

PTI Dynamometer Accessories

R. Moore & Sons
Perth, WA

Please keep this manual for future reference.

This manual is intended to assist operating personnel in becoming familiar with the machine and as guidance in ordering necessary parts inclusive of Power Test's warranty requirements.

Maximum operating efficiency and life of any Power Test machine will be attained through complete understanding of the instructions and recommendations contained within this manual.

SERVICE BOOKLET TABLE OF CONTENTS
R. MOORE & SONS – PERTH, WA
POWER TEST DYNAMOMETER ACCESSORIES
 MANUFACTURED MARCH, 2017

<u>Drawing Number</u>	<u>Revision Number</u>	<u>Item Description</u>
WARRANTY		
PUB_1001520_Resilient Coupling-63088 MANUAL		
25035	1	LIMITS- RES. COUPLING
1023317.03	0	RESILIENT COUPLING ASM
PUB_1003981_Cooling Columns-35X-45X MANUAL		
63590.1	1	COOLING COLUMN ASM 2100HP
63563.1	0	COOLING COLUMN BODY ASM 2 JC VALVE (4NPT)
PTI OM Last Page		

Power Test, Inc. Standard Warranty

Power Test, Inc. warrants, to the Original Purchaser, its Product (equipment, accessories, and parts) for a period of fifteen (15) months from the date of shipment, or twelve (12) months from commissioning sign off, whichever comes first, against defects in design, materials, and workmanship. In order to be entitled to the benefits of this warranty, the products must have been properly installed, maintained, and operated within their rated capacities and/or specified design parameters, and not otherwise abused. Periodic maintenance and adjustment is the sole responsibility of the owner. This warranty is Power Test, Inc.'s exclusive warranty. POWER TEST, INC. EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS. Nonstandard warranties, if any, must be specified by Power Test, Inc. in writing. All claims for breach of this warranty must be made within the warranty period.

In the event of any defects covered by this warranty, Power Test, Inc.'s sole obligation under this Warranty shall be limited to the repair or replacement of any part(s) which may prove defective, under normal use, from faulty material or poor workmanship provided they are returned to Power Test, Inc.'s factory in Sussex, Wisconsin, with all transportation or any related charges prepaid. This shall be the exclusive remedy for all claims whether based on contract, negligence, or strict liability. Power Test, Inc. neither assumes, nor authorizes any other person to assume for Power Test, Inc. any other liability in connection with the sale of its product. The term "original purchaser", as used in this warranty shall be deemed to mean that person for whom Power Test, Inc.'s product is originally installed. This warranty shall not be extended, altered, or varied except by a written instrument signed by Power Test, Inc. Power Test, Inc. shall not be liable in any way for any special, indirect, incidental, or consequential damages or contingent liability.

LIMITATION OF LIABILITY

Power Test, Inc. shall not in any event be liable for any loss of use of any equipment or incidental or consequential damages of any kind, whether for breach of warranty, negligence, or strict liability.

Ordering Parts

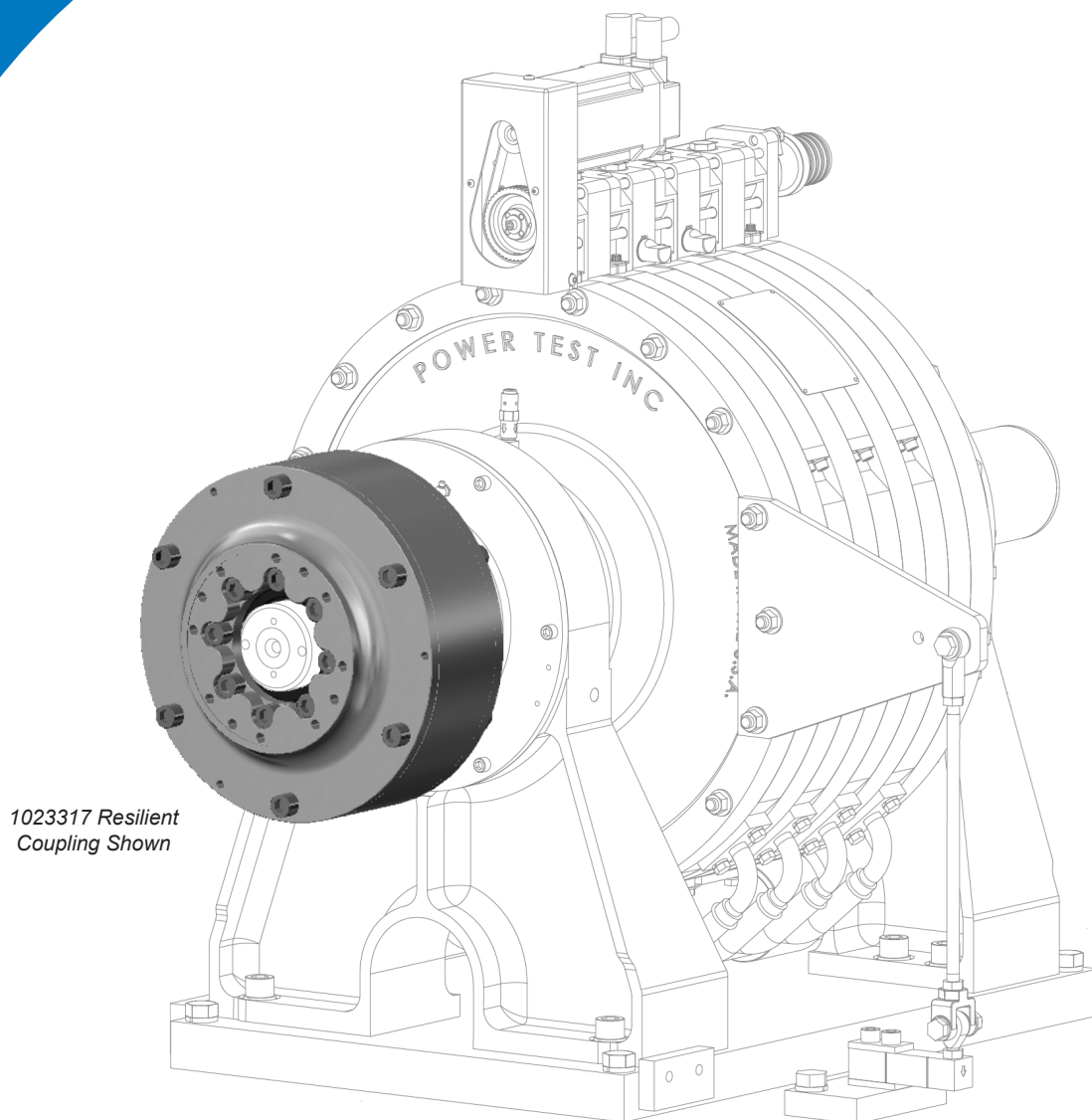
Repair or replacement parts, spare parts, update kits, and/or adapter kits may be ordered from Power Test, Inc. or one of Power Test's current sales representatives. Parts supplied only by Power Test, Inc. are covered under warranty as stated above.

IMPORTANT
When ordering parts be sure to include the serial number of the machine and the assembly and part number.

All work should be done by an accomplished mechanic following the assembly drawings. Particular attention should be noted in reference to the torque setting on various bolts. Set to the numbers as stated on the assembly drawings or to the standard setting for the bolt grade. In the event of difficulties in understanding this manual, or other problems, please contact your Power Test, Inc. representative.

Service Calls

If the buyer requests field service after the warranty period or during the warranty period if conditions have invalidated the warranty, the buyer shall pay the time and expenses of the field representative.



Resilient Coupling - 1023317.xx

Original Instructions

www.powertestdyno.com

Please keep this manual for future reference.

This manual is intended to assist operating personnel in becoming familiar with the product and as guidance in ordering necessary parts inclusive of Power Test's warranty requirements. Maximum operating efficiency and life of any Power Test product will be attained through complete understanding of the instructions and recommendations contained within this manual.

WARNING
Services performed beyond preventive maintenance by personnel other than Power Test Service Technicians on any Power Test products during the warranty period may void the warranty.

IMPORTANT
When available, please include the model number and serial number of the product in any correspondence.

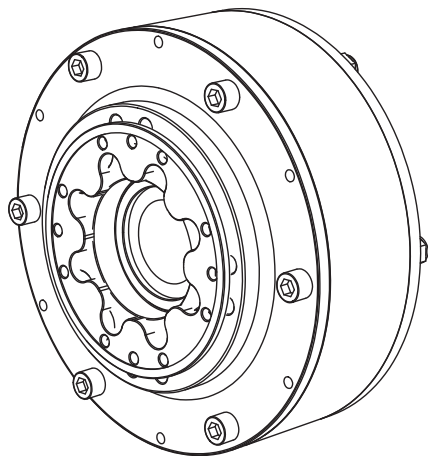
1.0 Overview

The dynamometer-mounted Torsionally Resilient Coupling is used when testing a comparatively small engine on a large capacity dynamometer. The coupling provides dampening of high-amplitude torsional vibration, minimizing transmission to the dynamometer.

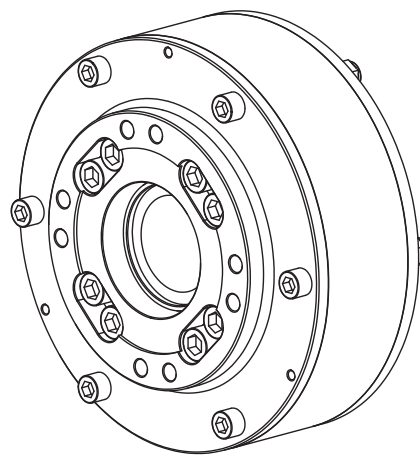
Dynamometer-Mounted Torsionally Resilient Couplings:

- Allow testing of many engine sizes using one dynamometer
- Allow for the adjustment of torsional stiffness to meet testing requirements
- Supplied with lockup bolts for locking the drive plate to the inner drive hub for testing large engines (above 2,500 ft-lbs) without changing couplings
- Coupling Drive Plate Adapter (p/n: 63087) can be purchased to adapt to SAE 1910

For torque values below 2,500 ft-lbs, torsionally resilient couplings utilize a brass wear ring that provides a renewable bearing surface for the coupling when operated as a flexible connection.



Torsionally Resilient Coupling
shown unlocked with 1810 Drive Plate
(locking bolts not installed)



Torsionally Resilient Coupling
shown locked with 1910 Drive Plate
(locking bolts installed)

Description	Part #	Max. Unlocked Torque (ft-lbs)	Drive Plates Supplied (SAE)			Max. Locked Torque (ft-lbs)	Max RPM	Weight (lbs)
			1610	1810	1910			
TR Coupling - 35X	1023317.01	2,500			X	7,206	4,000	161
TR Coupling - 35X	1023317.02	2,500	X	X		7,206	4,000	181
TR Coupling - 35X	1023317.03	2,500	X	X	X	7,206	4,000	201
TR Coupling - 45X	1023384.01	2,500			X	15,000	4,000	158
TR Coupling - 45X	1023384.02	2,500	X	X		15,000	4,000	178
TR Coupling - 45X	1023384.03	2,500	X	X	X	15,000	4,000	198

1.0 Overview

1.1 Purpose

Because the average dynamometer is called upon to test different levels of engine horsepower, the connection between the engine and dynamometer has become a critical item. This issue became more important as dynamometer users began to purchase larger capacity dynamometers. Although the larger capacity dynamometers were necessary, the majority of the engines being tested were in the horsepower range of one-fourth the capacity of the dynamometer. These smaller engines would cause torsional impulses as they were run at their critical speeds. On some engines these critical speeds were within the range at which the dynamometer tests were to be made. These torsional impulses caused vibrations that would greatly reduce the life of the drive shafts and, to a smaller degree, the life of the engine, dynamometer and instrumentation.

Using a small capacity dynamometer on a small horsepower engine or a large capacity dynamometer on a large horsepower engine resulted in torsional impulses not being noticed. This would, however, necessitate the need for two or more dynamometers, dynamometer rooms and accessories. To reduce these problems, the resilient coupling was designed. Although the resilient coupling does not do away with the torsional impulses, it does move these criticals to a speed range outside the area of a normal dynamometer test.

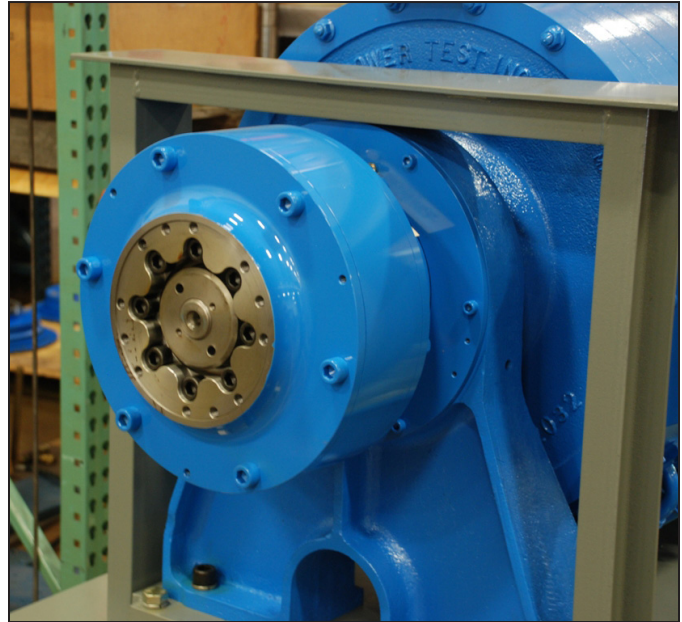


Figure 1.2: Resilient Coupling Mounted On Dynamometer

1.0 Overview

1.2 Primary Components and Functions

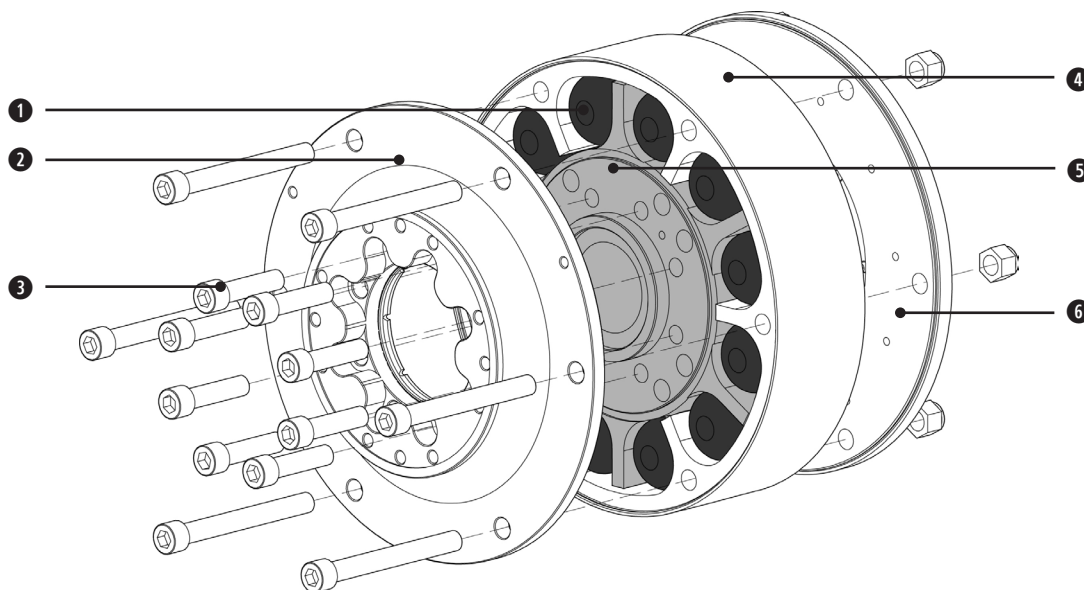


Figure 1.3: Resilient Coupling Components

- | | |
|------------------------------------|---------------|
| ❶ Resilient Rubber Blocks (12 ea.) | ❹ Out Housing |
| ❷ Drive Plate | ❺ Inner Hub |
| ❸ Lock Up Bolts (8 ea.) | ❻ End Plate |

Resilient couplings have a spider type inner hub that is mounted on the dynamometer shaft. The outer spider housing is slipped over the hub with resilient blocks (neoprene) placed between each finger of the two spider assemblies. A drive plate is mounted to the outer spider housing. The drive plate is tapped to accept the bolt pattern of the dynamometer's double universal joint drive shaft.

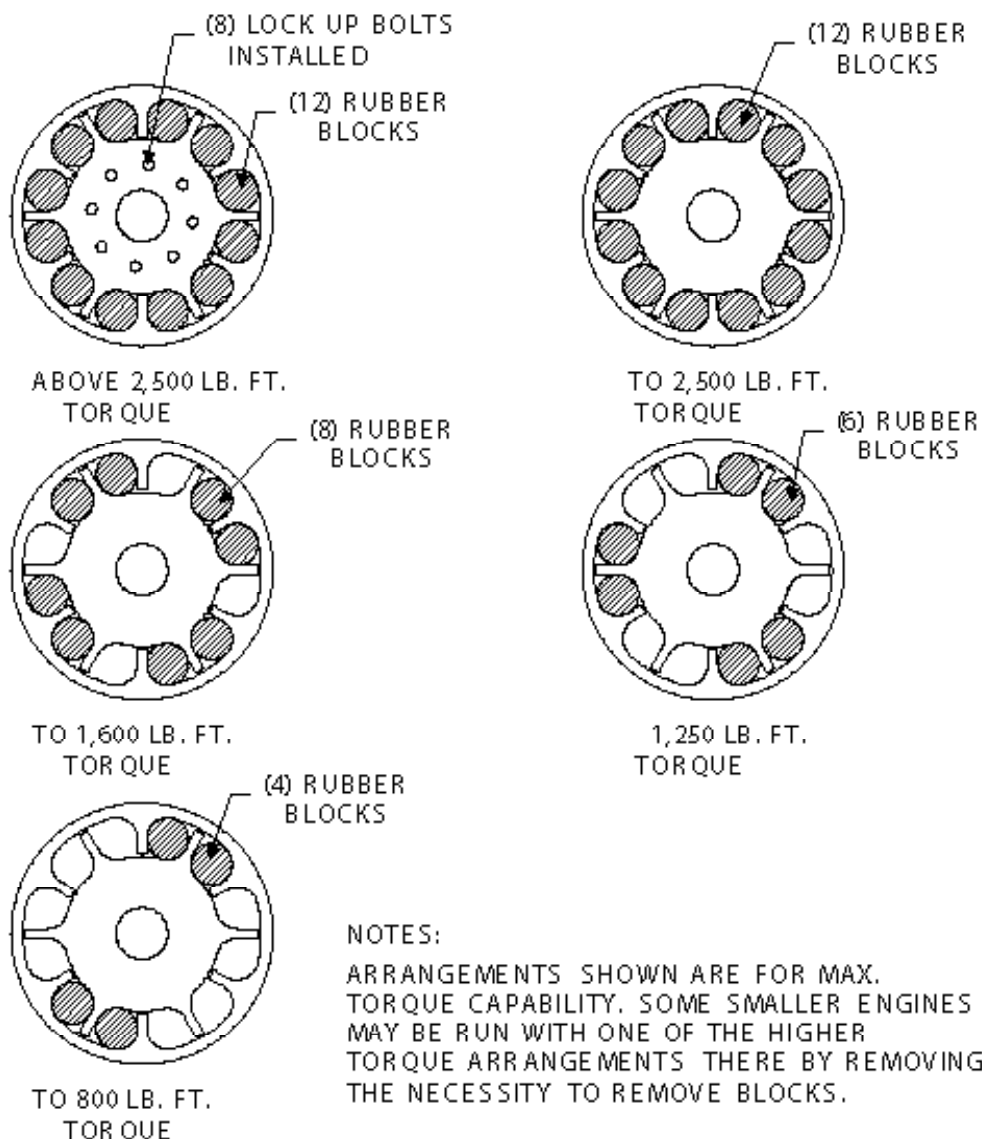
In operation, the engine would turn the drive shaft, which turns the outer spider. The outer spider, being separated from the inner spider by the resilient blocks, would then transmit the force through these blocks to the inner spider and dynamometer. Torsional impulses are dampened out by these blocks in a manner similar to the way a viscosity dampener operates when mounted on the fan end of an engine.

