,000	CHA-38/400	10.27 in ²	4.00"	38.83 in ³
	5,000	CHA-38/400	10.27 in ²	4.00"	38.83 in ³
3-1/16"	10,000	CHA-48/400	15.97 in ²	4.00"	62.38 in ³
	15,000	Consult Engineering			
4-1/16"	3,000	CHA-48/600	15.97 in ²	6.00"	78.35 in ³
	5,000	CHA-48/600	15.97 in ²	6.00"	78.35 in ³
	10,000	CHA-55/800	22.01 in ²	8.00"	107.98 in ³
	15,000	Consult Engineering			
5-1/8"	3,000	CHA-48/600	15.97 in ²	6.00"	92.32 in ³
	5,000	CHA-48/600	15.97 in ²	6.00"	92.32 in ³
	10,000	Consult Engineering			
6-3/8"	3,000	CHA-55/800	22.01 in ²	8.00"	157.50 in ³
	5,000	CHA-55/800	22.01 in ²	8.00"	157.50 in ³
7-1/16"	10,000	CHA-55/800	22.01 in ²	8.00"	174.01 in ³
	5,000	Consult Engineering			
	10,000	Consult Engineering			

5,000 psi Maximum Hydraulic Supply Pressure Systems					
Valve		Actuator			
Bore	psi	Model	Piston Eff. Area	Maximum Actuator Stroke	Volume Displacement
1-13/16"	10,000	CHA-38/400	10.27 in ²	4.00"	27.28 in ³
	15,000	CHA-38/400	10.27 in ²	4.00"	27.28 in ³
2-1/16"	3,000	CHA-38/400	10.27 in ²	4.00"	27.28 in ³
	5,000	CHA-38/400	10.27 in ²	4.00"	27.28 in ³
	10,000	CHA-38/400	10.27 in ²	4.00"	28.56 in ³
	15,000	CHA-38/400	10.27 in ²	4.00"	29.84 in ³
2-9/16"	3,000	CHA-38/400	10.27 in ²	4.00"	32.41 in ³
	5,000	CHA-38/400	10.27 in ²	4.00"	32.41 in ³
	10,000	CHA-38/400	10.27 in ²	4.00"	33.70 in ³
3-1/8"	3,000	CHA-38/400	10.27 in ²	4.00"	38.83 in ³
	5,000	CHA-38/400	10.27 in ²	4.00"	38.83 in ³
3-1/16"	10,000	CHA-38/400	10.27 in ²	4.00"	40.11 in ³
	15,000	CHA-48/400	15.97 in ²	4.00"	64.38 in ³
4-1/16"	3,000	CHA-48/600	15.97 in ²	6.00"	78.35 in ³
	5,000	CHA-48/600	15.97 in ²	6.00"	78.35 in ³
	10,000	CHA-48/600	15.97 in ²	6.00"	78.35 in ³
	15,000	Consult Engineering			
5-1/8"	3,000	CHA-48/600	15.97 in ²	6.00"	92.32 in ³
	5,000	CHA-48/600	15.97 in ²	6.00"	92.32 in ³
	10,000	CHA-55/800	22.01 in ²	8.00"	135.49 in ³
6-3/8"	3,000	CHA-55/800	22.01 in ²	8.00"	157.50 in ³
	5,000	CHA-55/800	22.01 in ²	8.00"	157.50 in ³
7-1/16"	10,000	CHA-55/800	22.01 in ²	8.00"	174.01 in ³
	5,000	CHA-55/800	22.01 in ²	8.00"	174.01 in ³
	10,000	Consult Engineering			



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Actuators

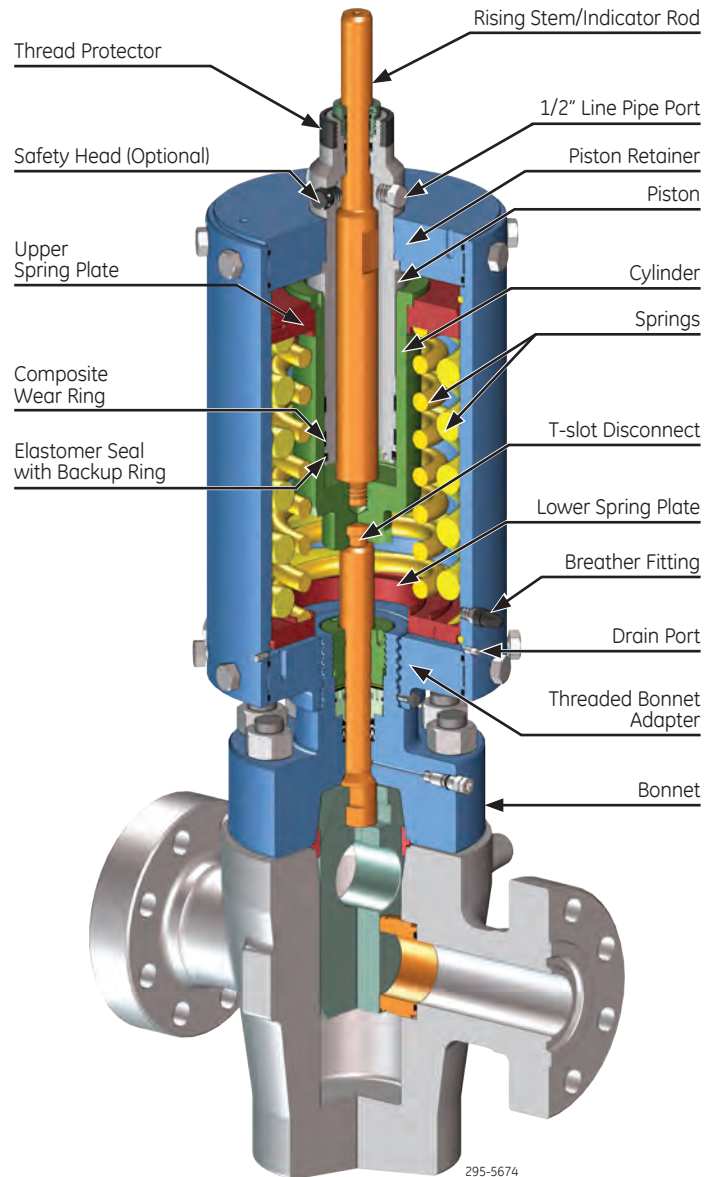
Pressure Control CHA-WLS Top Access Wireline Shearing Hydraulic Actuator

The CHA-WLS Top Access Wireline Shearing Hydraulic Actuator is available for valve sizes from 1-13/16" through 7-1/16" and wellhead pressure ratings from 2,000 psi through 15,000 psi and operates at a maximum supply pressure of 6,000 psi. Based on the field-proven CH actuator, the CHA-WLS's enhanced unitized construction and T-slot quick-disconnect enable it to be safely and quickly removed from the bonnet. It also features a rising stem for visual confirmation of the valve's position as well as a dual coil spring package capable of shearing standard 7/32" braided cable to allow valve closure. Easy seal replacement minimizes downtime during maintenance.

The CHA-WLS actuator is designed to operate when hydraulic pressure is applied between a stationary piston and a movable cylinder, causing the cylinder and spring to move downward, while opening a reverse-acting gate valve. When hydraulic pressure is vented or lost, the helical spring returns the actuator to the fully up (closed) position. This fail-safe return action occurs independent of valve pressurization.

Features —

- Improved safety
 - Quick-disconnect allows for removal of actuator from bonnet within the valve operating stroke without depressurizing the valve and releasing hydrocarbons
 - Powerful dual coil spring package capable of shearing standard 7/32" braided cable allowing valve closure
 - Captured spring designed to prevent release of preloaded spring during repair or actuator removal
 - Top access rising stem provides both a visual confirmation of the valve's position and an interface for the use of accessories
- Designed for long life and enhanced efficiency
 - 6,000 psi maximum supply pressure allows use of smaller actuator and greater control system flexibility
 - Hard chrome plated cylinder resists wear and extends elastomer life
 - Optimized coatings on internal metallic components provide enhanced corrosion resistance
 - Optional safety head protects actuator from overpressure
- Easy to maintain
 - No special tools required
 - External drift adjustment is permanently set within bonnet before installation and remains set regardless of work performed
 - Actuator piston seals can be replaced without removal or complete disassembly while mounted onto pressurized gate valve
 - Two 1/2" LP actuator ports minimize closure time, eliminate debris buildup, and provide easy alignment for supply line installation



CHA-WLS Top Access Wireline Shearing Hydraulic Actuator

Optional Configurations –

- CHA Top Access Standard Design (PC #12-0010) has no shearing capabilities
- CHA-C Classic Standard Design (PC #12-0336) has no rising stem or top access
- CHA-WLC Classic Wireline Shearing Design (PC #12-0342) has no rising stem or top access and is capable of standard shearing 7/32" braided wire

Accessories –

- Integral electric valve position indicator
- Electric valve position indicator
- Fusible lock open device
- Lock open cap
- Stem guard
- Clear stem protectors
- Manual and hydraulic overrides

Specifications –

Model CHA-WLS Top Access Wireline Shearing	
Models	CHA-48WLS, CHA-55WLS, CHA-70WLS
Valve Size	1-13/16" thru 7-1/16" (2,000 psi thru 15,000 psi)
API Specification	API 6A
Hydraulic Actuator	Standard Service
PR2	Annex F
Temperature	-20°F to +150°F (-29°C to +66°C)
Maximum Supply Pressure	6,000 psi (414 bars)
Maximum Test Pressure	9,000 psi (621 bars)

Hydraulic Actuator Sizing Charts –

3,000 psi Maximum Hydraulic Supply Pressure Systems					
Valve		Actuator			
Bore	psi	Model	Piston Eff. Area	Maximum Actuator Stroke	Volume Displacement
1-13/16"	10,000		Consult Engineering		
	15,000		Consult Engineering		
2-1/16"	3,000		Consult Engineering		
	5,000		Consult Engineering		
	10,000		Consult Engineering		
	15,000		Consult Engineering		
2-9/16"	3,000		Consult Engineering		
	5,000		Consult Engineering		
	10,000		Consult Engineering		
3-1/8"	3,000	CHA-48WLS/400	15.97 in ²	4.00"	60.38 in ³
	5,000	CHA-48WLS/400	15.97 in ²	4.00"	60.38 in ³
3-1/16"	10,000	CHA-48WLS/400	15.97 in ²	4.00"	62.38 in ³
	15,000	CHA-70WLS/850	35.37 in ²	8.50"	142.58 in ³
4-1/16"	3,000	CHA-48WLS/600	15.97 in ²	6.00"	78.35 in ³
	5,000	CHA-48WLS/600	15.97 in ²	6.00"	78.35 in ³
	10,000	CHA-70WLS/850	35.37 in ²	8.50"	173.53 in ³
	15,000		Consult Engineering		
5-1/8"	3,000	CHA-48WLS/400	15.97 in ²	6.00"	92.32 in ³
	5,000	CHA-55WLS/800	22.01 in ²	8.00"	127.24 in ³
	10,000	CHA-70WLS/850	35.37 in ²	8.50"	217.74 in ³
	15,000		Consult Engineering		
6-3/8"	3,000	CHA-55WLS/800	22.01 in ²	8.00"	157.50 in ³
	5,000	CHA-70WLS/850	35.37 in ²	8.50"	253.11 in ³
7-1/16"	3,000		Consult Engineering		
	10,000		Consult Engineering		

5,000 psi Maximum Hydraulic Supply Pressure Systems					
Valve		Actuator			
Bore	psi	Model	Piston Eff. Area	Maximum Actuator Stroke	Volume Displacement
1-13/16"	10,000		Consult Engineering		
	15,000		Consult Engineering		
2-1/16"	3,000		Consult Engineering		
	5,000		Consult Engineering		
	10,000		Consult Engineering		
	15,000		Consult Engineering		
2-9/16"	3,000		Consult Engineering		
	5,000		Consult Engineering		
	10,000		Consult Engineering		
3-1/8"	3,000	CHA-48WLS/400	15.97 in ²	4.00"	60.38 in ³
	5,000	CHA-48WLS/400	15.97 in ²	4.00"	60.38 in ³
3-1/16"	10,000	CHA-48WLS/400	15.97 in ²	4.00"	62.38 in ³
	15,000	CHA-48WLS/400	15.97 in ²	4.00"	64.38 in ³
4-1/16"	3,000	CHA-48WLS/600	15.97 in ²	6.00"	78.35 in ³
	5,000	CHA-48WLS/600	15.97 in ²	6.00"	78.35 in ³
	10,000	CHA-48WLS/600	15.97 in ²	6.00"	78.35 in ³
	15,000	CHA-70WLS/850	35.37 in ²	8.50"	182.37 in ³
5-1/8"	3,000	CHA-48WLS/600	15.97 in ²	6.00"	92.32 in ³
	5,000	CHA-48WLS/600	15.97 in ²	6.00"	92.32 in ³
	10,000	CHA-55WLS/800	22.01 in ²	8.00"	135.49 in ³
	15,000		Consult Engineering		
6-3/8"	3,000	CHA-55WLS/800	22.01 in ²	8.00"	157.50 in ³
	5,000	CHA-55WLS/800	22.01 in ²	8.00"	157.50 in ³
7-1/16"	10,000	CHA-70WLS/850	35.37 in ²	8.50"	266.37 in ³
	3,000	CHA-55WLS/800	22.01 in ²	8.00"	174.01 in ³
7-1/16"	5,000	CHA-55WLS/800	22.01 in ²	8.00"	174.01 in ³
	10,000		Consult Engineering		



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Actuators

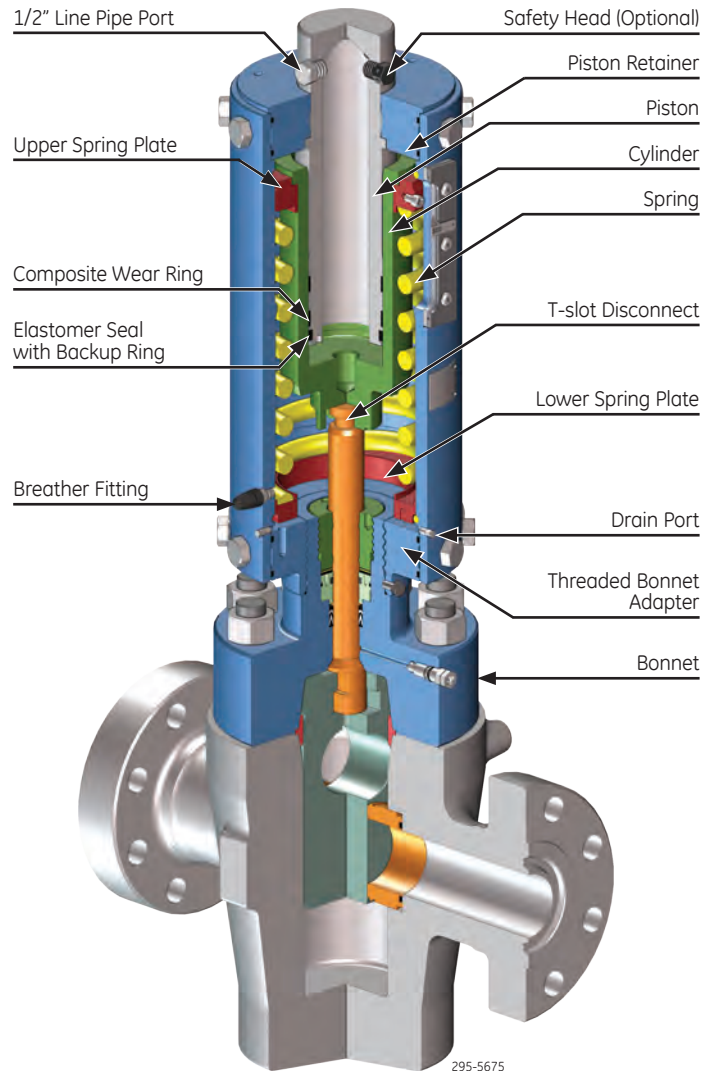
Pressure Control CHA-C Classic Standard Hydraulic Actuator

The CHA-C Classic Hydraulic Actuator is available for valve sizes from 1-13/16" through 7-1/16" and wellhead pressure ratings from 2,000 psi through 15,000 psi and operates at a maximum supply pressure of 6,000 psi. Based on the field-proven CH actuator, the CHA-C's enhanced unitized construction and T-slot quick-disconnect enable it to be safely and quickly removed from the bonnet. Easy seal replacement minimizes downtime during maintenance.

The CHA-C actuator is designed to operate when hydraulic pressure is applied between a stationary piston and a movable cylinder, causing the cylinder and spring to move downward, while opening a reverse-acting gate valve. When hydraulic pressure is vented or lost, the helical spring returns the actuator to the fully up (closed) position. This fail-safe return action occurs independent of valve pressurization.

