USA INDUSTRIES
Since 1982

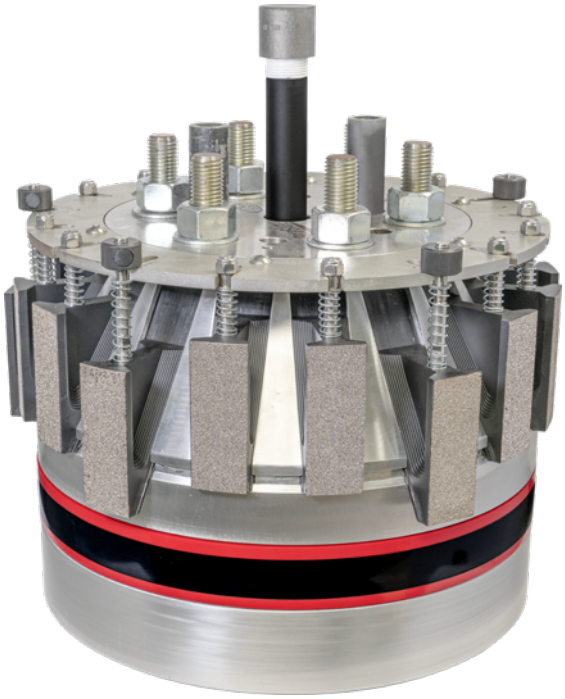
GripSafe® ST

OPERATING MANUAL

NPS 4"*

*4" Schedules 120, 160 and XXH refer to the GripSafe ST ORB Small Tool Operating Manaul

NPS 6" - 12"



NPS 14" - 24"**

** Larger sizes available upon request.

Large Outboard Retraction Blocking (ORB) Plug

Manufactured Exclusively by USA Industries, an ISO 9001:2015 Certified Company

For patent and trademark information, go to https//www.USAIndustries.com/gripsafe-patents/trademarks/

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Table of Contents

1. Introduction

Thank you for choosing GripSafe ST pipe plugging technology. This manual covers the proper use of this technology to ensure safe operating conditions. All necessary sockets, wrenches and lifting device to install this equipment are available for rental/purchase from USA Industries, Inc. See **Section 4 Table 2** for sockets and **Section 11 Table 3** for lifting device.

The information in this manual is intended for the use of a GripSafe ST plug in metallic piping. If the intended use of this plug is for any piping other than metallic piping please contact USA Industries, Inc. Customer Service Department for technical support.

⚠ **Do not use GripSafe ST equipment before fully reading and comprehending and comprehending this manual**

⚠ **Failure to follow this manual in full may result in injury to personnel and damage to equipment.**

2. Safety

⚠ Failure to follow proper safety requirements may result in the GripSafe ST Plug failing, which could lead to personnel injury, material loss, and damage to equipment.

⚠ Wear proper PPE when performing any task with the GripSafe ST Plug as defined by site safety rules. Always follow site procedure for safely lifting and operating equipment.

⚠ Never install the GripSafe ST Plug in a position where the Gripping Wedges would be located over a weld droop or ridge.

⚠ Never install the Seals or Gripping Wedge over a section of pipe that is missing its interior wall; e.g. weldolet, tee, etc.

⚠ Use care in the handling of the Wedge Studs. Never beat, hammer, or pry on the Wedge Studs. Never remove the nut located on the Wedge Studs.

⚠ Pressure testing can be an extremely hazardous operation and safety precautions should be strictly adhered to. Never stand or pass in front of any test plug while installed or while testing is in progress.

⚠ Do not make any adjustments to the plug, safety equipment, or vessel while the plug is under pressure.

⚠ Do not exceed rated pressure stamped on the plug. Plugs are rated for holding pressure in one direction only, never apply pressure on the non-rated side of the plug.

⚠ Backpressure rating on the plug is in reference to the plugs ultimate holding capacity. Never exceed the pressure capacity of the weakest component in a pressurized system. It is imperative that a system's components be studied prior to beginning a pressure test to confirm the maximum test pressure a system can be subjected to in accordance with all applicable industry and site-specific standards.

⚠ It is recommended that water be used as the test medium. Venting all gases from the vessel being pressurized is necessary before pressurizing the system.

⚠ In the event pneumatic testing is required, all attempts to limit potential damage to any personnel or equipment must be made. USA Industries recommends Nitrogen as the medium for pneumatic testing as it does not support combustion. Follow provisions outlined in ASME PCC-2 Repair of Pressure Equipment and Piping when testing pneumatically.

⚠ The Outboard Retraction Blocking GripSafe ST Plug is designed to hold pressure originating from the vessel side only.

⚠ Careful observation is needed at the location of the pipe where the Wedge Grippers make contact while performing a hydro test. If any deformation or swelling of the pipe is observed, stop immediately and slowly release the pressure from the system. Contact USA Industries for further assistance.

⚠ If at any time during hydro-testing a popping or clicking sound is heard, stop immediately and slowly release the pressure from the system. Popping or clicking sounds during hydro-testing could be a sign of the Wedge Gripper slipping, cracking, or plug components failing. Remove the plug from the pipe or fitting and inspect for damage. Contact USA Industries for further assistance.

⚠ Ensure plug is clean of debris, fouling, and contaminants before each use. Each Wedge Gripper should freely slide up and down in its slot with a full range of motion without any resistance. With impeded movement due to debris, dirt, contaminants, or other fouling will cause the plug to not grip on the pipe's inner diameter, which can cause it to eject under pressure, leading to personnel injury or death, material loss, and damage to equipment.

⚠ For any questions or concerns, contact USA Industries for technical assistance.

3. Parts

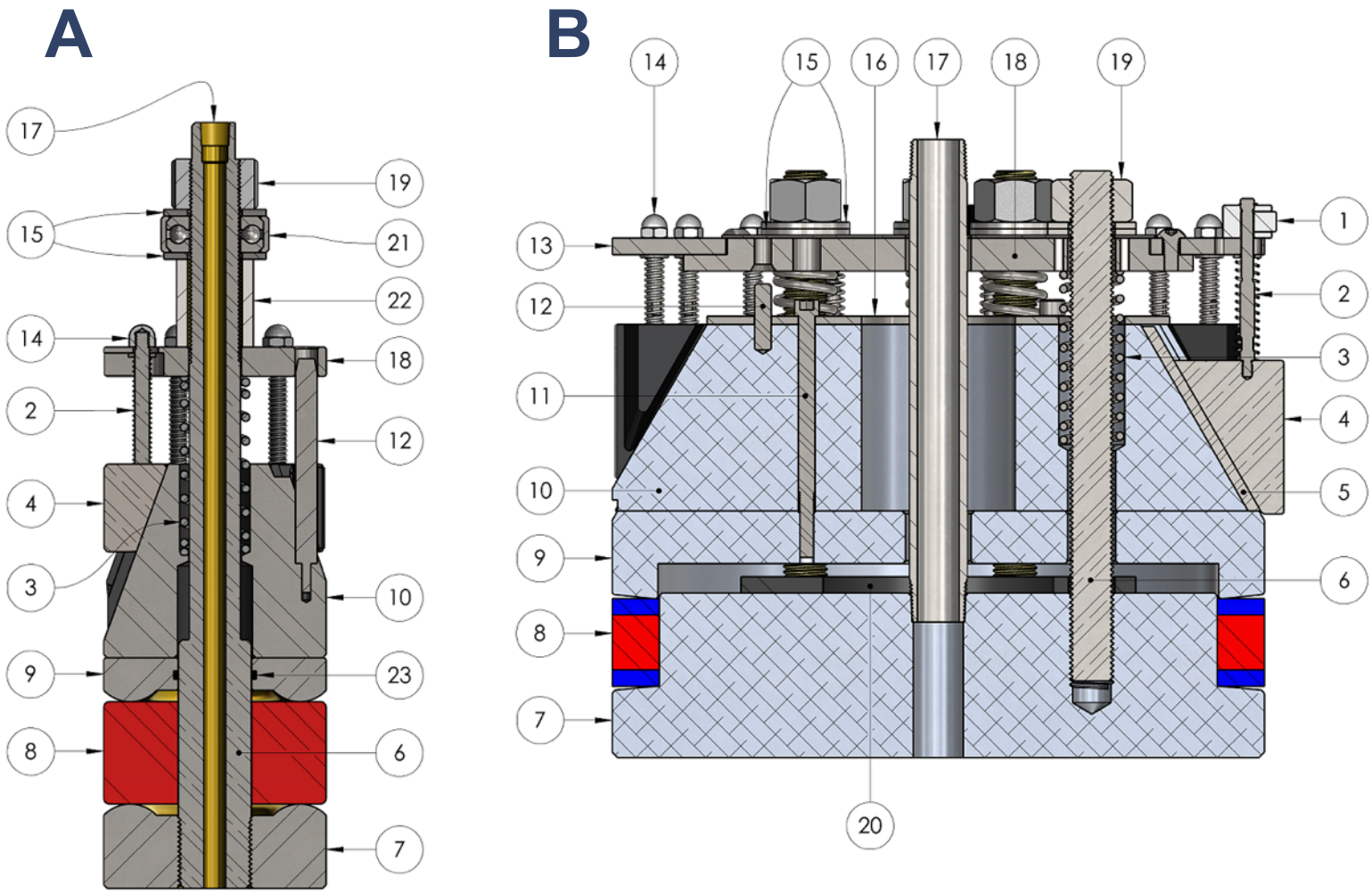

Figure 1: A- 4" | B – 6" – 24" GripSafe® ST Outboard Retraction Blocking Diagram

Table 1: GripSafe® ST ORB Bill Of Materials

Nominal Pipe Size (in)	Schedule	(1) Speed Nut	(2) Wedge Gripper Stem With Spring	(3) Retraction Compression Spring	(4) Wedge Gripper	(5) Back Plate	(6) Compression Shaft	(7) Bottom Compression Plate	(8) Seal	(9) Top Compression Plate	(10) Wedge Cone	(11) Wedge Cone Retaining Screw	(12) Alignment Dowel Pin	(13) Spring Plate Halo	(14) Wedge Gripper Nut	(15) Compression Washers	(16) Retainer Plate	(17) Back Pressure Vent Port	(18) Spring Plate Hub	(19) Compression Hex Nut	(20) Seal Dampener	(21) Thrust Bearing	(22) Compression Tubing	(23) Shaft O-Ring
4	10, 10S	0	6	1	6	0	1	1	1	1	1	0	3	0	6	2	0	1	1	1	0	1	1	1
	40, STD, 40S	0	6	1	6	0	1	1	1	1	1	0	3	0	6	2	0	1	1	1	0	1	1	1
	80, XS, 80S	0	6	1	6	0	1	1	1	1	1	0	3	0	6	2	0	1	1	1	0	1	1	1
6	10, 10S	0	9	1	9	9	4	1	1	1	1	2	2	0	9	8	1	1	1	4	0	4	0	0
	40, STD, 40S	0	9	1	9	9	4	1	1	1	1	2	2	0	9	8	1	1	1	4	0	4	0	0
	80, XS, 80S	0	9	1	9	9	4	1	1	1	1	2	2	0	9	8	1	1	1	4	0	4	0	0
	120	0	8	1	8	8	4	1	1	1	1	2	2	0	8	8	1	1	1	4	0	4	0	0
	160	0	7	1	7	7	4	1	1	1	1	2	2	0	7	8	1	1	1	4	0	4	0	0
	XX	0	6	1	6	6	4	1	1	1	1	2	2	0	6	8	1	1	1	4	0	4	0	0
8	10, 10S	0	15	1	15	15	4	1	1	1	1	2	2	0	15	8	1	1	1	4	0	4	0	0
	20	0	15	1	15	15	4	1	1	1	1	2	2	0	15	8	1	1	1	4	0	4	0	0
	30	0	15	1	15	15	4	1	1	1	1	2	2	0	15	8	1	1	1	4	0	4	0	0
	40, STD, 40S	0	15	1	15	15	4	1	1	1	1	2	2	0	15	8	1	1	1	4	0	4	0	0
	60	0	15	1	15	15	4	1	1	1	1	2	2	0	15	8	1	1	1	4	0	4	0	0
	80, XS, 80S	0	15	1	15	15	4	1	1	1	1	2	2	0	15	8	1	1	1	4	0	4	0	0
	100	0	14	1	14	14	4	1	1	1	1	2	2	0	14	8	1	1	1	4	0	4	0	0
	120	0	13	1	13	13	4	1	1	1	1	2	2	0	13	8	1	1	1	4	0	4	0	0
	140	0	13	1	13	13	4	1	1	1	1	2	2	0	13	8	1	1	1	4	0	4	0	0
	160	0	12	1	12	12	4	1	1	1	1	2	2	0	12	8	1	1	1	4	0	4	0	0
	XX	0	12	1	12	12	4	1	1	1	1	2	2	0	12	8	1	1	1	4	0	4	0	0
10	10, 10S	0	13	4	13	13	4	1	1	1	1	2	2	1	13	8	1	1	1	4	0	0	0	0
	20	0	13	4	13	13	4	1	1	1	1	2	2	1	13	8	1	1	1	4	0	0	0	0
	30	0	13	4	13	13	4	1	1	1	1	2	2	1	13	8	1	1	1	4	0	0	0	0
	40, STD, 40S	0	13	4	13	13	4	1	1	1	1	2	2	1	13	8	1	1	1	4	0	0	0	0
	60, XS, 80S	0	12	4	12	12	4	1	1	1	1	2	2	1	12	8	1	1	1	4	0	0	0	0
	80	0	11	4	11	11	4	1	1	1	1	2	2	1	11	8	1	1	1	4	0	0	0	0
	100	0	11	1	11	11	4	1	1	1	1	2	2	1	11	8	1	1	1	4	0	0	0	0
	120	0	10	1	10	10	4	1	1	1	1	2	2	1	10	8	1	1	1	4	0	0	0	0
	140, XX	0	9	1	9	9	4	1	1	1	1	2	2	1	9	8	1	1	1	4	0	0	0	0
	160	0	9	1	9	9	4	1	1	1	1	2	2	1	9	8	1	1	1	4	0	0	0	0

Table 1: GripSafe® ST ORB Bill Of Materials con't.