The coupling is capable of transmitting a maximum of 2,500 lb. ft. of torque when driving through the blocks. This rate can be reduced to 66, 50 or 33 percent by removing the blocks in pairs. This becomes important when testing an extremely small engine on a large dynamometer. By means of properly located openings, the coupling can always be checked to determine how many blocks are in the coupling without disassembly or removal of the engine.

1.0 Overview

The drive plate can be locked to the inner spider using the supplied set of lockup bolts for testing engines which exceed the 2,500 lb. ft. torque capability of the resilient blocks. With the use of these lockup bolts, engines can be tested up to the capability of the dynamometer without changing couplings. The coupling can be checked to determine if the lockup bolts are installed without disassembly or removal of the engine.

Brass wear rings provide a renewable bearing surface for the coupling when operated as a flexible connection. Always ensure the wear rings are in good condition to prevent damage to the coupling and dynamometer.



RESILIENT COUPLING TORQUE LIMITS

3.0 Maintenance

⚠ WARNING

- Only qualified operators and maintenance personnel should perform the procedures covered in this manual.

Power Test dynamometer accessories are designed to provide years of trouble free service with a minimum amount of regular maintenance. This section describes normal maintenance procedures.

5.1 General Inspection

1. Periodically inspect the wear rings at regular intervals for wear. The frequency of checks depends on local usage and conditions. Abnormal or unexplained vibrations maybe indicate a bad wear ring.

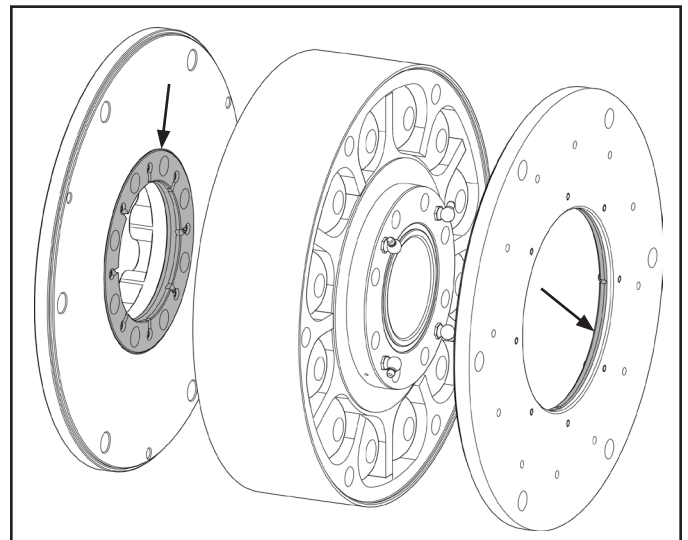


Figure 3.1: Wear Rings

2. Re-lubricate resilient coupling at grease fittings using NLGI #2 mineral oil grease with a lithium soap base. The frequency of lubrication depends on local usage and conditions. This can initially be determined experimentally and must then be strictly adhered to.

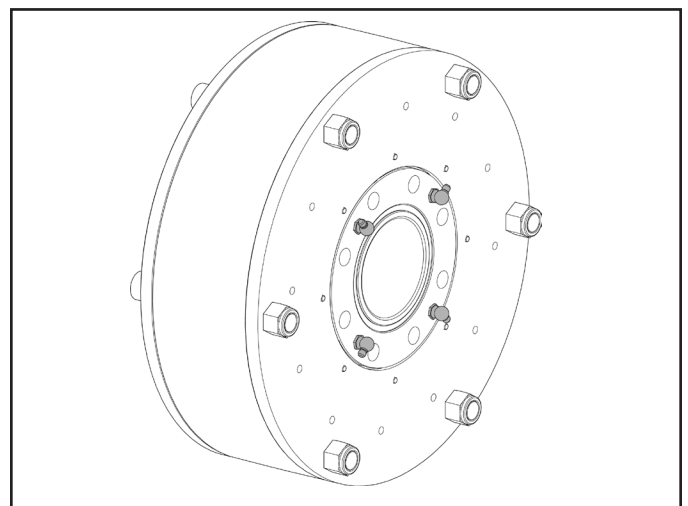


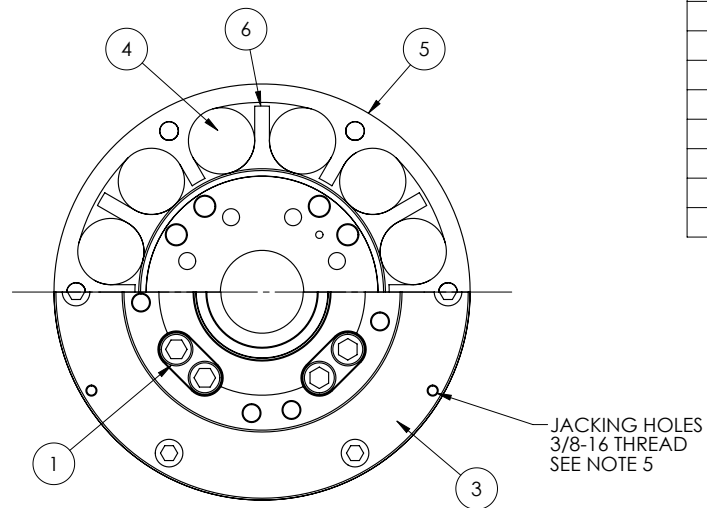
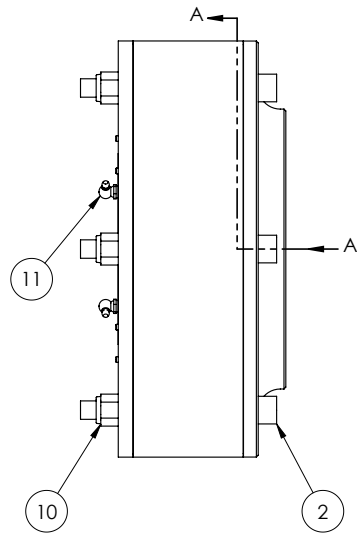
Figure 3.2: Grease Fittings

4.0 Appendix

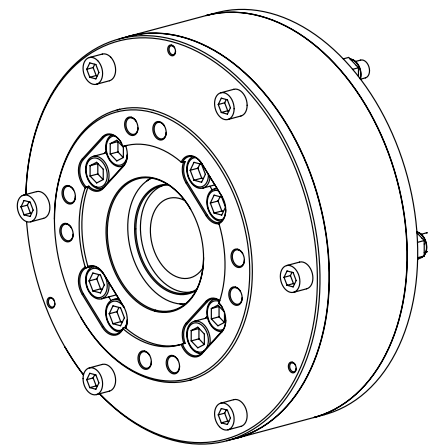
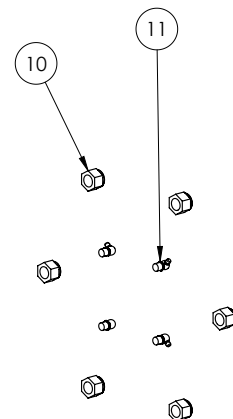
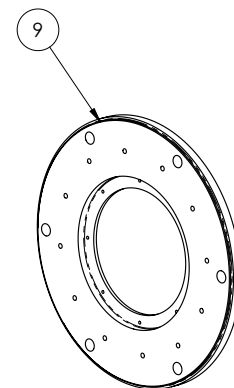
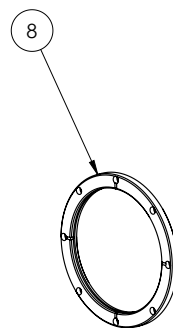
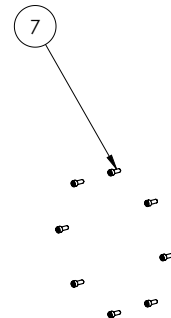
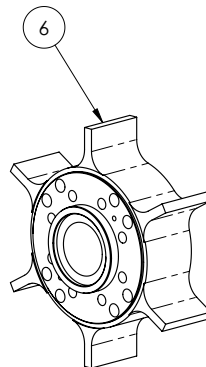
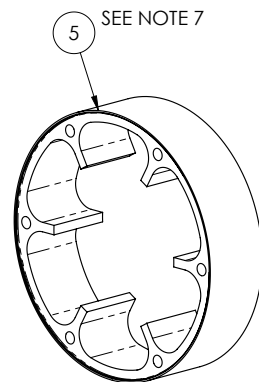
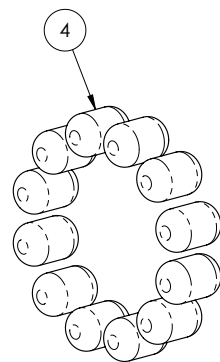
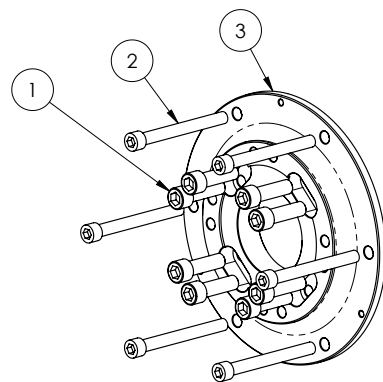
The following pages contain information specific to the Power Test equipment. As specifications and part numbers change, these documents will be updated to reflect the equipment and requirements at the time of shipment. Contact your Power Test sales representative for further information.

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SECTION A-A
SCALE 1 : 4



SCALE 1 : 4

- NOTE:
1. ASSEMBLY 1023317.01 IS USED WITH 1910 DRIVE SHAFT
ASSEMBLY 1023317.02 IS USED WITH 1610/1810 DRIVE SHAFT
ASSEMBLY 1023317.03 IS USED WITH 1610/1810/1910 DRIVE SHAFT
 2. ASSEMBLY CAN BE OPERATED WITHOUT
LOCK-UP BOLTS (H-0521) WITH A MAXIMUM
INPUT TORQUE OF 2500FT. LBS. AND BE TORSIONALLY
DAMPENED
 3. TO OPERATE ABOVE 2500FT. LBS. OF INPUT TORQUE PART
H-0521 MUST BE INSTALLED AND PROPERLY TORQUED
 4. FAILURE TO OPERATE THE COUPLING PER THE ABOVE
DIRECTIONS MAY CAUSE UNNECESSARY WEAR OR
DESTRUCTION
 5. TO REMOVE DRIVE PLATE (63087) REMOVE THRU
BOLTS (1005112) AND LOCK-UP BOLTS (H-0521)
AND INSTALL 3/8-16 BOLTS INTO JACKING HOLES
 6. MOMENT OF INERTIA 27.739 LB FT²
 7. APPLY GREASE TO MAINTAINING SURFACES FOR EASE OF
ASSEMBLY (63014)

3			4	
ITEM	QTY	PART NUMBER	TORQUE FT-LBS.	DESCRIPTION
1	8	H-0521	250	SOC HD CAP SCR 3/4-16 X 2 1/2
2	6	1005112	220	SOC HD CAP SCR 5/8-11 X 6
3	1	63087		TORSIONAL COUPLING FRONT PLT 1910 STYLE
4	12	23025.70		RESILIENT BLOCK 70 DURO
5	1	63014		OUTER HOUSING - RESILIENT COUPLING
6	1	63086		HUB - RESILIENT COUPLING 25X/35X/50X
7	8	H-001		SOC HD CAP SCR 10-24 X 1/2
8	1	43017		WEAR RING - LARGE
9	1	43015		END PLATE - RES CPLG
10	6	H-024		HEX NUT 5/8-11 NYLOK
11	4	H-047		GREASE FITTING ZERK 1/8NPTM X 90°

ECO DESCRIPTION:		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DECIMALS: .XX ± .01 XXX ± .005		CAD GENERATED DRAWING. DO NOT MANUALLY UPDATE		 Power Test (262) 252-4301 www.pwrtst.com N60 W22700 Silver Spring Dr. Sussex, WI 53089 USA RESILIENT COUPLING 35X - 1910													
		FRACTIONS: ± 1/32 < ± 1°		<table><tr><td>APPROVALS</td><td>DATE</td></tr><tr><td>DESIGNED BAS</td><td>03/17/2016</td></tr><tr><td>DETAILED BAS</td><td>03/18/2016</td></tr><tr><td>REVIEWED ALS</td><td>03/18/2016</td></tr><tr><td>APPROVED BLS</td><td>03/21/2016</td></tr></table>						APPROVALS	DATE	DESIGNED BAS	03/17/2016	DETAILED BAS	03/18/2016	REVIEWED ALS	03/18/2016	APPROVED BLS	03/21/2016
		APPROVALS	DATE																
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APPROVED BLS	03/21/2016																		
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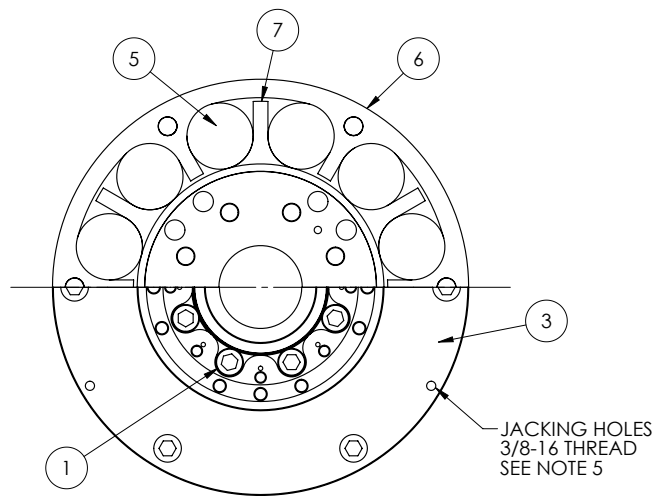
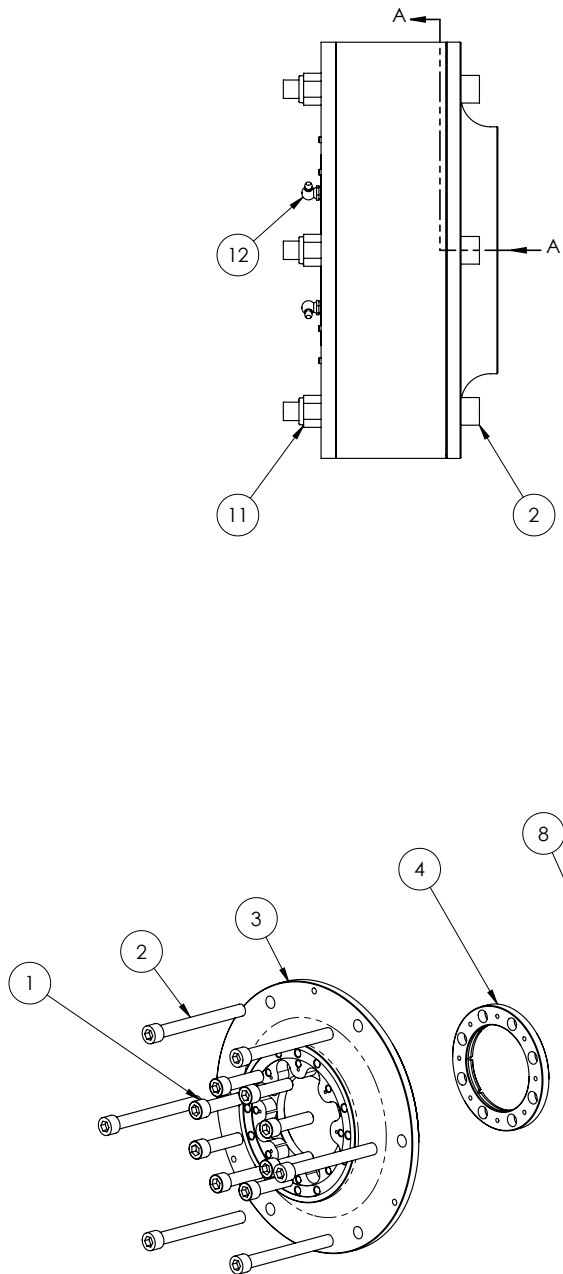
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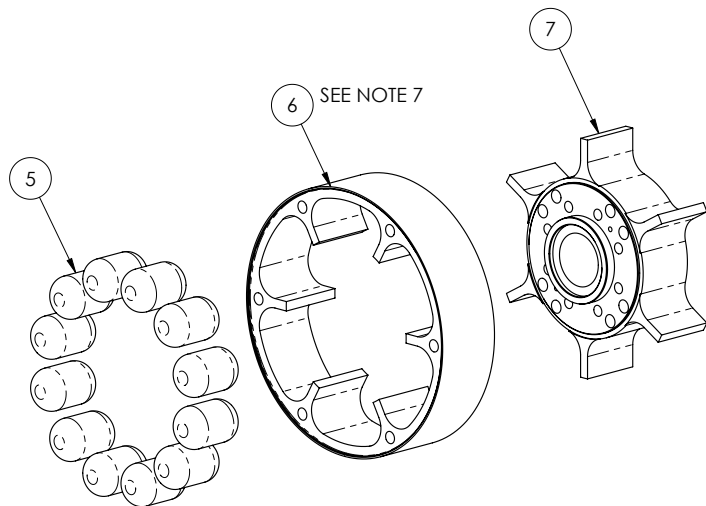
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D



SECTION A-A
SCALE 1 : 4



- NOTE:
1. ASSEMBLY 1023317.01 IS USED WITH 1910 DRIVE SHAFT
ASSEMBLY 1023317.02 IS USED WITH 1610/1810 DRIVE SHAFT
ASSEMBLY 1023317.03 IS USED WITH 1610/1810/1910 DRIVE SHAFT
 2. ASSEMBLY CAN BE OPERATED WITHOUT LOCK-UP BOLTS (H-0522) WITH A MAXIMUM INPUT TORQUE OF 2500FT. LBS. AND BE TORSIONALLY DAMPENED
 3. TO OPERATE ABOVE 2500FT. LBS. OF INPUT TORQUE PART H-0522 MUST BE INSTALLED AND PROPERLY TORQUED
 4. FAILURE TO OPERATE THE COUPLING PER THE ABOVE DIRECTIONS MAY CAUSE UNNECESSARY WEAR OR DESTRUCTION
 5. TO REMOVE DRIVE PLATE (63114) REMOVE THRU BOLTS (1005112) AND LOCK-UP BOLTS (H-0522) THEN INSTALL 3/8-16 BOLTS INTO JACKING HOLES
 6. MOMENT OF INERTIA 27.397 LB FT²
 7. APPLY GREASE TO MAINTAINING SURFACES FOR EASE OF ASSEMBLY (63014)