Features —

- Improved safety
 - Quick-disconnect allows for removal of actuator from bonnet within the valve operating stroke without depressurizing the valve and releasing hydrocarbons
 - Powerful coil spring allows valve closure
 - Captured spring designed to prevent release of preloaded spring during repair or actuator removal
 - Non-rising stem design with window for visual confirmation of the valve's position
- Designed for long life and enhanced efficiency
 - 6,000 psi maximum supply pressure allows use of smaller actuator and greater control system flexibility
 - Hard chrome plated cylinder resists wear and extends elastomer life
 - Optimized coatings on internal metallic components provide enhanced corrosion resistance
 - Optional safety head protects actuator from overpressure



- Easy to maintain
 - No special tools required
 - External drift adjustment is permanently set within bonnet before installation and remains set regardless of work performed
 - Actuator piston seals can be replaced without removal or complete disassembly while mounted onto pressurized gate valve
 - Two 1/2" LP actuator ports minimize closure time, eliminate debris buildup, and provide easy alignment for supply line installation



CHA-C Classic Standard Hydraulic Actuator

Optional Configurations —

- CHA-WLC Classic Wireline Shearing Design (PC #12-0342) is capable of shearing standard 7/32" braided wire
- CHA Top Access Standard Design (PC #12-0010) has rising stem and top access
- CHA-WLS Top Access Wireline Shearing Design (PC # 12-0341) has rising stem and top access and is capable of shearing standard 7/32" braided wire

Accessories —

- Integral electric valve position indicator
- Electric valve position indicator
- Fusible lock open device
- Lock open cap
- Stem guard
- Clear stem protectors
- Manual and hydraulic overrides

Specifications —

Model CHA-C Classic Standard	
Models	CHA-38C, CHA-48C, CHA-55C
Valve Size	1-13/16" thru 7-1/16" (2,000 psi thru 15,000 psi)
API Specification	API 6A
Hydraulic Actuator	Standard Service
PR2	Annex F
Temperature	-20°F to +150°F (-29°C to +66°C)
Maximum Supply Pressure	6,000 psi (414 bars)
Maximum Test Pressure	9,000 psi (621 bars)

Hydraulic Actuator Sizing Charts —

3,000 psi Maximum Hydraulic Supply Pressure Systems					
Valve		Actuator			
Bore	psi	Model	Piston Eff. Area	Maximum Actuator Stroke	Volume Displacement
1-13/16"	10,000	CHA-38C/400	11.06 in ²	4.00"	29.38 in ³
	15,000	CHA-48C/400	17.74 in ²	4.00"	47.12 in ³
2-1/16"	3,000	CHA-38C/400	11.06 in ²	4.00"	29.38 in ³
	5,000	CHA-38C/400	11.06 in ²	4.00"	29.38 in ³
	10,000	CHA-38C/400	11.06 in ²	4.00"	30.76 in ³
	15,000	CHA-48C/400	17.74 in ²	4.00"	51.55 in ³
2-9/16"	3,000	CHA-38C/400	11.06 in ²	4.00"	34.91 in ³
	5,000	CHA-38C/400	11.06 in ²	4.00"	34.91 in ³
	10,000	CHA-38C/400	11.06 in ²	4.00"	36.29 in ³
	15,000	CHA-55C/800	23.78 in ²	8.00"	83.97 in ³
3-1/8"	3,000	CHA-38C/400	11.06 in ²	4.00"	41.82 in ³
	5,000	CHA-38C/400	11.06 in ²	4.00"	41.82 in ³
3-1/16"	10,000	CHA-48C/400	17.74 in ²	4.00"	69.29 in ³
	15,000	Consult Engineering			
4-1/16"	3,000	CHA-48C/600	17.74 in ²	6.00"	87.03 in ³
	5,000	CHA-48C/600	17.74 in ²	6.00"	87.03 in ³
	10,000	CHA-55C/800	23.78 in ²	8.00"	116.67 in ³
	15,000	Consult Engineering			
5-1/8"	3,000	CHA-48C/600	17.74 in ²	6.00"	102.55 in ³
	5,000	CHA-48C/600	17.74 in ²	6.00"	102.55 in ³
	10,000	Consult Engineering			
	15,000	Consult Engineering			
6-3/8"	3,000	CHA-55C/800	23.78 in ²	8.00"	170.17 in ³
	5,000	CHA-55C/800	23.78 in ²	8.00"	170.17 in ³
7-1/16"	10,000	Consult Engineering			
	15,000	Consult Engineering			

5,000 psi Maximum Hydraulic Supply Pressure Systems					
Valve		Actuator			
Bore	psi	Model	Piston Eff. Area	Maximum Actuator Stroke	Volume Displacement
1-13/16"	10,000	CHA-38C/400	11.06 in ²	4.00"	29.38 in ³
	15,000	CHA-38C/400	11.06 in ²	4.00"	29.38 in ³
2-1/16"	3,000	CHA-38C/400	11.06 in ²	4.00"	29.38 in ³
	5,000	CHA-38C/400	11.06 in ²	4.00"	29.38 in ³
	10,000	CHA-38C/400	11.06 in ²	4.00"	30.76 in ³
	15,000	CHA-38C/400	11.06 in ²	4.00"	32.14 in ³
2-9/16"	3,000	CHA-38C/400	11.06 in ²	4.00"	34.91 in ³
	5,000	CHA-38C/400	11.06 in ²	4.00"	34.91 in ³
	10,000	CHA-38C/400	11.06 in ²	4.00"	36.29 in ³
	15,000	CHA-48C/400	17.74 in ²	4.00"	62.64 in ³
3-1/8"	3,000	CHA-38C/400	11.06 in ²	4.00"	41.82 in ³
	5,000	CHA-38C/400	11.06 in ²	4.00"	41.82 in ³
3-1/16"	10,000	CHA-38C/400	11.06 in ²	4.00"	43.20 in ³
	15,000	CHA-48C/400	17.74 in ²	4.00"	71.51 in ³
4-1/16"	3,000	CHA-48C/600	17.74 in ²	6.00"	87.03 in ³
	5,000	CHA-48C/600	17.74 in ²	6.00"	87.03 in ³
	10,000	CHA-48C/600	17.74 in ²	6.00"	87.03 in ³
	15,000	Consult Engineering			
5-1/8"	3,000	CHA-48C/600	17.74 in ²	6.00"	102.55 in ³
	5,000	CHA-48C/600	17.74 in ²	6.00"	102.55 in ³
	10,000	CHA-55C/800	23.78 in ²	8.00"	146.39 in ³
	15,000	Consult Engineering			
6-3/8"	3,000	CHA-55C/800	23.78 in ²	8.00"	170.17 in ³
	5,000	CHA-55C/800	23.78 in ²	8.00"	170.17 in ³
7-1/16"	10,000	Consult Engineering			
	15,000	Consult Engineering			



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Actuators

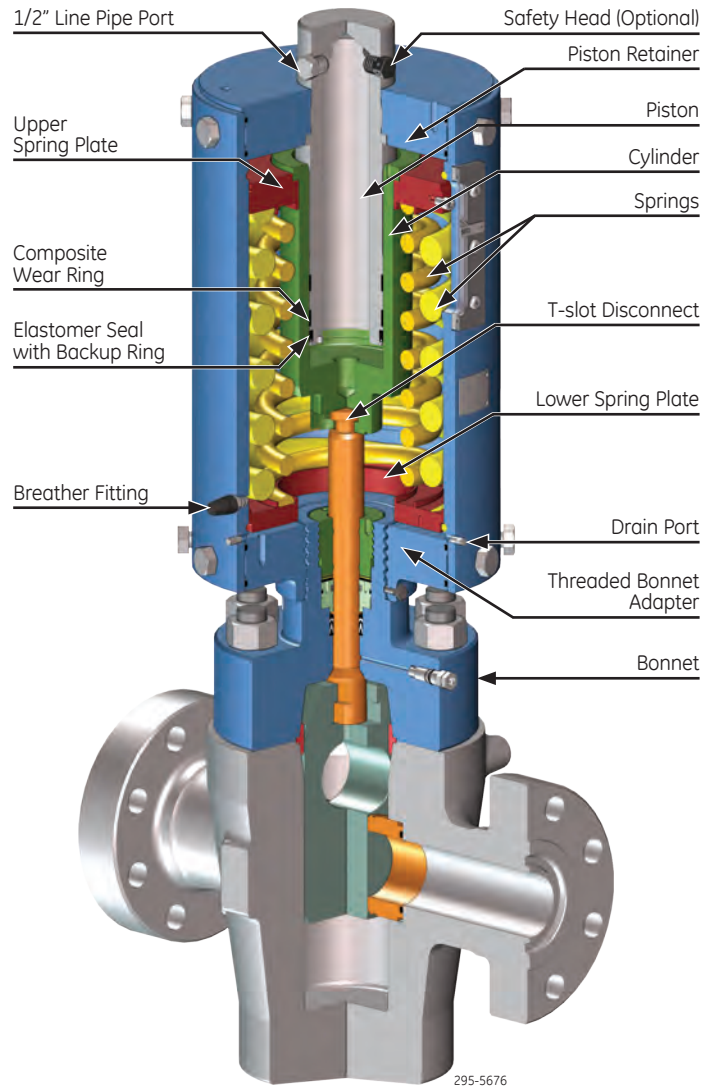
Pressure Control CHA-WLC Classic Wireline Shearing Hydraulic Actuator

The CHA-WLC Classic Wireline Shearing Hydraulic Actuator is available for valve sizes from 1-13/16" through 7-1/16" and wellhead pressure ratings from 2,000 psi through 15,000 psi and operates at a maximum supply pressure of 6,000 psi. Based on the field-proven CH actuator, the CHA-WLC's enhanced unitized construction and T-slot quick-disconnect enable it to be safely and quickly removed from the bonnet. It also features a dual coil spring package capable of shearing standard 7/32" braided cable to allow valve closure. Easy seal replacement minimizes downtime during maintenance.

The CHA-WLC actuator is designed to operate when hydraulic pressure is applied between a stationary piston and a movable cylinder, causing the cylinder and spring to move downward, while opening a reverse-acting gate valve. When hydraulic pressure is vented or lost, the helical spring returns the actuator to the fully up (closed) position. This fail-safe return action occurs independent of valve pressurization.

Features —

- Improved safety
 - Quick-disconnect allows for removal of actuator from bonnet within the valve operating stroke without depressurizing the valve and releasing hydrocarbons
 - Powerful dual coil spring package capable of shearing standard 7/32" braided cable allowing valve closure
 - Captured spring designed to prevent release of preloaded spring during repair or actuator removal
 - Non-rising stem design with window for visual confirmation of the valve's position
- Designed for long life and enhanced efficiency
 - 6,000 psi maximum supply pressure allows use of smaller actuator and greater control system flexibility
 - Hard chrome plated cylinder resists wear and extends elastomer life
 - Optimized coatings on internal metallic components provide enhanced corrosion resistance
 - Optional safety head protects actuator from overpressure
- Easy to maintain
 - No special tools required
 - External drift adjustment is permanently set within bonnet before installation and remains set regardless of work performed
 - Actuator piston seals can be replaced without removal or complete disassembly while mounted onto pressurized gate valve
 - Two 1/2" LP actuator ports minimize closure time, eliminate debris buildup, and provide easy alignment for supply line installation



CHA-WLC Classic Wireline Shearing Hydraulic Actuator

Optional Configurations –

- CHA-C Classic Standard Design (PC #12-0336) does not offer shearing capabilities
- CHA Top Access Standard Design (PC #12-0010) has rising stem and top access
- CHA-WLS Top Access Wireline Shearing Design (PC #12-0341) has rising stem and top access and is capable of shearing standard 7/32" braided wire

Accessories –

- Integral electric valve position indicator
- Electric valve position indicator
- Fusible lock open device
- Lock open cap
- Stem guard
- Clear stem protectors
- Manual and hydraulic overrides

Specifications –

Model CHA-WLC Classic Wireline Shearing	
Models	CHA-48WLC, CHA-55WLC, CHA-70WLC
Valve Size	1-13/16" thru 7-1/16" (2,000 psi thru 15,000 psi)
API Specification	API 6A
Hydraulic Actuator	Standard Service
PR2	Annex F
Temperature	-20°F to +150°F (-29°C to +66°C)
Maximum Supply Pressure	6,000 psi (414 bars)
Maximum Test Pressure	9,000 psi (621 bars)

Hydraulic Actuator Sizing Charts –

3,000 psi Maximum Hydraulic Supply Pressure Systems					
Valve		Actuator			
Bore	psi	Model	Piston Eff. Area	Maximum Actuator Stroke	Volume Displacement
1-13/16"	10,000		Consult Engineering		
	15,000		Consult Engineering		
2-1/16"	3,000		Consult Engineering		
	5,000		Consult Engineering		
	10,000		Consult Engineering		
	15,000		Consult Engineering		
2-9/16"	3,000		Consult Engineering		
	5,000		Consult Engineering		
	10,000		Consult Engineering		
3-1/8"	3,000	CHA-48WLC/400	17.74 in ²	4.00"	67.07 in ³
	5,000	CHA-48WLC/400	17.74 in ²	4.00"	67.07 in ³
3-1/16"	10,000	CHA-48WLC/400	17.74 in ²	4.00"	69.29 in ³
	15,000	CHA-70WLC/850	38.51 in ²	8.50"	155.23 in ³
4-1/16"	3,000	CHA-48WLC/600	17.74 in ²	6.00"	87.03 in ³
	5,000	CHA-48WLC/600	17.74 in ²	6.00"	87.03 in ³
	10,000	CHA-55WLC/800	23.78 in ²	8.00"	116.67 in ³
	15,000		Consult Engineering		
5-1/8"	3,000	CHA-48WLC/600	17.74 in ²	6.00"	102.55 in ³
	5,000	CHA-48WLC/600	17.74 in ²	6.00"	102.55 in ³
	10,000	CHA-70WLC/850	38.51 in ²	8.50"	237.07 in ³
	15,000		Consult Engineering		
6-3/8"	3,000	CHA-55WLC/800	23.78 in ²	8.00"	170.17 in ³
	5,000	CHA-55WLC/800	23.78 in ²	8.00"	170.17 in ³
	10,000		Consult Engineering		
7-1/16"	3,000	CHA-55WLC/800	23.78 in ²	8.00"	188.00 in ³
	5,000	CHA-70WLC/850	38.51 in ²	8.50"	304.46 in ³
	10,000		Consult Engineering		

5,000 psi Maximum Hydraulic Supply Pressure Systems					
Valve		Actuator			
Bore	psi	Model	Piston Eff. Area	Maximum Actuator Stroke	Volume Displacement
1-13/16"	10,000		Consult Engineering		
	15,000		Consult Engineering		
2-1/16"	3,000		Consult Engineering		
	5,000		Consult Engineering		
	10,000		Consult Engineering		
	15,000		Consult Engineering		
2-9/16"	3,000		Consult Engineering		
	5,000		Consult Engineering		
	10,000		Consult Engineering		
	15,000		Consult Engineering		
3-1/8"	3,000	CHA-48WLC/400	17.74 in ²	4.00"	67.07 in ³
	5,000	CHA-48WLC/400	17.74 in ²	4.00"	67.07 in ³
3-1/16"	10,000	CHA-48WLC/400	17.74 in ²	4.00"	69.29 in ³
	15,000	CHA-48WLC/400	17.74 in ²	4.00"	71.51 in ³
4-1/16"	3,000	CHA-48WLC/600	17.74 in ²	6.00"	87.03 in ³
	5,000	CHA-48WLC/600	17.74 in ²	6.00"	87.03 in ³
	10,000	CHA-48WLC/600	17.74 in ²	6.00"	87.03 in ³
	15,000	CHA-70WLC/850	38.51 in ²	8.50"	198.56 in ³
5-1/8"	3,000	CHA-48WLC/600	17.74 in ²	6.00"	102.55 in ³
	5,000	CHA-48WLC/600	17.74 in ²	6.00"	102.55 in ³
	10,000	CHA-55WLC/800	23.78 in ²	8.00"	146.39 in ³
	15,000	CHA-70WLC/850	38.51 in ²	8.50"	241.88 in ³
6-3/8"	3,000	CHA-55WLC/800	23.78 in ²	8.00"	170.17 in ³
	5,000	CHA-55WLC/800	23.78 in ²	8.00"	170.17 in ³
	10,000	CHA-70WLC/850	38.51 in ²	8.50"	290.02 in ³
7-1/16"	3,000	CHA-55WLC/800	23.78 in ²	8.00"	188.00 in ³
	5,000	CHA-55WLC/800	23.78 in ²	8.00"	188.00 in ³
	10,000		Consult Engineering		



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GE Oil & Gas

Pressure Control

General Catalog

Flow Control

Pressure Reduction Solutions *(Select a Product)*

MOS Multi-Orifice Sleeve Choke

PRS Pressure Reduction System

SES Solids Extraction Spool



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Pressure Reduction Systems

Pressure Control MOS Multi-Orifice Sleeve Surface Choke

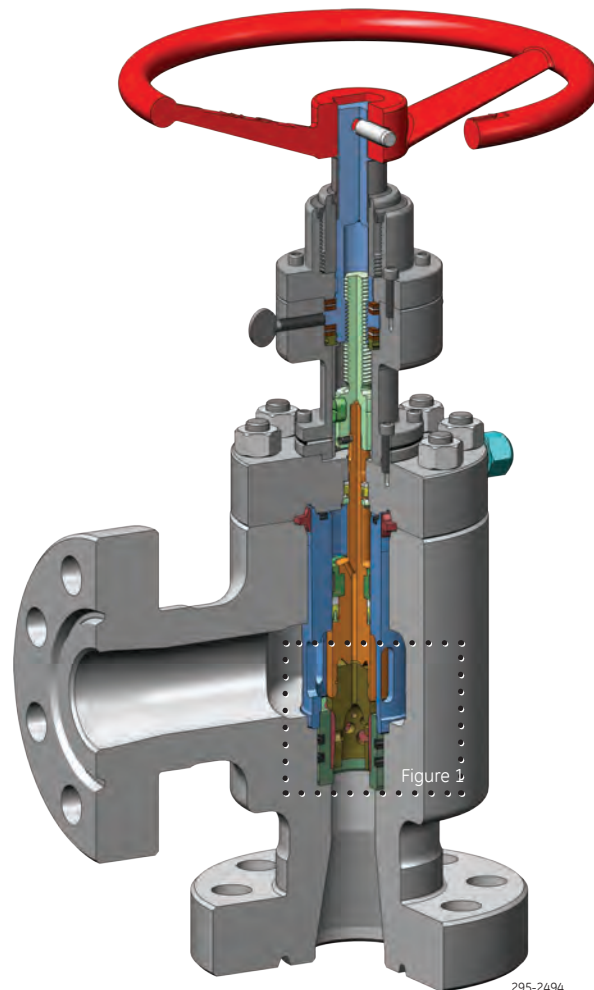
The MOS Surface Choke utilizes a Multi-Orifice Sleeve (MOS) trim to minimize erosion. The MOS surface choke can be used to control single or multi-phase flow along with the presence of sand. Its unique design utilizes interchangeable trims to allow for changing flow rates over the life of the well.