Nominal Pipe Size (in)	Schedule	(1) Speed Nut	(2) Wedge Gripper Stem With Spring	(3) Retraction Compression Spring	(4) Wedge Gripper	(5) Back Plate	(6) Compression Shaft	(7) Bottom Compression Plate	(8) Seal	(9) Top Compression Plate	(10) Wedge Cone	(11) Wedge Cone Retaining Screw	(12) Alignment Dowel Pin	(13) Spring Plate Halo	(14) Wedge Gripper Nut	(15) Compression Washers	(16) Retainer Plate	(17) Back Pressure Vent Port	(18) Spring Plate Hub	(19) Compression Hex Nut	(20) Seal Dampener	(21) Thrust Bearing	(22) Compression Tubing	(23) Shaft O-Ring
12	10, 10S	0	18	6	18	18	6	1	1	1	1	4	2	1	18	12	1	1	1	6	1	0	0	0
	20	0	18	6	18	18	6	1	1	1	1	4	2	1	18	12	1	1	1	6	1	0	0	0
	30	0	17	6	17	17	6	1	1	1	1	4	2	1	17	12	1	1	1	6	1	0	0	0
	STD, 40S	0	17	6	17	17	6	1	1	1	1	4	2	1	17	12	1	1	1	6	1	0	0	0
	40	0	17	6	17	17	6	1	1	1	1	4	2	1	17	12	1	1	1	6	1	0	0	0
	XS, 80S	0	16	6	16	16	6	1	1	1	1	4	2	1	16	12	1	1	1	6	1	0	0	0
	60	0	16	6	16	16	6	1	1	1	1	4	2	1	16	12	1	1	1	6	1	0	0	0
	80	0	16	6	16	16	6	1	1	1	1	4	2	1	16	12	1	1	1	6	1	0	0	0
	100	0	15	4	15	15	4	1	1	1	1	2	2	1	15	8	1	1	1	4	1	0	0	0
	120, XX	0	14	4	14	14	4	1	1	1	1	2	2	1	14	8	1	1	1	4	1	0	0	0
	140	0	13	4	13	13	4	1	1	1	1	2	2	1	13	8	1	1	1	4	1	0	0	0
	160	0	13	4	13	13	4	1	1	1	1	2	2	1	13	8	1	1	1	4	1	0	0	0
14	10S	0	15	6	15	15	6	1	1	1	1	4	2	1	15	12	1	1	1	6	1	0	0	0
	10	0	15	6	15	15	6	1	1	1	1	4	2	1	15	12	1	1	1	6	1	0	0	0
	20	0	15	6	15	15	6	1	1	1	1	4	2	1	15	12	1	1	1	6	1	0	0	0
	30,STD,40S	0	14	6	14	14	6	1	1	1	1	4	2	1	14	12	1	1	1	6	1	0	0	0
	40	0	14	6	14	14	6	1	1	1	1	4	2	1	14	12	1	1	1	6	1	0	0	0
	XS,80S	0	14	6	14	14	6	1	1	1	1	4	2	1	14	12	1	1	1	6	1	0	0	0
	60	0	19	6	19	19	6	1	1	1	1	4	2	1	19	12	1	1	1	6	1	0	0	0
	80	0	18	6	18	18	6	1	1	1	1	4	2	1	18	12	1	1	1	6	1	0	0	0
	100	0	17	6	17	17	6	1	1	1	1	4	2	1	17	12	1	1	1	6	1	0	0	0
	120	0	17	6	17	17	6	1	1	1	1	4	2	1	17	12	1	1	1	6	1	0	0	0
	140	0	16	6	16	16	6	1	1	1	1	4	2	1	16	12	1	1	1	6	1	0	0	0
	160	0	15	6	15	15	6	1	1	1	1	4	2	1	15	12	1	1	1	6	1	0	0	0
16	10S	5	19	6	19	19	6	1	1	1	1	4	2	1	14	12	1	1	1	6	1	0	0	0
	10	5	19	6	19	19	6	1	1	1	1	4	2	1	14	12	1	1	1	6	1	0	0	0
	20	5	19	6	19	19	6	1	1	1	1	4	2	1	14	12	1	1	1	6	1	0	0	0
	30,STD,40S	5	18	6	18	18	6	1	1	1	1	4	2	1	13	12	1	1	1	6	1	0	0	0
	40,XS,80S	5	18	6	18	18	6	1	1	1	1	4	2	1	13	12	1	1	1	6	1	0	0	0
	60	5	17	6	17	17	6	1	1	1	1	4	2	1	12	12	1	1	1	6	1	0	0	0
	80	5	22	6	22	22	6	1	1	1	1	4	2	1	17	12	1	1	1	6	1	0	0	0
	100	5	21	6	21	21	6	1	1	1	1	4	2	1	16	12	1	1	1	6	1	0	0	0
	120	5	21	6	21	21	6	1	1	1	1	4	2	1	16	12	1	1	1	6	1	0	0	0
	140	5	19	6	19	19	6	1	1	1	1	4	2	1	14	12	1	1	1	6	1	0	0	0
	160	5	19	6	19	19	6	1	1	1	1	4	2	1	14	12	1	1	1	6	1	0	0	0

Table 1: GripSafe® ST ORB Bill Of Materials con't.

Nominal Pipe Size (in)	Schedule	(1) Speed Nut	(2) Wedge Gripper Stem With Spring	(3) Retraction Compression Spring	(4) Wedge Gripper	(5) Back Plate	(6) Compression Shaft	(7) Bottom Compression Plate	(8) Seal	(9) Top Compression Plate	(10) Wedge Cone	(11) Wedge Cone Retaining Screw	(12) Alignment Dowel Pin	(13) Spring Plate Halo	(14) Wedge Gripper Nut	(15) Compression Washers	(16) Retainer Plate	(17) Back Pressure Vent Port	(18) Spring Plate Hub	(19) Compression Hex Nut	(20) Seal Dampener	(21) Thrust Bearing	(22) Compression Tubing	(23) Shaft O-Ring
18	10S	5	18	6	18	18	6	1	1	1	1	4	2	1	13	12	1	1	1	6	1	0	0	0
	10	5	18	6	18	18	6	1	1	1	1	4	2	1	13	12	1	1	1	6	1	0	0	0
	20	5	18	6	18	18	6	1	1	1	1	4	2	1	13	12	1	1	1	6	1	0	0	0
	STD,40S	5	17	6	17	17	6	1	1	1	1	4	2	1	12	12	1	1	1	6	1	0	0	0
	30	5	17	6	17	17	6	1	1	1	1	4	2	1	12	12	1	1	1	6	1	0	0	0
	XS,80S	5	17	6	17	17	6	1	1	1	1	4	2	1	12	12	1	1	1	6	1	0	0	0
	40	5	21	6	21	21	6	1	1	1	1	4	2	1	16	12	1	1	1	6	1	0	0	0
	60	5	21	6	21	21	6	1	1	1	1	4	2	1	16	12	1	1	1	6	1	0	0	0
	80	5	20	6	20	20	6	1	1	1	1	4	2	1	15	12	1	1	1	6	1	0	0	0
	100	5	26	6	26	26	6	1	1	1	1	4	2	1	21	12	1	1	1	6	1	0	0	0
	120	5	25	6	25	25	6	1	1	1	1	4	2	1	20	12	1	1	1	6	1	0	0	0
	140	5	24	6	24	24	6	1	1	1	1	4	2	1	19	12	1	1	1	6	1	0	0	0
	160	5	23	6	23	23	6	1	1	1	1	4	2	1	18	12	1	1	1	6	1	0	0	0
20	10S	5	20	8	20	20	8	1	1	1	1	6	2	1	15	16	1	1	1	8	1	0	0	0
	10	5	20	8	20	20	8	1	1	1	1	6	2	1	15	16	1	1	1	8	1	0	0	0
	20,STD,40S	5	20	8	20	20	8	1	1	1	1	6	2	1	15	16	1	1	1	8	1	0	0	0
	30,XS,80S	5	20	8	20	20	8	1	1	1	1	6	2	1	15	16	1	1	1	8	1	0	0	0
	40	5	20	8	20	20	8	1	1	1	1	6	2	1	15	16	1	1	1	8	1	0	0	0
	60	5	19	8	19	19	8	1	1	1	1	6	2	1	14	16	1	1	1	8	1	0	0	0
	80	5	24	8	24	24	8	1	1	1	1	6	2	1	19	16	1	1	1	8	1	0	0	0
	100	5	23	8	23	23	8	1	1	1	1	6	2	1	18	16	1	1	1	8	1	0	0	0
	120	5	22	8	22	22	8	1	1	1	1	6	2	1	17	16	1	1	1	8	1	0	0	0
	140	5	21	6	21	21	6	1	1	1	1	4	2	1	16	12	1	1	1	6	1	0	0	0
	160	5	20	6	20	20	6	1	1	1	1	4	2	1	15	12	1	1	1	6	1	0	0	0
24	10,10S	5	23	8	23	23	8	1	1	1	1	6	2	1	18	16	1	1	1	8	1	0	0	0
	20,STD,40S	5	22	8	22	22	8	1	1	1	1	6	2	1	17	16	1	1	1	8	1	0	0	0
	XS,80S	5	22	8	22	22	8	1	1	1	1	6	2	1	17	16	1	1	1	8	1	0	0	0
	30	5	22	8	22	22	8	1	1	1	1	6	2	1	17	16	1	1	1	8	1	0	0	0
	40	5	21	8	21	21	8	1	1	1	1	6	2	1	16	16	1	1	1	8	1	0	0	0
	60	5	21	8	21	21	8	1	1	1	1	6	2	1	16	16	1	1	1	8	1	0	0	0
	80	5	25	8	25	25	8	1	1	1	1	6	2	1	20	16	1	1	1	8	1	0	0	0
	100	5	24	8	24	24	8	1	1	1	1	6	2	1	19	16	1	1	1	8	1	0	0	0
	120	5	23	8	23	23	8	1	1	1	1	6	2	1	18	16	1	1	1	8	1	0	0	0
	140	5	21	8	21	21	8	1	1	1	1	6	2	1	16	16	1	1	1	8	1	0	0	0
	160	5	20	8	20	20	8	1	1	1	1	6	2	1	15	16	1	1	1	8	1	0	0	0