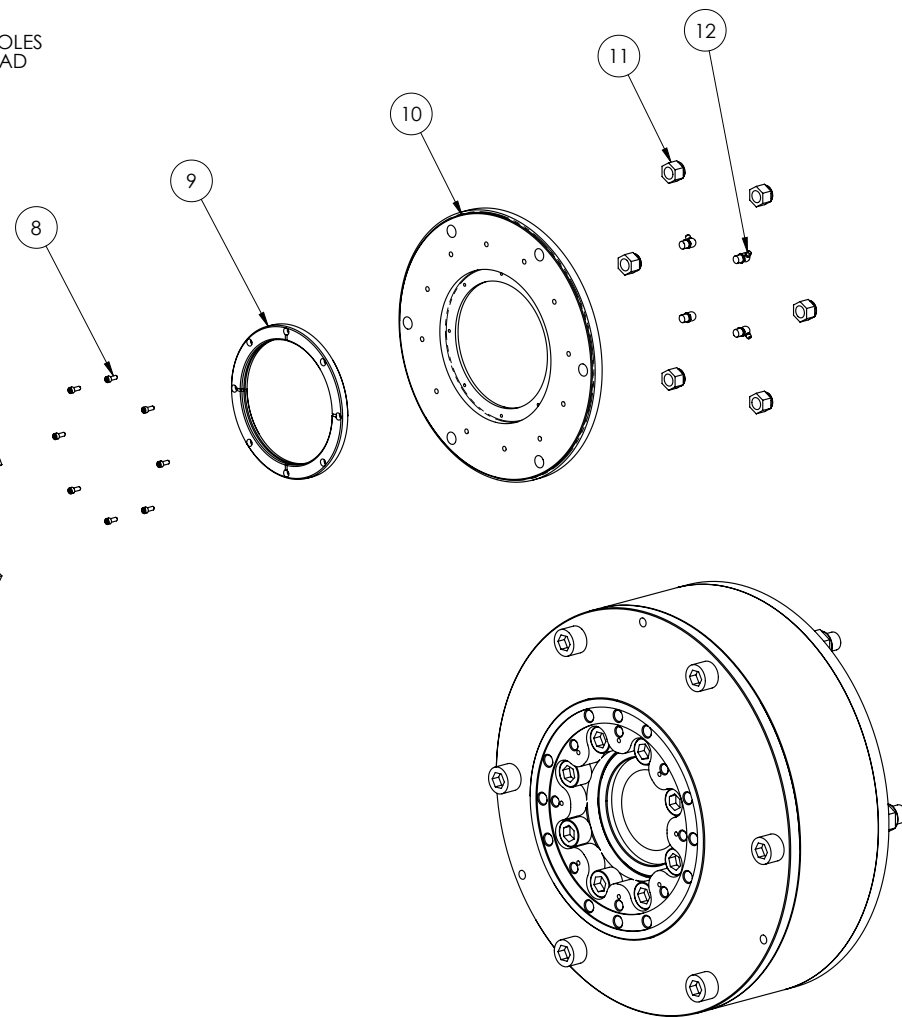
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ITEM	QTY.	PART NUMBER	TORQUE FT-LBS.	DESCRIPTION
1	8	H-0522	220	SOC HD CAP SCR 5/8-18 X 2 1/2
2	6	1005112	220	SOC HD CAP SCR 5/8-11 X 6
3	1	63114		DRIVE PLATE RESILIENT CPLG 1610/1810
4	1	43016		WEAR RING - SMALL
5	12	23025.70		RESILIENT BLOCK 70 DURO
6	1	63014		OUTER HOUSING - RESILIENT COUPLING
7	1	63086		HUB - RESILIENT COUPLING 25X/35X/50X
8	16	H-001		SOC HD CAP SCR 10-24 X 1/2
9	1	43017		WEAR RING - LARGE
10	1	43015		END PLATE - RES CPLG
11	6	H-024		HEX NUT 5/8-11 NYLOK
12	4	H-047		GREASE FITTING ZERK 1/8NPTM X 90°

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SCALE 1 : 4

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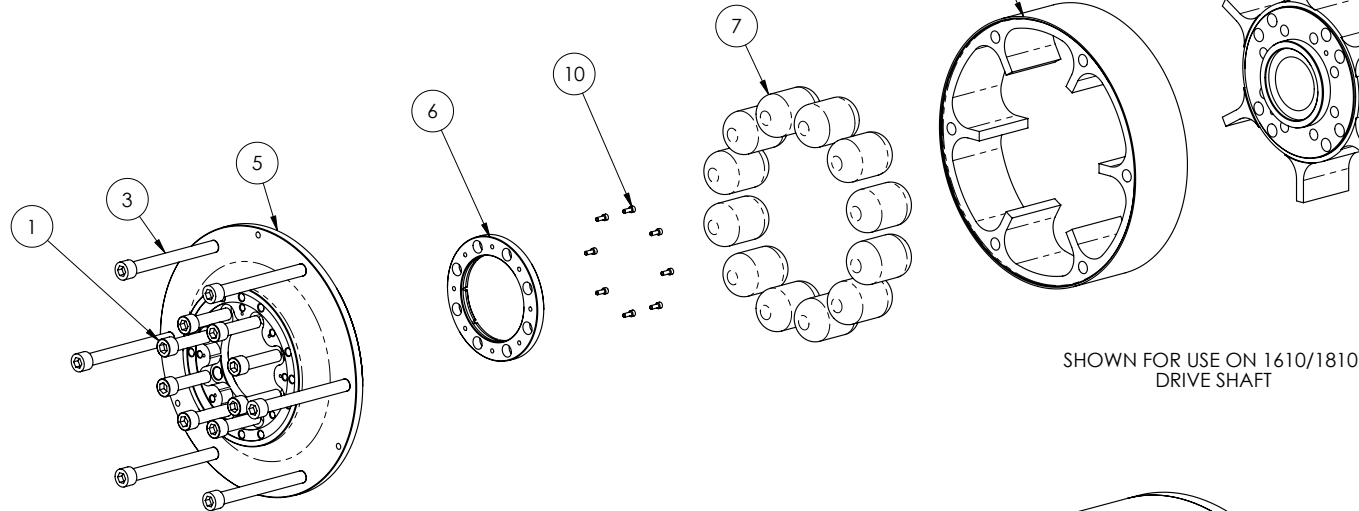
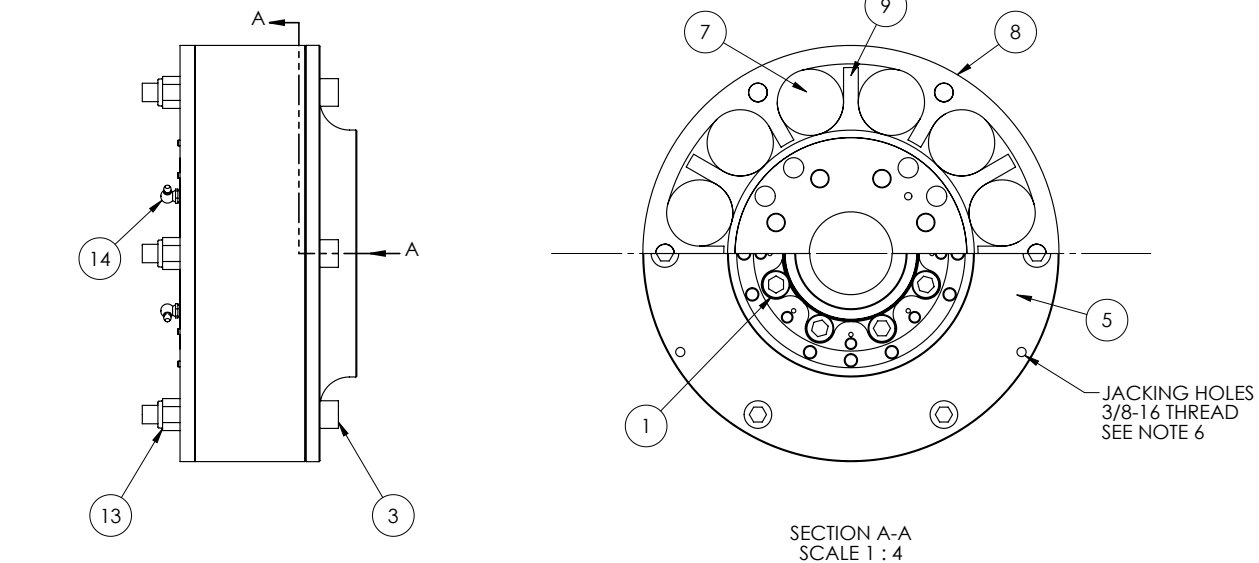
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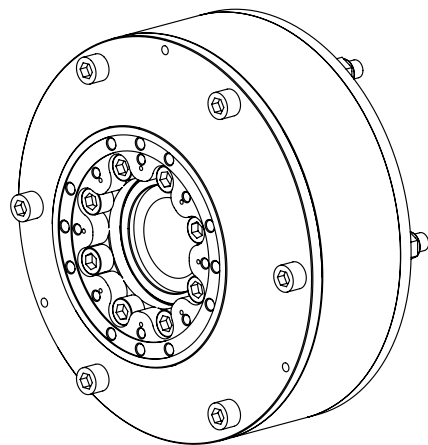
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SHOWN FOR USE ON 1610/1810
DRIVE SHAFT

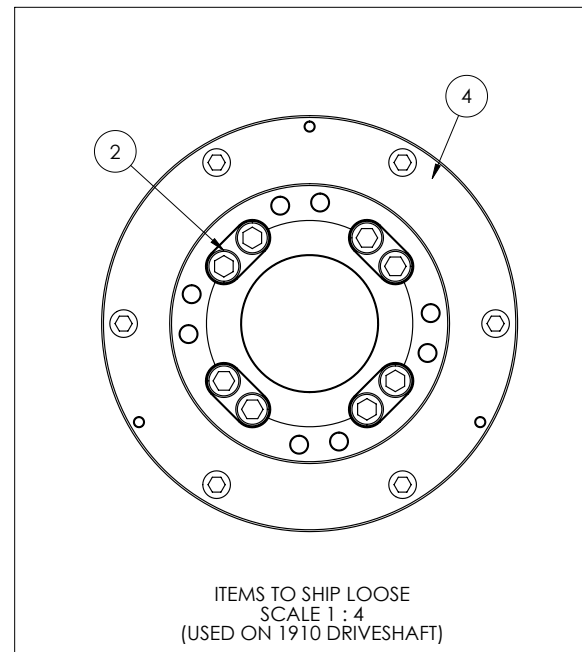
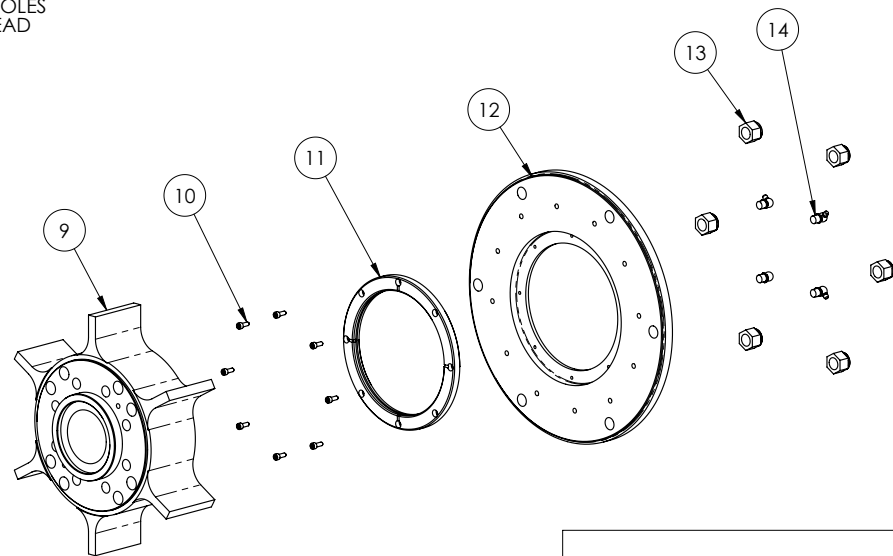


SCALE 1 : 4

NOTE:

- SHIP PARTS 63087 AND H-0521 LOOSE
- ASSEMBLY 1023317.01 IS USED WITH 1910 DRIVE SHAFT
ASSEMBLY 1023317.02 IS USED WITH 1610/1810 DRIVE SHAFT
ASSEMBLY 1023317.03 IS USED WITH 1610/1810/1910 DRIVE SHAFT
- ASSEMBLY 1023317.03 CAN BE OPERATED WITHOUT LOCK-UP BOLTS (H-0522 OR H-0521) WITH A MAXIMUM INPUT TORQUE OF 2500FT. LBS. AND BE TORSIONALLY DAMPENED
- TO OPERATE ABOVE 2500FT. LBS. OF INPUT TORQUE PARTS H-0522 & H-0521 MUST BE INSTALLED AND PROPERLY TORQUED
- FAILURE TO OPERATE THE COUPLING PER THE ABOVE DIRECTIONS MAY CAUSE UNNECESSARY WEAR OR DESTRUCTION
- TO REMOVE DRIVE PLATE (63114 OR 63087) REMOVE THRU BOLTS (1005112) AND LOCK-UP BOLTS (H-0522 OR H-0521) THEN INSTALL 3/8-16 BOLTS INTO JACKING HOLES
- MOMENT OF INERTIA 27.397 LB FT² W/ 63114 (1610/1810)
MOMENT OF INERTIA 27.739 LB FT² W/ 63087 (1910)
- APPLY GREASE TO MAINTAINING SURFACES FOR EASE OF ASSEMBLY (63014)

3		4		
ITEM	QTY.	PART NUMBER	TORQUE FT-LBS.	DESCRIPTION
1	8	H-0522	220	SOC HD CAP SCR 5/8-18 X 2 1/2
2	8	H-0521		SOC HD CAP SCR 3/4-16 X 2 1/2
3	6	1005112	220	SOC HD CAP SCR 5/8-11 X 6
4	1	63087		TORSIONAL COUPLING FRONT PLT 1910 STYLE
5	1	63114		DRIVE PLATE RESILIENT CPLG 1610/1810
6	1	43016		WEAR RING - SMALL
7	12	23025.70		RESILIENT BLOCK 70 DURO
8	1	63014		OUTER HOUSING - RESILIENT COUPLING
9	1	63086		HUB - RESILIENT COUPLING 25X/35X/50X
10	16	H-001		SOC HD CAP SCR 10-24 X 1/2
11	1	43017		WEAR RING - LARGE
12	1	43015		END PLATE - RES CPLG
13	6	H-024		HEX NUT 5/8-11 NYLOK
14	4	H-047		GREASE FITTING ZERK 1/8NPTM X 90°



ITEMS TO SHIP LOOSE
SCALE 1 : 4
(USED ON 1910 DRIVESHAFT)

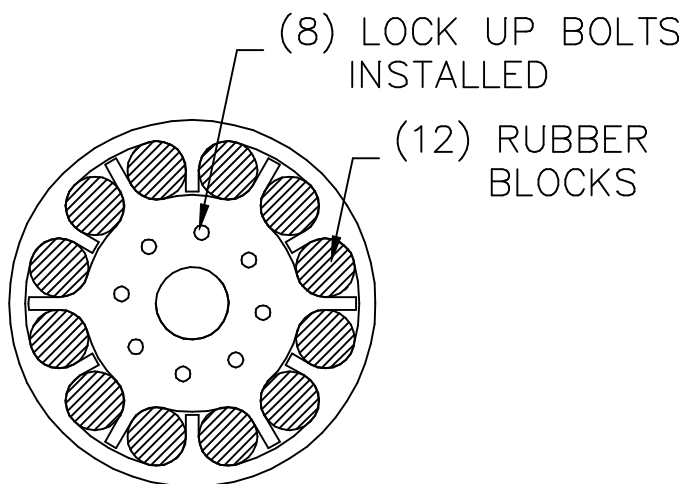
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DATE		MATERIAL	SEE BOM	
ECO		WEIGHT	159.807	
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		SHEET	1 OF 1	
		SUB	PART NO.	1023317.03
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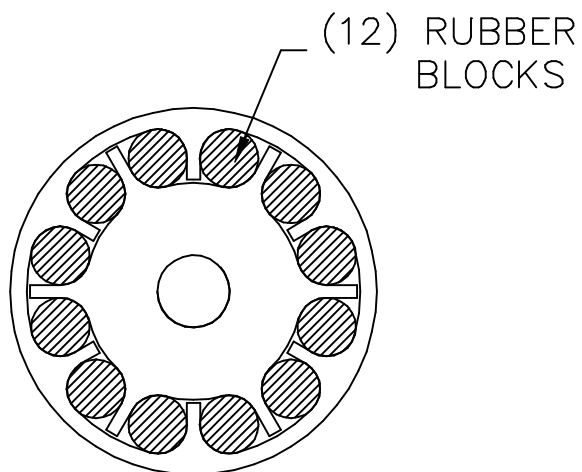
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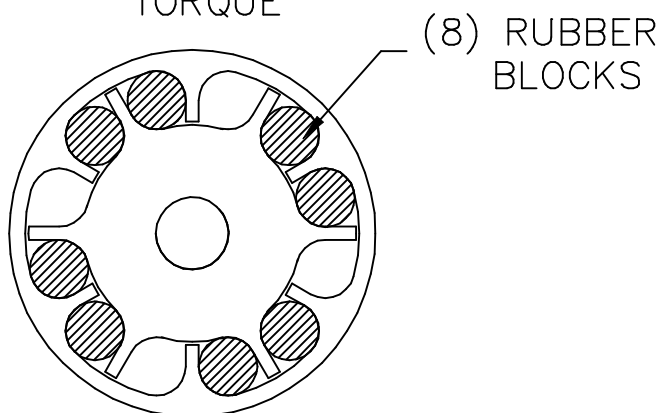
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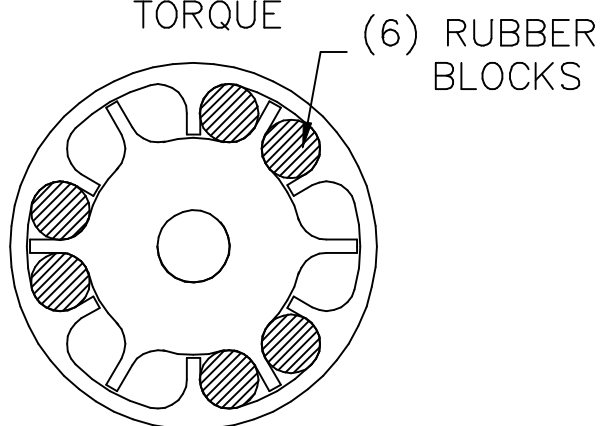
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TORQUE



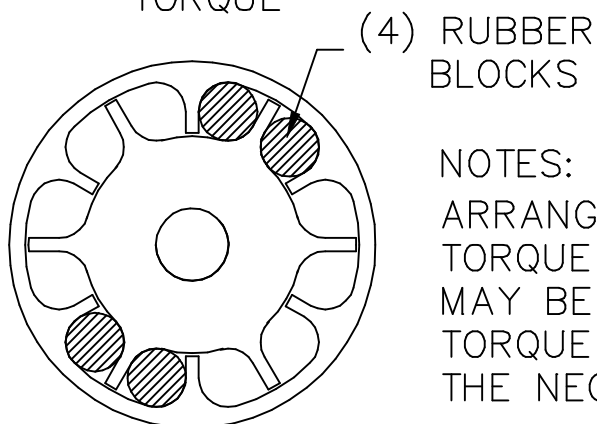
TO 2,500 LB. FT.
TORQUE



TO 1,600 LB. FT.
TORQUE



1,250 LB. FT.
TORQUE



TO 800 LB. FT.
TORQUE

NOTES:

ARRANGEMENTS SHOWN ARE FOR MAX.
TORQUE CAPABILITY. SOME SMALLER ENGINES
MAY BE RUN WITH ONE OF THE HIGHER
TORQUE ARRANGEMENTS THERE BY REMOVING
THE NECESSITY TO REMOVE BLOCKS.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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RESP ENG

MFG ENG

QUAL ENG

POWER TEST INC.