Features —

- Interchangeable stems with differing flow characteristics provide efficient flow control throughout the life of the well
- Self-impinging flow within stem cage absorbs fluid energy
- Guided stem reduces vibration and noise
- Easy access to change out internal components while installed inline
- Dead band area reduces trim erosion upon opening and closing
- Outer cage guide protects stem cage from debris in the flow
- Pressure-balanced stem lowers operating torque
- Provides excellent flow control resolution
- Equal percentage or linear characteristic
- Available in both API and ANSI ratings
- Custom trim design available to meet specific flow conditions

Actuation Options —

Operational Mode	Drive Motion	
	Linear	Rotary
Pneumatic	•	•
Hydraulic	•	•
Electric	-	•



295-2494

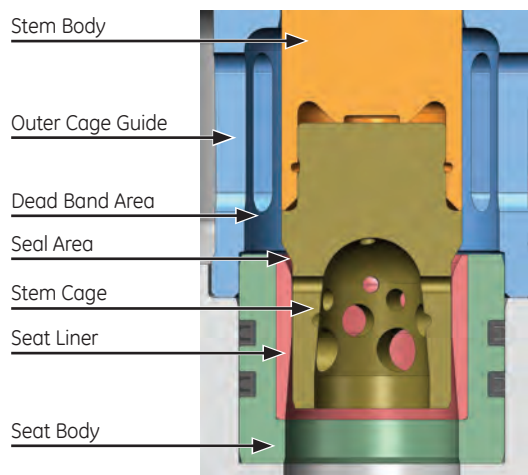


Figure 1: MOS detail - transitioning between open and closed positions 295-2494



MOS Design Options

Trim Size —

The MOS trim size is directly related to the valve capacity coefficient in full open position of each trim. The number in the size represents the full capacity of that choke. So, for example, a T35 has a full open capacity of 35 Cv.

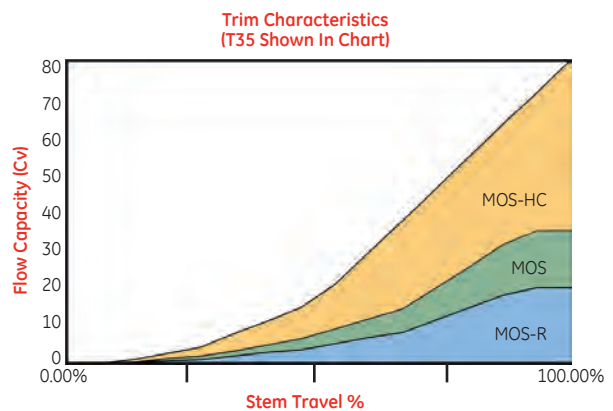
The body size of the choke is represented by the letter 'S' followed by a two digit number. That number stands for the typical flow line size. So, for example, an S12 has a typical flow line size between one and two inches.

Engineering should be consulted when selecting body size and trim to ensure that all factors are considered and the choke is optimized for the anticipated service conditions.

Body Size	Trim Size						
	T35	T80	T160	T280	T442	T660	T840
S12	•	•	-	-	-	-	-
S23	•	•	•	-	-	-	-
S45	•	•	•	•	-	-	-
S60	•	•	•	•	•	-	-
S70	•	•	•	•	•	•	-
S80	•	•	•	•	•	•	•

MOS Choke Tip Characteristics —

- The stem is guided within the seat and outer cage guide to reduce vibration and noise.
- The flow ports in the stem cage are located below the seal area creating a dead band. This dead band significantly reduces erosion of the sealing surfaces during instantaneous high velocity flow that occurs when the choke initially opens.
- Each port in the stem cage has an opposing port. Flow entering the stem cage impinges upon itself which results in absorption of the fluid energy. This all takes place inside the tungsten carbide stem cage thereby maximizing component life.
- For applications susceptible to build up of solids which may cause blockage of the choke balance port, contact Engineering.



295-2583

Multi Orifice Sleeve (MOS) —

The MOS trim can accommodate almost all flowing conditions. It can be used throughout a well's life and offers precise flow rate adjustment.



295-2586

Restricted (MOS-R) —

The restricted flow area of the MOS-R has been designed to reduce the initial capacity of the choke to allow for erratic start-up conditions.



295-2585

High Capacity (MOS-HC) —

The high capacity trim was specifically designed to maximize flow and reduce pressure drop. After the initial 30% of stem travel the tip geometry changes, thereby exposing a greater flow area significantly increasing flow capacity.



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Pressure Reduction Systems

Pressure Control PRS Pressure Reduction System

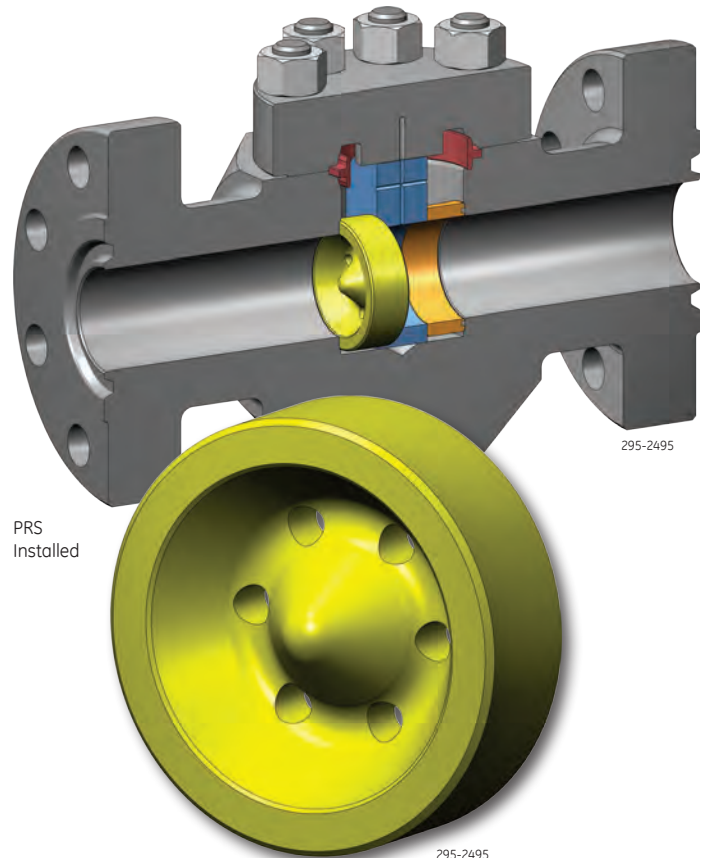
The PRS Pressure Reduction System is a device that reduces both velocity and pressure, while conditioning or streamlining flow.

Taking a drop in flowing pressure is usually achieved by the production choke. In some cases, the required pressure drop can be significant and two chokes are used. However, two chokes can pose more maintenance problems and be difficult to regulate.

Alternatively, a PRS can be positioned downstream from the choke to distribute the pressure drop and reduce flow velocity. The unique hole pattern in the PRS eliminates flow turbulence and vibration which can damage equipment downstream. The result is superior to the use of two chokes.

Features —

- Reduces wear and tear
 - Reduces damage to choke caused by significant pressure/velocity drop
 - Streamlines exiting flow
 - Reduces flow velocity
- Economical choice over second choke
- Spool body available in both API and ANSI ratings
- Custom designs
 - Tailored to meet specific well conditions
 - Interchangeable to match changing flowing pressures
 - Trim sized to meet customer requirements



PRS Element: Available in different hole patterns to fit well's specific needs



PRS installed within a flow line



PRS Pressure Reduction System

How Does It Work? —

The PRS is a device used to take much of the pressure reduction burden off of the choke. For example, if the initial flow rate is 10,000 psi, the desired rate is 3,000 psi and only a choke is used, then the burden of reducing that 7,000 psi pressure drop is solely on the choke. When using a choke in this manner it tends to wear out faster (see Figure 1) than if it were used in combination with a PRS (see Figure 2). The PRS is designed to take the brunt of the pressure drop, allowing the choke to be opened to a greater degree which reduces flow velocity, resulting in less wear.



Figure 1: The choke trim on the left is a brand-new trim. The choke trim on the right is the result of a trim being used without a PRS device.



Figure 2: This choke trim has been used under similar circumstances, but in conjunction with a PRS device and shows minimal wear.

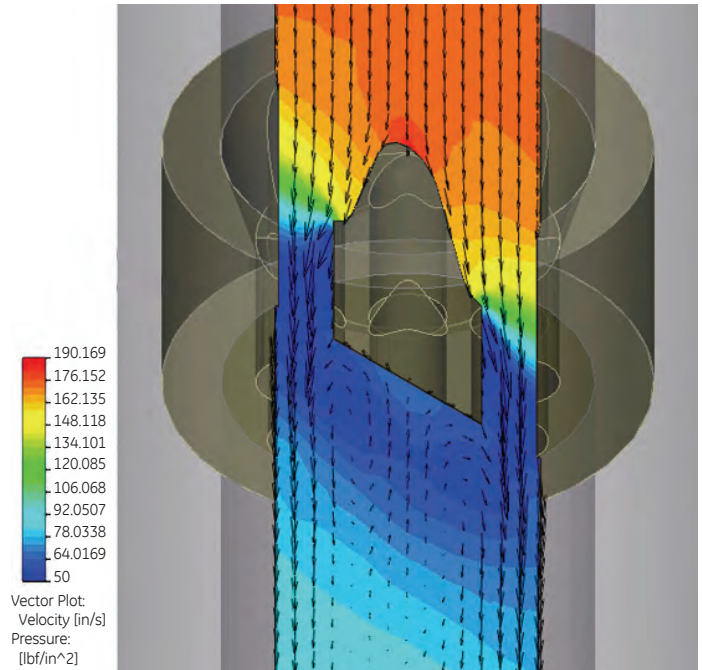


Diagram showing the change in flow velocity with use of a PRS device



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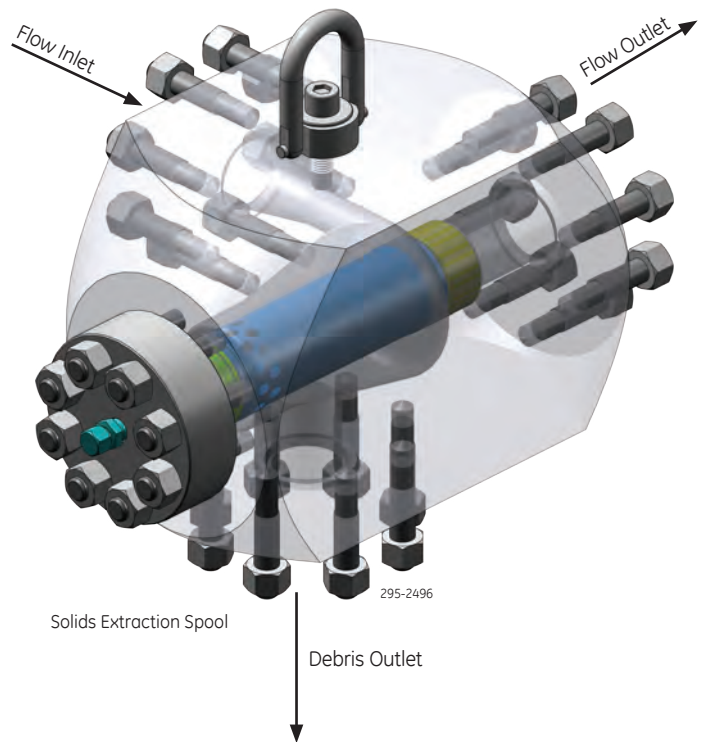
Pressure Reduction Systems

Pressure Control SES Solids Extraction Spool

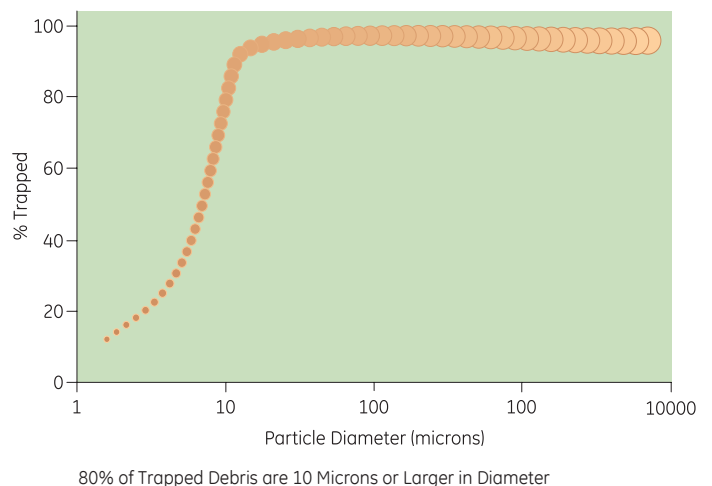
The SES Solids Extraction Spool is a device that pulls sand or other debris from the flow line. Installed upstream from the choke, flow enters the body chamber where a cyclonic action causes the flow to spin. Centrifugal force pulls the debris particles to the outside wall of the body chamber where they lose energy and ultimately enter the collection bore/vessel. The clean flow media exits through an integral pressure reduction element (PC #04-0409) which not only creates a drop in pressure, but streamlines the exiting flow as well.

Features —

- Improves well efficiency
 - Reduces erosion on downstream components
 - Increases production by cleaning flow media
 - Streamlines exiting flow
- Low cost and field-proven solution for sand extraction
- Available in both API and ANSI ratings
- Custom design available to meet specific well conditions
- Operates at pressure ratings up to 20,000 psi



Extracted Sand



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GE Oil & Gas

Pressure Control

General Catalog

Flow Control

Presco-Pilots™ and Presco-Switches™ *(Select a Product)*

3-Line Presco-Pilot™

Presco-Switch™

Model "DHTE" High Temperature
Presco-Switch™



GE imagination at work



Flow Control

3-Line Presco-Pilot™



The 3-Line Presco-Pilot™ is a pressure-responsive, three-way poppet valve that is typically used to monitor pipeline pressure upstream or downstream of an emergency shutdown device (ESD) and to control the ESD valve. The 3-Line Presco-Pilot is available for a wide variety of pressure ratings, service conditions and hydraulic or pneumatic configurations.