4. Specifications

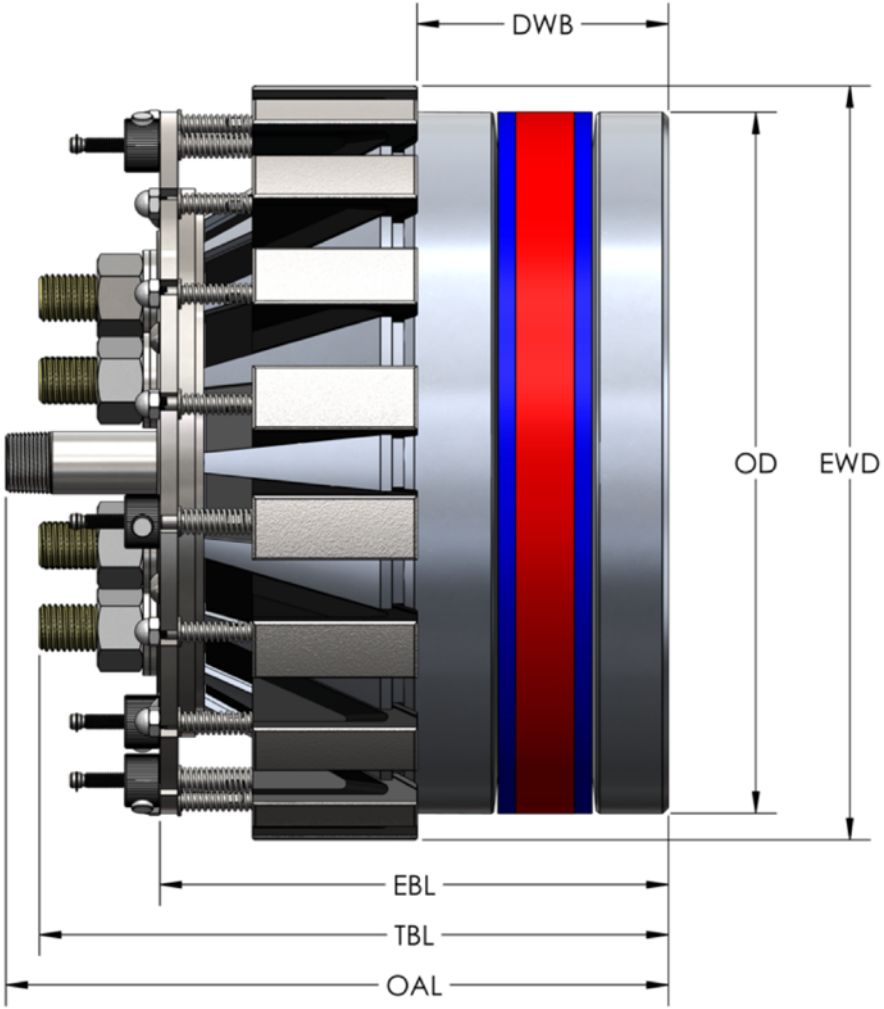

Figure 2: GripSafe® ST Outboard Retraction Blocking Dimensions Diagram

Table 2: GripSafe® ST ORB Specifications

Nominal Pipe Size (in)	Schedule	Part Number	Tool Diameter (in)	Rec. ID Range* (in)	Nominal Pipe ID Clearance (in)	Approx. Tool Weight (lbs)	Tool Length (in)	Torque Range (ft-lbs)		Compression Hex Nut Size (in)	Back Pressure Vent Thread	Back Pressure Rating (PSI)	EWD Energized Wedge Diameter	EBL Energized Body Length	TBL Tool Body Length w/o Nipple	DWB Distance to Wedge Bottom
								Norm	Max.							
4	10,10S	GS-I-S-0400-010	4.04	4.10 - 4.54	0.220	21	13.38	120	250	1-5/16	1/4 FNPT	4875	5.00	7.75	13.00	4.38
	40,STD,40S	GS-I-S-0400-040	3.81	3.87 - 4.31	0.220	19	13.38	120	250	1-5/16	1/4 FNPT	5450	4.77	7.75	13.00	4.38
	80,XS,80S	GS-I-S-0400-080	3.61	3.67 - 4.11	0.220	17	13.38	120	250	1-5/16	1/4 FNPT	6050	4.57	7.75	13.00	4.38
6	10,10S	GS-I-S-0600-010	5.98	6.04 - 6.42	0.375	26	12.40	85	130	1-1/16	1/4 MNPT	850	6.94	9.06	11.31	5.34
	40,STD,40S	GS-I-S-0600-040	5.69	5.75 - 6.13	0.375	24	12.40	75	110	1-1/16	1/4 MNPT	2370	6.65	9.06	11.31	5.34
	80,XS,80S	GS-I-S-0600-080	5.39	5.45 - 5.82	0.375	21	12.40	60	95	1-1/16	1/4 MNPT	4000	6.35	9.06	11.31	5.34
	120	GS-I-S-0600-120	5.13	5.19 - 5.56	0.375	19	12.40	55	80	1-1/16	1/4 MNPT	3900	6.08	9.06	11.31	5.34
	160	GS-I-S-0600-160	4.81	4.87 - 5.25	0.375	17	12.40	40	60	3/4	1/4 MNPT	3850	5.77	9.06	11.31	5.34
	XX	GS-I-S-0600-XXH	4.52	4.58 - 4.96	0.375	15	12.40	35	55	3/4	1/4 MNPT	3700	5.48	9.06	11.31	5.34
8	10,10S	GS-I-S-0800-010	7.95	8.02 - 8.40	0.375	51	12.25	120	150	1-1/4	1/2 MNPT	575	8.91	9.19	11.50	5.34
	20	GS-I-S-0800-020	7.75	7.81 - 8.20	0.375	49	12.25	120	150	1-1/4	1/2 MNPT	1125	8.71	9.19	11.50	5.34
	30	GS-I-S-0800-030	7.70	7.76 - 8.15	0.375	48	12.25	120	150	1-1/4	1/2 MNPT	1300	8.65	9.19	11.50	5.34
	40,STD,40S	GS-I-S-0800-040	7.61	7.67 - 8.05	0.375	46	12.25	120	150	1-1/4	1/2 MNPT	1575	8.56	9.19	11.50	5.34
	60	GS-I-S-0800-060	7.44	7.50 - 7.89	0.375	45	12.25	120	150	1-1/4	1/2 MNPT	2175	8.40	9.19	11.50	5.34
	80,XS,80S	GS-I-S-0800-080	7.25	7.31 - 7.70	0.375	43	12.25	120	150	1-1/4	1/2 MNPT	3250	8.21	9.19	11.50	5.34
	100	GS-I-S-0800-100	7.06	7.12 - 7.51	0.375	40	12.25	100	150	1-1/4	1/2 MNPT	3860	8.02	9.19	11.50	5.34
	120	GS-I-S-0800-120	6.81	6.87 - 7.26	0.375	38	12.25	100	150	1-1/4	1/2 MNPT	3725	7.77	9.19	11.50	5.34
	140	GS-I-S-0800-140	6.63	6.69 - 7.07	0.375	36	12.25	90	150	1-1/16	1/4 MNPT	3925	7.58	9.19	11.50	5.34
	160	GS-I-S-0800-160	6.44	6.50 - 6.88	0.375	34	12.25	90	150	1-1/16	1/4 MNPT	3825	7.40	9.19	11.50	5.34
	XX	GS-I-S-0800-XXH	6.50	6.56 - 6.94	0.375	34	12.25	90	150	1-1/16	1/4 MNPT	3750	7.46	9.19	11.50	5.34
10	10,10S	GSST-I-S-1000-010	10.05	10.11 - 10.85	0.375	75	13.20	120	270	1-1/4	3/4 MNPT	4200	11.18	9.81	11.88	5.34
	20	GSST-I-S-1000-020	9.88	9.94 - 10.68	0.375	72	13.20	120	270	1-1/4	3/4 MNPT	4500	11.01	9.81	11.88	5.34
	30	GSST-I-S-1000-030	9.76	9.82 - 10.56	0.375	71	13.20	120	270	1-1/4	3/4 MNPT	4800	10.89	9.81	11.88	5.34
	40,4STD,40S	GSST-I-S-1000-040	9.65	9.71 - 10.45	0.375	69	13.20	120	270	1-1/4	3/4 MNPT	5000	10.78	9.81	11.88	5.34
	60,XS,80S	GSST-I-S-1000-08S	9.38	9.44 - 10.18	0.375	66	13.20	120	270	1-1/4	3/4 MNPT	5975	10.51	9.81	11.88	5.34
	80	GSST-I-S-1000-080	9.19	9.25 - 9.99	0.375	63	13.20	120	200	1-1/4	3/4 MNPT	5700	10.32	9.81	11.88	5.34
	100	GSST-I-S-1000-100	8.94	9.00 - 9.74	0.375	58	13.20	120	195	1-1/4	3/8 MNPT	6000	10.07	9.81	11.88	5.34
	120	GSST-I-S-1000-120	8.69	8.75 - 9.49	0.375	56	13.20	120	185	1-1/4	3/8 MNPT	5775	9.82	9.81	11.88	5.34
	140,XX	GSST-I-S-1000-140	8.38	8.44 - 9.18	0.375	54	13.20	120	180	1-1/4	3/8 MNPT	5575	9.51	9.81	11.88	5.34
	160	GSST-I-S-1000-160	8.13	8.19 - 8.93	0.375	53	13.20	120	175	1-1/4	3/8 MNPT	5925	9.26	9.81	11.88	5.34

NOTE: For 6" – 8" plug sizes, OD must be within 0.125-inche concentricity to the pipe ID.
NOTE: For 10" plug sizes and above, no more than 0.500-inch clearance between the spring plate and the pipe's inner diameter is permissible for reliably safe operation of the plug.

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Table 2: GripSafe® ST ORB Specifications con't.

Nominal Pipe Size (in)	Schedule	Part Number	Tool Diameter (in)	Rec. ID Range* (in)	Nominal Pipe ID Clearance (in)	Approx. Tool Weight (lbs)	Tool Length (in)	Torque Range (ft-lbs)		Compression Hex Nut Size (in)	Back Pressure Vent Thread	Back Pressure Rating (PSI)	EWD Energized Wedge Diameter	EBL Energized Body Length	TBL Tool Body Length w/o Nipple	DWB Distance to Wedge Bottom
								Norm	Max.							
12	10,10S	GSST-I-S-1200-010	12.02	12.08 - 12.82	0.375	125	13.20	120	180	1-1/4	3/4 MNPT	5500	13.14	9.81	11.88	5.34
	20	GSST-I-S-1200-020	11.88	11.94 - 12.68	0.375	123	13.20	120	175	1-1/4	3/4 MNPT	5625	13.00	9.81	11.88	5.34
	30	GSST-I-S-1200-030	11.72	11.78 - 12.52	0.375	119	13.20	120	175	1-1/4	3/4 MNPT	5475	12.84	9.81	11.88	5.34
	STD,40S	GSST-I-S-1200-04S	11.63	11.69 - 12.43	0.375	116	13.20	120	250	1-1/4	3/4 MNPT	4550	12.75	9.81	11.88	5.34
	40	GSST-I-S-1200-040	11.56	11.63 - 12.36	0.375	115	13.20	120	245	1-1/4	3/4 MNPT	4700	12.69	9.81	11.88	5.34
	XS,80S	GSST-I-S-1200-08S	11.38	11.44 - 12.18	0.375	112	13.20	120	225	1-1/4	3/4 MNPT	5175	12.50	9.81	11.88	5.34
	60	GSST-I-S-1200-060	11.25	11.31 - 12.05	0.375	98	13.20	120	165	1-1/4	3/4 MNPT	5575	12.38	9.81	11.88	5.34
	80	GSST-I-S-1200-080	11.00	11.06 - 11.80	0.375	94	13.20	120	160	1-1/4	3/4 MNPT	5825	12.13	9.81	11.88	5.34
	100	GSST-I-S-1200-100	10.69	10.75 - 11.49	0.375	90	13.20	120	235	1-1/4	3/4 MNPT	5775	11.82	9.81	11.88	5.34
	120,XX	GSST-I-S-1200-120	10.38	10.44 - 11.18	0.375	88	13.20	120	230	1-1/4	3/4 MNPT	5700	11.51	9.81	11.88	5.34
	140	GSST-I-S-1200-140	10.13	10.19 - 10.93	0.375	86	13.20	120	220	1-1/4	3/4 MNPT	5550	11.26	9.81	11.88	5.34
	160	GSST-I-S-1200-160	9.75	9.81 - 10.55	0.375	82	13.20	120	215	1-1/4	3/4 MNPT	5975	10.88	9.81	11.88	5.34
14	10S	GSST-I-S-1400-01S	13.25	13.31 - 14.05	0.375	170	14.09	120	200	1-1/4	1 MNPT	6250	14.37	10.81	12.88	5.34
	10	GSST-I-S-1400-010	13.13	13.19 - 13.93	0.375	167	14.09	120	195	1-1/4	1 MNPT	6350	14.25	10.81	12.88	5.34
	20	GSST-I-S-1400-020	13.00	13.06 - 13.80	0.375	164	14.09	120	195	1-1/4	1 MNPT	6475	14.13	10.81	12.88	5.34
	30,STD,40S	GSST-I-S-1400-04S	12.88	12.94 - 13.68	0.375	158	14.09	120	205	1-1/4	1 MNPT	6175	14.00	10.81	12.88	5.34
	40	GSST-I-S-1400-040	12.75	12.81 - 13.55	0.375	157	14.09	120	195	1-1/4	1 MNPT	6275	13.88	10.81	12.88	5.34
	XS,80S	GSST-I-S-1400-08S	12.63	12.69 - 13.43	0.375	154	14.09	120	180	1-1/4	1 MNPT	6400	13.75	10.81	12.88	5.34
	60	GSST-I-S-1400-060	12.44	12.50 - 13.24	0.375	134	13.20	120	185	1-1/4	3/4 MNPT	5425	13.56	9.81	11.88	5.34
	80	GSST-I-S-1400-080	12.13	12.19 - 12.93	0.375	127	13.20	120	180	1-1/4	3/4 MNPT	5400	13.25	9.81	11.88	5.34
	100	GSST-I-S-1400-100	11.75	11.81 - 12.55	0.375	120	13.20	120	175	1-1/4	3/4 MNPT	5425	12.88	9.81	11.88	5.34
	120	GSST-I-S-1400-120	11.44	11.50 - 12.24	0.375	116	13.20	120	170	1-1/4	3/4 MNPT	5725	12.56	9.81	11.88	5.34
	140	GSST-I-S-1400-140	11.13	11.19 - 11.93	0.375	109	13.20	120	165	1-1/4	3/4 MNPT	5700	12.25	9.81	11.88	5.34
	160	GSST-I-S-1400-160	10.81	10.88 - 11.61	0.375	104	13.20	120	160	1-1/4	3/4 MNPT	5650	11.94	9.81	11.88	5.34
16	10S	GSST-I-S-1600-01S	15.25	15.31 - 16.05	0.375	231	14.09	120	310	1-5/8	1 MNPT	6000	16.37	10.81	13.00	5.34
	10	GSST-I-S-1600-010	15.13	15.19 - 15.93	0.375	228	14.09	120	305	1-5/8	1 MNPT	6100	16.25	10.81	13.00	5.34
	20	GSST-I-S-1600-020	15.00	15.06 - 15.80	0.375	225	14.09	120	300	1-5/8	1 MNPT	6200	16.13	10.81	13.00	5.34
	30,STD,40S	GSST-I-S-1600-04S	14.88	14.94 - 15.68	0.375	218	14.09	120	320	1-5/8	1 MNPT	5700	16.00	10.81	13.00	5.34
	40,XS,80S	GSST-I-S-1600-08S	14.63	14.69 - 15.43	0.375	213	14.09	120	280	1-5/8	1 MNPT	6175	15.75	10.81	13.00	5.34
	60	GSST-I-S-1600-060	14.31	14.38 - 15.11	0.375	204	14.09	120	285	1-5/8	1 MNPT	6075	15.44	10.81	13.00	5.34
	80	GSST-I-S-1600-080	13.94	14.00 - 14.74	0.375	170	13.20	120	270	1-5/8	3/4 MNPT	4975	15.06	9.81	12.06	5.34
	100	GSST-I-S-1600-100	13.56	13.63 - 14.36	0.375	165	13.20	120	270	1-5/8	3/4 MNPT	5050	14.69	9.81	12.06	5.34
	120	GSST-I-S-1600-120	13.19	13.25 - 13.99	0.375	158	13.20	120	265	1-5/8	3/4 MNPT	5350	14.31	9.81	12.06	5.34
	140	GSST-I-S-1600-140	12.75	12.81 - 13.55	0.375	140	13.20	120	190	1-1/4	3/4 MNPT	5175	13.88	9.81	11.63	5.34
	160	GSST-I-S-1600-160	12.44	12.50 - 13.24	0.375	135	13.20	120	185	1-1/4	3/4 MNPT	5425	13.56	9.81	11.63	5.34

NOTE: For 6" – 8" plug sizes, OD must be within 0.125-inche concentricity to the pipe ID.
NOTE: For 10" plug sizes and above, no more than 0.500-inch clearance between the spring plate and the pipe's inner diameter is permissible for reliably safe operation of the plug.

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Table 2: GripSafe® ST ORB Specifications con't.