TORQUE LIMITS
RESILIENT COUPLING

SIZE

DWG. NO.

25035

REV.

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SCALE 1/8

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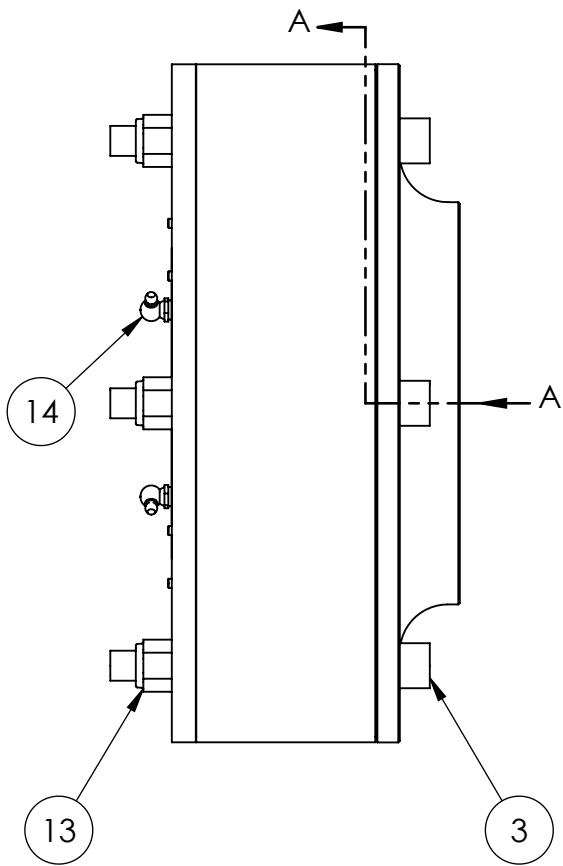
SHEET 1 OF 1

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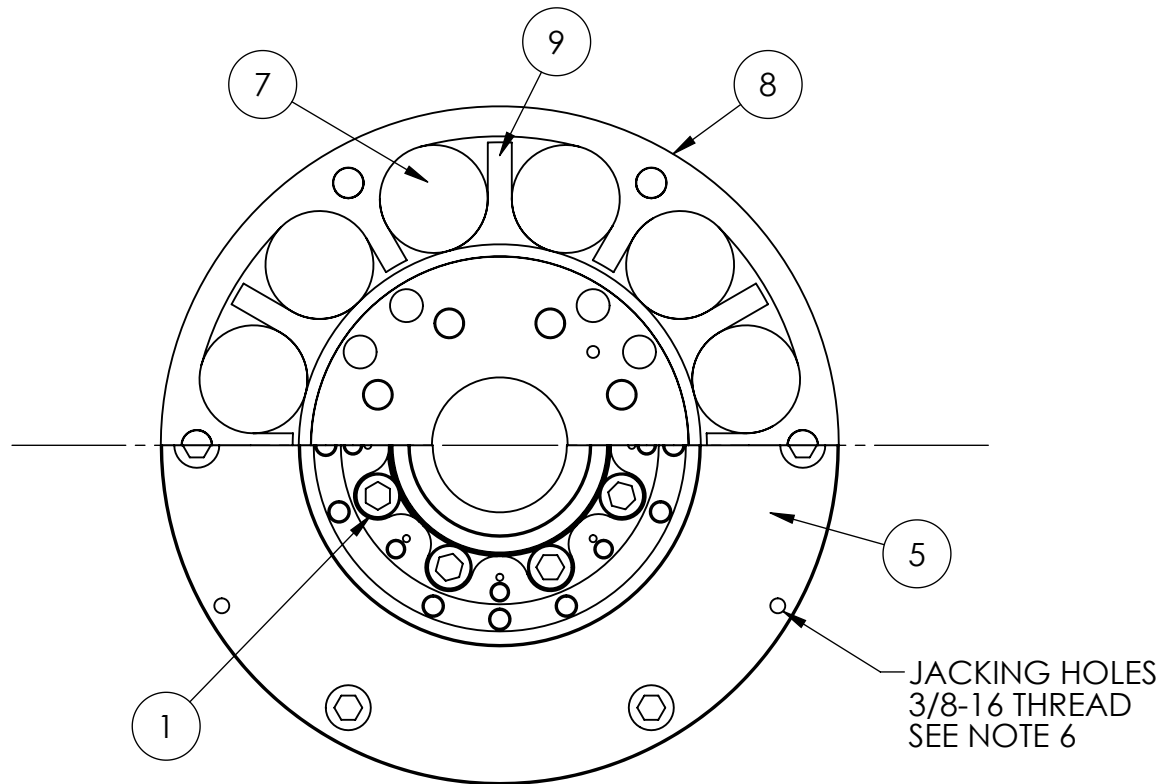
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A



2



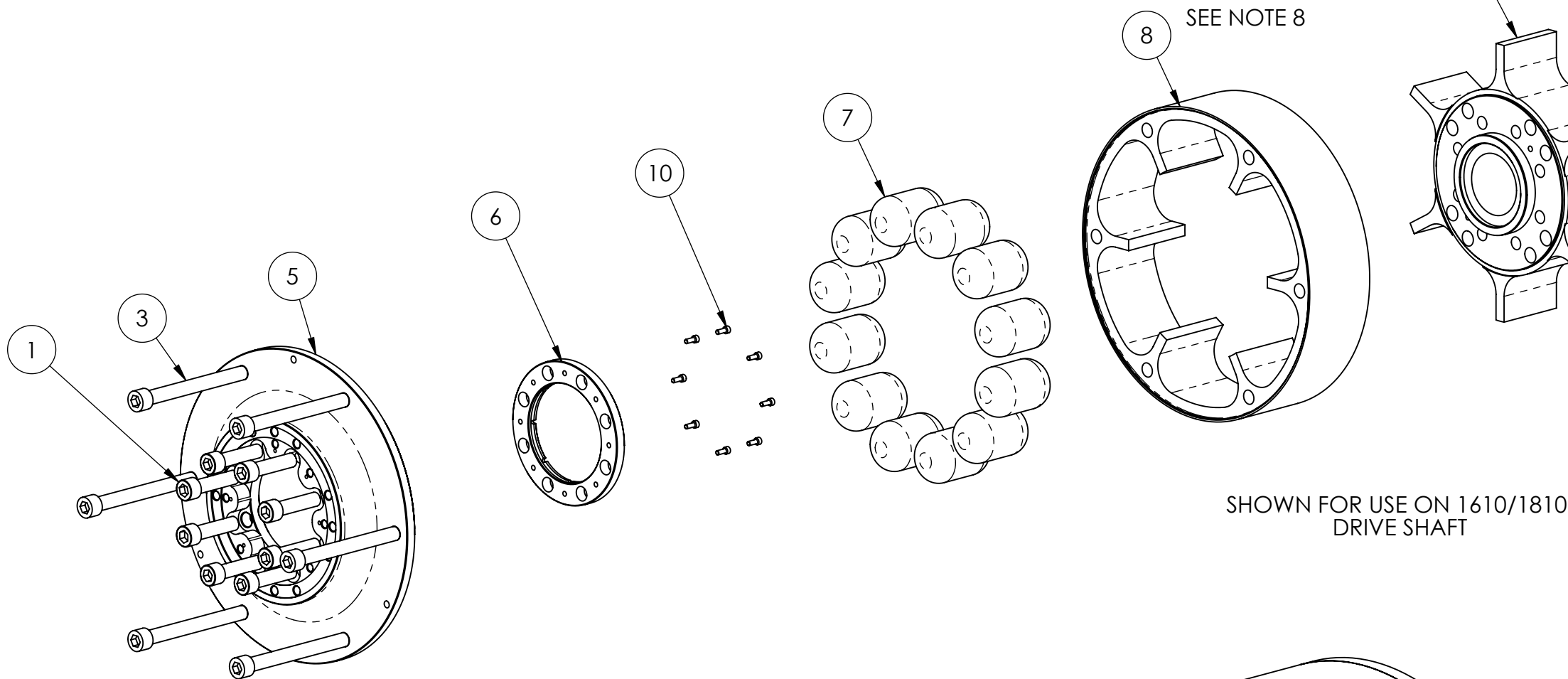
SECTION A-A
SCALE 1 : 4

3

ITEM	QTY.	PART NUMBER	TORQUE FT-LBS.	DESCRIPTION
1	8	H-0522	220	SOC HD CAP SCR 5/8-18 X 2 1/2
2	8	H-0521		SOC HD CAP SCR 3/4-16 X 2 1/2
3	6	1005112	220	SOC HD CAP SCR 5/8-11 X 6
4	1	63087		TORSIONAL COUPLING FRONT PLT 1910 STYLE
5	1	63114		DRIVE PLATE RESILIENT CPLG 1610/1810
6	1	43016		WEAR RING - SMALL
7	12	23025.70		RESILIENT BLOCK 70 DURO
8	1	63014		OUTER HOUSING - RESILIENT COUPLING
9	1	63086		HUB - RESILIENT COUPLING 25X/35X/50X
10	16	H-001		SOC HD CAP SCR 10-24 X 1/2
11	1	43017		WEAR RING - LARGE
12	1	43015		END PLATE - RES CPLG
13	6	H-024		HEX NUT 5/8-11 NYLOK
14	4	H-047		GREASE FITTING ZERK 1/8NPTM X 90°

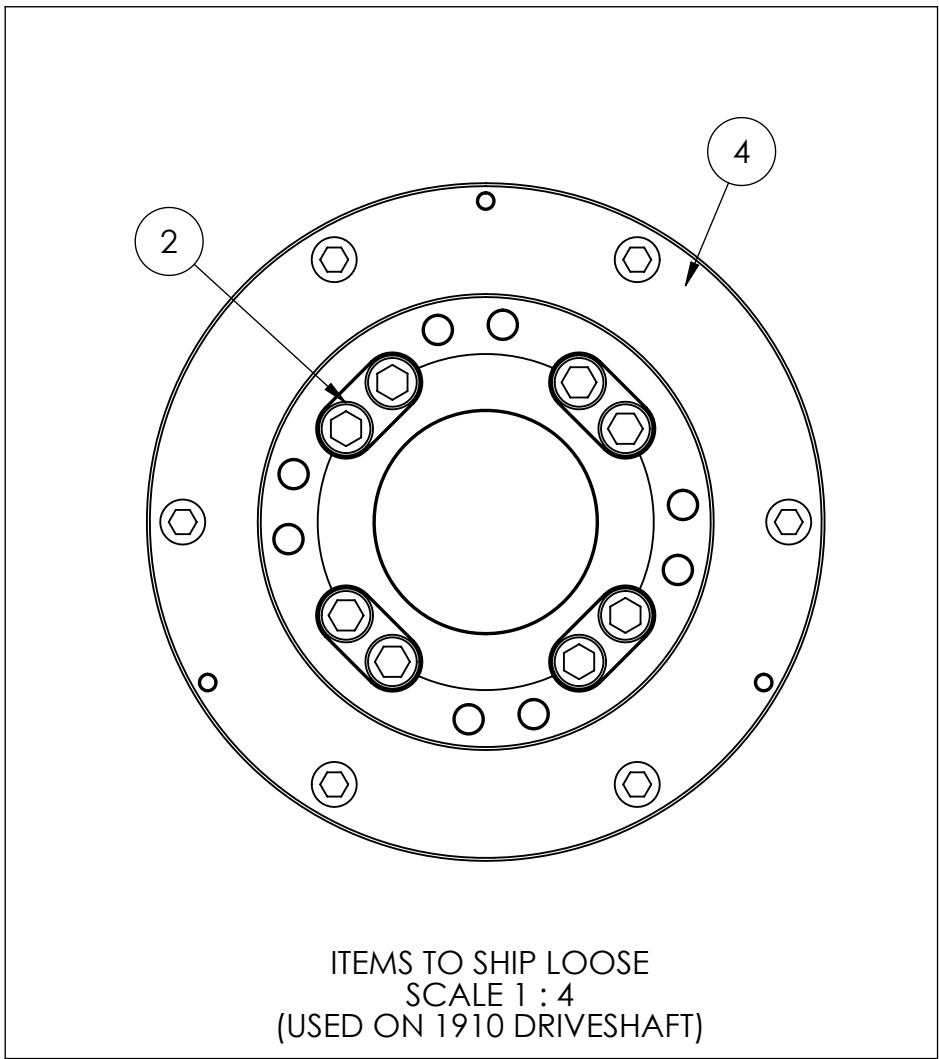
A

B



SHOWN FOR USE ON 1610/1810
DRIVE SHAFT

C



ITEMS TO SHIP LOOSE
SCALE 1 : 4
(USED ON 1910 DRIVESHAFT)

B

D

- NOTE:
- SHIP PARTS 63087 AND H-0521 LOOSE
 - ASSEMBLY 1023317.01 IS USED WITH 1910 DRIVE SHAFT
ASSEMBLY 1023317.02 IS USED WITH 1610/1810 DRIVE SHAFT
ASSEMBLY 1023317.03 IS USED WITH 1610/1810/1910 DRIVE SHAFT
 - ASSEMBLY 1023317.03 CAN BE OPERATED WITHOUT LOCK-UP BOLTS (H-0522 OR H-0521) WITH A MAXIMUM INPUT TORQUE OF 2500FT. LBS. AND BE TORSIONALLY DAMPENED
 - TO OPERATE ABOVE 2500FT. LBS. OF INPUT TORQUE PARTS H-0522 & H-0521 MUST BE INSTALLED AND PROPERLY TORQUED
 - FAILURE TO OPERATE THE COUPLING PER THE ABOVE DIRECTIONS MAY CAUSE UNNECESSARY WEAR OR DESTRUCTION
 - TO REMOVE DRIVE PLATE (63114 OR 63087) REMOVE THRU BOLTS (1005112) AND LOCK-UP BOLTS (H-0522 OR H-0521) THEN INSTALL 3/8-16 BOLTS INTO JACKING HOLES
 - MOMENT OF INERTIA 27.397 LB FT² W/ 63114 (1610/1810)
MOMENT OF INERTIA 27.739 LB FT² W/ 63087 (1910)
 - APPLY GREASE TO MAINTAINING SURFACES FOR EASE OF ASSEMBLY (63014)

SCALE 1 : 4

C

ECO DESCRIPTION:

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DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
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DESIGNED BAS 03/17/2016

DATE

DETAILED BAS 03/18/2016

REVIEWED ALS 03/18/2016

APPROVED BLS 03/21/2016

SCALE: 1:6 SHEET 1 OF 1

DATE

ECO

MATERIAL SEE BOM

WEIGHT 159.807

PowerTest
(262) 252-4301 www.pwrlst.com
N60 W22700 Silver Spring Dr. Sussex, WI 53089 USA

RESILIENT COUPLING 35X
- 1610/1810/1910

SIZE PART NO. 1023317.03 REV. 0

D

1

2

3

4



Engine / After Cooler Cooling Column

Original Instructions www.powertestdyno.com

Please keep this manual for future reference.

This manual is intended to assist operating personnel in becoming familiar with the product and as guidance in ordering necessary parts inclusive of Power Test's warranty requirements. Maximum operating efficiency and life of any Power Test product will be attained through complete understanding of the instructions and recommendations contained within this manual.

WARNING
Services performed beyond preventive maintenance by personnel other than Power Test Service Technicians on any Power Test products during the warranty period may void the warranty.

IMPORTANT
When available, please include the model number and serial number of the product in any correspondence.

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1.0 Safety Guidelines

Safety is the most important consideration when operating any dynamometer system. Operators and service personnel should read this manual and become familiar with its content before attempting to operate this machine or to perform service or maintenance to it. Familiarization with this manual will minimize the possibility of accidents or injuries. Although the procedures covered in this manual have proven safe in use, Power Test assumes no responsibility for personal injury or damage to equipment resulting from its applications. All operators must be aware that there are several hazards present to anyone in the test cell. Some of these hazards are:

- Objects rotating at high speeds
- Electrical shock
- Noise
- Pressurized hoses
- Flammable liquids
- Hot solids or liquids
- Exhaust emissions

Certain precautions must be exercised. They are:

- DO NOT operate without ALL shields, guards, and emergency cutoffs in place and operating.
- DO NOT enter the test cell during an engine test unless necessary.
- DO NOT wear loose fitting clothing in the test cell.
- Warning decals are located near areas of potential danger. Replace damaged or lost decals.
- DO NOT make any connections while power is applied to the system.
- DO NOT open any panels while power is applied to the system.
- DO NOT make any plumbing connections without shutting down all water supplies and pumps.
- DO bleed air pressure from all lines before connecting or disconnecting any air hoses.
- ALWAYS wear eye protection.
- ALWAYS wear eye and hearing protection whenever the engine is operating.
- ALWAYS keep work area clean. If a spill occurs, eliminate the hazard immediately.
- NO smoking or open flame in the test area.

These are general guidelines for working with a dynamometer system. It is often helpful to prepare a safety checklist that is distributed to all personnel who enter the test cell. Proper safety is achieved through reinforcement and discipline.

This manual places safety concerns into four categories, they are:

 DANGER This is the highest level statement. Failure to follow the listed instructions will most likely result in severe injury or death.	 CAUTION The statements used with this level of warning deal with a safe operating procedure. If they are ignored the possibility of equipment damage or personal injury may exist.
 WARNING This is a statement of serious hazard. Failure to follow the listed instructions could place the individual at risk of serious injury or death.	IMPORTANT IMPORTANT indicates precautions relating to operation or usage of the machine or highlights important information on a page.

1.0 Safety Guidelines

The following universal warning decals can be found in the appropriate locations on your equipment. A description of each warning decal is provided below. In addition, these symbols will appear throughout the manual in sections where these hazards may be encountered.



Refer to Manual

- Read and understand manual before operation.
- Failure to understand manual may result in personal injury and/or death.



Warning

- General warning label.
- Indicates an imminent hazard.



Tip Over Hazard

- High center of gravity.



Burn Hazard

- Hot components, water and/or oil.
- Do not touch during operation or while cooling.
- Allow to cool before touching, disconnecting, or servicing.

Contact Power Test if you have any questions about the safe operations of our equipment and for service and advice.

1.0 Safety Guidelines

1.1 At Installation



⚠ WARNING

TIP OVER HAZARD.
The Cooling Column has a high center of gravity. Exercise caution when assembling or moving. Do NOT attempt to move when full or with engine coolant hoses connected.

1.2 During Operation



⚠ WARNING

BURN HAZARD.

- Input and output hoses contain hot liquids and may be under pressure. Hoses may disconnect and/or spray hot fluids if improperly connected or worn.
- During operation temperatures can reach over 125° F. Do NOT touch discharge water or piping during operation. Allow to cool before servicing.