Pressure Sensing Base Features —

- Bases use diaphragms, plungers or bellows
- Interchangeable springs enable each basic unit to be used for a variety of pressure ranges
- Smooth plunger movement and precision manufacturing provide accurate operation and repeatability
- Guide plunger ensures longer useful that exceeds other types of pressure switch mechanisms
- Positive plunger stop provides high proof pressure so the Presco-Pilot will withstand overpressure and surges
- Rugged design enables the Presco-Pilot to withstand severe operating conditions including shock and corrosion
- Standard male 2" NPT pressure sensing connection provides a solid mount that will not plug off or freeze

- Canadian Registration Numbers:
 - Alberta - 0F08082.2 and 0F04920.2
 - British Columbia - 0F08082.21
 - Saskatchewan - 0F08082.23
 - Manitoba - 0F08082.24

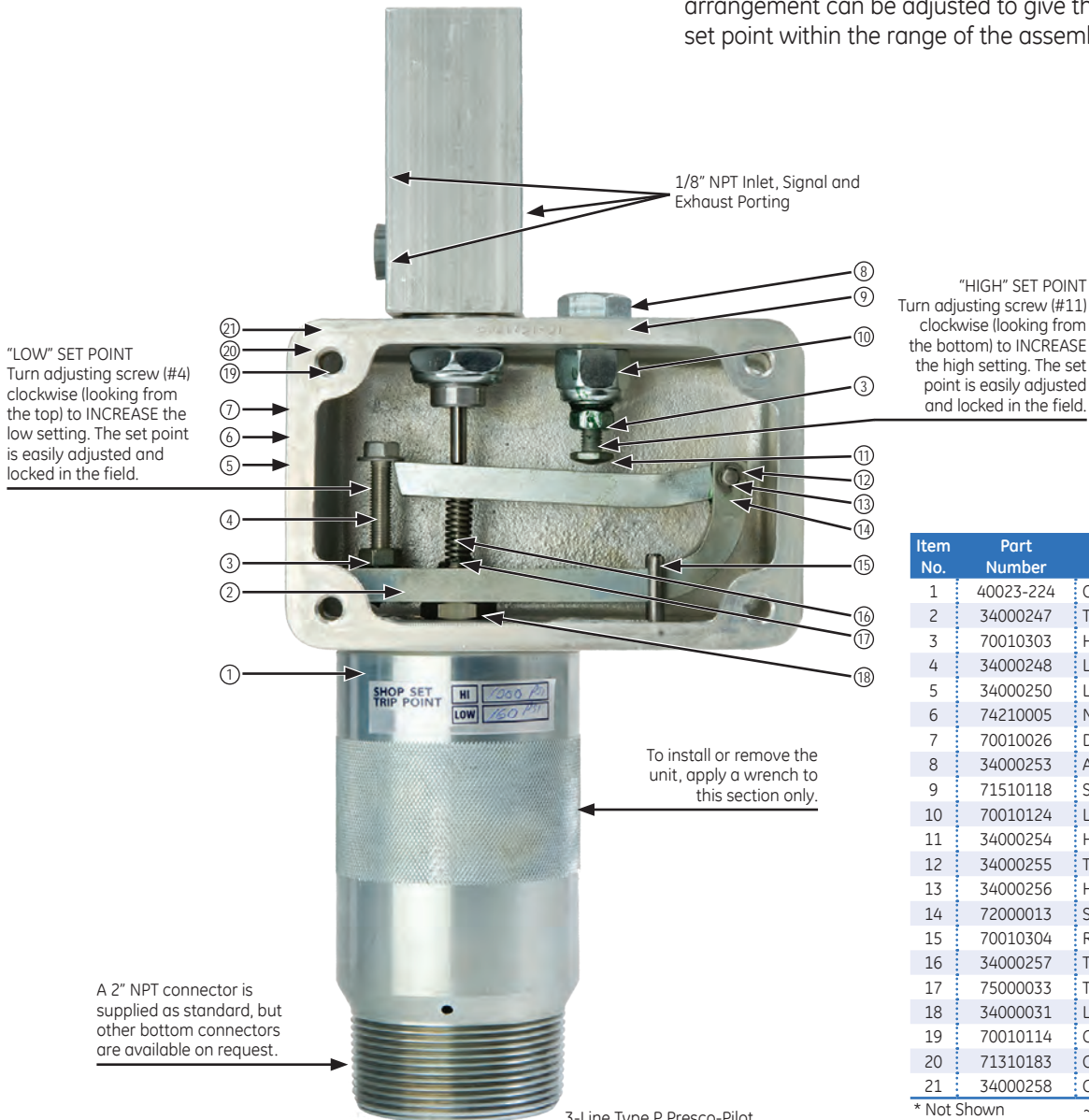
Note: Type S and SH are registered only to 5,000 psig

Options —

- Mounting Brackets
- Switching Valves
- Relay Valves
- Solenoid Valves
- Regulators
- Filters
- Tubing
- Gauges
- Isolation Valves
- Needle Valves

Linkage Housing —

The linkage housing contains the adjustable linkage that transfers motion from the lower pressure sensing base housing to the upper section trip control valve. The linkage arrangement can be adjusted to give the desired high and low set point within the range of the assembly.



Item No.	Part Number	Description
1	40023-224	O-Ring *
2	34000247	Transfer Yoke
3	70010303	Hex Jam Nut
4	34000248	Low Pressure Adjusting Screw
5	34000250	Linkage Housing
6	74210005	Name Plate *
7	70010026	Drive Screw *
8	34000253	Adjusting Screw Ret.
9	71510118	Seal ~
10	70010124	Lock Nut
11	34000254	High Pressure Adjusting Screw
12	34000255	Toggle Bar
13	34000256	Hinge Pin
14	72000013	Snap Ring
15	70010304	Roll Pin - Spiral
16	34000257	Transfer Spring Guide
17	75000033	Transfer Spring
18	34000031	Lock Nut
19	70010114	Cover Screws ~ *
20	71310183	Cover Gasket ~ *
21	34000258	Cover ~ *

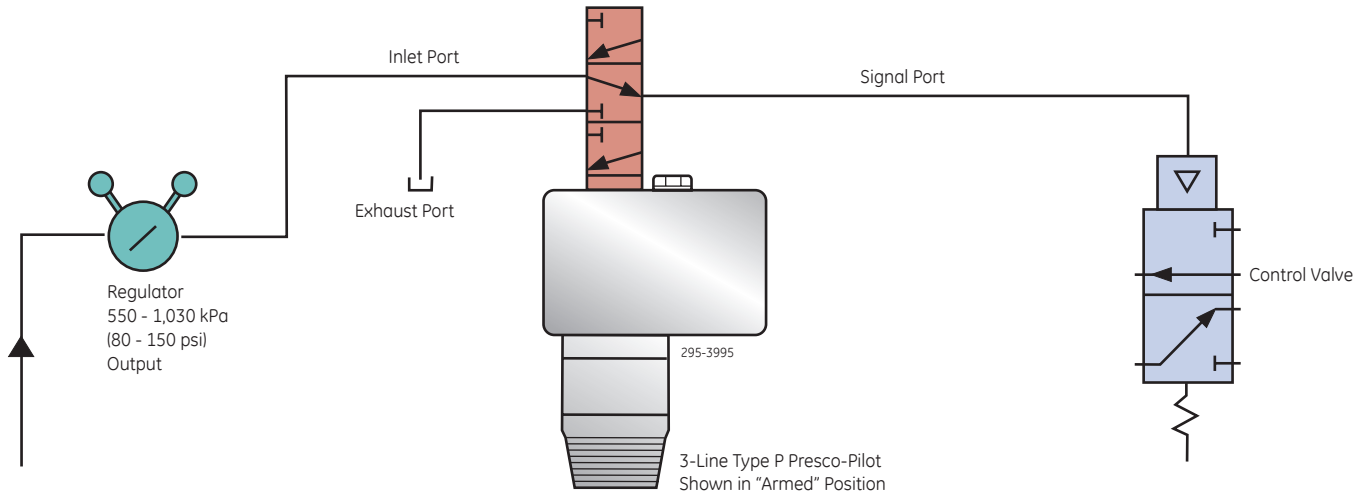
* Not Shown

~ Recommended Spare Parts

3-Line Type P Presco-Pilot

Direct Acting On-Off Control —

The Type B-HL-P, D-HL-P, or S-HL-P Presco-Pilot opens and closes a control valve in direct response to **high** or **low** sensed pressures. These pilot types have a "P" suffix.



Manual Latching and Override —

The Type B-HL-M, D-HL-M, or S-HL-M Presco-Pilot latches and maintains a signal. When the sensed pressure becomes normal, it arms and continues to maintain the signal. When the sensed pressure is abnormal, the Presco-Pilot trips and bleeds the signal to exhaust. These pilot types are designated with the "M" suffix.

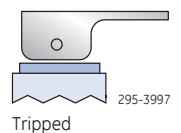
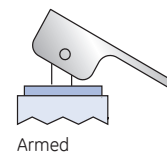
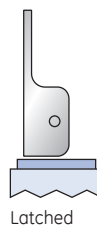
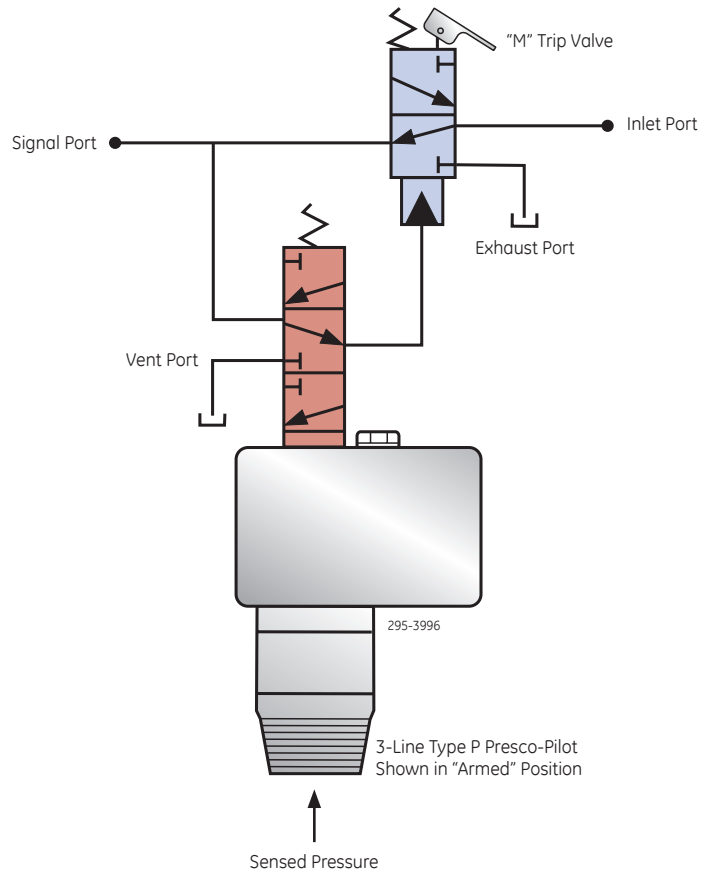
The control media should be dry gas, air or oil regulated to within 550 and 1,034 kPa (80 and 150 psi) depending upon the requirements of the system being controlled.

To initiate an output signal, rotate Lever "M" outward to the LATCHED position. The control media pressure now flows through the Trip Valve to the signal port.

When the sensed pressure is **within** the set range points of the Presco-Pilot, the resulting internal signal shifts the Trip Valve to the ARMED position. (Be certain that the Trip Valve is in the ARMED position before leaving the site.)

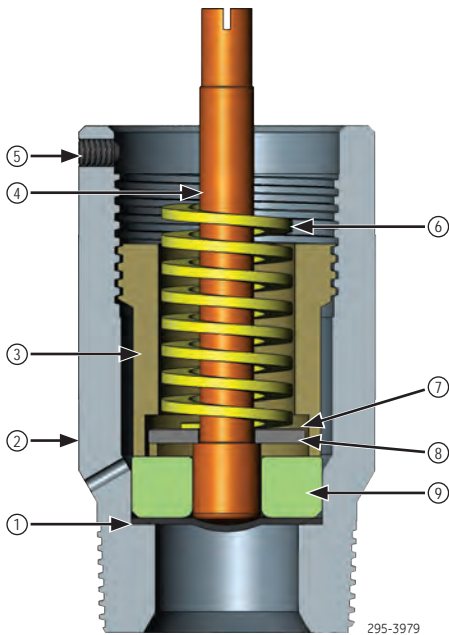
When the sensed pressure is **outside** the set range points of the Presco-Pilot, the internal signal to the Trip Valve is shut off and vented. The Trip Valve shifts to the TRIPPED position and exhausts pressure from the signal port.

To manually trip the system, when the sensed pressure is **within** the set points, push Lever "M". The Trip Valve will now remain in the TRIPPED position until Lever "M" is rotated outward.



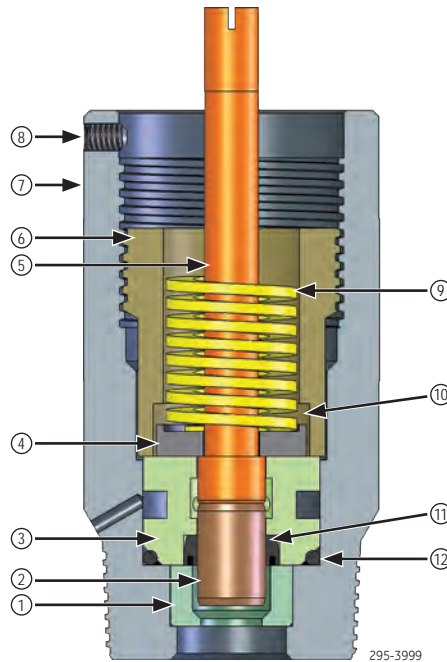
Pressure Sensing Base Housing Types —

Type	Design	Operating Conditions	Maximum Working Pressure (kPa/psi)
D	Hydrin diaphragm pressure sensor with backup plunger	Standard oilfield and mildly sour and corrosive gas, crude oil and water service	1,380/200 20,680/3,000
S	Lapped stainless steel plunger pressure sensor with energized teflon seal	Sour and corrosive gas, crude oil and water service	34,470/5,000
B	Inconel bellows pressure sensor with sensitive set point capability	Sour and corrosive gas, crude oil and water service	13,795/2,000



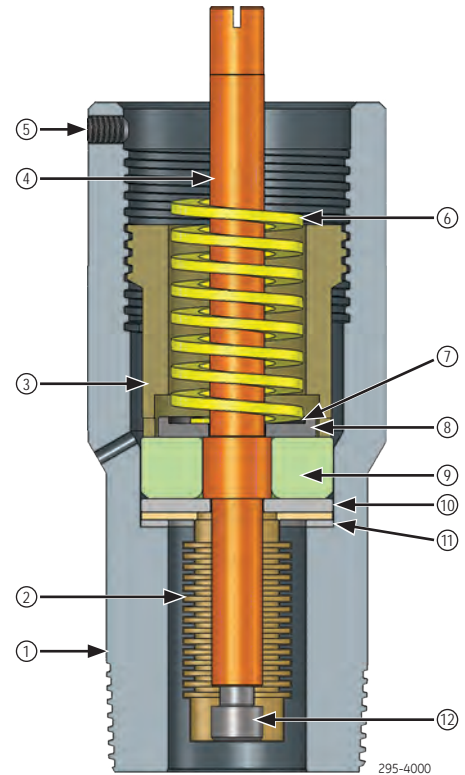
Type D

295-3979



Type S

295-3999



Type B

295-4000

Item No.	Part Number	Description
1	34000087	Diaphragm, Hydrin *
2	34000078	Base Housing
3	34000081	Piston Guide Sleeve
4	34010017	Piston, Low Pressure
4	34000084	Piston, Medium Pressure
5	70000087	Set Screw
6	Spring	See Spring Range Chart
7	34010009	Spring Spacer, .010
7	34010010	Spring Spacer, .025
7	34010011	Spring Spacer, .045
7	34010012	Spring Spacer, .187
7	34010013	Spring Spacer, .437
8	34000085	Spring Base Plate
9	34010022	Piston Guide, Low Pressure
9	34000079	Piston Guide, Medium Pressure

*Recommended Spare Parts

Item No.	Part Number	Description
1	34000195	3/8" Plunger Retainer
1	34000190	5/8" Plunger Retainer
1	34000182	7/8" Plunger Retainer
2	34000194	3/8" Plunger
2	34000189	5/8" Plunger
2	34000181	7/8" Plunger
3	34000193	3/8" Plunger Guide
3	34000188	5/8" Plunger Guide
3	34000180	7/8" Plunger Guide
4	34000245	Base Plate (Pilot)
5	34000178	Piston
6	34000177	Piston Guide Sleeve
7	34000187	Base Housing
8	70000087	Set Screw
9	Spring	See Spring Range Chart
10	34010009	Spring Spacer, .010
10	34010010	Spring Spacer, .025
10	34010011	Spring Spacer, .045
10	34010012	Spring Spacer, .187
10	34010013	Spring Spacer, .437
11	71510084	3/8" Plunger Seal *
11	71510085	5/8" Plunger Seal *
11	71510086	7/8" Plunger Seal *
12	71000050	O-Ring *