Nominal Pipe Size (in)	Schedule	Part Number	Tool Diameter (in)	Rec. ID Range* (in)	Nominal Pipe ID Clearance (in)	Approx. Tool Weight (lbs)	Tool Length (in)	Torque Range (ft-lbs)		Compression Hex Nut Size (in)	Back Pressure Vent Thread	Back Pressure Rating (PSI)	EWD Energized Wedge Diameter	EBL Energized Body Length	TBL Tool Body Length w/o Nipple	DWB Distance to Wedge Bottom
								Norm	Max.							
18	10S	GSST-I-S-1800-01S	17.25	17.31 - 18.05	0.375	325	15.09	120	430	1-5/8	1 MNPT	4175	18.37	11.81	14.25	5.34
	10	GSST-I-S-1800-010	17.13	17.19 - 17.93	0.375	321	15.09	120	430	1-5/8	1 MNPT	4200	18.25	11.81	14.25	5.34
	20	GSST-I-S-1800-020	17.00	17.06 - 17.80	0.375	318	15.09	120	425	1-5/8	1 MNPT	4250	18.13	11.81	14.25	5.34
	STD,40S	GSST-I-S-1800-04S	16.88	16.94 - 17.68	0.375	309	15.09	120	485	1-5/8	1 MNPT	3550	18.00	11.81	14.25	5.34
	30	GSST-I-S-1800-030	16.75	16.81 - 17.55	0.375	306	15.09	120	465	1-5/8	1 MNPT	3750	17.88	11.81	14.25	5.34
	XS,80S	GSST-I-S-1800-08S	16.63	16.69 - 17.43	0.375	302	15.09	120	440	1-5/8	1 MNPT	4000	17.75	11.81	14.25	5.34
	40	GSST-I-S-1800-040	16.50	16.56 - 17.30	0.375	266	14.09	120	410	1-5/8	1 MNPT	4350	17.63	10.81	13.00	5.34
	60	GSST-I-S-1800-060	16.13	16.19 - 16.93	0.375	247	14.09	120	400	1-5/8	1 MNPT	4450	17.25	10.81	13.00	5.34
	80	GSST-I-S-1800-080	15.75	15.81 - 16.55	0.375	245	14.09	120	390	1-5/8	1 MNPT	4525	16.88	10.81	13.00	5.34
	100	GSST-I-S-1800-100	15.31	15.38 - 16.11	0.375	207	14.09	120	380	1-5/8	1 MNPT	4650	16.44	9.81	12.06	5.34
	120	GSST-I-S-1800-120	14.88	14.94 - 15.68	0.375	212	14.21	120	370	1-5/8	1 MNPT	4900	16.01	9.94	12.19	5.47
	140	GSST-I-S-1800-140	14.50	14.56 - 15.30	0.375	185	14.34	120	360	1-5/8	1 MNPT	5075	15.63	10.06	12.31	5.59
	160	GSST-I-S-1800-160	14.06	14.13 - 14.86	0.375	175	14.46	120	345	1-5/8	1 MNPT	5150	15.19	10.19	12.44	5.72
20	10S	GSST-I-S-2000-01S	19.19	19.25 - 19.99	0.375	406	15.32	120	365	1-5/8	1-1/2 MNPT	5000	20.31	12.06	14.50	5.59
	10	GSST-I-S-2000-010	19.13	19.19 - 19.93	0.375	404	15.32	120	360	1-5/8	1-1/2 MNPT	5025	20.25	12.06	14.50	5.59
	20,STD,40S	GSST-I-S-2000-04S	18.88	18.94 - 19.68	0.375	395	15.32	120	415	1-5/8	1-1/2 MNPT	4275	20.00	12.06	14.50	5.59
	30,XS,80S	GSST-I-S-2000-08S	18.63	18.69 - 19.43	0.375	380	15.32	120	375	1-5/8	1-1/2 MNPT	4500	19.75	12.06	14.50	5.59
	40	GSST-I-S-2000-040	18.44	18.50 - 19.24	0.375	374	15.32	120	350	1-5/8	1-1/2 MNPT	5250	19.56	12.06	14.50	5.59
	60	GSST-I-S-2000-060	18.00	18.06 - 18.80	0.375	357	15.32	120	340	1-5/8	1-1/2 MNPT	5375	19.13	12.06	14.50	5.59
	80	GSST-I-S-2000-080	17.56	17.63 - 18.36	0.375	309	14.32	120	330	1-5/8	1-1/2 MNPT	5475	18.69	11.06	13.25	5.59
	100	GSST-I-S-2000-100	17.06	17.13 - 17.86	0.375	293	14.32	120	320	1-5/8	1-1/2 MNPT	5625	18.19	11.06	13.25	5.59
	120	GSST-I-S-2000-120	16.63	16.69 - 17.43	0.375	279	14.32	120	310	1-5/8	1-1/2 MNPT	5750	17.75	11.06	13.25	5.59
	140	GSST-I-S-2000-140	16.13	16.19 - 16.93	0.375	258	14.44	120	400	1-5/8	1-1/2 MNPT	5950	17.25	11.19	13.38	5.72
	160	GSST-I-S-2000-160	15.69	15.75 - 16.49	0.375	245	14.44	120	390	1-5/8	1-1/2 MNPT	5975	16.81	11.19	13.38	5.72
24	10,10S	GSST-I-S-2400-01S	23.13	23.19 - 23.93	0.375	625	17.32	120	465	1-5/8	1-1/2 MNPT	3700	24.25	13.06	15.38	5.59
	20,STD,40S	GSST-I-S-2400-04S	22.88	22.94 - 23.68	0.375	607	17.32	120	510	1-5/8	1-1/2 MNPT	3600	24.00	13.06	15.38	5.59
	XS,80S	GSST-I-S-2400-08S	22.63	22.69 - 23.43	0.375	597	17.32	120	465	1-5/8	1-1/2 MNPT	3675	23.75	13.06	15.38	5.59
	30	GSST-I-S-2400-030	22.50	22.56 - 23.30	0.375	598	17.32	120	450	1-5/8	1-1/2 MNPT	3725	23.63	13.06	15.38	5.59
	40	GSST-I-S-2400-040	22.25	22.31 - 23.05	0.375	580	17.32	120	445	1-5/8	1-1/2 MNPT	3650	23.38	13.06	15.38	5.59
	60	GSST-I-S-2400-060	21.69	21.75 - 22.49	0.375	557	17.32	120	435	1-5/8	1-1/2 MNPT	3825	22.81	13.06	15.38	5.59
	80	GSST-I-S-2400-080	21.19	21.25 - 21.99	0.375	484	16.32	120	425	1-5/8	1-1/2 MNPT	4375	22.31	12.06	14.50	5.59
	100	GSST-I-S-2400-100	20.56	20.63 - 21.36	0.375	457	16.32	120	410	1-5/8	1-1/2 MNPT	4500	21.69	12.06	14.50	5.59
	120	GSST-I-S-2400-120	20.00	20.06 - 20.80	0.375	433	16.44	120	395	1-5/8	1-1/2 MNPT	5250	21.13	12.19	14.63	5.72
	140	GSST-I-S-2400-140	19.50	19.56 - 20.30	0.375	413	16.57	120	385	1-5/8	1-1/2 MNPT	5100	20.63	12.31	14.75	5.84
	160	GSST-I-S-2400-160	18.94	19.00 - 19.74	0.375	393	16.69	120	375	1-5/8	1-1/2 MNPT	5125	20.06	12.44	14.88	5.97

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NPS 4” – 12” ORB PREPARATION & INSTALLATION STEPS

4”

6” – 12”

5. Preparing the 4” – 12”, 14” SCH 60-160, and 16” SCH 120-160 Nominal Pipe Size (NPS) GripSafe ST ORB Plug for Installation

- The GripSafe ST Outboard Retraction Blocking NPS 4” to 12”, 14” SCH 60-160, and 16” SCH 120-160 plugs should be in the “Ready to Install” position from the factory, see Figure 4.

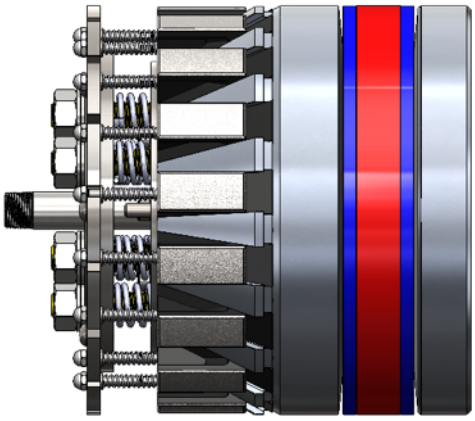


Figure 3: Not Ready to Install (Retracted)

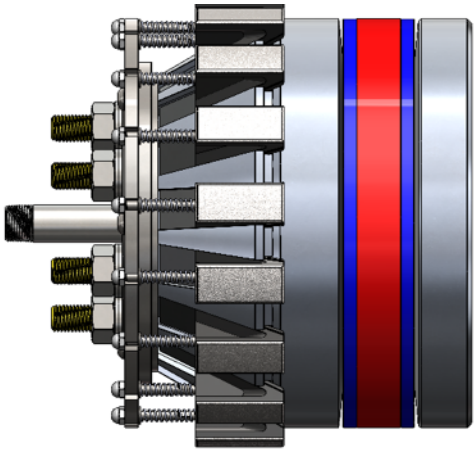


Figure 4: Ready to Install (Compressed)

- Ensure the ***Compression Hex Nuts(19)*** are tightened to the point where the ***Spring Plate Hub(18)*** is in the Compressed state, see Figure 4, and is flush with the ***Retainer Plate(16)***.

- Do not over tighten or torque nuts to the point that the ***Seal(8)*** starts to swell or extrude beyond the outer diameter of the plug to the point it will encumber or impede insertion into the pipe. If it is desired to help center the plug in horizontal installations see **Note 6.7**.

- In the Compressed state show in Figure 4, the GripSafe ST Plug will immediately grip the pipe upon insertion.

CHECK: Ensure plug is clean of debris, fouling, and contaminants before each use. Each ***Wedge Gripper(4)*** should slide freely up and down in its slot with a full range of motion and without resistance. ***Wedge Gripper(4)*** with impeded movement due to debris, dirt, contaminants or other fouling will cause the plug to not grip on the pipe’s inner diameter, which can cause the plug to eject under pressure, leading to personnel injury or death, material loss, and damage to equipment.

6. Installing the GripSafe® ST NPS 4” – 12”, 14” SCH 60-160, and 16” SCH 120-160 ORB Plug

CAUTION: Ensure pipe I.D. is clean. Debris, pipe scaling, and rust layer must be removed to the deepest point the plug will be installed into. If the pipe is lined or has irremovable product, ***STOP*** and contact USA Industries for support before proceeding. Failure to do so may impede the wedge’s ability to grip and cause the plug to eject under pressure. Be sure to wear proper PPE **and follow all site guidelines.**

6.1 Insert the GripSafe ST Outboard Retraction Blocking Plug evenly into the pipe.

- See Table 2 for Operational ID Range and clearance requirements.
- For using GripSafe ST Lifting Device, see *Section 11-12*.

6.2 When the ***Wedge Grippers(4)*** come into contact with the pipe I.D., evenly push the GripSafe ST Outboard Retraction Blocking Plug further into the pipe.

6.3 A slight rocking motion will assist in insertion.

- Once the ***Wedge Grippers(4)*** have entered the pipe, each will be in independent contact with the pipe inner diameter. Retraction or removal of the plug at this time is not possible unless the ***Compression Hex Nuts(19)*** are loosened, see *Section 7* for plug removal if needed.

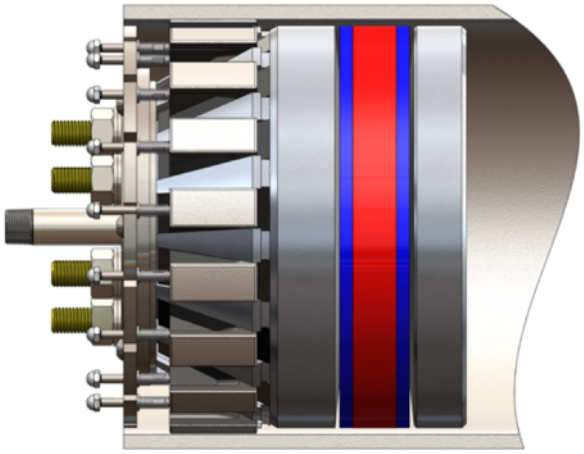


Figure 5: GripSafe ST ORB Auto-Locking Minimum Insertion Depth in a Sectioned Pipe

6.4 Insert the plug until the top of the ***Spring Plate Hub(18)*** is at least flush with the end of the pipe. See Figure 5.

6.5 If insertion into the pipe proves problematic in the Compressed state, shown in Figure 4, it may be advantageous to insert the plug in the Retracted state, shown in Figure 3. To do so, loosen all ***Compression Hex Nuts(19)*** to the top of their respective ***Compression Shafts(6)***. Care should be taken to not completely remove the ***Compression Hex Nuts(19)*** from the assembly. In this orientation, the ***Wedge Grippers(4)*** will be fully retracted and the plug can be inserted freely into the pipe.

CAUTION: In the orientation described in **6.5**, it is important to note the plug will not be immediately gripping the pipe upon insertion. Only after tightening the ***Compression Hex Nuts(19)*** while plug is in the pipe, to advance the bottom of the ***Spring Plate Hub(18)*** to contact the top of the ***Retainer Plate(16)***, will the plug be securely gripping the pipe.

TEMPERATURE NOTE: If welding is to occur on the pipe while the plug is installed, the ***Seal (Tri-Ply™)(8)*** should be installed a minimum of 6" from the center of an active weld to prevent it from degrading or ultimately failing due to melting. For post weld heat treats, bake-outs, etc., the ***Seal (Tri-Ply™)(8)*** should be at least 12" from the nearest edge of the heating element, and the temperature at the depth the plug is installed at should not exceed 220° F. If a high temperature bake out is being performed (400° F or higher) increase the installation depth as much as possible. It is recommended to always monitor the pressure behind the plug (ORB) and/or between the seals (DBB) and stop work immediately if any pressure drop is detected. In addition, the pipe's external surface temperature should always be monitored corresponding to the plug's seal location to ensure damage to the seal does not occur.

6.6 When the plug is in the desired depth, check for plug and pipe concentricity.

- For NPS 6"- 8" plugs, use the .350" portion of the GripSafe Concentricity Gauge. If the .350" portion of the No-Go Gauge goes in between the plug's outer diameter and the pipe's inner diameter, repositioning the plug is required, see Figure 6 "REPOSITIONING REQUIRED". If the .350" portion of the No-Go Gauge does not go in between the plug's outer diameter and the pipe's inner diameter as shown in Figure 6 "NO REPOSITIONING REQUIRED" proceed to the next step. To help with plug's concentricity, see **Note 6.7**.
- For NPS 10" plugs and above, use the .500" portion of the GripSafe Concentricity Gauge. If the .500" portion of the No-Go Gauge goes in between the plug's outer diameter and the pipe's inner diameter, repositioning the plug is required, see Figure 7 "REPOSITIONING REQUIRED". If the .500" portion of the No-Go Gauge does not go in between the plug's outer diameter and the pipe's inner diameter as shown in Figure 7 "NO REPOSITIONING REQUIRED" proceed to the next step. To help with plug's concentricity, see **Note 6.7**.