⚠ WARNING

- Prior to each use, check each hose carefully to ensure they have not become cracked, torn, or show other signs of wear. Replace as necessary.
- Only qualified operators and maintenance personnel should perform the procedures covered in this manual.



⚠ WARNING

WEAR EYE and HEARING PROTECTION.
Proper eye and hearing protection should be worn at all times when the engine and equipment is operating.

⚠ CAUTION

- Personnel should NOT be in the test cell during operation and observation areas MUST be constructed to protect personnel.
- Personnel and other equipment should be kept clear of the drive shaft guard area and NEVER cause an obstruction or block doorways.

1.0 Safety Guidelines

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2.0 Equipment Specifications

2.1 Overview

A cooling column acts as a means by which the temperature of an engine can be regulated in a confined testing area, without a fragile radiator and dangerous fan, while simulating the engine cooling system's operating characteristics.

2.2 Cooling Column

- ❶ Sight Glass and Gas Collector (Engine cooling column only)
- ❷ Temperature Gauge - Coolant from Engine
- ❸ Pressure Gauge
- ❹ Temperature Gauge - Coolant to Engine
- ❺ Drain Valve
- ❻ Air or Exhaust Gas Bleed Valve
- ❼ Pressure Regulator Valve
- ❽ Pressure Adjustment
- ❾ Caster(s)
- ❿ Cooling Column
- ⓫ Coolant Input from Engine
- ⓬ Temperature Control Valve
- ⓭ Temperature Sending Unit
- ⓮ Coolant Return to Engine
- ⓯ Fill Valve
- ⓰ Hot Water Discharge - to Drain
- ⓱ Cold Water Supply Inlet

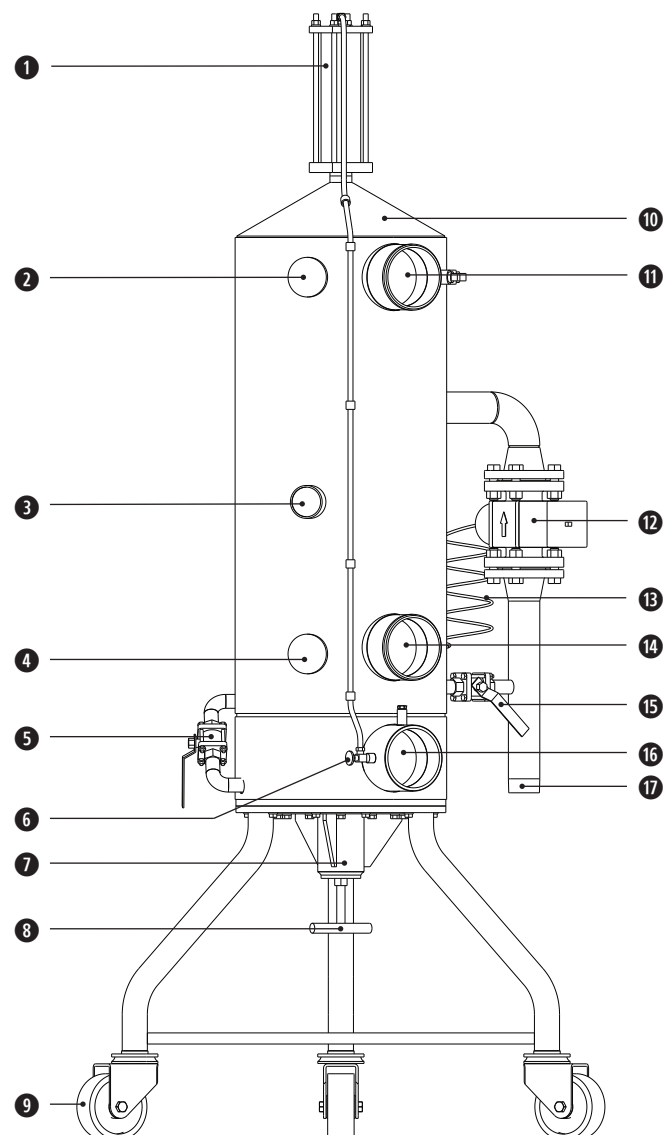


Figure 2.1: Cooling Column Overview

2.0 Equipment Specifications

2.3 Requirements

- Water Requirements: Clean, clear water at least 60psi and less than 85° F (38° C)
6gpm/100HP (ex. a 500HP engine requires 30gpm)

2.4 Specifications

Refer to Table 2.1 below or to the engineering print specific to the actual model included with your system for the exact weights and dimensions.

Cooling Columns				
Description	Model	Specifications		
1,400HP Engine Cooling Column	63591	Max Temp.	Max Press*	Height
		230° F	15 PSI	85"
		Fill Connection	Drain Connection	Engine Connection
		1 1/2" NPT	4" NPT	4" NPT
2,100HP Engine Cooling Column	63590	Max Temp.	Max Press*	Height
		230° F	15 PSI	85"
		Fill Connection	Drain Connection	Engine Connection
		2" NPT	4" NPT	4" NPT
3,150HP Engine Cooling Column	63565	Max Temp.	Max Press*	Height
		230° F	15 PSI	85"
		Fill Connection	Drain Connection	Engine Connection
		2" NPT	4" NPT	4" NPT
4,500HP Engine Cooling Column	63564	Max Temp.	Max Press*	Height
		230° F	15 PSI	85"
		Fill Connection	Drain Connection	Engine Connection
		3" NPT	4" NPT	4" NPT
4,500HP After Cooler Cooling Column	63585	Max Temp.	Max Press*	Height
		135° F	15 PSI	85"
		Fill Connection	Drain Connection	Engine Connection
		2" NPT	4" NPT	4" NPT

Table 2.1: Cooling Column Specifications

*Cooling columns designed for CE compliance are designed to be pressure limited to 7.25psi (0.5 BAR) and are therefore not subject to the compliance of the EC Pressure Directive (PED)97/23/EC.

3.0 Assembly and Installation

3.1 Assembly Instructions



⚠ WARNING

TIP OVER HAZARD.
The Cooling Column has a high center of gravity. Exercise caution when assembling or moving. Do NOT attempt to move when full or with engine coolant hoses connected.

1. Install the casters to the legs of the cooling column using the provided hardware.
2. Assemble the sight glass / gas collector and gas bleed line as shown in Figure 3.1. Thread the bleed line through the eyelets on the cooling column.

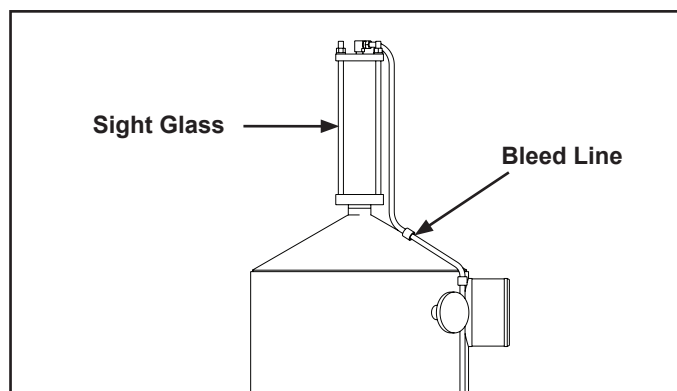


Figure 3.1: Sight Glass and Bleed Line

3.2 Connecting the Engine Cooling Column to the Engine

It is recommended to only use high-quality, wire-reinforced hoses rated for high temperature and pressure.

1. At the engine side, connect the cooling hoses with the appropriate hardware.
2. Use pipe thread sealant to connect the appropriate hose adapters (optional equipment) to the cooling column.
3. Connect the cooling hoses from the engine to the positions indicated in Figure 2.1 using the appropriate hardware.

3.0 Assembly and Installation

3.3 Connecting the Water Supply and Column Discharge

1. Connect the cold water supply to the water supply inlet port as shown in Figure 3.2.

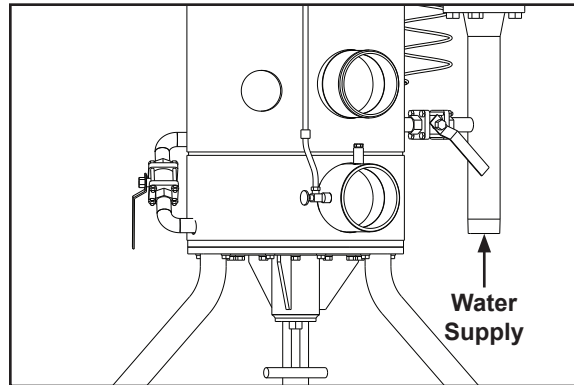


Figure 3.2: Cold Water Supply Inlet Port

2. Connect the column discharge located on the bottom of the column to a hose or other drain connection (not supplied) as shown in Figure 3.3 in order to exhaust the hot water during engine testing. Close the water exhaust drain valve as shown in Figure 3.3.

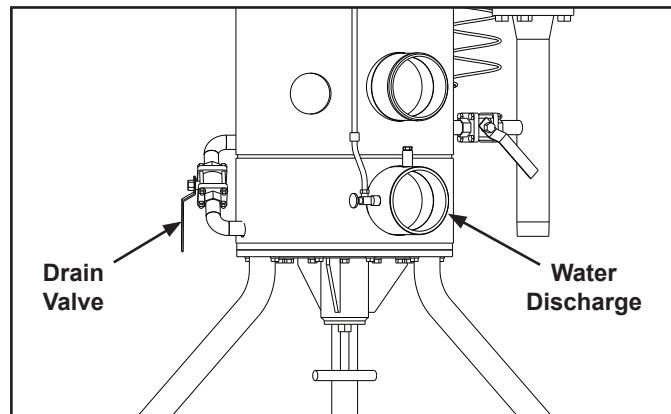


Figure 3.2: Hot Water Discharge and Drain Valve

4.0 Operation

⚠ WARNING



BURN HAZARD.

- Input and output hoses contain hot liquids and may be under pressure. Hoses may disconnect and/or spray hot fluids if improperly connected or worn.
- During operation temperatures can reach over 125° F. Do NOT touch discharge water or piping during operation. Allow to cool before servicing.

⚠ WARNING

- Prior to each use, check each hose carefully to ensure they have not become cracked, torn, or show other signs of wear. Replace as necessary.
- Only qualified operators and maintenance personnel should perform the procedures covered in this manual.

⚠ WARNING



WEAR EYE

and HEARING PROTECTION.

Proper eye and hearing protection should be worn at all times when the engine and equipment is operating.

⚠ CAUTION

- Personnel should NOT be in the test cell during operation and observation areas **MUST** be constructed to protect personnel.
- Personnel and other equipment should be kept clear of the drive shaft guard area and **NEVER** cause an obstruction or block doorways.

4.1 General Operation

Water is circulated through the unobstructed cooling column by the engine's coolant pump. As the water starts to warm, it is sensed by the temperature control valve's sensing unit. When the temperature reaches a preset value, the valve starts to open to allow cold water into the column in order to maintain engine temperature.

IMPORTANT

The Cooling Column is designed to operate with or without the use of the engine thermostat. If the temperature setpoint is set too low and a thermostat is not used, the engine will have difficulty reaching its normal operating temperature range. When used with an engine with a thermostat, the setpoint should be set below the thermostat's rated temperature (20 Deg F below rating recommended).

4.0 Operation

4.2 Filling the Column

Turn ON the cold water supply, turn the fill valve parallel to the water feed pipe to the OPEN position to fill the cooling column and engine. OPEN the air bleed valve located at the column discharge as shown in Figure 3.3. If applicable, OPEN the bleed valve/fittings on the engine connected to the cooling column. CLOSE all bleed valves once a steady stream of water flows out of.

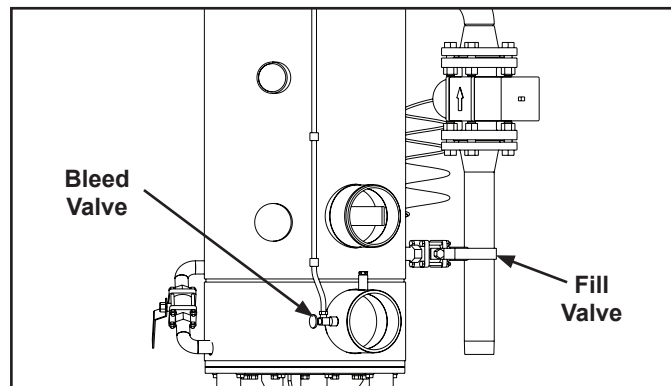


Figure 4.1: Fill Valve and Bleed Valve

IMPORTANT
Engines ran with a thermostat may trap air in the system. After initial start up or after the thermostat opens, the bleed procedure may need to be repeated.

4.0 Operation

4.3 Sight Glass

The sight glass and gas collector shown in Figure 4.2 provides a number of functions. It serves as a visual indicator that the cooling column has been properly filled. Any combustion leaks into the cooling system are collected in the sight glass and the rate of accumulation can be timed. The accumulated gases can be vented through the bleeder valve or left to increase and be discharged with the hot coolant through the riser tube.

IMPORTANT

In order to maintain a constant visible liquid level, leave the bleeder valve slightly open. Closing the valve entirely will force all liquid from the sight glass.

Excessive gas bubbles or the appearance of oil in the sight glass indicates a major engine fault, ie. faulty head gasket or cracked engine block/head.

IMPORTANT

Diesel engines by nature will experience mild combustion leaks. The appearance of bubbles in the sight glass does not necessarily indicate a fault.

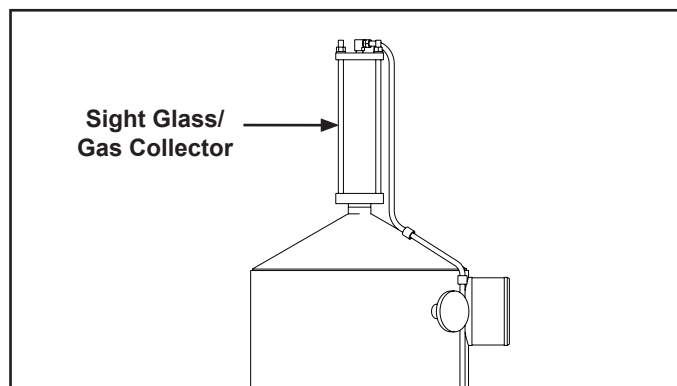


Figure 4.2: Sight Glass and Gas Collector

⚠ CAUTION

If excessive bubbles and/or oil is observed in the sight glass, immediately shut down and inspect the engine to determine the cause of the leak.

4.0 Operation

4.4 Adjusting the Pressure

The cooling column's pressure is adjustable. To adjust the pressure regulating valve, rotate the pressure adjustment wheel and adjust valve to raise or lower pressure as shown in Figure 4.3.

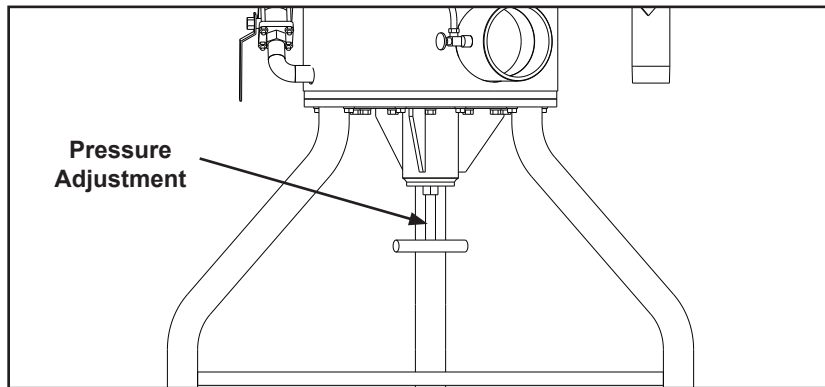


Figure 4.3: Pressure Adjustment

*Cooling columns designed for CE compliance are designed to be pressure limited to 7.25psi (0.5 BAR) and are therefore not subject to the compliance of the EC Pressure Directive (PED)97/23/EC.

IMPORTANT
Open the water inlet valve when making adjustments in order to maintain pressure in the cooling column.

4.0 Operation

4.5 Setting the Temperature

The coolant temperature should be set to the engine manufacturer's recommended operating temperature on engines that do not have a thermostat. When used with an engine that has a thermostat, the setpoint should be set below the thermostat's rated temperature (20 Deg F below rating recommended). Start with a low setting and adjust as necessary. During normal operation, there should be no need to adjust the temperature control valve. Return coolant temperature may be monitored by using the temperature gauge located on the lower half of the cooling column, shown in Figure 4.4.

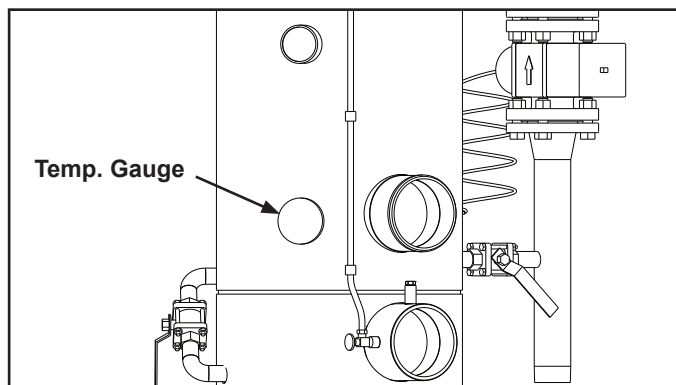


Figure 4.4: Return Coolant Temperature Gauge

⚠ CAUTION

DO NOT operate the cooling column at temperatures above 185° F. Running above 185° F may result in damage to the engine/equipment or injury.

⚠ CAUTION

ALWAYS monitor the engine temperature through the use of an additional gauge. Failure to monitor engine temperature may result in damage or injury.

As necessary, adjustments may be performed using the adjustment knob on the water temperature control valve as shown in Figure 4.5. Turning the knob clockwise lowers the temperature, turning the knob counter-clockwise raises the temperature.

⚠ CAUTION

DO NOT exceed an operating temperature of 185° F. Excessive temperature can result in damage to the engine and personal injury.

IMPORTANT

The Cooling Column is designed to operate with or without the use of the engine thermostat. If the temperature setpoint is set too low and a thermostat is not used, the engine will have difficulty reaching its normal operating temperature range. When used with an engine with a thermostat, the setpoint should be set below the thermostat's rated temperature (20 Deg F below rating recommended).

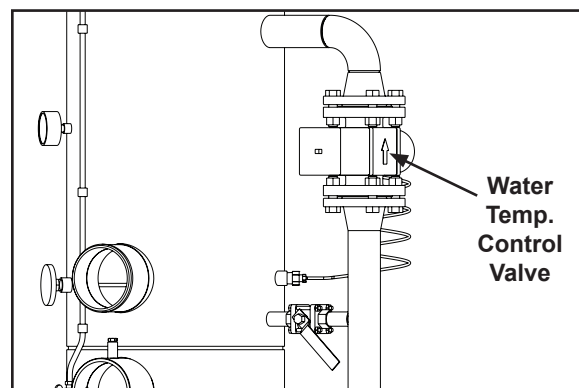


Figure 4.5: Temperature Control Valve

4.0 Operation

4.6 Draining the Cooling Column

Prior to disconnecting the engine from the cooling column it must be drained of all liquid. Once temperature inside of the column has stabilized, turn OFF the coolant supply valve by turning perpendicular to the water pipe to the CLOSED position as shown in Figure 4.6.