*Recommended Spare Parts

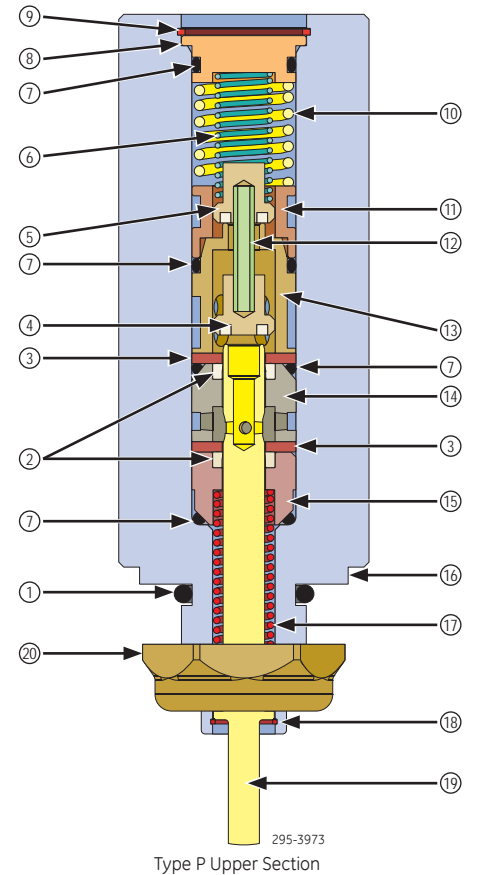
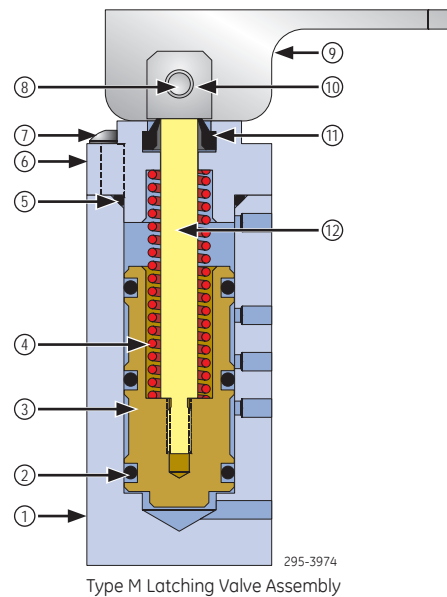
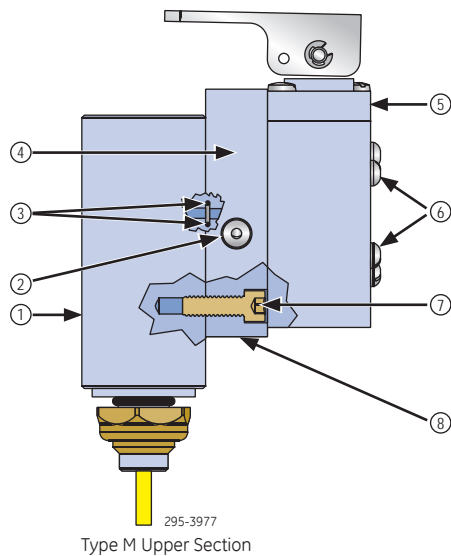
Item No.	Part Number	Description
1	34010295	Base Housing SS316
2	34000207	Bellows
3	34000081	Piston Guide Sleeve
4	34000210	Piston
5	70000087	Set Screw
6	Spring	See Spring Range Chart
7	34010009	Spring Spacer, .010
7	34010010	Spring Spacer, .025
7	34010011	Spring Spacer, .045
7	34010012	Spring Spacer, .187
7	34010013	Spring Spacer, .437
8	34000208	Spring Base Plate
9	34000079	Piston Guide
10	34000209	Bellows Retainer Plate
11	71370782	Gasket *
12	34010038	Adjustment Screw Assembly

*Recommended Spare Parts

All part numbers listed are for standard configurations only and may vary with your application.

Trip Control Types (Upper Section) –

Type	Description
M	<ul style="list-style-type: none"> The trip control valve can be latched to initiate and sustain a start-up signal. When the sensed pressure comes within the high and low set point, the trip control valve is unlatched and armed, thus maintaining the signal. When the sensed pressure moves outside the high or low set point, the trip control valve shifts and bleeds the signal to exhaust.
P	<ul style="list-style-type: none"> The trip control valve automatically sends a signal when the sensed pressure comes within the high and low set point. When the sensed pressure moves outside the high or low set point, the trip control valve shifts and bleeds the signal to exhaust.



Item No.	Part Number	Description
1	34000262	Pilot Valve Subassembly
2	79910056	Vent Seal *
3	71000061	O-Ring *
4	34010189	Manifold Block
5	34010565	Latching Valve
6	70010043	Machine Screws
7	70000227	Cap Screw
8	77010192	Pipe Plug

*Recommended Spare Parts

Item No.	Part Number	Description
1	34010559	Body
2	800850	O-Ring *
3	34010562	Spool
4	75010286	Century Spring
5	801086	O-Ring *
6	34010561	Cover
7	70010970	Screw
8	39110041	Pin
9	34010564	Toggle Lever
10	72000013	Retainer Ring
11	71510525	Wiper, Parker *
12	34010560	Stern

*Recommended Spare Parts

Item No.	Part Number	Description
1	800850	O-Ring *
2	71510122	Ball Seal *
3	34000264	Retainer Washer
4	34000265	Exhaust Poppet *
5	34000267	Inlet Poppet *
6	75000034	Poppet Spring
7	801083	O-Ring *
8	34000269	Body Cover
9	72010042	Retainer Ring *
10	75000019	Body Spring
11	34000270	Inlet Port Element
12	70000023	Roll Pin *
13	34000272	Signal Port Element
14	34000273	Exhaust Port Element
15	34010190	Plunger Guide
16	34000263	Body
17	75010020	Plunger Spring
18	72010041	Retainer Ring *
19	34000275	Plunger
20	70000239	Retainer Nut

*Recommended Spare Parts

How to Order –

To order, select the model that suits your application from the following list:

Model	Description
B-HL-P	<ul style="list-style-type: none"> Inconel bellows for sensitive set point capability for sour, corrosive service and automatic reset 13,795 kPa (2,000 psi) maximum working pressure 17,236 kPa (2,500 psi) proof pressure
D-HL-P	<ul style="list-style-type: none"> Hydrin diaphragm for standard service and automatic reset 20,680 kPa (3,000 psi) maximum working pressure 34,470 kPa (5,000 psi) proof pressure
S-HL-P	<ul style="list-style-type: none"> 17-4 PH stainless steel plunger for sour, corrosive service and automatic reset 34,470 kPa (5,000 psi) maximum working pressure 41,370 kPa (6,000 psi) proof pressure
B-HL-M	<ul style="list-style-type: none"> Inconel bellows for sensitive set point capability for sour, corrosive service and manual override/reset 13,795 kPa (2,000 psi) maximum working pressure 17,236 kPa (2,500 psi) proof pressure
D-HL-M	<ul style="list-style-type: none"> Hydrin diaphragm for standard service and manual override/reset 20,680 kPa (3,000 psi) maximum working pressure 34,470 kPa (5,000 psi) proof pressure
S-HL-M	<ul style="list-style-type: none"> 17-4 PH stainless steel plunger for sour, corrosive service and manual override/reset 34,470 kPa (5,000 psi) maximum working pressure 41,370 kPa (6,000 psi) proof pressure

Many pressure ranges are available, including a special Type SH type high pressure pilot to 68,946 kPa (10,000 psi) maximum working pressure. A 2" pipe thread on the base housing is the standard pressure/mounting connection. Optional 1/2", 1" and 1-1/2" pipe threads as well as flanges and proprietary connections are available.

Explanation of Model Types –

1) Select the PRESSURE SENSING TYPE:

e.g. Diaphragm type Presco-Pilot for mildly corrosive crude oil and water service.

2) Select the HIGH/LOW PRESSURE SETTING CAPABILITY:

3) Select the UPPER SECTION:

e.g. The "M" type designates Manual Latching and Override (once tripped, subsequent changes in the sensed pressure will not automatically reactivate the system). The "P" type opens and closes a control valve in direct response to high or low sensed pressures.

4) Select the PRESSURE RANGE NUMBER:

e.g. The Range Number is actually 10% of the maximum possible set point (see RANGE NUMBER CHART). The pressures are designated in psi.

D HL M 100 THIS IS A TYPICAL 3-LINE PRESCO-PILOT MODEL NUMBER.

When selecting a range number, it also is necessary to consider two factors: the range span and deadband. The range span is the difference in pressure between the low-end and the high-end of the range. Deadband is the difference in pressure between the LOW set point and its reset point, OR the difference in pressure between the HIGH set point and its reset point. NOTE: The HIGH reset pressure and the LOW reset pressure should not overlap nor should they be too close to each other. The following table will help clarify the set point capability of the 3-line pilots.

Deadband as Expressed in Percentage of the Range Span			
Setting Portion	D	S	B
HighHigh-end	30%	18%	12%
HighMid-point	20%	15%	10%
LowMid-point	20%	15%	10%
LowLow-end	10%	12%	8%

Examples: D-HL-M-100 (150 to 1,000 psi range). The range span is 850 psi (1,000 minus 150). If the HIGH set point is 900 psi high-increasing, then the high-decreasing reset point would be approximately 645 psi (900 minus 30% of 850).

If the LOW set point is 300 psi low-decreasing, then the low-increasing reset point would be approximately 385 psi (300 plus 10% of 850).

Range Number Chart –

Range Number	Plunger Diameter	Model D		Plunger Diameter	Model S		Plunger Diameter	Model SH		Bellows Diameter	Model B	
		kPa	psi		kPa	psi		kPa	psi		kPa	psi
6	1.25"	70 - 414	10 - 60	-	-	-	-	-	-	-	-	-
12	1.25"	103 - 827	15 - 120	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	0.86"	103 - 1,034	15 - 150
16	1.25"	138 - 1,100	20 - 160	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	0.86"	138 - 1,380	20 - 200
25	-	-	-	0.87"	276 - 1,723	40 - 250	-	-	-	0.86"	172 - 1,723	25 - 250
32	0.62"	276 - 2,206	40 - 320	0.87"	345 - 2,206	50 - 320	-	-	-	-	-	-
40	-	-	-	0.87"	414 - 2,760	60 - 400	-	-	-	0.86"	276 - 2,760	40 - 400
48	0.62"	414 - 3,310	60 - 480	0.87"	483 - 3,310	70 - 480	-	-	-	-	-	-
50	-	-	-	-	-	-	-	-	-	0.86"	345 - 3,450	50 - 500
56	-	-	-	0.87"	621 - 3,860	90 - 560	-	-	-	-	-	-
60	-	-	-	-	-	-	-	-	-	0.86"	414 - 4,140	60 - 600
64	-	-	-	0.62"	690 - 4,410	100 - 640	-	-	-	-	-	-
70	-	-	-	-	-	-	-	-	-	0.86"	483 - 4,825	70 - 700
80	0.62"	690 - 5,520	100 - 800	0.62"	860 - 5,520	125 - 800	-	-	-	-	-	-
100	0.62"	1,034 - 6,895	150 - 1,000	0.62"	1,100 - 6,895	160 - 1,000	-	-	-	0.86"	690 - 6,895	100 - 1,000
120	0.62"	2,070 - 8,275	300 - 1,200	0.62"	1,380 - 8,300	200 - 1,200	-	-	-	-	-	-
150	-	-	-	-	-	-	-	-	-	0.86"	2,070 - 10,338	300 - 1,500
160	0.62"	2,760 - 11,032	400 - 1,600	0.37"	1,896 - 11,032	275 - 1,600	0.37"	1,896 - 11,032	275 - 1,600	-	-	-
200	0.62"	3,450 - 13,795	500 - 2,000	0.37"	2,415 - 13,795	350 - 2,000	0.37"	2,415 - 13,795	350 - 2,000	0.86"	2,760 - 13,795	400 - 2,000
240	0.62"	4,140 - 16,548	600 - 2,400	0.37"	2,930 - 16,548	425 - 2,400	0.37"	2,930 - 16,548	425 - 2,400	-	-	-
280	-	-	-	-	-	-	0.25"	3,450 - 19,306	500 - 2,800	-	-	-
400	-	-	-	-	-	-	0.25"	5,170 - 27,580	750 - 4,000	-	-	-
600	-	-	-	-	-	-	0.25"	8,275 - 41,370	1,200 - 6,000	-	-	-
800	-	-	-	-	-	-	0.25"	10,338 - 55,160	1,500 - 8,000	-	-	-

Spring Range Chart –

Spring Required	Part Number	Model D				Model B	
		1.25" Diameter Piston		0.62" Diameter Piston		0.86" Diameter Bellows	
		kPa	psi	kPa	psi	kPa	psi
Red 0.81	75000001	70 - 414	10 - 60	-	-	-	-
Green 1.0	75000013	103 - 827	15 - 120	276 - 2,206	40 - 320	103 - 1,034	15 - 150
Blue 1.0	75000010	138 - 1,100	20 - 160	414 - 3,310	60 - 480	138 - 1,380	20 - 200
Dark Red 1.0	75010292	-	-	690 - 5,520	100 - 800	172 - 1,723	25 - 250
Red 1.0	75000011	-	-	1,034 - 6,895	150 - 1,000	276 - 2,760	40 - 400
Yellow 1.0	75000026	-	-	2,070 - 8,275	300 - 1,200	350 - 3,450	50 - 500
Red 1.25	75000025	-	-	2,760 - 11,032	400 - 1,600	414 - 4,140	60 - 600
Yellow 1.25	75000008	-	-	3,450 - 13,795	500 - 2,000	483 - 4,825	70 - 700
Short Yellow	75000028	-	-	4,140 - 16,548	600 - 2,400	690 - 6,895	100 - 1,000
Silver	75000002	-	-	-	-	2,070 - 10,338	300 - 1,500
Gold	75000003	-	-	-	-	2,760 - 13,795	400 - 2,000

Spring Required	Part Number	Model S				Model SH					
		0.87" Diameter Plunger		0.62" Diameter Plunger		0.37" Diameter Plunger		0.25" Diameter Plunger			
		kPa	psi	kPa	psi	kPa	psi	kPa	psi		
Red 0.81	75000001	-	-	-	-	-	-	-	-	-	-
Green 1.0	75000013	-	-	-	-	-	-	-	-	-	-
Blue 1.0	75000010	-	-	-	-	-	-	-	-	-	-
Dark Red 1.0	75010292	276 - 1,723	40 - 250	-	-	-	-	-	-	-	-
Red 1.0	75000011	345 - 2,206	50 - 320	690 - 4,410	100 - 640	1,896 - 11,032	275 - 1,600	1,900 - 11,030	275 - 1,600	3,450 - 19,306	500 - 2,800
Yellow 1.0	75000026	414 - 2,760	60 - 400	860 - 5,520	125 - 800	2,415 - 13,795	350 - 2,000	2,400 - 13,800	350 - 2,000	5,170 - 27,580	750 - 4,000
Red 1.25	75000025	483 - 3,310	70 - 480	1,100 - 6,895	160 - 1,000	2,930 - 16,548	425 - 2,400	2,900 - 16,550	425 - 2,400	8,275 - 41,370	1,200 - 6,000
Yellow 1.25	75000008	621 - 3,860	90 - 560	1,380 - 8,275	200 - 1,200	3,450 - 22,064	500 - 3,200	3,450 - 22,064	500 - 3,200	10,338 - 55,160	1,500 - 8,000
Short Yellow	75000028	1,034 - 5,520	150 - 800	2,070 - 10,338	300 - 1,500	4,825 - 27,580	700 - 4,000	4,800 - 27,580	700 - 4,000	12,066 - 68,946	1,750 - 10,000
Silver	75000002	-	-	-	-	-	-	-	-	-	-
Gold	75000003	-	-	-	-	-	-	-	-	-	-

Additional pressure ranges are available on special order.

Note: 6.895 kPa = 1.0 psi



GE imagination at work



Manufactured in Canada

geoilandgas.com/pressurecontrol

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10/13, PC #08-0057 rev 3

Flow Control

Pressure Control Presco-Switch™

The Presco-Switch™ is a pressure-responsive device that opens or closes one or more integral electrical switches at predetermined set points in order to:

- start or stop pump motors for pump jacks and electric submersible pump systems
- stop gas engines
- control valve operations

Switch Features —

- Convenient microswitch adjustments make field setting easy.
- Versatile switching arrangements satisfy most applications.
- Switch housing's explosion-proof design is CSA approved for Class 1, Group D, Division 1, Hazardous Locations.

Pressure Sensing Base Features —

- Pressure sensing bases use diaphragms, plungers or bellows.
- Interchangeable springs enable each basic unit to be used for a variety of pressure ranges.
- Accurate operation and repeatability are provided by the smooth plunger movement and precision manufacturing.
- Long life is ensured by a guided plunger, resulting in a useful life that exceeds other types of pressure switch mechanisms.
- High proof pressure is provided by a positive plunger stop so that the Presco-Switch will withstand overpressure and surges.
- Rugged design enables the Presco-Switch to withstand severe operating conditions including shock, vibration and corrosion.
- Standard male 2" NPT pressure sensing connection provides a solid mount that will not plug off or freeze readily.
- Certificate of authorization issued by ABSA is 0F08082.2.