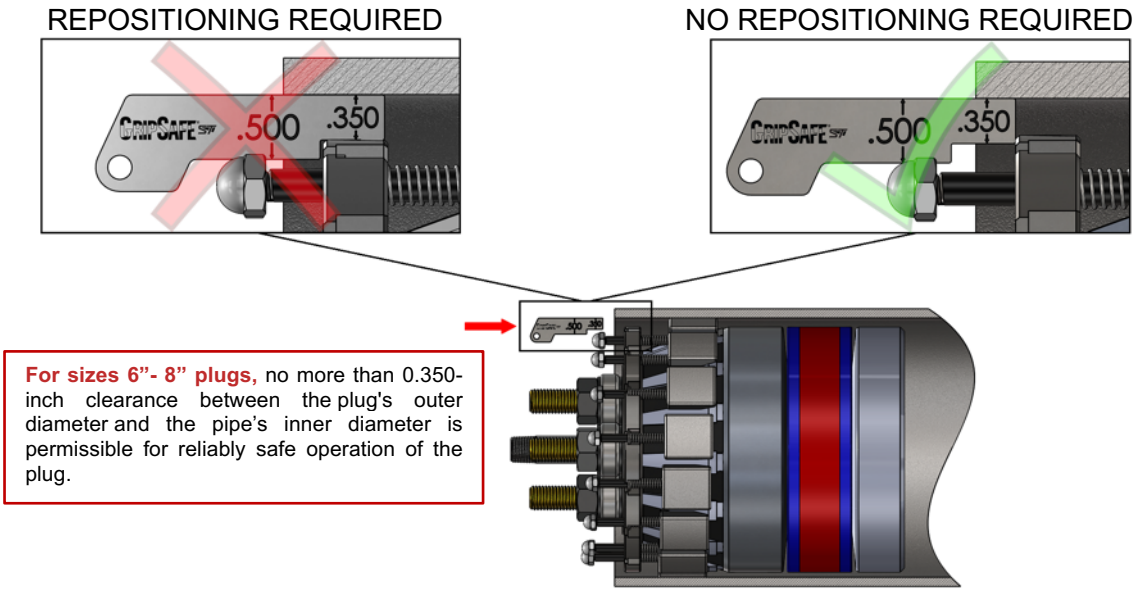


Figure 6: Sizes 6" – 8" GripSafe ST Plug and Pipe Concentricity

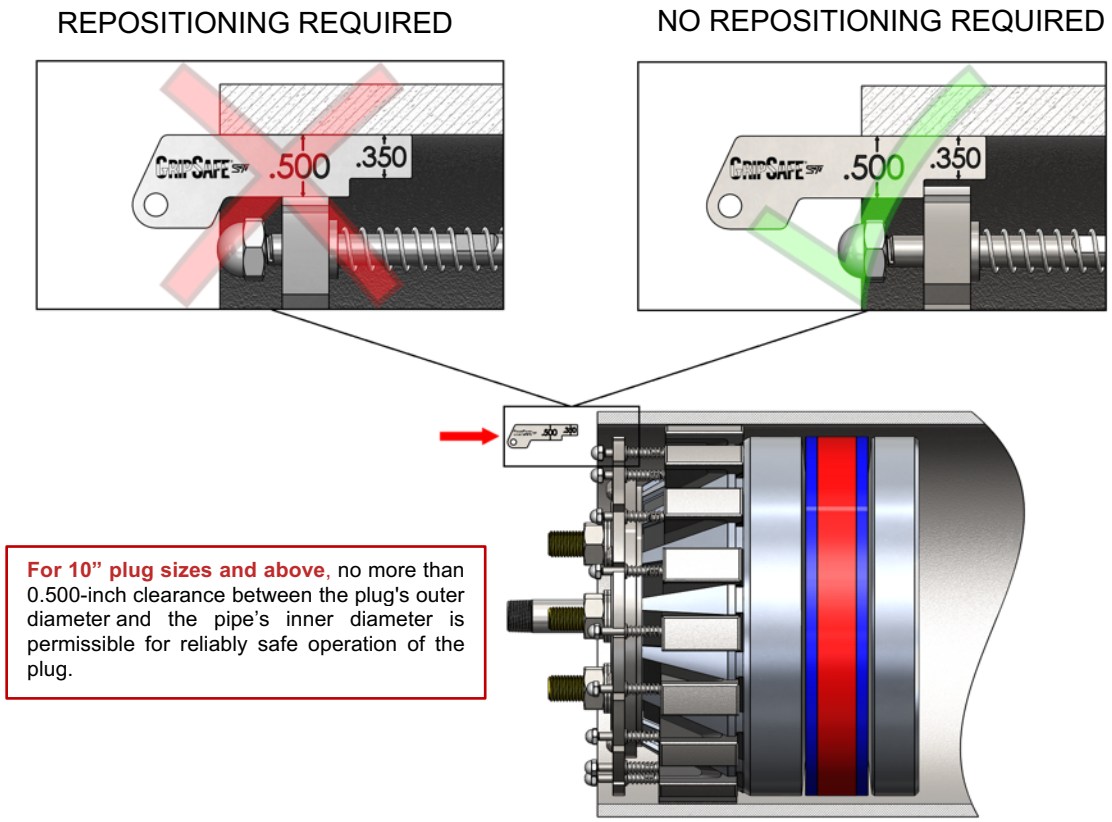


Figure 7: Sizes 10" and above GripSafe ST Plug and Pipe Concentricity

6.7 Evenly tighten the Compression Nuts.

- Using a star pattern shown in Figure 8, turn each ***Compression Hex Nuts(19)*** a maximum of 3 full revolutions before moving to the next nut. Repeat until 50% target torque is achieved on all nuts, then increase to 100% target installation torque and continue torqueing in a star pattern. After completing the star pattern at 100% of the target torque, use a circular pattern to confirm all nuts are torqued correctly.
- Minimal torque will be required for the first several passes, but torque will increase notably after the ***Seal(8)*** begins to compress against the pipe ID.

NOTE 6.7: To help center the plug in the pipe it may be desirable to tighten the two or three bottom-most ***Compression Hex Nuts(19)*** to expand the ***Seal(8)*** under them, thereby lifting the plug up to center. A short push of the plug will reset the ***Wedge Grippers(4)*** to accommodate the new centered position respective to the rest of the plug body. Normal installation should commence once the plug is centered. This may be desirable in the event the plug is noticeably not in the center of the pipe and test pressures are not achieved while the plug is at Maximum Compression Torque or the plug is not within the 0.350" clearance between the plug's outer diameter and the pipe's inner diameter for plugs 6"-8" and 0.500" for plugs 10" and above.

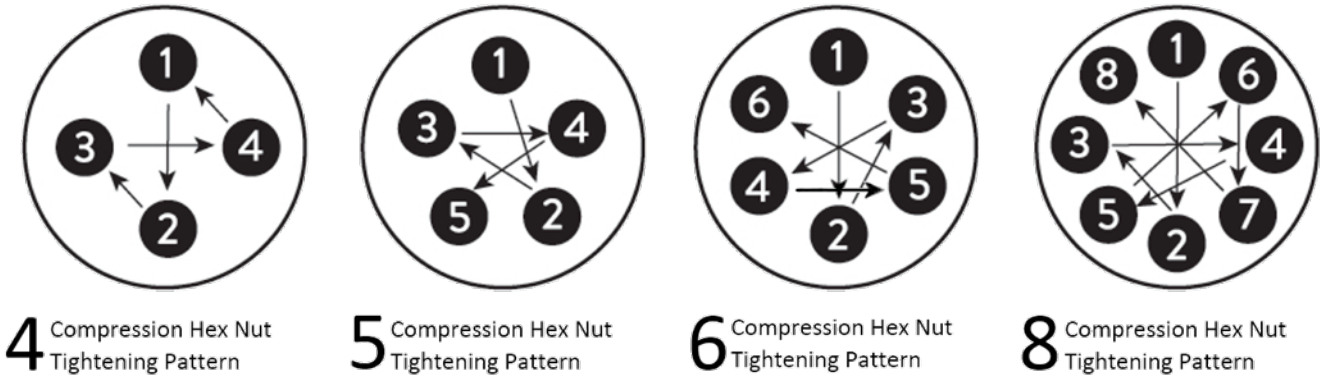


Figure 8: Compression Hex Nut Tightening Pattern Examples

6.8 For installing and using Safety Gag, see *Section 13*.

6.9 Verify the integrity of the Seals.

- If the plug is being used for pressure testing, use proper fittings to install a hydro test pump to the ***Backpressure Vent Port(17)***. Otherwise, install a cap to seal off the system or a backpressure monitoring tee.
- It may be desirable to attach a gauge and vent hose assembly, or a backpressure monitoring tee, to the ***Backpressure Vent Port(17)*** to bleed off any backpressure. The hose should be long enough to redirect any vapor coming out of the vessel to a safe location away from workers that may be in the area. A valve may also be attached to this port to allow safe backpressure venting before plug removal, see Section 7. If using a backpressure monitoring tee it may be useful to have a pressure gauge on the branch side of the tee while connecting the run side to the ***Backpressure Vent Port(17)*** and a ball valve. Further advantages can be made by attaching a hose to the ball valve on the monitoring tee and running the hose to vent to a safe location away from workers that may be in the area.

CAUTION: Fast flowing gases or liquids through hosing can cause hose whip. Take caution to avoid this, failure to do so may result in injury to personnel or damage to equipment.

- Increase pressure to 25% of target pressure or 150 psig, whichever is less. Observance of pressure drop may not be an indication of leakage. GripSafe ST ***Seals(8)*** will creep under pressure until they are fully seated. This creep will increase the pressure test volume. Depending on the test volume size this may be by such a trivial amount it will not be seen on a gauge. For relatively small test volumes a noticeable gradual loss in pressure may be observed during this creep phase. Seating the seal is obtained by reapplying pressure until the pressure becomes stable. This seal creep may also be observed when the system is subjected to the full pressure. Resolution to this creep is the same at high pressure and while verifying integrity.

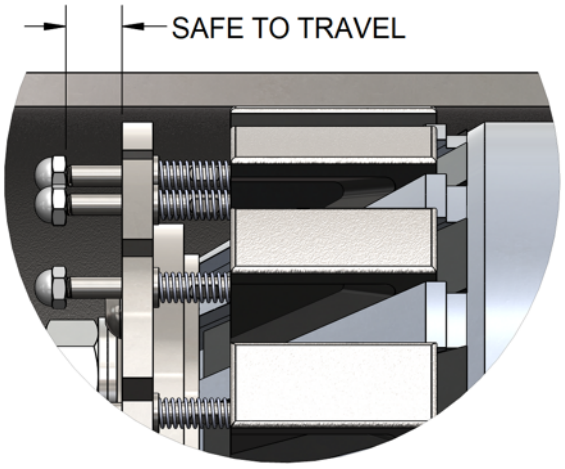


Figure 9: Wedge Grippers Safe to Travel

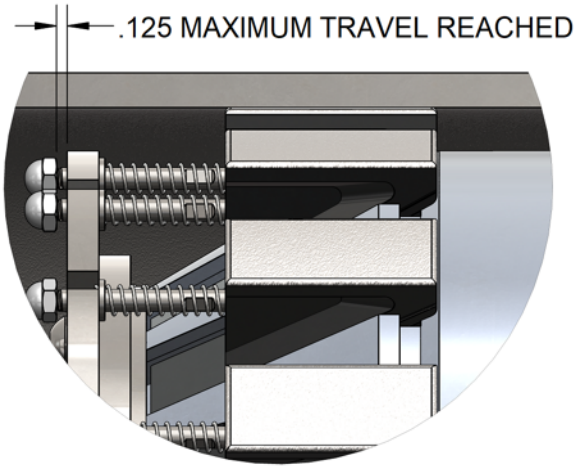


Figure 10: Wedge Grippers Maximum Travel Reached

6.10 The GripSafe plug is now ready to accept back pressure.

CAUTION: If the plug is being used for pressure testing, careful observation is needed on the ***Wedge Gripper Nuts'(14)*** travel. As seen in Figure 9, pressure can be added to the system since the ***Wedge Gripper Nuts'(14)*** are at least 1/8" from the ***Spring Plate Halo(13)***. As seen in Figure 10 however, no additional pressure can be added to the system since the ***Wedge Gripper Nuts'(14)*** have reached their maximum travel.

CAUTION: Do not stand directly in front of the GripSafe ST Outboard Retraction Blocking at any time. Installed plugs should always be treated in this manner irrespective if the plug has backpressure on it or not.

CAUTION: If backpressure develops, constant observation of pressure observed through the use of an attached gauge and physical observation of pipe integrity is necessary to ensure safety to personnel and equipment. Any bulging, enlargement or tapering of the pipe is an indication of over pressuring. The Backpressure Rating listed in Table 1 is for the pressure holding capability of the GripSafe ST Outboard Retraction Blocking and could be well beyond the system design limitations in which it is being used to test.

CAUTION: Careful observation is needed at the location of the pipe where the ***Wedge Grippers(14)*** make contact while performing a hydro test. If any deformation or swelling of the pipe is observed, stop immediately and slowly release the pressure from the system. Contact USA Industries for further assistance.

CAUTION: If at any time during hydro testing a popping or clicking sound is heard, stop immediately and slowly release the pressure from the system. Popping or clicking sounds during hydro-testing could be a sign of the ***Wedge Gripper(14)*** slipping, cracking, or one of the plug components failing. Remove the plug from the pipe or fitting and inspect for damage. Contact USA Industries for further assistance.

7. Removal of GripSafe® ST NPS 4" – 12", 14" SCH 60-160, and 16" SCH 120-160 ORB Plug

7.1 Depressurize the system through the hydrotest pump or a valve on the backpressure monitoring tee and drain all water.

7.2 Ensure there is no backpressure on the GripSafe ST ORB plug.

CAUTION: SLOWLY open ***Vent Port(17)*** to relieve any back pressure. Care must be taken when opening valves or loosening fittings if any inadvertent backpressure was introduced to the vessel. Failure to do so may result in hazardous pressure flow and/or fittings becoming violently hazardous projectiles that may cause injury to personnel and damage to equipment. If utilizing a backpressure monitoring tee, fast flowing gases or liquids through hosing can cause hose whip. Take caution to avoid this, failure to do so may result in injury to personnel and damage to equipment.

7.3 Loosen the ***Compression Hex Nuts(19)*** in an even star pattern as to not place the whole load on one bolt.

7.4 If a ***Compression Hex Nuts(19)*** runs free during loosening, run the nut back to flush with the top of the ***Spring Plate Hub(18)***. The ***Seal(8)*** acts as a spring containing a large amount of force too great for one ***Compression Shaft(6)*** to handle.

7.5 After the ***Seal(8)*** has fully decompressed, the loosening torque required will be notably less.

7.6 Once the ***Seal(8)*** has freed from the pipe ID, continue loosening the ***Compression Hex Nuts(19)*** until they are even with the top of the ***Compression Shaft(6)***.

NOTE: Do not remove the ***Compression Hex Nuts(19)*** from the bolt. If this happens, immediately reinstall the components.

CAUTION: Ensure that all ***Compression Hex Nuts(19)*** maintain a load on them during the entire loosening process. Having all ***Compression Hex Nuts(19)*** loose but one means that a large load may be left on one ***Compression Shaft(6)*** and the risk of breakage is probable. Once the ***Seal(8)*** has relaxed enough to break the seal from the pipe inner diameter the plug is now in a relaxed state and ***Compression Hex Nuts(19)*** can be loosened in full.

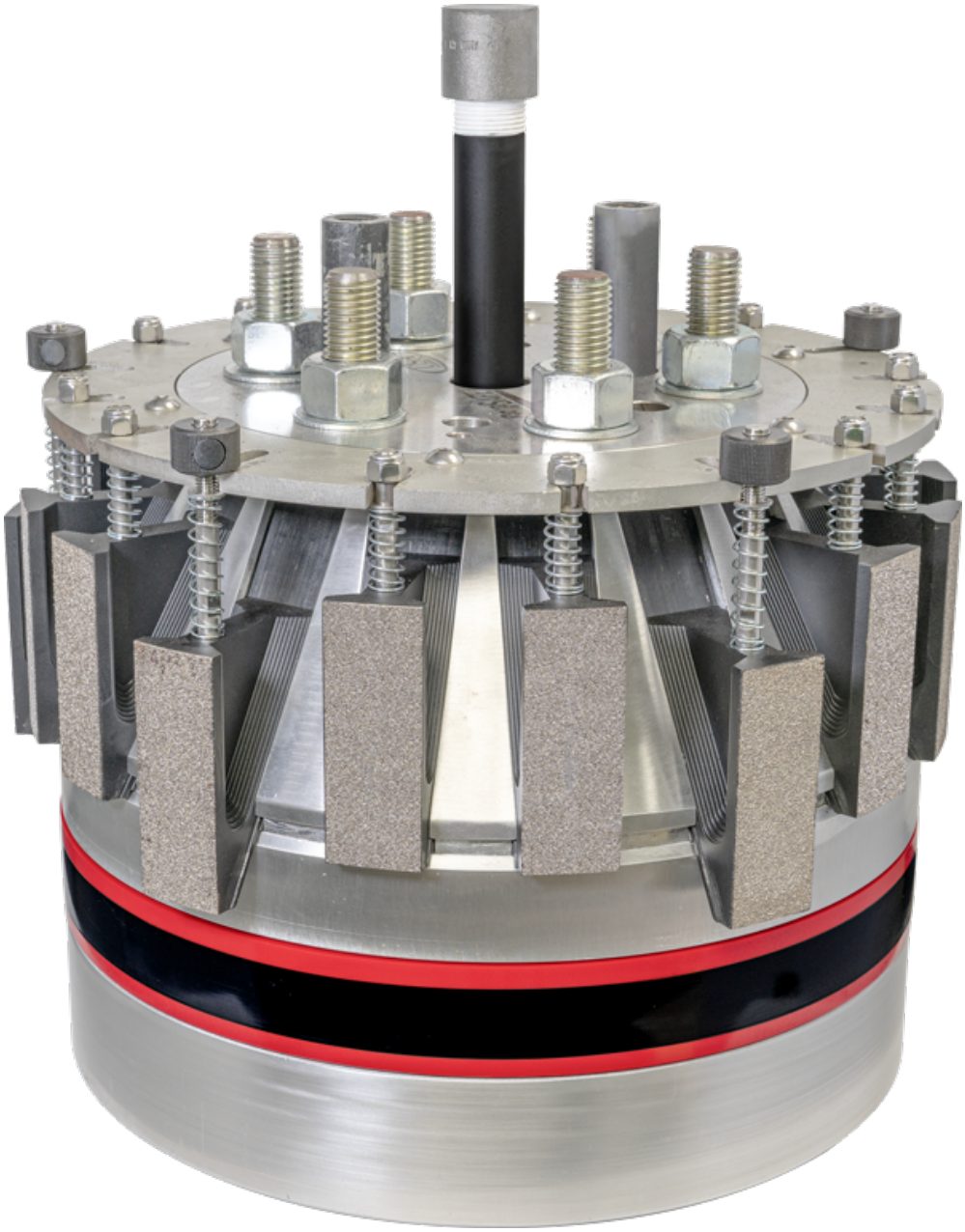
7.7 Remove the GripSafe ST ORB plug from the pipe.