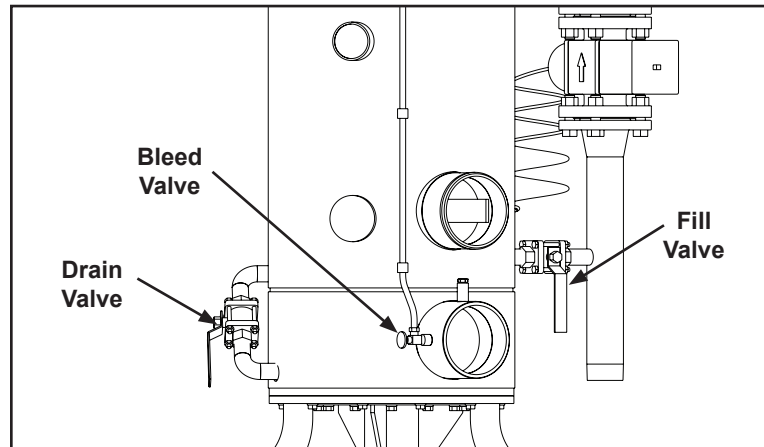


Figure 4.6: Fill and Drain Valves

If not already open, OPEN the bleed valve and OPEN the exhaust drain valve located on the bottom of the cooling column to completely drain the engine and cooling column. Disconnect the coolant hoses from the engine.

WARNING



BURN HAZARD.
Input and output hoses contain hot liquids and may be under pressure. Hoses may disconnect and/or spray hot fluids if improperly connected or worn.

IMPORTANT

In order to avoid unnecessary spillage, be aware of residual water left in the hoses and engine when disconnecting.

5.0 Maintenance

WARNING

- Prior to each use, check each hose carefully to ensure they have not become cracked, torn, or show other signs of wear. Replace as necessary.
- Only qualified operators and maintenance personnel should perform the procedures covered in this manual.

This product is designed to provide years of trouble free service with a minimum amount of regular maintenance. This section describes normal maintenance procedures.

5.1 Routine Maintenance

Sight Glass and Tube

- The frequency of cleaning will depend on the cleanliness of the water jacket of the tested engines.

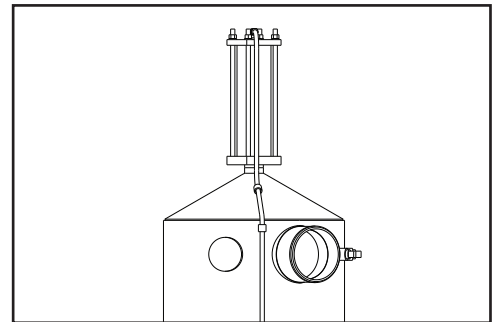


Figure 5.1: Sight Glass and Bleed Line

Temperature Control Valve

- Inspect capillary tube for damage. Replace as necessary.

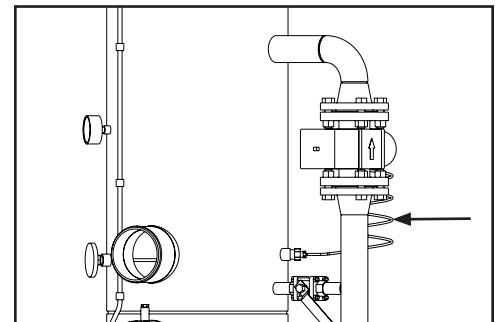


Figure 5.2: Temperature Control Valve

5.0 Maintenance

Cooling Column Gasket

- The frequency of cleaning will depend on the cleanliness of the water jacket of the tested engines. If the column is not holding water or pressure, the gasket may be dirty or worn. Clean and replace if necessary.

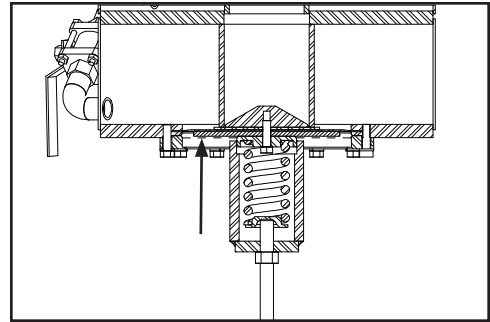


Figure 5.3: Cooling Column Gasket

Casters

- Grease caster axles and swivel bearings monthly with chassis lube.

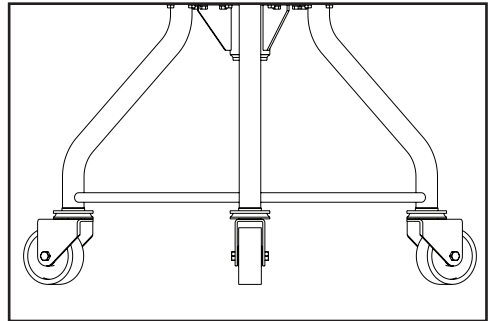


Figure 5.4: Swivel Casters

5.0 Maintenance

5.2 Long-Term Storage Requirements

Purpose

The purpose of Long-Term Storage Requirements is to ensure that equipment manufactured by Power Test do not sustain any damage, degradation or corrosion due to being in a dormant state for extended periods of time. The proper implementation and adherence to these requirements will ensure that when the equipment is started and operated it will be in the intended condition.

⚠ WARNING

Failure to adhere to the Long-Term Storage Requirements will render any written or implied Power Test warranty null and void.

Definition Of Long-Term Storage

In general, equipment manufactured by Power Test that meets any, some, or all of the conditions below should be prepared for Long-Term Storage.

- a. Equipment not “commissioned” within six (6) months of leaving the Power Test factory.
NOTE: In the event that equipment has a planned commissioning delay, Power Test will prepare equipment for long-term storage before leaving the factory.
- b. Equipment that will not “operate” for three (3) months or more.
NOTE: “Operate” is defined as useful testing and/or operation.

Condition a. is based upon the unit being stored indoors in a dry, non-corrosive environment. Special provisions may be necessary for environmental conditions outside these parameters. Please contact Power Test for further instructions if storage is subject to non-standard environmental changes/conditions.

NOTE: Outdoor storage is not recommended and will void product warranty.

Long-Term Storage Preparations

Engine / After Cooler Cooling Column

- Turn OFF water supply and remove the water inlet line from cooling column.
- Remove all cooling column port hoses, open ball valves and reduce pressure adjustment to zero (0) as illustrated in Figure 5.6.
- Protect all external exposed, machined, unpainted surfaces with Cosmoline or similar type of protective coating. This procedure should be repeated as often as necessary during storage to prevent oxidation.

These steps are done to insure water does not enter cooling column during storage and the internal components are allowed to dry to prevent oxidation.

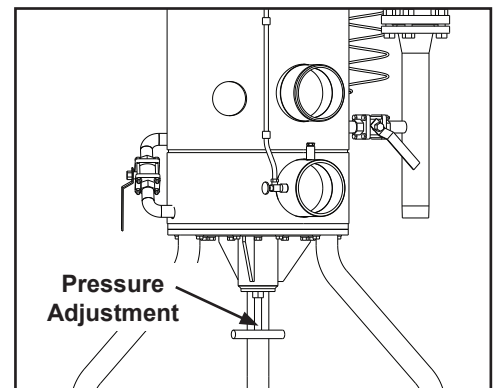


Figure 5.6: Pressure Adjustment

6.0 Troubleshooting

This section outlines basic procedures to follow if the component or instruments do not function properly, if any occur.

6.1 Cooling Column

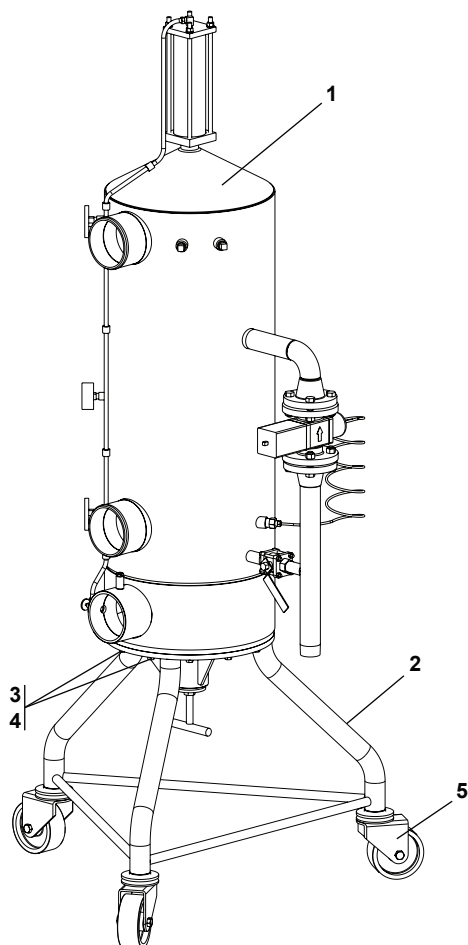
Troubleshooting Guide: Electric Motor		
Symptom	Probable Cause	Corrective Action
Water Leakage.	Input/Output connections not secure.	Inspect and reattach adapters and hoses as necessary.
Engine Runs too Cold.	Temperature control valve set too low.	Inspect and adjust as necessary.
Engine Runs too Hot.	Temperature control valve set too low (engine without thermostat).	Inspect and adjust as necessary.
	Temperature control valve improperly set (engine with thermostat).	Inspect and adjust as necessary. When used with an engine with a thermostat, the setpoint should be set below the thermostats rated temperature (20 Deg F below rating recommended).
	Temperature valve capillary tube broke.	Replace if broken.
Engine Temperatures Surging.	Temperature control valve improperly set (engine with thermostat).	Inspect and adjust as necessary. When used with an engine with a thermostat, the setpoint should be set below the thermostats rated temperature (20 Deg F below rating recommended).
Cooling Column does not Hold Water/Pressure too Low.	Cooling column base gasket dirty/worn.	Inspect gasket and clean/replace if necessary.

6.2 Gauges

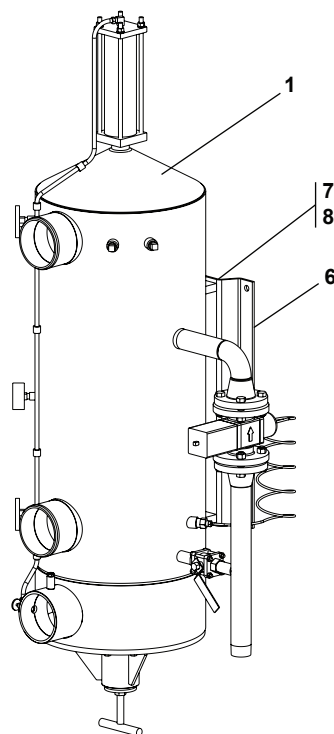
Troubleshooting Guide: Pressure Gauges		
Symptom	Probable Cause	Corrective Action
Gauge not Reading Correct Temperature.	The gauge should be checked against an accurate gauge or dead weight gauge tester.	Replace or repair as necessary.
	Temperature sending unit/capillary tube damaged.	Replace as necessary.
Gauge Will not Return to Zero.	If the gauge is over pressurized or stuck, it should be checked against an accurate test gauge.	Replace or repair if it is found to be defective.

7.0 Replacement Parts

7.1 1,400 HP Cooling Column - 63591._



ASSEMBLY: 63591.1
(INCLUDES LEG ASM. & CASTERS)



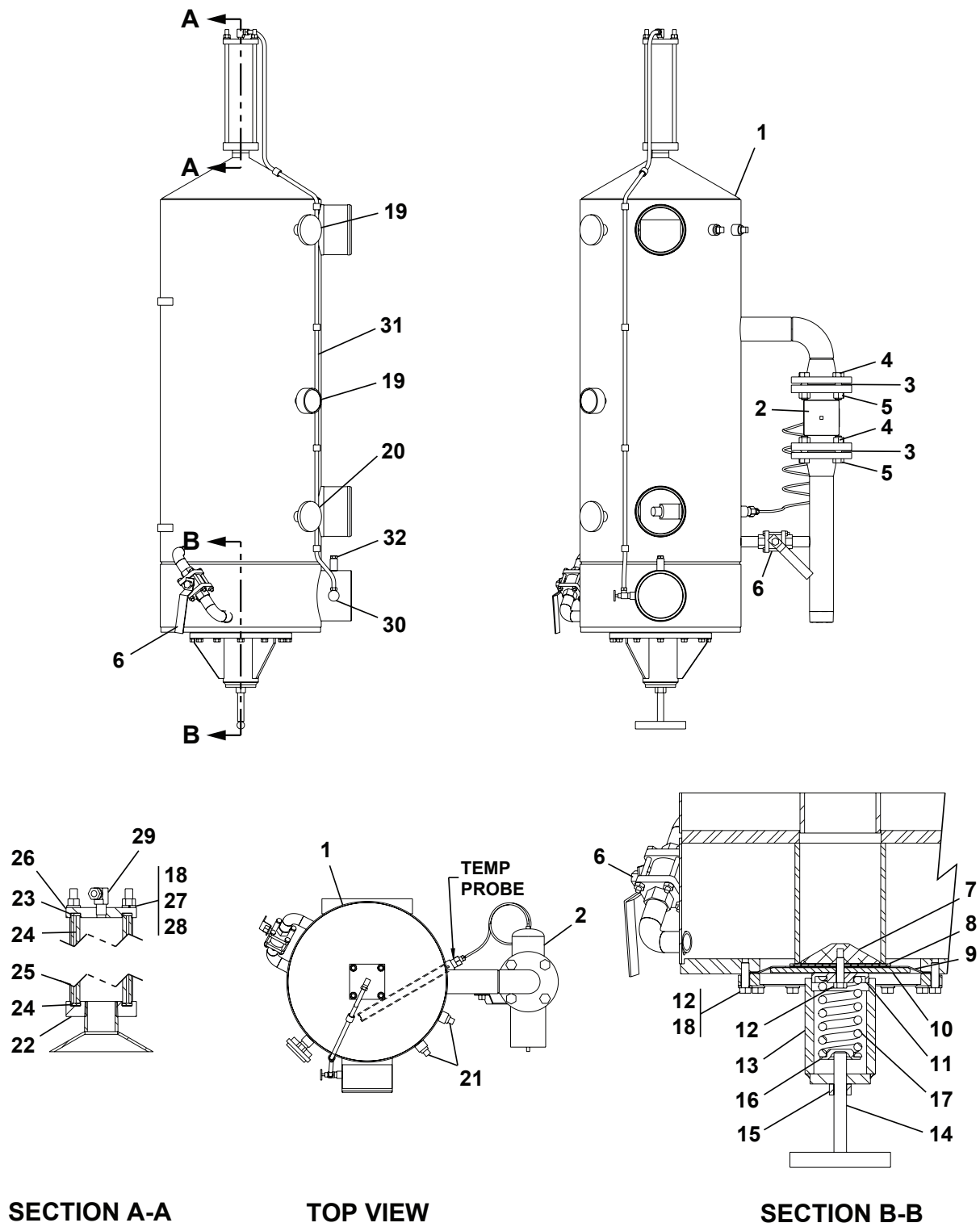
ASSEMBLY: 63591.2
(INCLUDES WALL MOUNT BRACKET)

ITEM #	QTY PER ASM NO.		DESCRIPTION	PART NUMBER
	63591.1	63591.2		
1	1	1	COOLING COLUMN BODY ASM 1.5JC VALVE (4NPT)	63589._
2	1	0	LEG WELDMENT-COOLING COLUMN	63525
3	12	0	HEX HD CAP SCR 3/8-16 X 1 GD5	H-009
4	12	0	LOCK WASHER 3/8 ZINC	H-029
5	3	0	CASTER-SWIVEL 5 X 2 POLY w1x4 POST 500LB	14594
6	0	1	WALL MOUNTING PLATE - COOLING COLUMN	44221
7	0	4	LOCK WASHER 1/2 ZINC	H-028
8	0	4	HEX HD CAP SCR 1/2-13 X 1 GD5	H-0345

NOTE: Complete item 1 part number by adding the last digit of the assembly number to the blank.
Example: For assembly number 63591.1, item 1 part number would be 63589.1

7.0 Replacement Parts

1,400 HP Cooling Column Body Assembly



7.0 Replacement Parts

1,400 HP Cooling Column Body Assembly Parts List

ITEM #	QTY PER ASM NO.		DESCRIPTION	PART NUMBER
	63591.1	63591.2		
1	1	1	COOLING COLUMN BODY WELD 2K/3K/4K (4NPT)	63561.____
2	1	1	TEMP CONT VALVE 2 FLANGE 160°-230°F	11044
3	2	2	FLANGE GASKET 1 1/2 - 1/16 FIBER (RING)	23024
4	8	8	HEX HD CAP SCR 1/2-13 X 2 GD5	H-035
5	8	8	HEX NUT 1/2-13 GD5 ZINC	H-017
6	2	2	BALL VALVE 3/4 SOC WELD - 3-PIECE	11143
7	1	1	METERING PLATE COOLING COLUMN	23016
8	1	1	COOLING COLUMN GASKET	23017
9	1	1	DIAPHRAGM - COOLING COLUMN	23138
10	1	1	BACKUP PLATE	23325
11	1	1	UPPER SPRING GUIDE	23174
12	13	13	HEX HD CAP SCR 3/8-16 X 1 1/4 GD5 ZINC	H-010
13	1	1	SPRING CASE - COOLING COLUMN	43281
14	1	1	ADJUSTING HANDLE - COOLING COLUMN	23018
15	1	1	HEX NUT 5/8-11 GD5 ZINC	H-025
16	1	1	SPRING CAP	23172
17	1	1	SPRING - COOLING COLUMN	11038
18	16	16	LOCK WASHER 3/8 ZINC	H-029
19	2	2	THERMOMETER 50-300F COOLING COLUMN	11049
20	1	1	PRESS GAGE 0-30PSI COOLING COLUM	11048
21	2	2	PIPE PLUG 1/2NPT SQ HD	P-122
22	1	1	LOWER PLATE - SIGHT GLASS	23023
23	2	2	SIGHT GLASS GASKET	23020
24	1	1	SIGHT GLASS	11042
25	1	1	SIGHT GLASS GUARD	11041
26	1	1	UPPER PLATE - SIGHT GLASS	23022
27	4	4	STUD, 3/8" X 12" LG.	23050
28	4	4	HEX NUT 3/8-16 GD5 ZINC	H-026
29	1	1	COMP FTG 3/8T X 1/4NPTM 90° (POLY) BRASS	P-105
30	1	1	NEEDLE VALVE 1/4NPT BRASS	P-41
31	1	1	TUBING 1/4 ID X 1/16 W CLEAR VINYL /FT	11079
32	1	1	BREATHER VENT 1/4NPTM SINTERED BRONZE	12797