DF, SM and SF Presco-Switches



DF Presco-Switch Detail



Presco-Switch™

Pressure Sensing Base Housing Types —

Type	Design	Operating Conditions	Maximum Working Pressure (kPa/psi)	Length (in)	Weight (lbs/kg)
D	Hydrin diaphragm pressure sensor with backup plunger	Standard oilfield and mildly sour and corrosive gas, crude oil and water service	1,400/200	8.0" (-M=9.4")	5.8/2.6
			20,700/3,000	8.0" (-M=9.4")	5.8/2.6
DP	Hydrin diaphragm pressure sensor with backup plunger and built-in pulsation dampener	Standard oilfield and mildly sour and corrosive gas, crude oil and water service; Units withstand pressure pulsations often found on the discharge side of a pipeline plunger pump.	1,400/200	9.8" (-M=11.1")	7.0/3.2
			10,400/1,500	9.8" (-M=11.1")	7.0/3.2
S	Lapped stainless steel plunger pressure sensor with energized teflon seal	Sour and corrosive gas, crude oil and water service	34,500/5,000	9.3" (-M=10.6")	6.5/2.9
SH	Lapped stainless steel plunger pressure sensor with energized teflon seal	High pressure sour and corrosive gas, crude oil and water service; Units usually have a 1/2" NPT female pipe bottom connection. Optional flanged or clamp type connectors are also available.	69,000/10,000	10.5" (-M=11.8")	8.5/3.8
B	Inconel bellows pressure sensor with sensitive set point capability	Sour and corrosive gas, crude oil and water service	13,800/2,000	10.3" (-M=11.6")	8.0/3.6
BP	Inconel bellows pressure sensor with sensitive set point capability and built-in pulsation dampener	Sour and corrosive gas, crude oil and water service; Units withstand severe pulsation as found on the discharge side of a water injection pump.	34,500/5,000	11.5" (-M=12.8")	9.0/4.1

Switch Arrangement Types —

Type	Switch Function	Description
F	Fixed Differential	<ul style="list-style-type: none"> Switch setting is adjustable within pressure range of switch. The fixed differential is approximately 4% of the pressure switch range.
FF	Dual Fixed Differential	<ul style="list-style-type: none"> Two independently adjustable microswitches provide separate circuits, each with a fixed differential.
FV	Fixed and Variable Differential	<ul style="list-style-type: none"> Two independently adjustable microswitches, one with a fixed and one with a variable differential.
V	Variable Differential	<ul style="list-style-type: none"> Low and high switch settings can be adjusted independently of each other within the pressure range using one variable differential microswitch.
VV	Dual Variable Differential	<ul style="list-style-type: none"> Two independently adjustable microswitches provide separate circuits, each with a variable differential.
M	Manual Reset	<ul style="list-style-type: none"> A tripping microswitch actuates on increasing pressure. When the pressure decreases and the manual reset knob is pushed, the microswitch will then reset.



GE imagination at work



Manufactured in Canada

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10/13, PC #07-0138 rev 2

Flow Control

Pressure Control Model DHTE High Temperature Presco-Switch™

The Model DHTE High Temperature Presco-Switch™ is a pressure-responsive device that opens or closes one or more integral electrical switches at predetermined set points in order to:

- start or stop pump motors for pump jacks, electric submersible pump systems and pumping well heads
- stop gas engines
- control valve operations

Switch Features —

- Unlike the lower temperature Presco-Switches (PC #08-0071), the DHTE is only available in the Type F (fixed differential) switch arrangement.
 - Switch setting is adjustable within the pressure range of the switch.
 - Fixed differential is approximately 4% of the pressure switch range.
- Convenient microswitch adjustments make field setting easy.
- The switch housing's explosion-proof design is CSA approved for Class 1, Group D, Hazardous Locations.

Pressure Sensing Base Features —

- External adjustment is calibrated for convenience and enables the operator to adjust the set point without removing the switch housing cover or turning off the power.
- Interchangeable springs enable the base unit to be used for a variety of pressure ranges.
- Accurate operation and repeatability are provided by the smooth plunger movement and precision manufacturing.
- Long life is ensured by a guided plunger, resulting in a useful life that exceeds other types of pressure switch mechanisms.
- High proof pressure is provided by a positive plunger stop so that the DHTE switch will withstand overpressure and surges.



- Rugged design enables the DHTE switch to withstand severe operating conditions including shock, moderate vibration and corrosion.
- Standard male 2" NPT pressure sensing connection provides a solid mount that will not plug off or freeze readily. Canadian Registration Number is 0F08082.2.

Option —

- A tamper resistant pin in hex socket (requires special wrench to adjust) is available.

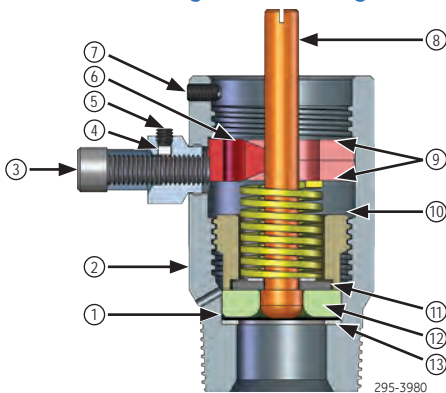


Model DHTE High Temperature Presco-Switch™

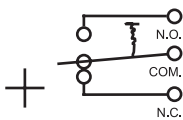
General Specifications –

Working Pressure	Maximum - 13,795 kPa (2,000 psi)
Accuracy	Repeatability 1% to 2% of range
Adjustment	External - To lower trip point, rotate hex socket adjusting screw with 3/8" hex wrench counterclockwise; to raise trip point, rotate clockwise.
Differential	Fixed - 3% of range
Temperature Range	up to +425°C (+800°F). NOTE: Although the pressure sensing diaphragm and gasket are suitable for temperatures up to 425°C (800°F), the operating temperature at the base should not exceed 315°C (600°F) for prolonged periods.
Electrical Classification	CSA approved for Class 1, Group D, Hazardous Locations
Electrical Rating	SPDT - Switch Rating @200°C (400°F), 5 Amps, 125/250/480 VAC; 0.5 Amp, 125 VDC; 0.25 Amp, 250 VDC; UL Code, L-35
Electrical Housing	3-1/2" OD
Electrical Connection	1/2" NPT (female)
Pressure Connection	2" NPT (male) standard
ABSA Registration	Alberta Boilers Safety Association Canadian Registration Number (CRN) 0F08082.2

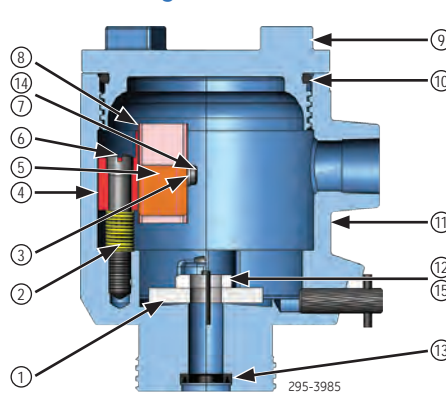
Pressure Sensing Base Housing –



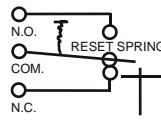
Model DHTE



Switch Arrangement –



Type F



DHTE Ordering Procedure –

When ordering, please specify:

- 1) Pressure Sensing Model: **DHTE**
- 2) From Pressure Range to Nominal Pressure Range: **See Range Number Chart**
- 3) Pressure Setting: **Specify the desired setting within the pressure range (kPa) (psi)**
- 4) Cable Assembly (Optional Item): **Maximum length 50'**

Range Number Chart –

Range Number	Plunger Diameter	Model DHTE	
		kPa	psi
100	0.62"	690 - 6,900	100 - 1,000
125	0.62"	1,034 - 8,619	150 - 1,250
150	0.62"	2,070 - 10,338	300 - 1,500
200	0.62"	2,760 - 13,795	400 - 2,000

Spring Range Chart –

Spring Required	Part Number	0.62" Diameter Piston	
		kPa	psi
Dark Red 1.0	75010292	690 - 6,900	100 - 1,000
Red 1.0	75000011	1,034 - 8,619	150 - 1,250
Yellow 1.0	75000026	2,070 - 10,338	300 - 1,500
Red 1.25	75000025	2,760 - 13,795	400 - 2,000

Item No.	Part Number	Description
1	34000232	Diaphragm
2	34010177	Adjusting Screw Hub
3	34000224	Adjusting Load Screw
4	34000233	Locking Plug
5	70000087	Set Screw
6	34000225	Wedge
7	70010274	Set Screw
8	34000227	Piston
9	34000228	Ramp
10	34000230	Piston Guide Sleeve
11	34000085	Spring Base Plate
12	34000231	Piston Guide
13	71310182	Gasket

Item No.	Part Number	Description
1	34000023	Trip Plate
2	34000238	Spring Spacer
3	34010015	Backing Plate
4	34000239	Switch Mounting Block
5	73010010	Microswitch
6	70000213	Cap Screw
7	70000214	Screw
8	34000240	Insulating Barrier
9	34000021	Switch Housing Cover
10	71000057	O-Ring
11	34010293	Switch Housing
12	34000031	Lock Nut
13	71510111	U-Cup
14	70010275	Washer
15	75010013	Wave Spring



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 Manufactured in Canada

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GE Oil & Gas

Pressure Control

General Catalog

Flow Control

Presco-Pumps™ *(Select a Product)*

High Pressure Presco-Pump™ Module



GE imagination at work

Flow Control

Pressure Control High Pressure Presco-Pump™ Module

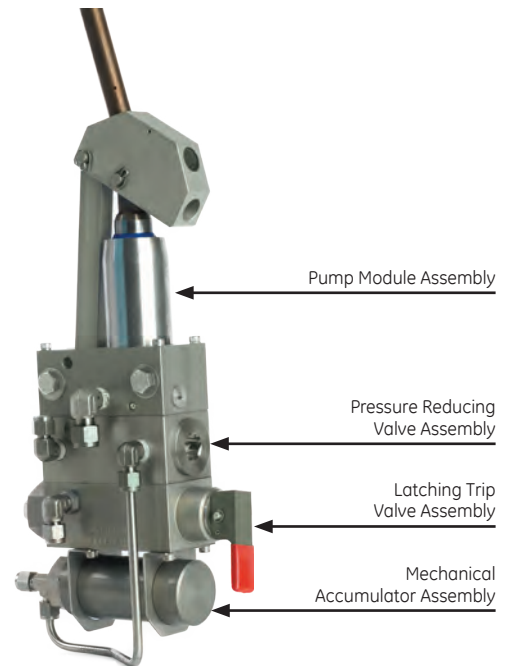
The High Pressure Presco-Pump Module is a manual hydraulic pressurizing device typically installed on an actuator to open or close an emergency shutdown (ESD) valve. The Presco-Pump consists of a:

- pump module assembly,
- pressure reducing valve assembly that controls the pressure of the fluid,
- latching trip valve assembly to arm and trip the pump module, and
- separate accumulators assembled on the high pressure or low pressure side that compensate for volume changes in the hydraulic fluid due to temperature changes.
- In addition, if required by the application, a reservoir for the hydraulic fluid may be added.

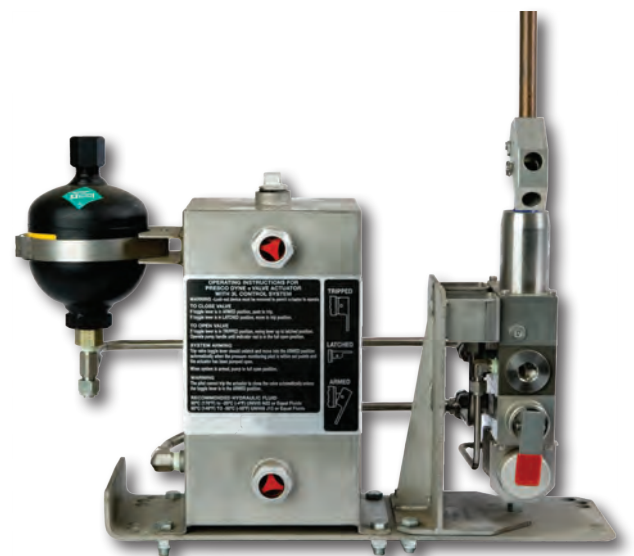
The module utilizes a hand pump attached to the plunger to raise the pressure of the hydraulic fluid. The fluid passes through the pressure reducing valve, which controls the pressure of the fluid flow. High pressure hydraulic fluid flows from the pressure reducing valve to the actuator to open the valve.

Features —

- Can be used with 2- and 3-line pressure pilots, solenoid valves, and panic buttons
- Field-proven for extreme service conditions
- Available in system pressure ratings up to 41,370 kPa (6,000 psi)
 - 1" plunger for 10,300 kPa (1,500 psi) and 13,800 kPa (2,000 psi)
 - 3/4" plunger for up to 24,130 kPa (3,500 psi)
 - 1/2" plunger for up to 41,370 kPa (6,000 psi)
- Flexible installation options
 - Horizontal or vertical actuator orientation
 - Remotely mounted as a stand-alone control package
- Designed to operate both linear and quarter-turn hydraulic actuators
- All components can be individually replaced, if needed



Components of a High Pressure Presco-Pump™ Module



High Pressure Presco-Pump™ Module with Remote Control and Hydraulic Fluid Reservoir



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GE Oil & Gas

Pressure Control

General Catalog

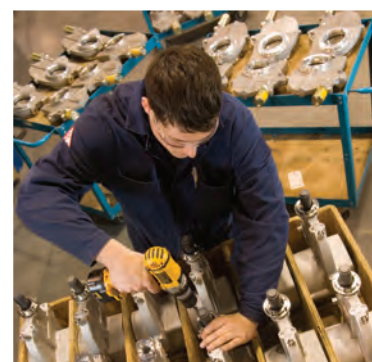
Flow Control

Barber Safety Systems Brochure *(Select a Product)*

Barber Safety Systems Brochure



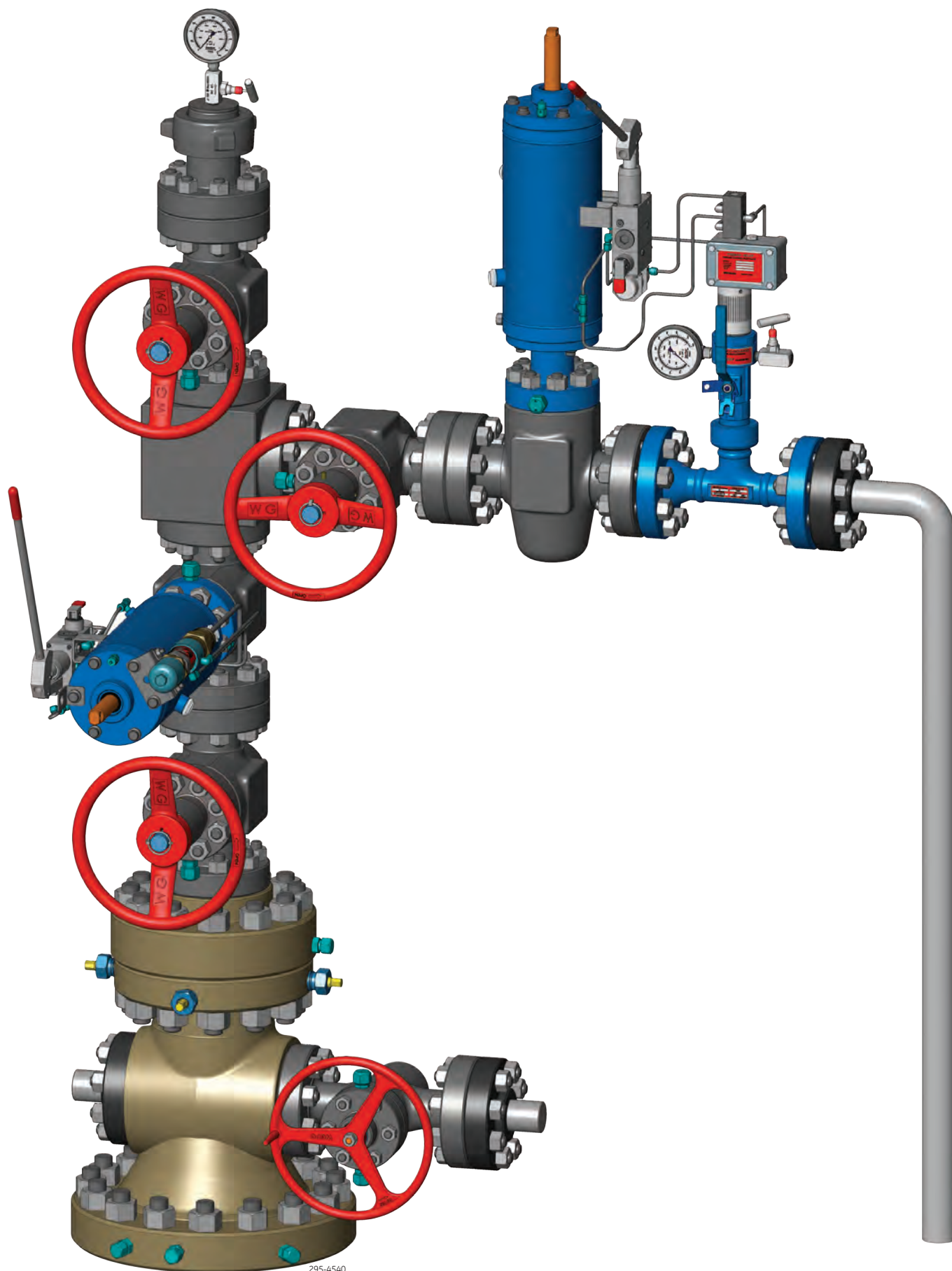
GE imagination at work



Barber Safety Systems



Long recognized as a global leader for the supply of wellhead systems to the Oil and Gas Industry, GE Oil & Gas Pressure Control also offers Barber Safety Systems, innovative control products for wellhead, pipeline, process, and refinery applications. All products are designed and manufactured to strict API specifications and ISO standards to meet the most critical service conditions.