- Clean and store for later use or return to USA Industries.
- ***Wedge Grippers(4)*** texture may become plugged with pipe scale and rust through several uses of the plug. Inspection of this surface after each use is necessary to keep the gripping strength at peak performance. To clean, simply use mild dishwashing soap and a stiff stainless steel bristled brush such as a welding brush.

If plugging is persistent, use of a household rust remover along with a stiff stainless steel bristled brush should be sufficient. Rinse plug clean of any residual chemicals with tap water and dry thoroughly.

- Inspect ***Wedge Grippers'(4)*** freedom of motion. Each ***Wedge Gripper(4)*** should slide freely up and down in its slot with a full range of motion and without resistance.
- Store out of direct sunlight in an area not exposed to above 150° F, UV light and excessive heat will cause ***Seal(8)*** degradation over time.
- When replacing ***Seal(8)***, make sure to inspect the ***Seal Dampener(20)*** for cracks, excessive permanent deformation, and/or loss of elasticity.
- If damage to the ***Seal Dampener(20)*** is observed as mentioned above, replace the component before using the plug for another test.

NPS 14” – 24” PREPARATION & INSTALLATION STEPS



8. Preparing the NPS 14” – 24” GripSafe® ST ORB Plug for Installation

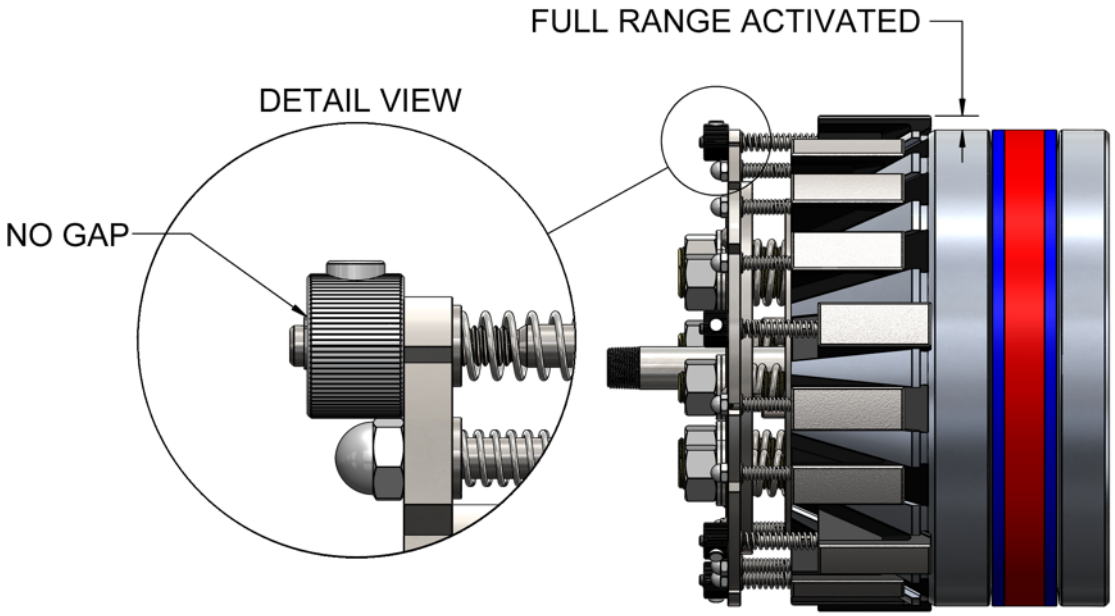


Figure 11: Selected Wedges Auto-Locking Technology Correct Ready to Install State

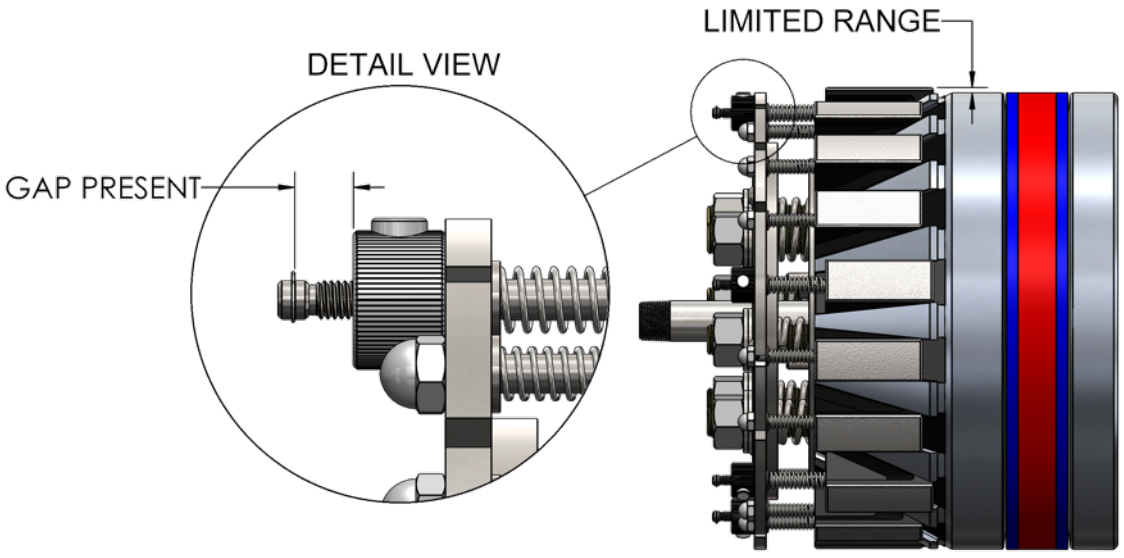


Figure 12: Selected Wedges Auto-Locking Technology Incorrect Ready to Install State

8.1 14” and larger sized GripSafe ST Outboard Retraction Blocking plugs are fitted with a Selected ***Wedge Gripper(4)*** auto-locking technology (SWAT) to ease the insertion of the plug into the pipe.

- Plugs fitted with SWAT must be in the “Correct Ready to Install State,” see Figure 11, when inserting it into the pipe.

NOTE: Plugs that are fitted with SWAT have an opposite “Ready to Install” than those plugs that are not fitted with it. In Figure 4, “Ready to Install” shows a plugs that is in the **(Compressed)** state, ***Spring Plate Hub(18)*** is flush with the ***Retainer Plate(16)***. However, plugs that are fitted with SWAT must be in the “Retracted” state that is shown in both Figures 3 and 11. If the plugs that are fitted with SWAT are in the **(Compressed)** state, all of the ***Wedge Grippers(4)*** will be energized and inserting the plug into the pipe will require more force than practical.

- In the “Correct Ready to Install State,” only five ***Wedge Grippers(4)*** are active and extend beyond the plug’s outer diameter. The remaining ***Wedge Grippers(4)*** are within the plug’s outer diameter and are inactive. Upon insertion, a total of 5 ***Wedge Grippers(4)*** will engage the pipe inner diameter, thereby reducing the force needed to insert the plug while maintaining engagement to the pipe.
- In the “Correct Ready to Install State,” ***Speed Nuts(1)*** are at the top of the ***Wedge Gripper Stems(2)*** with no gap between the ***Speed Nut(1)*** and its retainer ring, see Figure 11 – *DETAIL VIEW*. There must be **NO GAP** present between the ***Speed Nuts(1)*** and its retainer ring when installing the plug to ensure proper activation of the SWAT.

CAUTION: Proper attention is needed to determine if plug that is fitted with SWAT are in the “Correct Ready to Install State.” In figure 12, the *DETAIL VIEW* shows a plug with its ***Speed Nuts(1)*** having a gap between its retainer ring. In this state, the ***Wedge Grippers(4)*** have a limited range, which could cause the plug not to grip upon insertion. This gap must not be present during the installation and is only used when removing the plug from service.

CHECK: Ensure plug is clean of debris, fouling, and contaminants before each use. Each ***Wedge Gripper(4)*** should slide freely up and down in its slot with a full range of motion and without resistance. ***Wedge Gripper(4)*** with impeded movement due to debris, dirt, contaminants or other fouling will cause the plug to not grip on the pipe’s inner diameter, which can cause the plug to eject under pressure, leading to personnel injury or death, material loss, and damage to equipment.

9. Installing the GripSafe® ST NPS 14" – 24" Outboard Retraction Blocking Plug

CAUTION: Ensure pipe I.D. is clean. Debris, pipe scaling, and rust layer must be removed to the deepest point the plug will be installed into. If the pipe is lined or has irremovable product, ***STOP*** and contact USA Industries for support before proceeding. Failure to do so may impede the wedge's ability to grip and cause the plug to eject under pressure. Be sure to wear proper PPE **and follow all site guidelines.**

9.1 Insert the GripSafe ST Outboard Retraction Blocking Plug evenly into the pipe.

- See Table 2 for Operational ID Range and clearance requirements.
- For using GripSafe ST Lifting Device, see *Section 11-12*.

9.2 When the ***Wedge Grippers(4)*** come into contact with the pipe I.D., evenly push the GripSafe ST Outboard Retraction Blocking Plug further into the pipe.

9.3 A slight rocking motion will assist in insertion.

- Once the ***Wedge Grippers(4)*** have begun entering the pipe, the selected ***Wedge Grippers(4)*** will be in independent contact with the pipe I.D. Retraction or removal of the plug at this time is not possible, see Section 10 for plug removal if needed.

9.4 Insert plug until the top of the ***Spring Plate Hub(18)*** is at least flush with the end of the pipe, see Figure 13.

9.5 Once the insertion depth requirement is met, tighten the ***Compression Hex Nuts(19)*** evenly so that the ***Spring Plate Hub(18)*** is touching the ***Retainer Plate(16).*** At this point, all of the ***Wedge Grippers(4)*** are activated and are independently touching the pipe inner diameter, see Figure 14.

TEMPERATURE NOTE: If welding is to occur on the pipe while the plug is installed, the ***Seal (Tri-Ply™)(8)*** should be installed a minimum of 6" from the center of an active weld to prevent it from degrading or ultimately failing due to melting. For post weld heat treats, bake-outs, etc., the ***Seal (Tri-Ply™)(8)*** should be at least 12" from the nearest edge of the heating element, and the temperature at the depth the plug is installed at should not exceed 220° F. If a high temperature bake out is being performed (400° F or higher) increase the installation depth as much as possible. It is recommended to always monitor the pressure behind the plug (ORB) and/or between the seals (DBB) and stop work immediately if any pressure drop is detected. In addition, the pipe's external surface temperature should always be monitored corresponding to the plug's seal location to ensure damage to the seal does not occur.

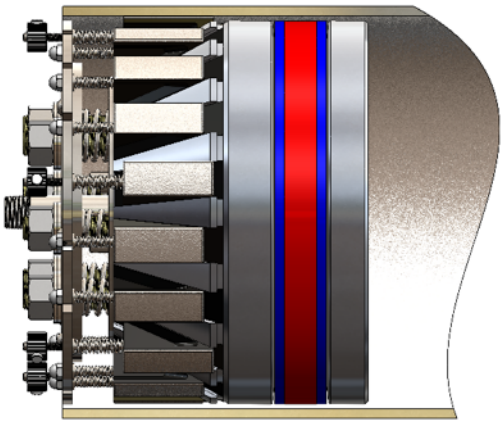


Figure 13: GripSafe ST ORB Auto-Locking Minimum Insertion Depth in a Sectioned Pipe

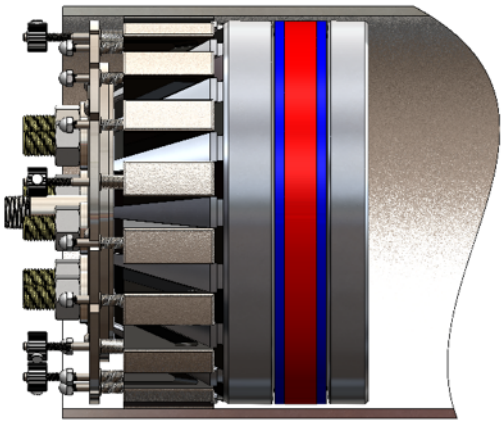


Figure 14: GripSafe ST ORB Auto-Locking all Wedge Grippers activated (Compressed)

9.6 After tightening the ***Compression Hex Nuts(19)*** evenly so that the ***Spring Plate Hub(18)*** is touching the ***Retainer Plate(16)***, check for plug and pipe's concentricity before proceeding to the next step.

- Visit Section 6.6 for this step.

9.7 Evenly tighten the Compression Nuts.

- Using a star pattern shown in Figure 15, turn each ***Compression Hex Nuts(19)*** a maximum of 3 full revolutions before moving to the next nut. Repeat until 50% target torque is achieved on all nuts, then increase to 100% target installation torque and continue torqueing in a star pattern. After completing the star pattern at 100% of the target torque, use a circular pattern to confirm all nuts are torqued correctly.
- Minimal torque will be required for the first several passes, but torque will increase notably after the ***Seal(8)*** begins to compress against the pipe ID.

NOTE 9.7: To help center the plug in the pipe it may be desirable to tighten the two or three bottom-most ***Compression Hex Nuts(19)*** to expand the ***Seal(8)*** under them, thereby lifting the plug up to center. A short push of the plug will reset the ***Wedge Grippers(4)*** to accommodate the new centered position respective to the rest of the plug body. Normal installation should commence once the plug is centered. This may be desirable in the event the plug is noticeably not in the center of the pipe and test pressures are not achieved while the plug is at Maximum Compression Torque or the plug is not within the 0.350" clearance between the plug's outer diameter and the pipe's inner diameter for plugs 6"-8" and 0.500" for plugs 10" and above.