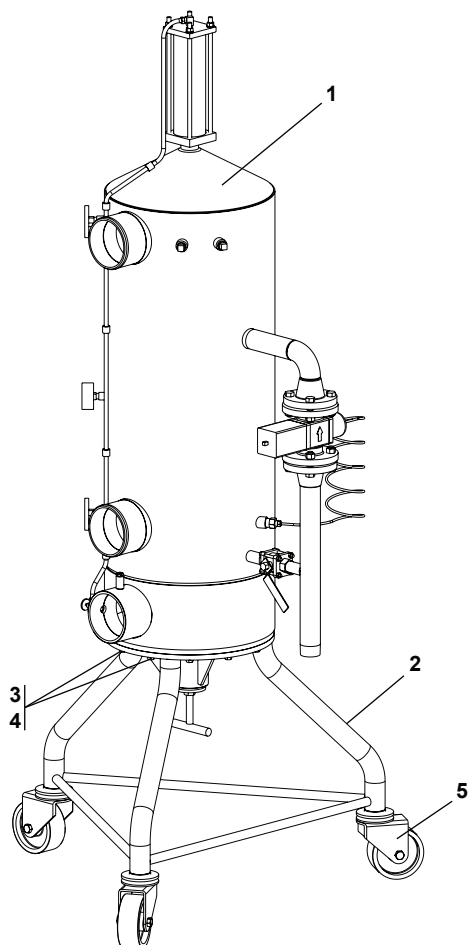
NOTE: Complete item 1 part number by adding the last digit of the assembly number to the blank.
Example: For assembly number 63590.1, item 1 part number would be 63561.1

7.0 Replacement Parts

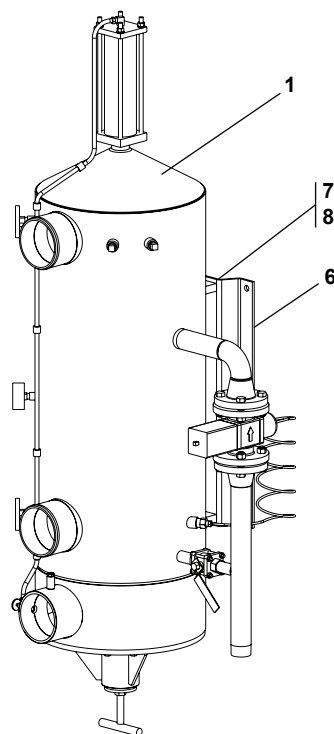
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7.0 Replacement Parts

7.2 2,100 HP Cooling Column - 63590._



ASSEMBLY: 63590.1
(INCLUDES LEG ASM. & CASTERS)



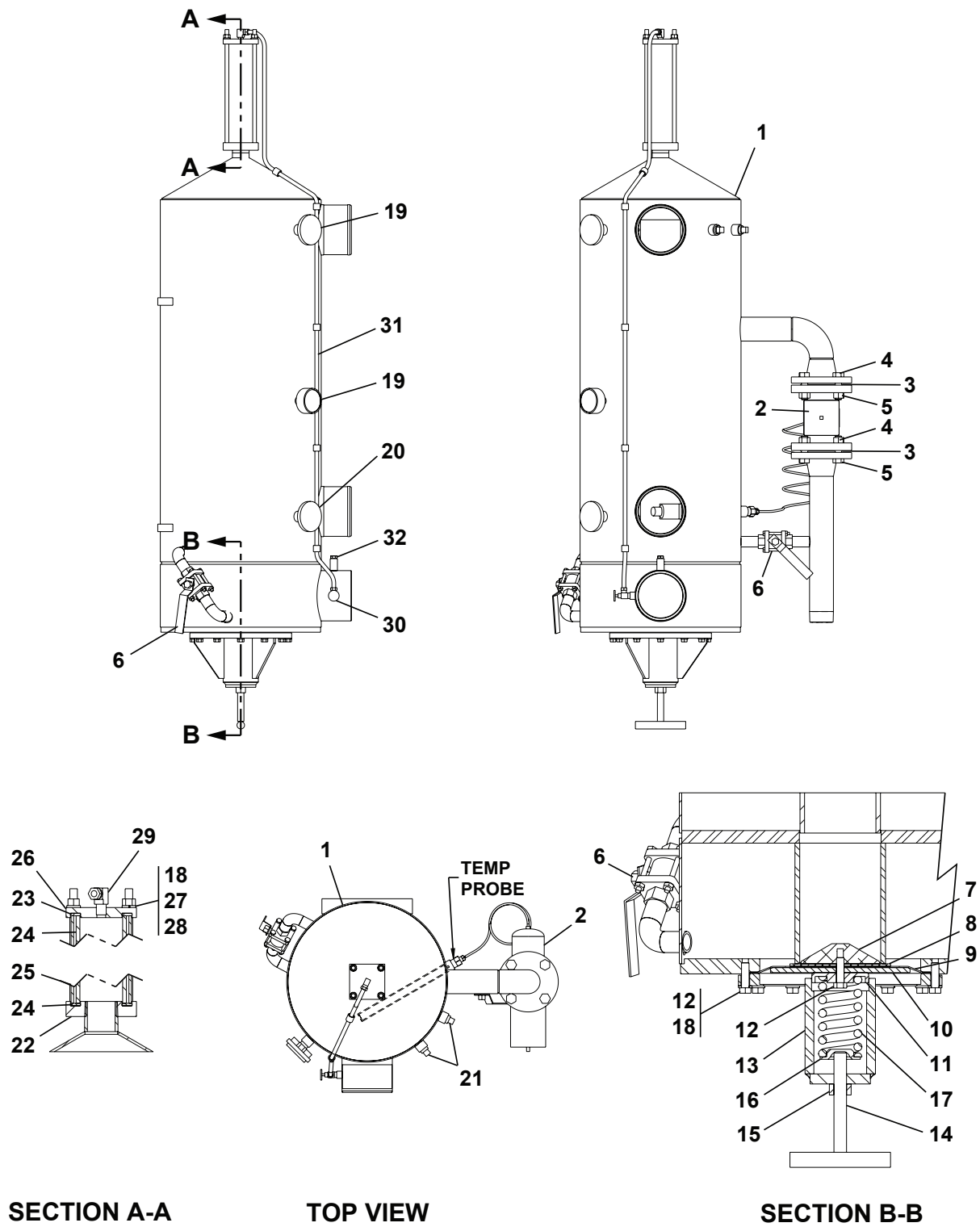
ASSEMBLY: 63590.2
(INCLUDES WALL MOUNT BRACKET)

ITEM #	QTY PER ASM NO.		DESCRIPTION	PART NUMBER
	63590.1	63590.2		
1	1	1	COOLING COLUMN BODY ASM 2JC VALVE (4NPT)	63563._
2	1	0	LEG WELDMENT-COOLING COLUMN	63525
3	12	0	HEX HD CAP SCR 3/8-16 X 1 GD5	H-009
4	12	0	LOCK WASHER 3/8 ZINC	H-029
5	3	0	CASTER-SWIVEL 5 X 2 POLY w1x4 POST 500LB	14594
6	0	1	WALL MOUNTING PLATE - COOLING COLUMN	44221
7	0	4	LOCK WASHER 1/2 ZINC	H-028
8	0	4	HEX HD CAP SCR 1/2-13 X 1 GD5	H-0345

NOTE: Complete item 1 part number by adding the last digit of the assembly number to the blank.
Example: For assembly number 63590.1, item 1 part number would be 63563.1

7.0 Replacement Parts

2,100 HP Cooling Column Body Assembly



7.0 Replacement Parts

2,100 HP Cooling Column Body Assembly Parts List

ITEM #	QTY PER ASM NO.		DESCRIPTION	PART NUMBER
	63590.1	63590.2		
1	1	1	COOLING COLUMN BODY WELD 2K/3K/4K (4NPT)	63561.____
2	1	1	TEMP CONT VALVE 2 FLANGE 160°-205°F	11043
3	2	2	FLANGE GASKET 2 - 1/16 FIBER (RING)	23021
4	8	8	HEX HD CAP SCR 5/8-11 X 2 1/4 GD5	H-019
5	8	8	HEX NUT 5/8-11 GD5 ZINC	H-025
6	2	2	BALL VALVE 3/4 SOC WELD - 3-PIECE	11143
7	1	1	METERING PLATE COOLING COLUMN	23016
8	1	1	COOLING COLUMN GASKET	23017
9	1	1	DIAPHRAGM - COOLING COLUMN	23138
10	1	1	BACKUP PLATE	23325
11	1	1	UPPER SPRING GUIDE	23174
12	13	13	HEX HD CAP SCR 3/8-16 X 1 1/4 GD5 ZINC	H-010
13	1	1	SPRING CASE - COOLING COLUMN	43281
14	1	1	ADJUSTING HANDLE - COOLING COLUMN	23018
15	1	1	HEX NUT 5/8-11 GD5 ZINC	H-025
16	1	1	SPRING CAP	23172
17	1	1	SPRING - COOLING COLUMN	11038
18	16	16	LOCK WASHER 3/8 ZINC	H-029
19	2	2	THERMOMETER 50-300F COOLING COLUMN	11049
20	1	1	PRESS GAGE 0-30PSI COOLING COLUM	11048
21	2	2	PIPE PLUG 1/2NPT SQ HD	P-122
22	1	1	LOWER PLATE - SIGHT GLASS	23023
23	2	2	SIGHT GLASS GASKET	23020
24	1	1	SIGHT GLASS	11042
25	1	1	SIGHT GLASS GUARD	11041
26	1	1	UPPER PLATE - SIGHT GLASS	23022
27	4	4	STUD, 3/8" X 12" LG.	23050
28	4	4	HEX NUT 3/8-16 GD5 ZINC	H-026
29	1	1	COMP FTG 3/8T X 1/4NPTM 90° (POLY) BRASS	P-105
30	1	1	NEEDLE VALVE 1/4NPT BRASS	P-41
31	1	1	TUBING 1/4 ID X 1/16 W CLEAR VINYL /FT	11079
32	1	1	BREATHER VENT 1/4NPTM SINTERED BRONZE	12797

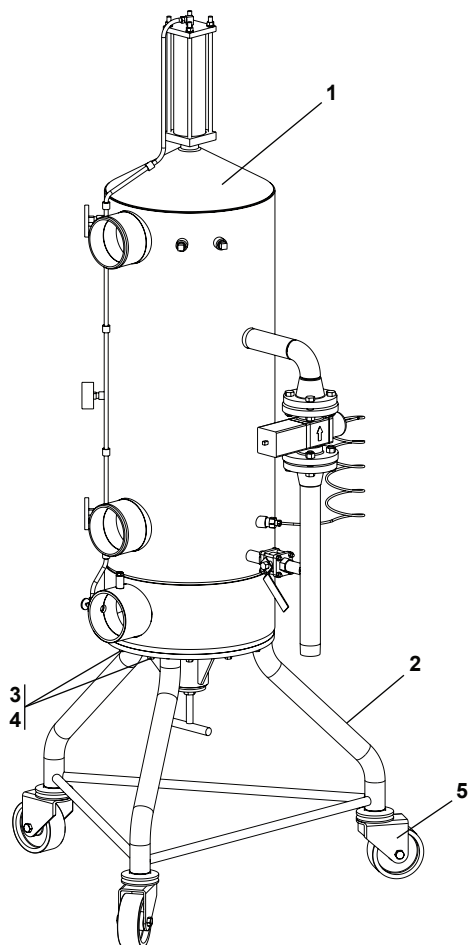
NOTE: Complete item 1 part number by adding the last digit of the assembly number to the blank.
Example: For assembly number 63590.1, item 1 part number would be 63561.1

7.0 Replacement Parts

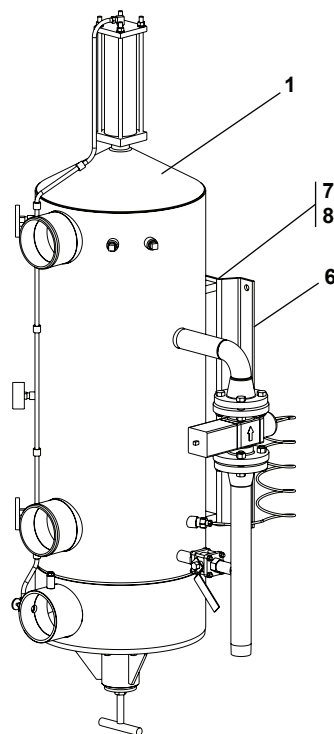
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7.0 Replacement Parts

7.3 3,150 HP Cooling Column - 63565._



ASSEMBLY: 63565.1
(INCLUDES LEG ASM. & CASTERS)



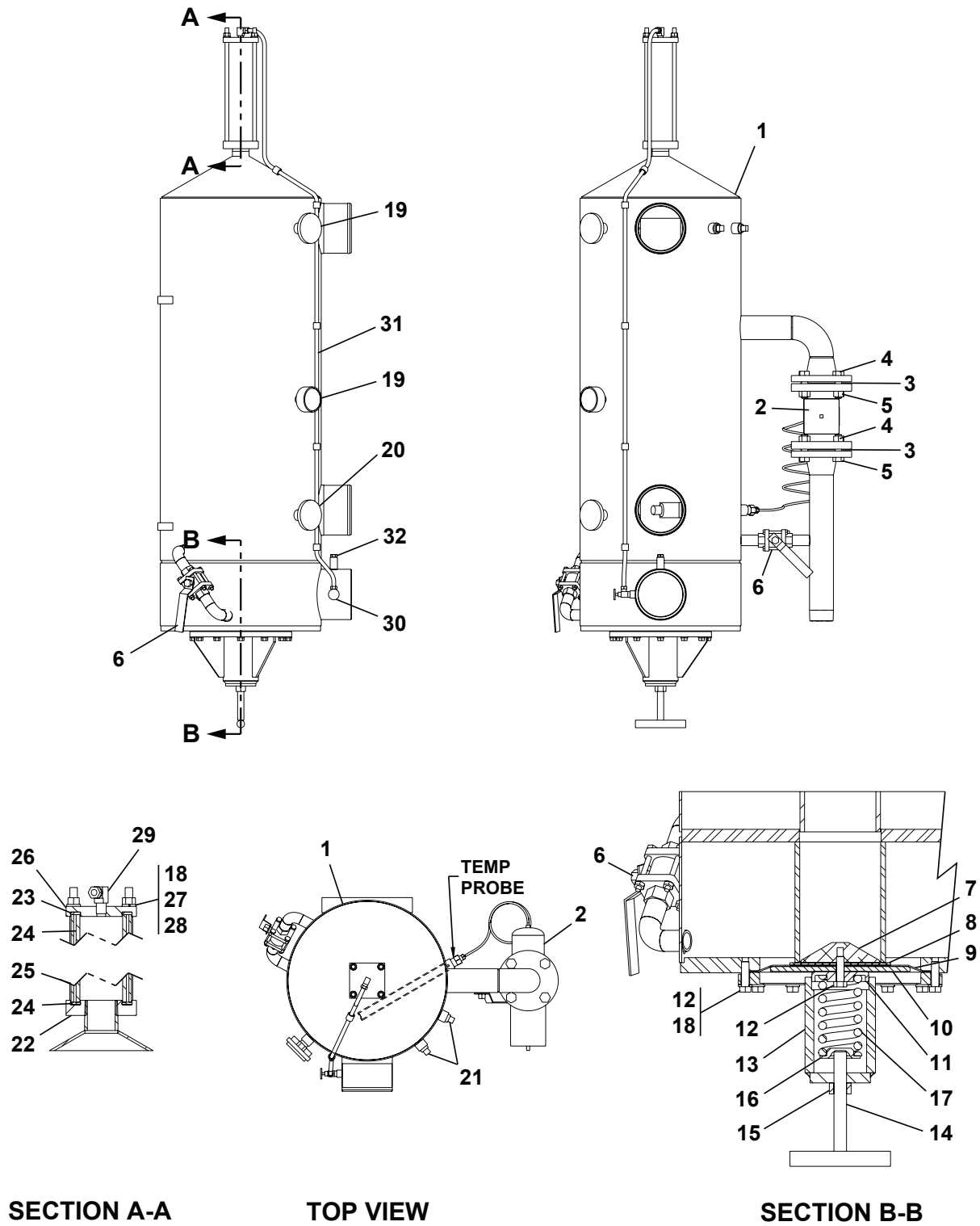
ASSEMBLY: 63565.2
(INCLUDES WALL MOUNT BRACKET)

ITEM #	QTY PER ASM NO.		DESCRIPTION	PART NUMBER
	63565.1	63565.2		
1	1	1	COOLING COLUMN BODY ASM 2JC VALVE (4NPT)	63563._
2	1	0	LEG WELDMENT-COOLING COLUMN	63525
3	12	0	HEX HD CAP SCR 3/8-16 X 1 GD5	H-009
4	12	0	LOCK WASHER 3/8 ZINC	H-029
5	3	0	CASTER-SWIVEL 5 X 2 POLY w1x4 POST 500LB	14594
6	0	1	WALL MOUNTING PLATE - COOLING COLUMN	44221
7	0	4	LOCK WASHER 1/2 ZINC	H-028
8	0	4	HEX HD CAP SCR 1/2-13 X 1 GD5	H-0345

NOTE: Complete item 1 part number by adding the last digit of the assembly number to the blank.
Example: For assembly number 63565.1, item 1 part number would be 63563.1

7.0 Replacement Parts

3,150 HP Cooling Column Body Assembly



7.0 Replacement Parts

3,150 HP Cooling Column Body Assembly Parts List

ITEM #	QTY PER ASM NO.		DESCRIPTION	PART NUMBER
	63565.1	63565.2		
1	1	1	COOLING COLUMN BODY WELD 2K/3K/4K (4NPT)	63561.____
2	1	1	TEMP CONT VALVE 2 FLANGE 160°-205°F	11043
3	2	2	FLANGE GASKET 2 - 1/16 FIBER (RING)	23021
4	8	8	HEX HD CAP SCR 5/8-11 X 2 1/4 GD5	H-019
5	8	8	HEX NUT 5/8-11 GD5 ZINC	H-025
6	2	2	BALL VALVE 3/4 SOC WELD - 3-PIECE	11143
7	1	1	METERING PLATE COOLING COLUMN	23016
8	1	1	COOLING COLUMN GASKET	23017
9	1	1	DIAPHRAGM - COOLING COLUMN	23138
10	1	1	BACKUP PLATE	23325
11	1	1	UPPER SPRING GUIDE	23174
12	13	13	HEX HD CAP SCR 3/8-16 X 1 1/4 GD5 ZINC	H-010
13	1	1	SPRING CASE - COOLING COLUMN	43281
14	1	1	ADJUSTING HANDLE - COOLING COLUMN	23018
15	1	1	HEX NUT 5/8-11 GD5 ZINC	H-025
16	1	1	SPRING CAP	23172
17	1	1	SPRING - COOLING COLUMN	11038
18	16	16	LOCK WASHER 3/8 ZINC	H-029
19	2	2	THERMOMETER 50-300F COOLING COLUMN	11049
20	1	1	PRESS GAGE 0-30PSI COOLING COLUM	11048
21	2	2	PIPE PLUG 1/2NPT SQ HD	P-122
22	1	1	LOWER PLATE - SIGHT GLASS	23023
23	2	2	SIGHT GLASS GASKET	23020
24	1	1	SIGHT GLASS	11042
25	1	1	SIGHT GLASS GUARD	11041
26	1	1	UPPER PLATE - SIGHT GLASS	23022
27	4	4	STUD, 3/8" X 12" LG.	23050
28	4	4	HEX NUT 3/8-16 GD5 ZINC	H-026
29	1	1	COMP FTG 3/8T X 1/4NPTM 90° (POLY) BRASS	P-105
30	1	1	NEEDLE VALVE 1/4NPT BRASS	P-41
31	1	1	TUBING 1/4 ID X 1/16 W CLEAR VINYL /FT	11079
32	1	1	BREATHER VENT 1/4NPTM SINTERED BRONZE	12797