295-4540

2-Line Presco-Pilot™

- Pressure-responsive two-way valve generally used to control actuators
- Pilot trip points easily field adjustable
- Widest range of spring ranges and trip points available in a single pilot



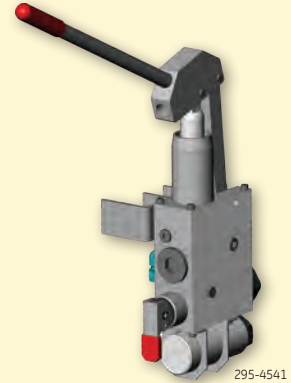
3-Line Presco-Pilot™

- Pressure-responsive three-way poppet valve typically used to control actuators
- Pilot trip points easily field adjustable
- Design incorporates combined high and low trip points
- Suitable for a variety of pressure ratings and service conditions
- Available in both hydraulic and pneumatic configurations



Presco-Pump™ Module

- Used to open a hydraulic emergency shutdown device (ESD)
- Consists of a manual pump, pressure reducing valve, latching trip valve and mechanical accumulator
- Can operate both linear and quarter-turn hydraulic actuators
- Can operate subsurface safety valves (SSV's)



Presco-Isolator™

- Simplifies field calibration of Presco pilots or switches
- Facilitates removal or replacement of Presco pilots and switches without depressurizing flowline



Presco-Tee™

- One-piece flowline element for convenient mounting of Presco pressure sensing pilots and switches



RA Hydraulic Actuator

- Basic hydraulic actuator adaptable to most manufacturers' gate valves
- Can be modified to incorporate Presco-Pump and other components
- Available in wireline-cutting designs

RA-ESD Self-Contained Hydraulic Actuator

- RA actuator fitted with Presco-Pump and 2- or 3-line Presco-Pilot
- Ideally suited for use in remote areas where no other power sources are available
- Safe for use in hazardous areas
- Closed loop hydraulic system
 - Uses clean hydraulic fluid and patented internal reservoir
- Available for use on a wide variety of API and ANSI rated valve sizes, working pressures, service conditions and temperatures

Presco-Switch™

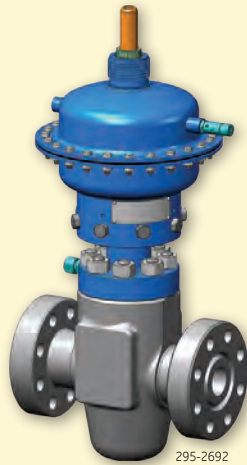
- Pressure-responsive device that:
 - starts or stops pump motors for pump jacks and electric submersible pump systems
 - stops gas engines



295-4539

D Pneumatic Diaphragm Actuator

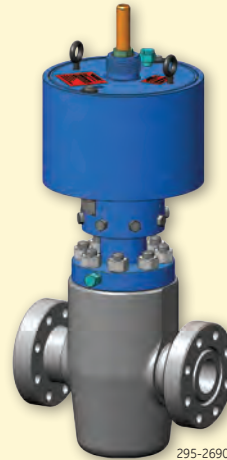
- Light-weight and reliable, yet simple in design
- Quick disconnect feature allows removal of actuator without the use of special tools or depressurizing valve
- Actuator top shaft/indicator rod provides visual position of gate valve
- Designed for use on most manufacturers' gate valves in a wide range of sizes, working pressures, service conditions and temperatures



295-2692

P Pneumatic Piston Actuator

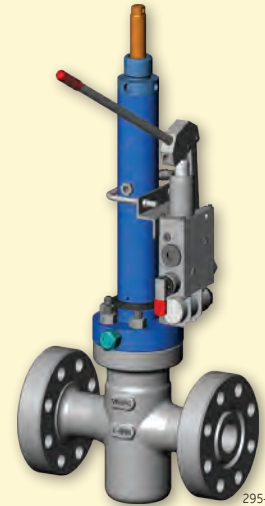
- Suitable for applications where diaphragm actuators are not permitted or allowed
- All non-stainless parts are Xylan coated to protect against harsh environments and provide long service life
- Designed for optimum closure in harsh and severe environments
- Suitable for use on API 6A and ANSI applications
- Designed for use on most manufacturers' gate valves in a wide range of sizes, working pressures, service conditions and temperatures



295-2690

HSRA-2 Self-Contained ESD Hydraulic System

- Designed specifically for use in 2-1/16" 2,000 to 5,000 psi applications
- Small, light and compact



295-4595



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Manufactured in Canada

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GE Oil & Gas

Pressure Control

General Catalog

Shale 360™ Services *(Select a Product or Service)*

Shale 360™ Services

Frac Manifold Skid

Frac Isolation Sleeve



GE imagination at work

GE Oil & Gas

Shale 360™ Services

Integrated Shale-focused Solutions



A Singular Focus On Elevating Performance



The shale exploration and production boom has dramatically changed the energy landscape. Characterized by thin, narrow production zones with low permeability, these plays can yield abundant oil and gas production. However, they also pose significant risks, high costs and extreme demands on product performance. To respond to the challenge, GE Oil & Gas Pressure Control has developed Shale 360™ Services, an integrated suite of shale-focused solutions. Shale 360 Services brings together in-field technical expertise, proven technology, renowned quality and engineering leadership, along with dedicated frac-focused Centers of Excellence to optimize operators' performance.

GE's Shale 360 Services delivers new efficiencies and greater productivity to unconventional shale plays within North America and throughout the world. Its singular focus on elevating performance begins with ensuring high availability of innovative equipment designed to handle the technical rigors of shale plays. Together with a new network of facilities created specifically for this demanding market, these services are backed by a highly trained and experienced team dedicated solely to delivering superior safety, reliability and operational excellence. On every critical issue, Shale 360 Services has your needs covered.



GE Oil & Gas Pressure Control operates over 80 manufacturing, service, and sales locations globally, covering all aspects of operations with advanced tools, skills and solutions in every region. In addition to frac solutions, Pressure Control offers conventional and time-saving wellhead systems, gate valves, actuators and flow control systems and services.

Shale 360 Services' Centers of Excellence

More than ever, operators in shale plays require quality products that are readily available and can be counted on to perform day-in, day-out. To assure the best equipment, quality and dependability, we have created a network of Centers of Excellence that is strategically located in major shale plays in North America. Developed to speed service and raise quality, these field-driven Centers of Excellence are 100% focused on frac services and repairs, and staffed by experts trained specifically in frac services.

At our Centers of Excellence, we leverage efficient technologies such as GPS tracking and RFID tagging to quickly identify where equipment is located for improved scheduling of GE assets. Our experts perform ultrasonic testing in-house to assure product reliability. And, we utilize "green" practices that increase both quality and asset availability in a quarter of the time of traditional methods. In addition, our common ERP platform means customers benefit from the simplicity of one invoice for all rental needs.



-  Centers of Excellence
-  Service Centers

To maximize operational uptime, our Centers of Excellence are located in major shale plays, giving customers quick access to the service excellence they need.

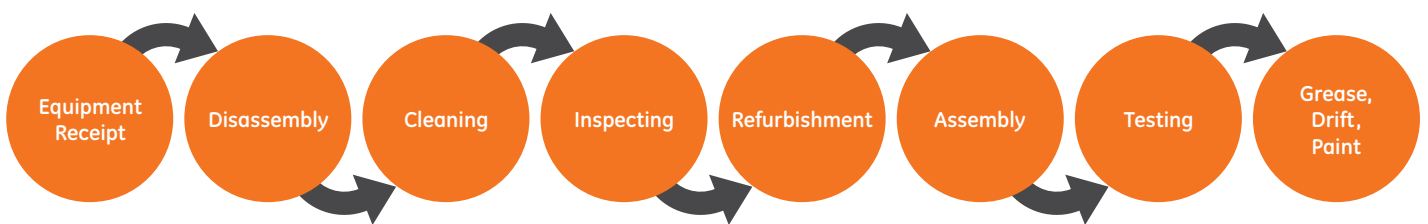


The Human Asset

We have developed a robust and highly skilled team to expertly meet the challenges customers face in shale plays. Pressure Control has hired the most experienced and educated people in the field and deployed substantial quality and inspection resources at each Center.

In addition, all our Frac Service Technicians are provided with comprehensive training. From Entry, to Professional, to Lead Technician, and finally Master Technician, each level is reached by completing a unique combination of intensive training and experience in the field. Our people are also supported by an extensive mentorship program that ensures continuous learning.

To provide shorter turnaround times, Shale 360 Services has integrated the Kaizen Method at every Center of Excellence. Japanese for “change for the best”, Kaizen focuses on continuous improvement of work processes. In this approach, GE’s Six Sigma personnel monitor the repair process during each stage at the centers to make sure efficiencies are greatest. This translates into faster time of delivery to customers in the field and greater availability.



To maximize efficiencies and continually improve processes, we implement Kaizen, 5S and Six Sigma practices at our Centers of Excellence.



Critical Services, Expertly Delivered

Shale 360 Services brings a higher level of specialization to four critical services that extend across the life of the well. Our full suite of installation, test and maintenance services are delivered by experts in shale operations.



1: MOBILIZATION

Using crane trucks, the skilled professionals at Shale 360 Services both install and remove rental equipment from the wellhead.



2: INSTALLATION

Installing your equipment in a safer and more efficient manner is critical to bringing your systems on-line, on-time. Following API procedures enhanced by GE's torquing and testing procedures, we provide installation of frac trees, high-pressure flow iron, and frac manifolds.



3: ONSITE OPERATIONS

Maximizing equipment uptime is vital for success. To ensure valves are operating at optimal efficiency, our personnel combine OEM equipment knowledge, supported by in-depth technical capability to perform on-site maintenance, torquing, testing and greasing services.



4: FLOWBACK SUPPORT

To meet your ongoing needs, we provide equipment and services that assist in the flowback process, including modifications to the frac tree.



Advanced Technologies, Readily Available

With Shale 360 Services, customers benefit from an extensive inventory of frac equipment installed by experienced professionals, and a fleet of crane trucks to deliver equipment where and when it's needed. To ensure optimal performance, we test and service equipment using our multi-purpose torque and test trailers. And we offer a wide range of ancillary equipment to further support your needs.

Innovation Driven

Our commitment to delivering advanced shale-focused solutions means continually developing innovations that increase performance and productivity. Our modular frac manifolds have fewer connection make-ups and line manipulations to reduce risks. We are also releasing a ball launcher designed to isolate stages during frac operations as well as an innovative solution for transferring fracturing fluids from the manifold to the wellhead.

Frac Trees

- Designed for use in abrasive environments
- Available at working pressures from 5,000 psi through 20,000 psi
- Bore sizes from 1-13/16" through 7-1/16"
- 5-1/8" and 7-1/16" valves available with equalization manifold to reduce wear and opening torque
- Remote actuation available upon request

Frac Manifolds

- Engineered for multi-stage frac operations on multi-well pads, providing increased productivity and operational safety
- Adjustable connections provide assembly flexibility in uneven terrain
- Remote-operated valves with manual overrides allow safer operating distance
- Hydraulic units assist in assembly, eliminating pinch points, and increasing speed of installation
- Ergonomically designed hand wheel lowers operating elevation
- Modular design allows units to be shipped to/from well site with GE crane trucks, reducing freight costs; "wide load" permitting no longer required
- Vertically mounted Sandbuster® frac valves are designed to reduce impact of sand, proppants or flowback debris.
- Secondary spill containment holds fluids and helps prevent environmental issues

Frac Stack Stand

- Engineered for improved safety
- Attached to the center of the frac stack assembly on 7" frac stacks

Two to Four Station Closing Units

- Allows remote operation of our double-acting, high pressure hydraulic frac valves
- Completely self-contained closing units generate and store enough hydraulic energy to operate any oilfield closing device several times
- Pressure switch shuts down the motor at 3,000 psi

Crane Trucks

- Crane trucks are used to deliver and set equipment directly onto the wellhead
- Easily and precisely lift and place a 7-1/16" 15,000 psi working pressure frac stack
- Torque wrench and operator on board
- Medium duty trucks (18' flat bed) and heavy duty trucks (24" flat bed) available

Multi-Purpose Torque and Test Trailers

- Equipped to handle high pressure, high volume, hydrostatic test and bolt torque requirements
- Significantly reduce total service hours on location

Ancillary Equipment and Services

- Innovative time-saving wellhead and production tree systems for increased field efficiencies
- High-pressure flow iron and connectors to transfer fracturing fluids between manifolds and trees
- Ball catcher to remove debris during flowback operations
- Trailer-mounted greasing units for extended valve life management
- Combination frac sleeve and frac adapters to protect lower pressure rated wellheads from higher frac pressure
- GE-engineered lubricators in working pressures up to 20,000 psi
- Flow life prediction using Computational Fluid Dynamics (CFD) simulations, erosion analysis, and customized engineering solutions for improved operational performance





EHS Above All

At GE Oil & Gas Pressure Control, health, safety, and the environment are at the core of all our operations. We provide comprehensive training programs, on-site safety and in-field contingency procedures that are followed by every Shale 360 Services professional. We adhere to the Human and Organizational Performance, or “HOP” principles in our everyday operations. HOP reflects our view of safety - focusing on preventing incidents before they occur.

The Power of GE

Through Shale 360 Services, GE Oil & Gas Pressure Control is committed to bringing reliable technologies, innovations and service leadership to shale plays the world over. Shale 360 Services draws on the experience and expertise of GE Oil & Gas, a key player in the energy market operating in over 100 countries around the world. GE Oil & Gas works on the things that matter in the oil and gas industry. In collaboration with our customers, we push the boundaries of technology to bring energy to the world. From extraction to transportation to end use, we address today's toughest challenges in order to fuel the future.



GE Oil & Gas

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GEA31384 (08/2014)

Shale 360™ Services

Pressure Control Modular Frac Manifold

The Modular Frac Manifold is designed to safely allow for simultaneous frac operations on multiple well pads. Each self-contained unit consists of a customized array of actuated valves, blocks, and frac head outlet and is engineered to safely isolate each well during stimulation. Multiple manifolds can be installed side-by-side to accommodate each customer's specific well site/pad requirements.

Features —

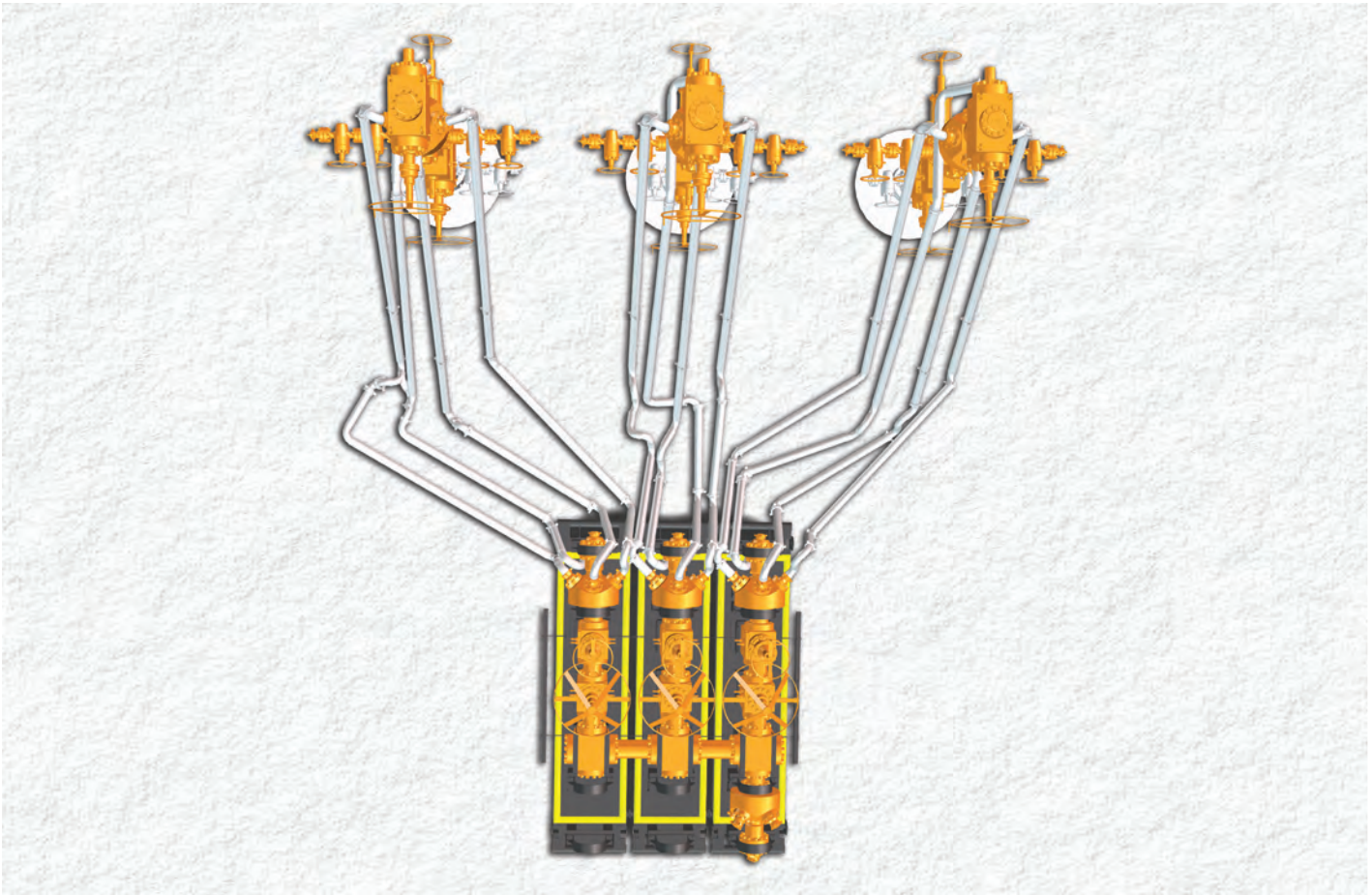
- Improved safety
 - Less repeated lifting, fewer connection make-ups and line manipulations to reduce risks
 - Handwheel ergonomically designed at stand level within the safety zone
 - Unique hydraulic jacking system moves manifold units together to final assembly reduce pinch points and allow for quicker installation
 - Hydraulic valve allows closing the manifold from a remote, safe distance
 - Double acting hydraulic actuator with manual override ensures proper flow control and shut off even if hydraulic system has been interrupted
 - Self-contained units act as a barrier to hold fluids and prevent environmental issues
- Time-saving efficiencies
 - Rigged up before frac equipment arrives expedites pad preparation
 - Made-up once, eliminating downtime, teardown, and repositioning of lines while each well on the pad is fractured
- Economical, modular design
 - Modular design allows units to be shipped to/from well site with GE crane trucks reduces freight costs due to no "wide load" permitting
 - 4-unit-connecting spools with rotating flange provide adjustability to overcome minor alignment issues
 - Factory assembled in two-well units or customized per operator's specific well site/pad requirements
 - Frac head designed with four or five outlets allows for enhanced versatility of flow volume control
 - Vertically mounted Sandbuster® frac valves save space, reduce hazards and simplify repairs
- Optional on-site support
 - Provide 24-hour frac maintenance to operate and grease valves and to re-torque connections