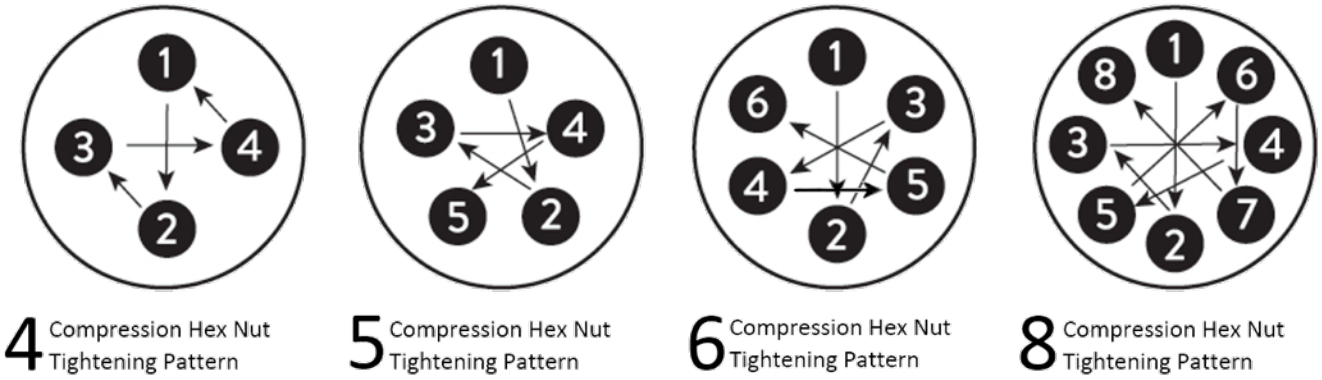


Figure 15: Compression Hex Nut Tightening Pattern Examples

9.8 For installing and using Safety Gag, see *Section 13*.

9.9 Verify the integrity of the Seals.

- If the plug is being used for pressure testing, use proper fittings to install a hydro test pump to the ***Backpressure Vent Port(17)***. Otherwise, install a cap to seal off the system or a backpressure monitoring tee.
- It may be desirable to attach a gauge and vent hose assembly, or a backpressure monitoring tee, to the ***Backpressure Vent Port(17)*** to bleed off any backpressure. The hose should be long enough to redirect any vapor coming out of the vessel to a safe location away from workers that may be in the area. A valve may also be attached to this port to allow safe backpressure venting before plug removal, see Section 7. If using a backpressure monitoring tee it may be useful to have a pressure gauge on the branch side of the tee while connecting the run side to the ***Backpressure Vent Port(17)*** and a ball valve. Further advantages can be made by attaching a hose to the ball valve on the monitoring tee and running the hose to vent to a safe location away from workers that may be in the area.

CAUTION: Fast flowing gases or liquids through hosing can cause hose whip. Take caution to avoid this, failure to do so may result in injury to personnel or damage to equipment.

- Increase pressure to 25% of target pressure or 150 psig, whichever is less. Observance of pressure drop may not be an indication of leakage. GripSafe ST ***Seals(8)*** will creep under pressure until they are fully seated. This creep will increase the pressure test volume. Depending on the test volume size this may be by such a trivial amount it will not be seen on a gauge. For relatively small test volumes a noticeable gradual loss in pressure may be observed during this creep phase. Seating the seal is obtained by reapplying pressure until the pressure becomes stable. This seal creep may also be observed when the system is subjected to the full pressure. Resolution to this creep is the same at high pressure and while verifying integrity.

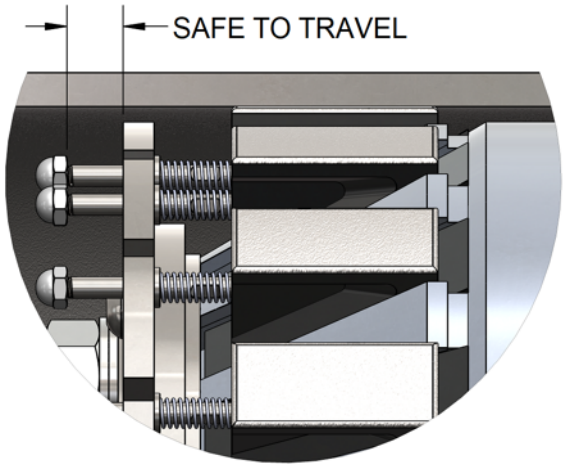


Figure 16: Wedge Grippers Safe to Travel

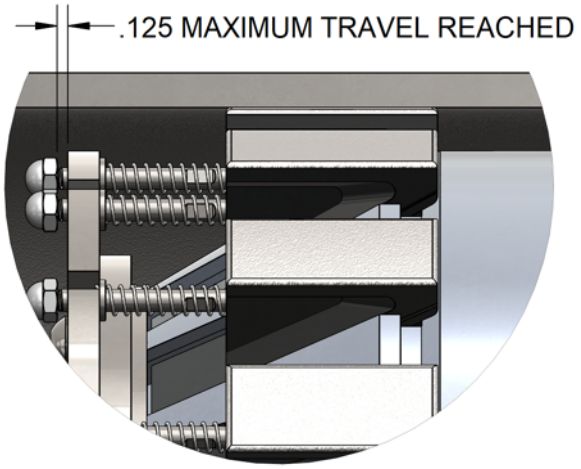


Figure 17: Wedge Grippers Maximum Travel Reached

9.10 The GripSafe plug is now ready to accept back pressure.

CAUTION: If the plug is being used for pressure testing, careful observation is needed on the ***Wedge Gripper Nuts'(14)*** travel. As seen in Figure 9, pressure can be added to the system since the ***Wedge Gripper Nuts'(14)*** are at least 1/8" from the ***Spring Plate Halo(13)***. As seen in Figure 10 however, no additional pressure can be added to the system since the ***Wedge Gripper Nuts'(14)*** have reached their maximum travel.

CAUTION: Do not stand directly in front of the GripSafe ST Outboard Retraction Blocking at any time. Installed plugs should always be treated in this manner irrespective if the plug has backpressure on it or not.

CAUTION: If backpressure develops, constant observation of pressure observed through the use of an attached gauge and physical observation of pipe integrity is necessary to ensure safety to personnel and equipment. Any bulging, enlargement or tapering of the pipe is an indication of over pressuring. The Backpressure Rating listed in Table 1 is for the pressure holding capability of the GripSafe ST Outboard Retraction Blocking and could be well beyond the system design limitations in which it is being used to test.

CAUTION: Careful observation is needed at the location of the pipe where the ***Wedge Grippers(14)*** make contact while performing a hydro test. If any deformation or swelling of the pipe is observed, stop immediately and slowly release the pressure from the system. Contact USA Industries for further assistance.

CAUTION: If at any time during hydro testing a popping or clicking sound is heard, stop immediately and slowly release the pressure from the system. Popping or clicking sounds during hydro-testing could be a sign of the ***Wedge Gripper(14)*** slipping, cracking, or one of the plug components failing. Remove the plug from the pipe or fitting and inspect for damage. Contact USA Industries for further assistance.

10. Removal of NPS 14” – 24” GripSafe ST Outboard Retraction Blocking Plug

10.1 Depressurize the system through the hydro test pump or a valve on the backpressure monitoring tee and drain all water.

10.2 Ensure there is no back pressure on the GripSafe ST ORB plug.

CAUTION: SLOWLY open ***Vent Port(17)*** to relieve any back pressure. Care must be taken when opening valves or loosening fittings if any inadvertent backpressure was introduced to the vessel. Failure to do so may result in hazardous pressure flow and/or fittings becoming violently hazardous projectiles that may cause injury to personnel and damage to equipment. If utilizing a backpressure monitoring tee, fast flowing gases or liquids through hosing can cause hose whip. Take caution to avoid this, failure to do so may result in injury to personnel and damage to equipment.

10.3 Before loosening the ***Compression Hex Nuts(19)***, all ***Speed Nut(1)*** must first be positioned all the way to the end of the stud’s thread as shown in Figure 18 – AFTER.

10.4 Turn the ***Speed Nut(1)*** clockwise until it reaches the end of the thread, away from the retainer ring. For faster repositioning, press the button of the ***Speed Nut(1)*** and slide it toward the end of the thread, away from the retainer ring, see Figure 18 – BEFORE. Once it is at the end of the thread, make sure that threads are interlocked by turning the ***Speed Nut(1)*** clockwise until it is finger tight.

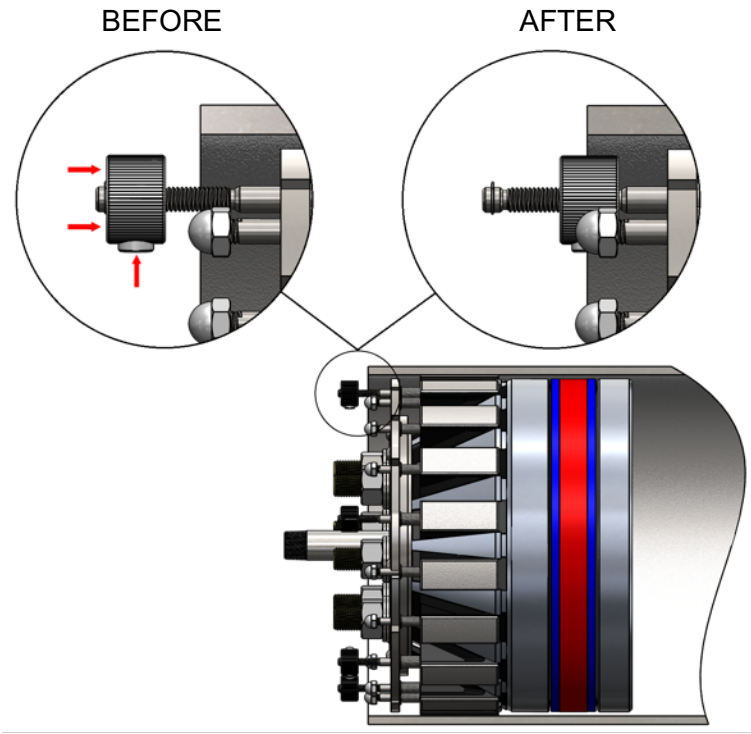


Figure 18: Repositioning Speed Nut

10.5 Make sure step 10.4 is done to all 5 of the ***Speed Nuts(1)***.

- All ***Speed Nut(1)*** must be in the "AFTER" position shown in Figure 18 before loosening the ***Compression Hex Nuts(19)***.

10.6 Loosen the ***Compression Hex Nuts(19)*** in an even star pattern as to not place the whole load on one bolt.

10.7 If a ***Compression Hex Nuts(19)*** runs free during loosening, run the nut back to flush with the top of the ***Spring Plate Hub(18)***. The ***Seal(8)*** act as a spring containing a large amount of force too great for one ***Compression Shaft(6)*** to handle.

10.8 After the ***Seal(8)*** has fully decompressed, the loosening torque required will be notably less.

10.9 Once the ***Seal(8)*** has broken free from the pipe ID, continue loosening the ***Compression Hex Nuts(19)*** until they are even with the top of the ***Compression Shaft(6)***.

NOTE: Do not remove the ***Compression Hex Nuts(19)*** from the bolt. If this happens, immediately reinstall the components.

CAUTION: Ensure that all ***Compression Hex Nuts(19)*** maintain a load on them during the entire loosening process. Having all ***Compression Hex Nuts(19)*** loose but one means that a large load may be left on one ***Compression Shaft(6)*** and the risk of breakage is probable. Once the ***Seal(8)*** has relaxed enough to break the seal from the pipe inner diameter the plug is now in a relaxed state and ***Compression Hex Nuts(19)*** can be loosened in full.

10.10 Remove the GripSafe ST ORB plug from the pipe.

- Clean and store for later use or return to USA Industries.
- ***Wedge Grippers(4)*** texture may become plugged with pipe scale and rust through several uses of the plug. Inspection of this surface after each use is necessary to keep the gripping strength at peak performance. To clean, simply use mild dishwashing soap and a stiff stainless steel bristled brush such as a welding brush. If plugging is persistent, use of a household rust remover along with a stiff stainless steel bristled brush should be sufficient. Rinse plug clean of any residual chemicals with tap water and dry thoroughly.
- Inspect ***Wedge Grippers'(4)*** freedom of motion. Each ***Wedge Gripper(4)*** should slide freely up and down in its slot with a full range of motion and without resistance.
- Store out of direct sunlight in an area not exposed to above 150° F, UV light and excessive heat will cause ***Seal(8)*** degradation over time.
- When replacing ***Seal(8)***, make sure to inspect the ***Seal Dampener(20)*** for cracks, excessive permanent deformation, and/or loss of elasticity.
- If damage to the ***Seal Dampener(20)*** is observed as mentioned above, replace the component before using the plug for another test.

11. GripSafe® ST Lifting Device Parts

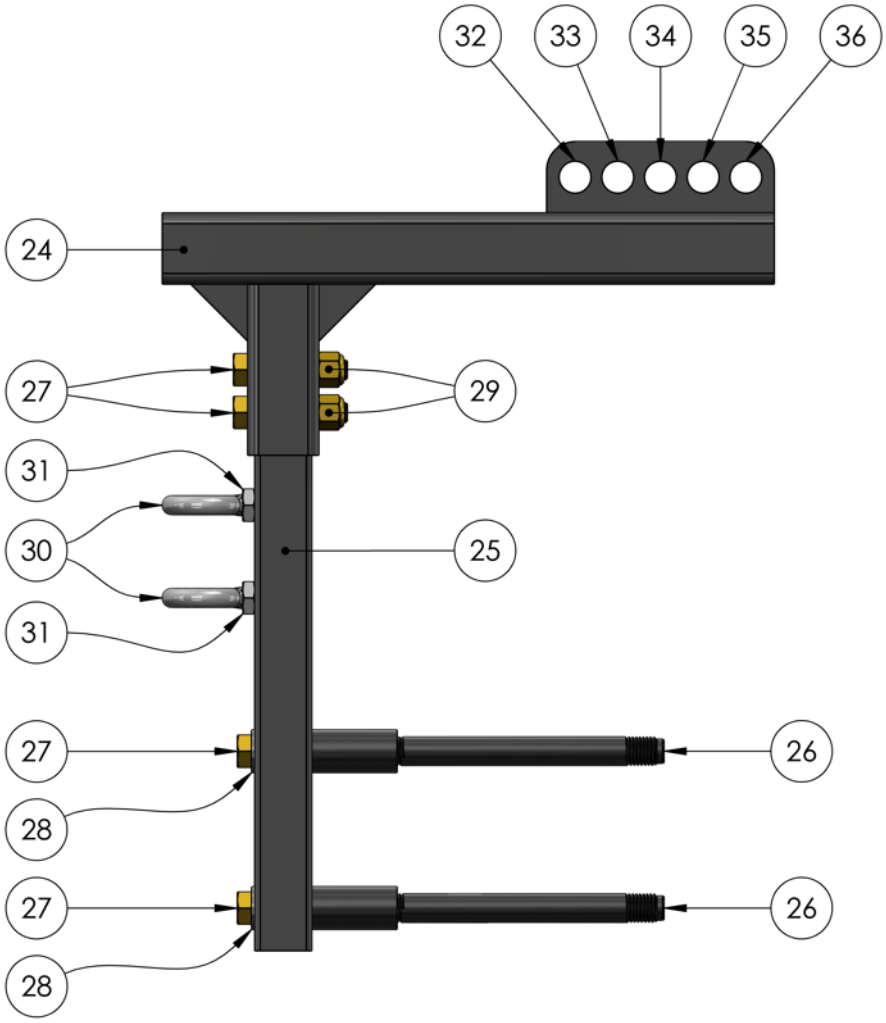


Table 3: Lifting Device Bill of Materials

Plug Size	Part Number	(24)	(25)	(25)	(26)	(26)	(26)	(26)	(27)	(28)	(29)	(30)	(31)
		Universal Lifting Bar	Telescoping Lifting Attachment #1	Telescoping Lifting Attachment #2	Lifting Standoff #1	Lifting Standoff #2	Lifting Standoff #3	Lifting Standoff #4	Lifting Device Bolt	Lifting Device Washer	Lifting Device Nut	Vertical Lifting Eyebolt	Eyebolt Nut
10	GSST-I-A-1000-ALL-LD	1	1	N/A	2	N/A	N/A	N/A	4	2	2	2	2
12	GSST-I-A-1200-ALL-LD	1	1	N/A	N/A	2	N/A	N/A	4	2	2	2	2
14	GSST-I-A-1200-ALL-LD	1	1	N/A	N/A	2	N/A	N/A	4	2	2	2	2
16	GSST-I-A-1200-ALL-LD	1	1	N/A	N/A	2	N/A	N/A	4	2	2	2	2
18	GSST-I-S-1800-ALL-LD	1	1	N/A	N/A	N/A	2	N/A	4	2	2	2	2
20	GSST-I-S-2000-ALL-LD	1	N/A	1	N/A	N/A	2	N/A	4	2	2	2	2
24	GSST-I-S-2400-ALL-LD	1	N/A	1	N/A	N/A	2	N/A	4	2	2	2	2

12. Installing the lifting device on the GripSafe ST Plug

12.1 Insert the ***Lifting Standoffs(26)*** into the two holes located on top of the ***Spring Plate Hub(18)***. Hand tighten both ***Lifting Standoffs(26)*** until they bottom out, see Figure 21.