3-Well Frac Manifold



Modular Frac Manifold



295-5779

Single source supplier advantage —

- Crane trucks deliver and place equipment, eliminating the need to contract a crane to remove individual components from the manifold and pay for costly operating and standby time
- Complete line of wellhead solutions and production trees
- Frac trees and manifold assemblies available for working pressures from 5,000 psi through 20,000 psi
- Frac stack stands engineered for safety
- Self-contained, two- to four-station closing units
- Mobile torque and test units
- Trailer mounted greasing units

Specifications —

Modular Frac Manifold		
Nominal Size	7-1/16" 10M	7-1/16" 15M
Maximum Pump Rate (5.12" Bore)*	61 bbl/min	61 bbl/min
Maximum Pump Rate (7.06" Bore)*	Up to 116 bbl/min	Up to 116 bbl/min
Maximum Working Pressure	10,000 psi	15,000 psi
Temperature Range	-20°F to +250°F (-29°C to +121°C)	-20°F to +250°F (-29°C to +121°C)
API Specification	API 6A	API 6A
Material Class**	DD-0,5 and EE-0,5	DD-0,5 and EE-0,5
PR2	PR2	PR2 Appendix F
Service	H ₂ S	H ₂ S
Flanges	7-1/16" 10M	7-1/16" 15M
Gasket Type	Stainless Steel	Stainless Steel
Inlet Connections	7-1/16" 10M	7-1/16" 15M
Outlet Connections	4-1/16" 10M	4-1/16" 15M
Available Connections	3" 1502 or 4" 1502	3" 2202 Hammer Union or 4" 2202 Hammer Union
Isolation Valves	7-1/16" 10M Manual and Hydraulic Sandbuster® Slab Gate Valves	7-1/16" 15M Manual and Hydraulic Sandbuster® Slab Gate Valves
Dimensions - (Per Unit, L x W x H)	17 ft 10 in x 4 ft x 9 ft 2 in (5.44 m x 1.22 m x 2.79 m)	17 ft 10 in x 4 ft x 9 ft 8 in (5.44 m x 1.22 m x 2.95 m)
Approximate Weight (Including Weight of Skid)		
Per Unit with One Frac Cross	21,200 lbs (9,616 kg)	29,000 lbs (13,154 kg)
Per Unit with Two Frac Crosses	23,500 lbs (10,659 kg)	32,000 lbs (14,515 kg)

* Maximum Pump Rate: Consult Engineering for custom flow rates

** Material Class: Additional trims available upon request



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Shale 360™ Services

Pressure Control Frac Isolation System

The Frac Isolation System is used when fracturing pressures will exceed the rated working pressure of the tubing head. The frac isolation system consists of three components:

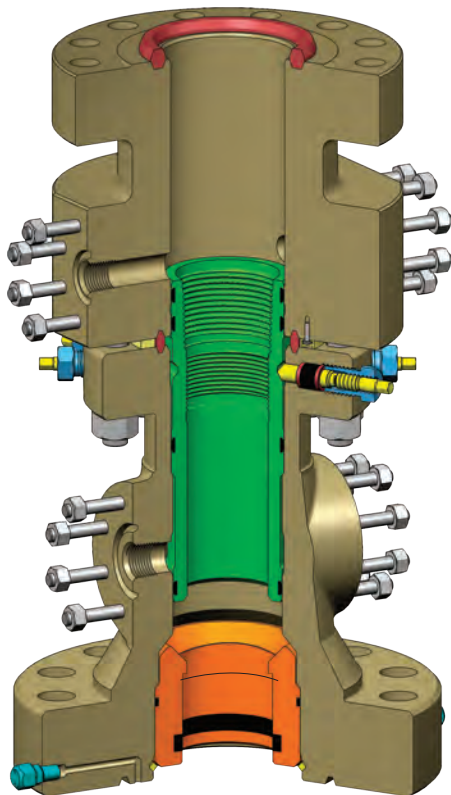
- a modified 7-1/16" 5,000 psi WP Type T tubing head with an isolation sleeve profile,
- a frac isolation sleeve with field-proven, 10,000 psi rated seals on the OD and BPV threads in the bore, and
- a frac adapter which transitions from the 5,000 psi tubing head to the 10,000 psi frac valve.

Frac isolation sleeves are available for use over both 4-1/2" and 5-1/2" production casing.

7-1/16" 10,000 psi

Optional Outlets —
1-13/16" 10,000 psi

7-1/16" 5,000 psi

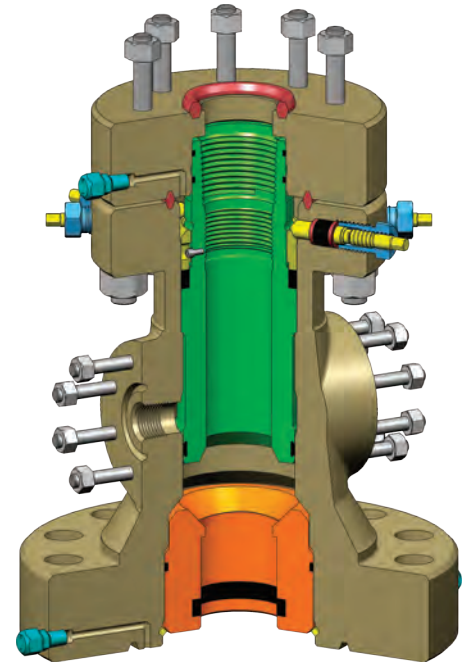


Frac Isolation System for Use Over 5-1/2" Production Casing

295-3194

4-1/16" 10,000 psi

7-1/16" 5,000 psi



Frac Isolation System for Use Over 4-1/2" Production Casing

295-3195

Features —

- Isolates the tubing head rated for 5,000 psi from fracturing pressures up to 10,000 psi
- Isolation sleeve can be safely removed from the wellhead under pressure
- Isolation sleeve and adapter can be reused for multi-well programs
- Lower cost compared to rental of conventional frac isolation tools
- Standard T tubing head bowl accepts all Pressure Control tubing hangers for subsequent completion
- Frac adapter for 5-1/2" available with optional 1-13/16" 10,000 psi outlets

Availability —

Production Casing	Minimum Sleeve ID	Frac Sleeve Part Number	Frac Adapter Part Number	
4-1/2"	3.900"	358642	347373	353755

Production Casing	Minimum Sleeve ID	Frac Sleeve Part Number	Frac Adapter Part Number	
			Without Outlets	With Outlets
5-1/2"	4.930"	355971	347373	353755



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08/14, PC #05-0301 rev 5

GE Oil & Gas

Pressure Control

General Catalog

Other Products *(Select a Product)*

Slip Clamp, Temporary Landing Device



GE imagination at work

Other Products

Pressure Control Slip Clamp, Temporary Landing Device

The Slip Clamp is used for temporary support of the casing string while cement “sets up”. The slip clamp is assembled around the casing in the cellar and transfers casing weight to the previous string. Once the string is fully supported, the casing head can be installed. This simple procedure **will save up to 8 hours of rig time**. This value-added product is not limited to use with any particular wellhead product line and is offered as a stand-alone tool to speed up our customers’ drilling process.

Features —

- No welding or open flame needed
- Quick installation
- Can be reused
- Supports casing string while cement sets up

Availability —

- Conductor sizes 20” through 30”
- Casing sizes up to 13-3/8”
- Available for rental

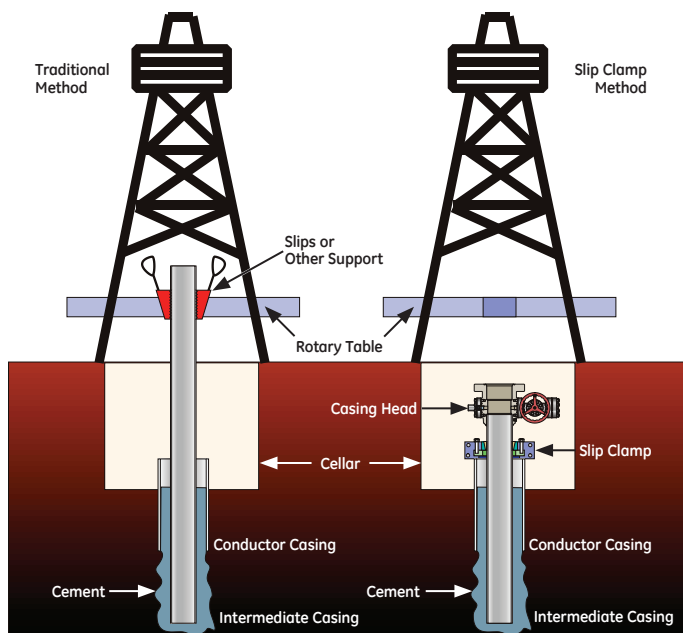
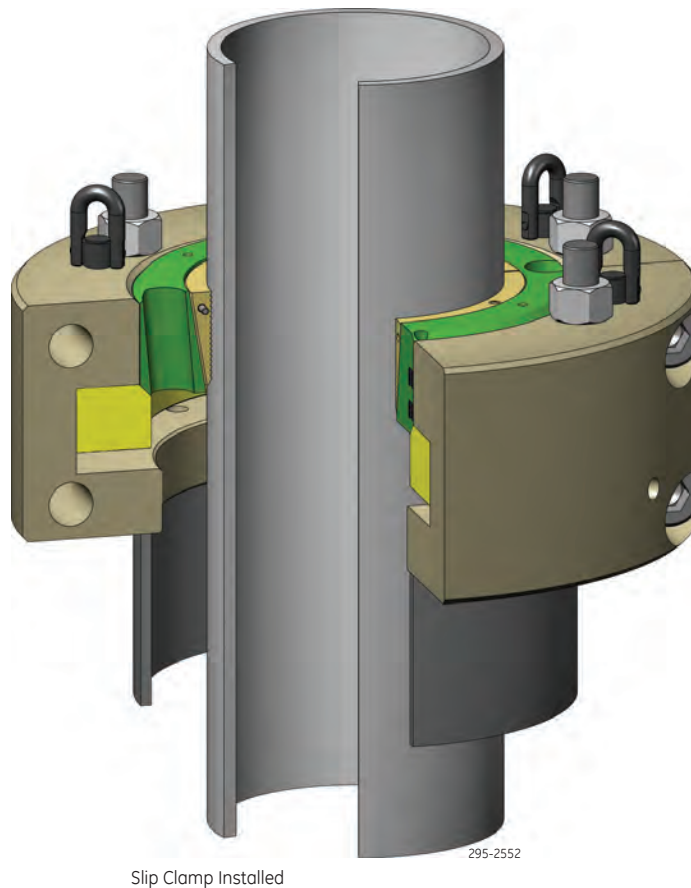


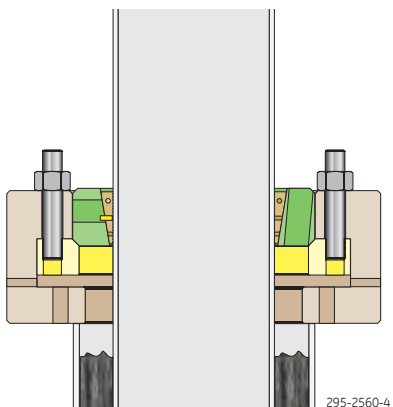
Figure 1: Traditional method vs. slip clamp method of cement setting and installing the casing head

295-2540



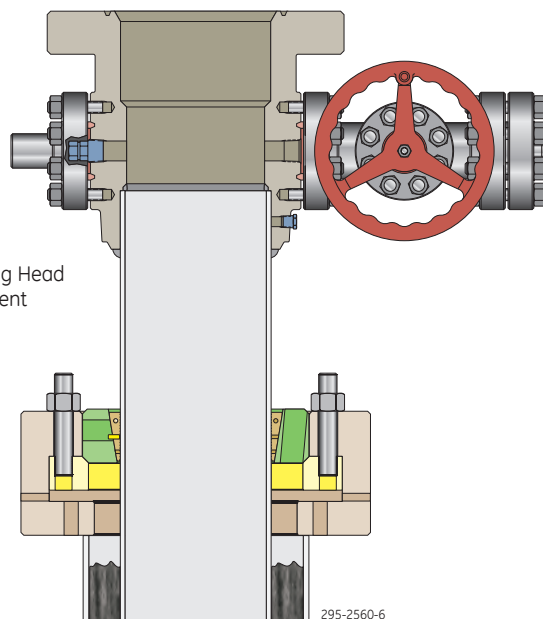
Slip Clamp, Temporary Landing Device

Installation —



Step #1

- Assemble slip clamp around casing
- Install slip bowl and slips
- Hang off casing
- Cut casing above slip clamp

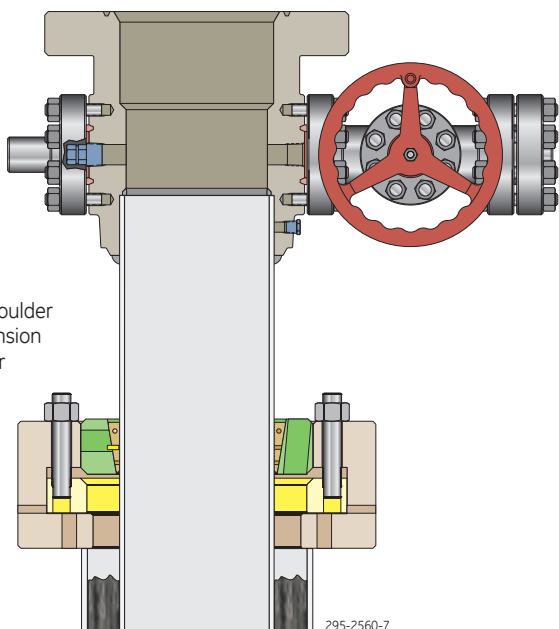


Install the Casing Head
Before the Cement
Has Set Up

Step #2

- Install casing head

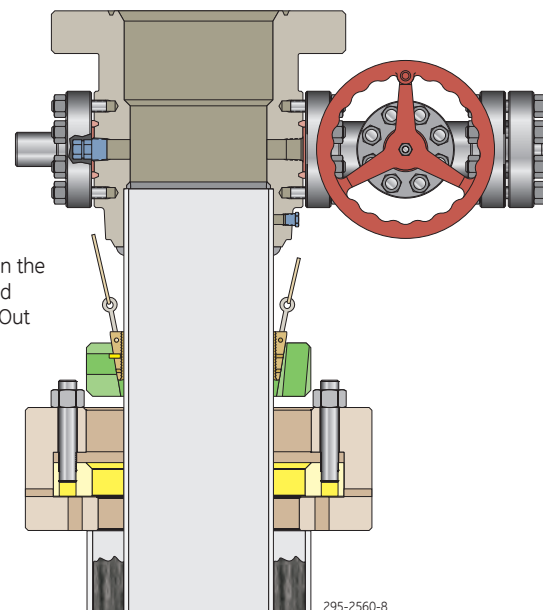
Removal —



Drop Load Shoulder
to Release Tension
on the Hanger

Step #1

- Install casing head
- Verify cement is set
- Lower load shoulder



Install Lift Eyes in the
Hanger Slips and
Lift the Hanger Out
of the Clamp

Step #2

- Pull slip bowl and slips
- Split and remove slip clamp



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