CAUTION: A minimum of 6 full turns is needed when threading both the ***Lifting Standoffs(22)*** into the GripSafe ST plug. Failure to ensure the studs are fully threaded-in may cause the mating threads to fail under the load of the GripSafe ST causing it to fall and potentially injuring personnel and damaging equipment.

NOTE: There are four types of ***Lifting Standoffs(26)***, #1, #2, #3, and #4. #1 is used for NPS 10” both ORB and IIB plugs, and #2 is used for plugs NPS 12”-16” both ORB and IIB plugs, #3 is used for NPS 18”-24” ORB plugs only, and #4 is used for NPS 18” - 24” IIB plugs only.

12.2 Line up the holes on the ***Telescoping Lifting Attachment(25)*** with the internally threaded holes on the ***Lifting Standoffs(26)***. Fasten the ***Telescoping Lifting Attachment(25)*** onto the ***Lifting Standoffs(26)*** with the provided ***Lifting Device Bolts(27)*** and ***Washers(28)***. See Figure 22.

NOTE: There are 2 types of ***Telescoping Lifting Attachment(25)***, #1, and #2. Each differs in length and hole locations to accommodate different-sized plugs.

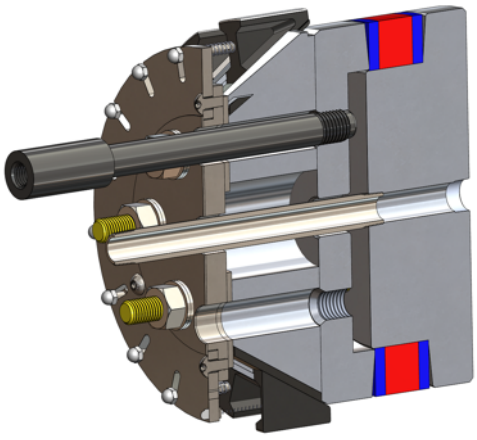


Figure 21: Inserting and Threading Lifting Standoffs into the Plug

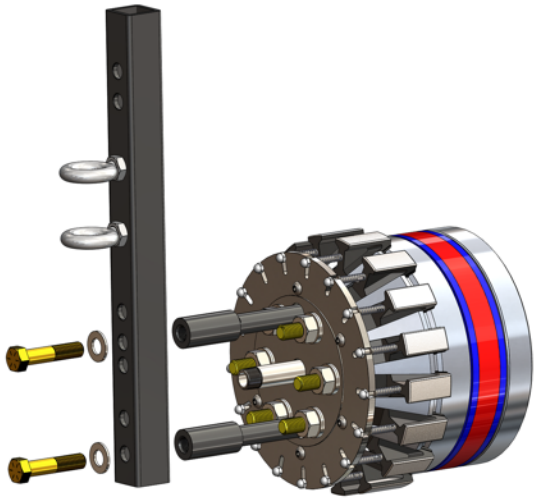


Figure 22: Aligning and fastening Telescoping Lifting Attachment on to Lifting Standoffs

12.3 After fastening the ***Telescoping Lifting Attachment(25)*** to the ***Lifting Standoffs(26)***, slide it into the ***Universal Lifting Bar(24)*** shorter square tubing. Upon insertion, align the two holes on both the ***Telescoping Lifting Attachment(25)*** and ***Universal Lifting Bar(24)***.

12.4 Fasten the ***Telescoping Lifting Attachment(25)*** with the provided ***Lifting Device Bolts(27)*** and ***Nuts(29)*** through the aligned holes in step 12.3. See Figure 23.

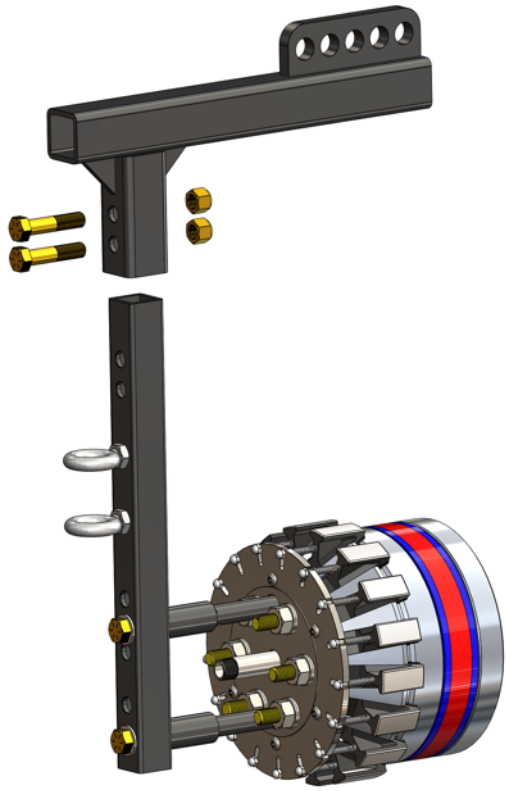


Figure 23: Aligning and Fastening Telescoping Lifting Attachment onto Universal Lifting Bar

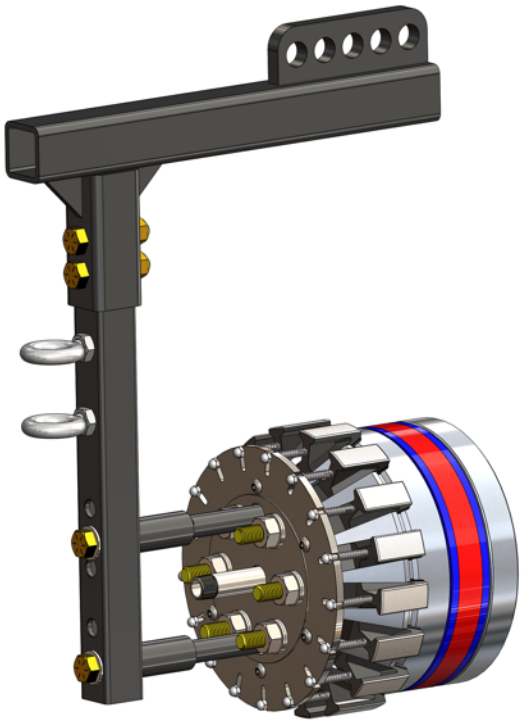


Figure 24: Lifting Device Finished Assembly

12.5 Using the Lifting Device.

- There are five lifting points ***(32)***, ***(33)***, ***(34)***, ***(35)***, and ***(36)*** on the Lifting Device. Use one or two of the five lifting points to orient the GripSafe ST Plug horizontally.
- If the plug does not hang balanced with the center gravity, a cheater bar may be inserted in the long square tubing portion of the ***Universal Lifting Bar (24)*** and used as leverage. A cheater bar can be used to help manipulate the plug while inserting it into the pipe.

CAUTION: DO NOT lift the Lifting Device from the ***Vertical Lifting Eyebolts(30)*** *and* ***Eyebolt Nuts(31)*** installed in the ***Telescoping Lifting Attachment(25)***. The ***Vertical Lifting Eyebolts(30)*** *and* ***Eyebolt Nuts(31)*** are threaded into the ***Telescoping Lifting Attachment(25)*** for storage only. Lifting from this point may cause failure and loss of control over the load resulting in damage to equipment and personnel.

12.6 Vertical Lifting

- For vertical lifting, remove the ***Lifting Device Bolts(27)*** that are holding the ***Lifting Standoffs(26)*** to the ***Telescoping Lifting Attachment(25)***.
- Fasten the provided ***Vertical Lifting Eyebolts(30)*** and ***Eyebolt Nuts (31)*** to both ***Lifting Standoffs(26)***. Note, the ***Vertical Lifting Eyebolts'(30)*** thread is ¾-10.
- While holding the ***Vertical Lifting Eyebolt(30)*** in the correct orientation, snug its ***Eyebolt Nut(31)*** against the top of the ***Lifting Standoffs(26)*** and turn the ***Eyebolt Nut(31)*** an additional ½ turn. Do the same to the other ***Vertical Lifting Eyebolt(30)*** and its ***Eyebolt Nut(31)***. See Figure 25 for properly installed ***Vertical Lifting Eyebolt(30)*** and ***Eyebolt Nut(31)*** illustration.
- When lifting vertically, both ***Vertical Lifting Eyebolts(30)*** and ***Eyebolt Nuts (31)*** must be used.

CAUTION: A minimum of 6 full turns is needed when threading both ***Vertical Lifting Eyebolts(30)*** and ***Eyebolt Nuts(31)*** into the ***Lifting Standoffs(22)***. Failure to ensure the ***Vertical Lifting Eyebolts(30)*** and ***Eyebolt Nuts(31)*** are fully threaded-in may cause the mating threads to fail under the load of the GripSafe ST causing it to fall and potentially injuring personnel and damaging equipment.

CAUTION: Lifting the GripSafe ST with only one ***Vertical Lifting Eyebolt(30)*** and ***Eyebolt Nut(31)*** is not recommended. Failing to lift the plug with both ***Vertical Lifting Eyebolts(30)*** and ***Eyebolt Nuts(31)*** could cause the plug to twist and turn which could lead to the ***Vertical Lifting Eyebolts(30)*** and ***Eyebolt Nuts(31)*** unthreading/loosening causing it to fall and potentially injuring personnel and damaging equipment.

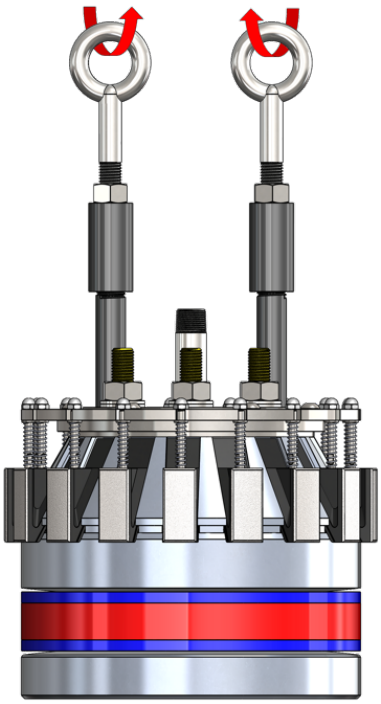


Figure 25: Properly Installed Lifting Eyes for Vertical Lifting

13. Installing and Using Safety Gag

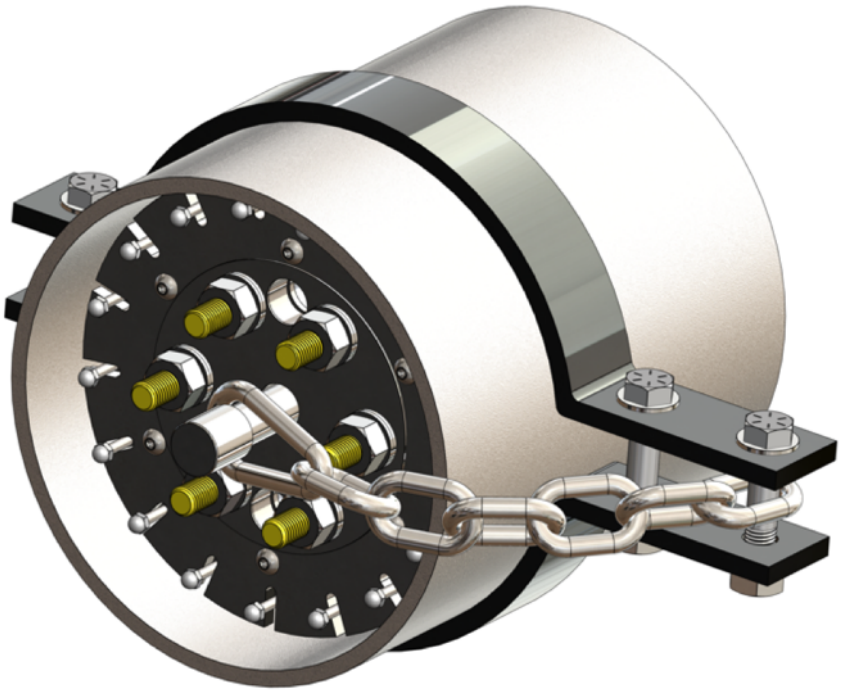


Figure 26: Properly Installed Safety Gag on Pipe

NOTE: Safety Gags are not required but are recommended to provide a layer of protection in the unlikely event of plug discharge.

13.1 Slide the loosely assembled Safety Gag over the pipe before inserting the plug.

13.2 Follow the plug installation instructions in Sections 5-7 for NPS 4”-12” and Sections 8-10 for NPS 14”-24” before continuing to step 13.4.

13.3 Place the pear-shaped link over the ***Back Pressure Vent Port(17)***.

13.4 Push the clamp further down the pipe to remove all slack in the chain. Ensure that the chain is not snagged, twisted, or knotted, and is tight from the gag bolt to the pear-shaped link.

13.5 Starting with the two bolts nearest the pipe, snug all of the bolts on the clamp. For the two bolts nearest the pipe, turn an additional 1/3-1/2 turn.

- When properly installed, the Safety Gag should be firmly clamped and not be able to rotate, slide, or tilt in any fashion when pushed or pulled.
- See Figure 26 for an example of a properly installed Safety Gag.

13.6 Reverse steps 13.1-13.5 to uninstall.

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