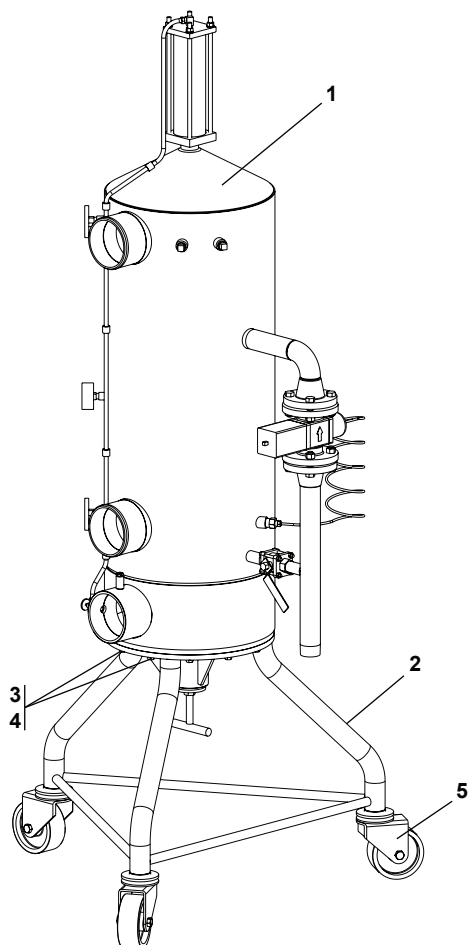
NOTE: Complete item 1 part number by adding the last digit of the assembly number to the blank.
Example: For assembly number 63565.1, item 1 part number would be 63561.1

7.0 Replacement Parts

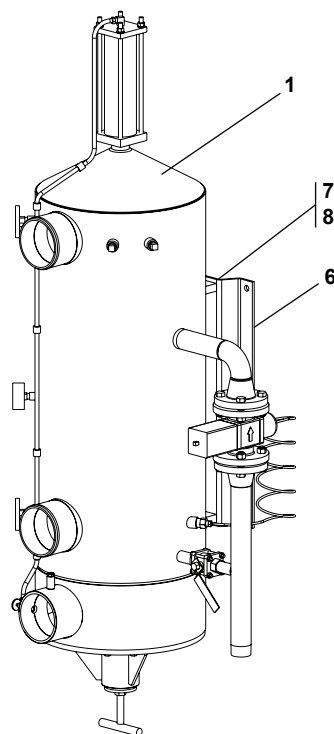
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7.0 Replacement Parts

7.4 4,500 HP Cooling Column - 63564._



ASSEMBLY: 63564.1
(INCLUDES LEG ASM. & CASTERS)



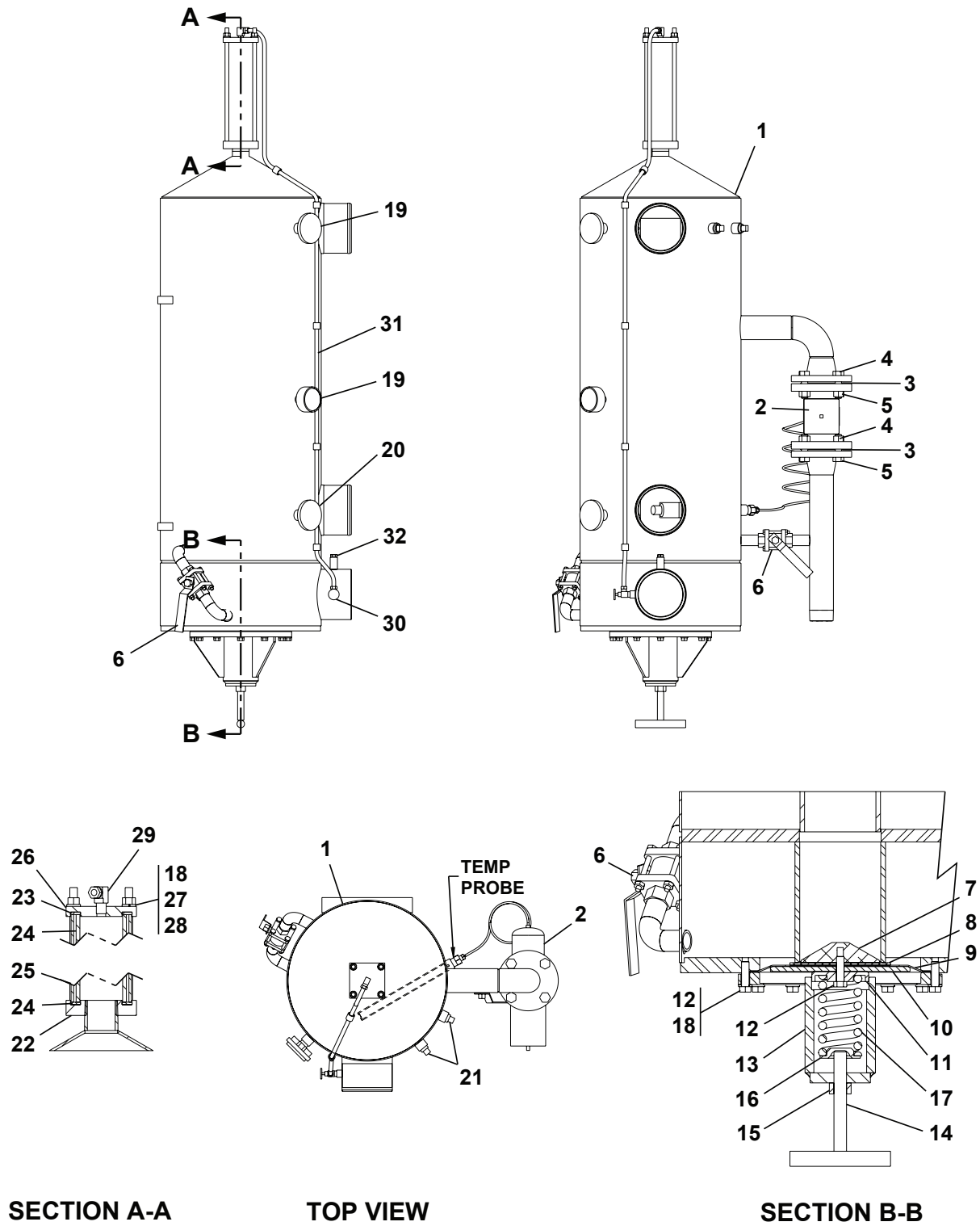
ASSEMBLY: 63564.2
(INCLUDES WALL MOUNT BRACKET)

ITEM #	QTY PER ASM NO.		DESCRIPTION	PART NUMBER
	63564.1	63564.2		
1	1	1	COOLING COLUMN BODY ASM 2.5JC VALVE (4NPT)	63562._
2	1	0	LEG WELDMENT-COOLING COLUMN	63525
3	12	0	HEX HD CAP SCR 3/8-16 X 1 GD5	H-009
4	12	0	LOCK WASHER 3/8 ZINC	H-029
5	3	0	CASTER-SWIVEL 5 X 2 POLY w1x4 POST 500LB	14594
6	0	1	WALL MOUNTING PLATE - COOLING COLUMN	44221
7	0	4	LOCK WASHER 1/2 ZINC	H-028
8	0	4	HEX HD CAP SCR 1/2-13 X 1 GD5	H-0345

NOTE: Complete item 1 part number by adding the last digit of the assembly number to the blank.
Example: For assembly number 63564.1, item 1 part number would be 63562.1

7.0 Replacement Parts

4,500 HP Cooling Column Body Assembly



7.0 Replacement Parts

4,500 HP Cooling Column Body Assembly Parts List

ITEM #	QTY PER ASM NO.		DESCRIPTION	PART NUMBER
	63564.1	63564.2		
1	1	1	COOLING COLUMN BODY WELD 2K/3K/4K (4NPT)	63561.____
2	1	1	TEMP CONT VALVE 2 1/2 FLANGE 160°-205°F	13295
3	2	2	FLANGE GASKET 2 1/2 - 1/16 FIBER (RING)	14595
4	8	8	HEX HD CAP SCR 5/8-11 X 2 1/2 GD5	H-0365
5	8	8	HEX NUT 5/8-11 GD5 ZINC	H-025
6	2	2	BALL VALVE 3/4 SOC WELD - 3-PIECE	11143
7	1	1	METERING PLATE COOLING COLUMN	23016
8	1	1	COOLING COLUMN GASKET	23017
9	1	1	DIAPHRAGM - COOLING COLUMN	23138
10	1	1	BACKUP PLATE	23325
11	1	1	UPPER SPRING GUIDE	23174
12	13	13	HEX HD CAP SCR 3/8-16 X 1 1/4 GD5 ZINC	H-010
13	1	1	SPRING CASE - COOLING COLUMN	43281
14	1	1	ADJUSTING HANDLE - COOLING COLUMN	23018
15	1	1	HEX NUT 5/8-11 GD5 ZINC	H-025
16	1	1	SPRING CAP	23172
17	1	1	SPRING - COOLING COLUMN	11038
18	16	16	LOCK WASHER 3/8 ZINC	H-029
19	2	2	THERMOMETER 50-300F COOLING COLUMN	11049
20	1	1	PRESS GAGE 0-30PSI COOLING COLUM	11048
21	2	2	PIPE PLUG 1/2NPT SQ HD	P-122
22	1	1	LOWER PLATE - SIGHT GLASS	23023
23	2	2	SIGHT GLASS GASKET	23020
24	1	1	SIGHT GLASS	11042
25	1	1	SIGHT GLASS GUARD	11041
26	1	1	UPPER PLATE - SIGHT GLASS	23022
27	4	4	STUD, 3/8" X 12" LG.	23050
28	4	4	HEX NUT 3/8-16 GD5 ZINC	H-026
29	1	1	COMP FTG 3/8T X 1/4NPTM 90° (POLY) BRASS	P-105
30	1	1	NEEDLE VALVE 1/4NPT BRASS	P-41
31	1	1	TUBING 1/4 ID X 1/16 W CLEAR VINYL /FT	11079
32	1	1	BREATHER VENT 1/4NPTM SINTERED BRONZE	12797

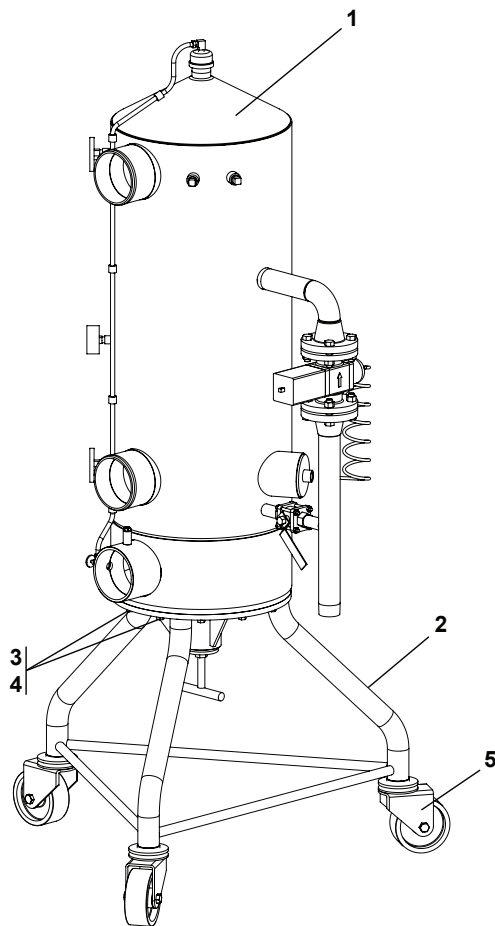
NOTE: Complete item 1 part number by adding the last digit of the assembly number to the blank.
Example: For assembly number 63564.1, item 1 part number would be 63561.1

7.0 Replacement Parts

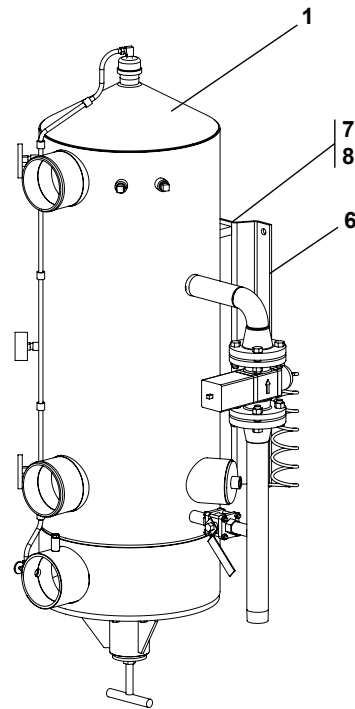
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7.0 Replacement Parts

7.5 4,500 HP After Cooler Column - 63585._



ASSEMBLY: 63585.1
(INCLUDES LEG ASM. & CASTERS)



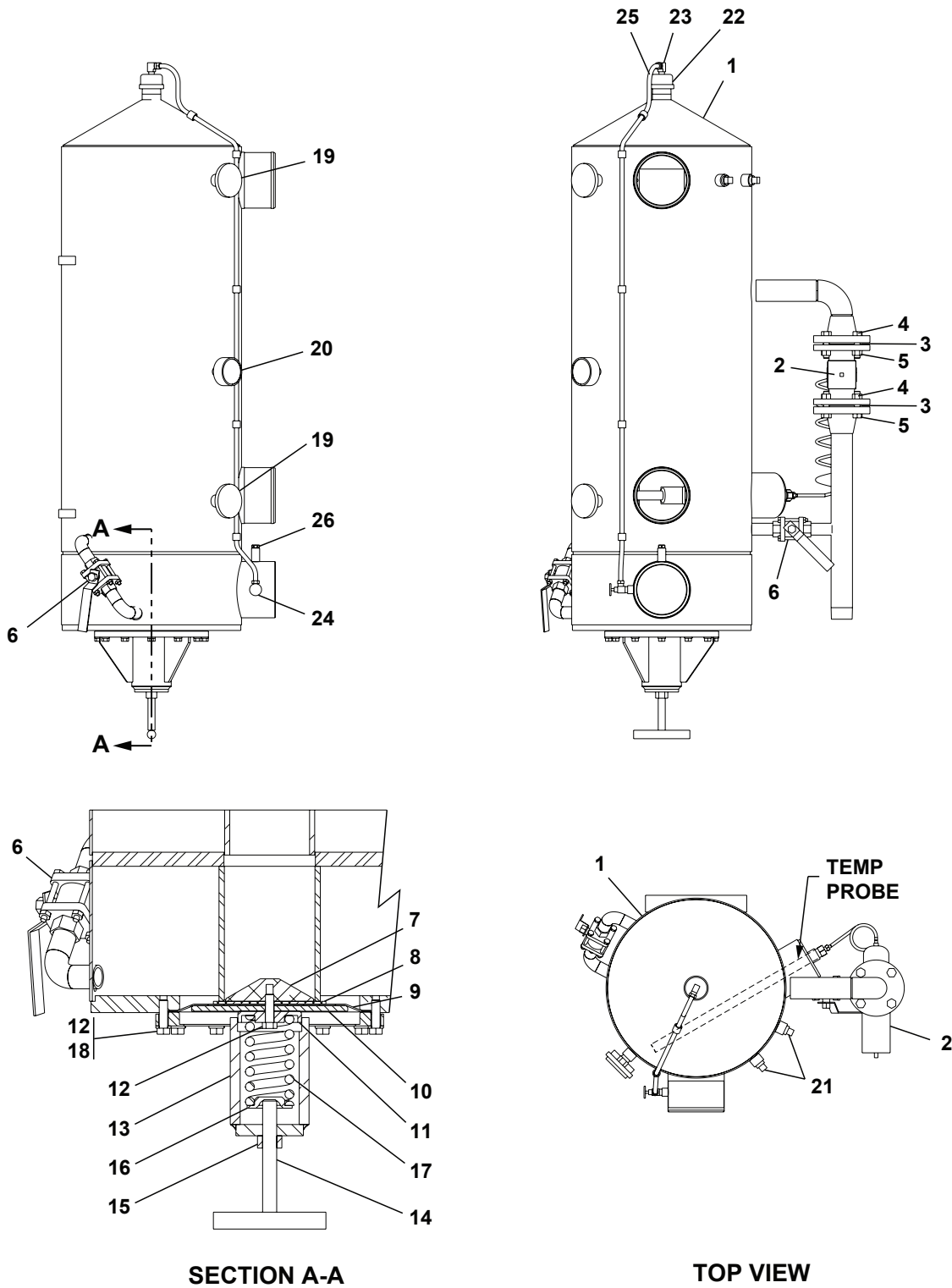
ASSEMBLY: 63585.2
(INCLUDES WALL MOUNT BRACKET)

ITEM #	QTY PER ASM NO.		DESCRIPTION	PART NUMBER
	63585.1	63585.2		
1	1	1	COOLING COLUMN BODY ASM 2.5JC VALVE (4NPT)	63584._
2	1	0	LEG WELDMENT-COOLING COLUMN	63525
3	12	0	HEX HD CAP SCR 3/8-16 X 1 GD5	H-009
4	12	0	LOCK WASHER 3/8 ZINC	H-029
5	3	0	CASTER-SWIVEL 5 X 2 POLY w1x4 POST 500LB	14594
6	0	1	WALL MOUNTING PLATE - COOLING COLUMN	44221
7	0	4	LOCK WASHER 1/2 ZINC	H-028
8	0	4	HEX HD CAP SCR 1/2-13 X 1 GD5	H-0345

NOTE: Complete item 1 part number by adding the last digit of the assembly number to the blank.
Example: For assembly number 63585.1, item 1 part number would be 63584.1

7.0 Replacement Parts

4,500 HP After Cooler Column Body Assembly



7.0 Replacement Parts

4,500 HP After Cooler Column Body Assembly Parts List

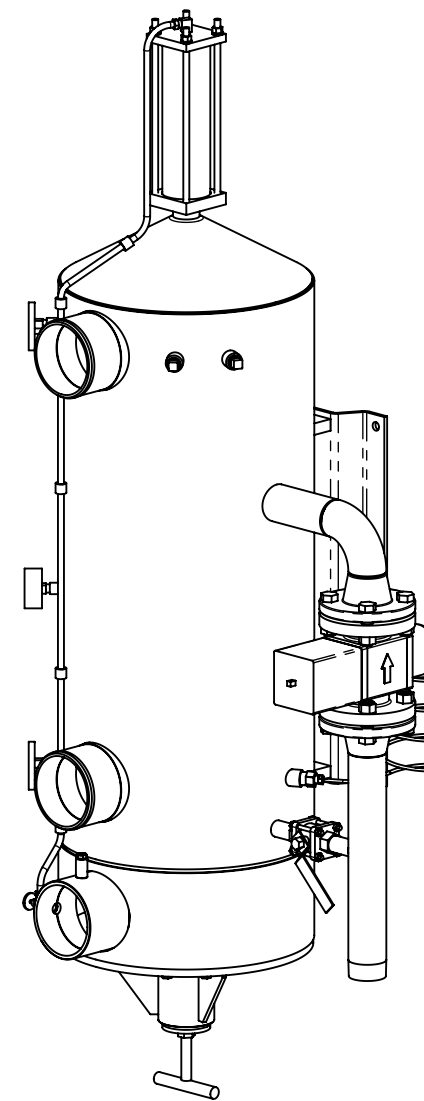
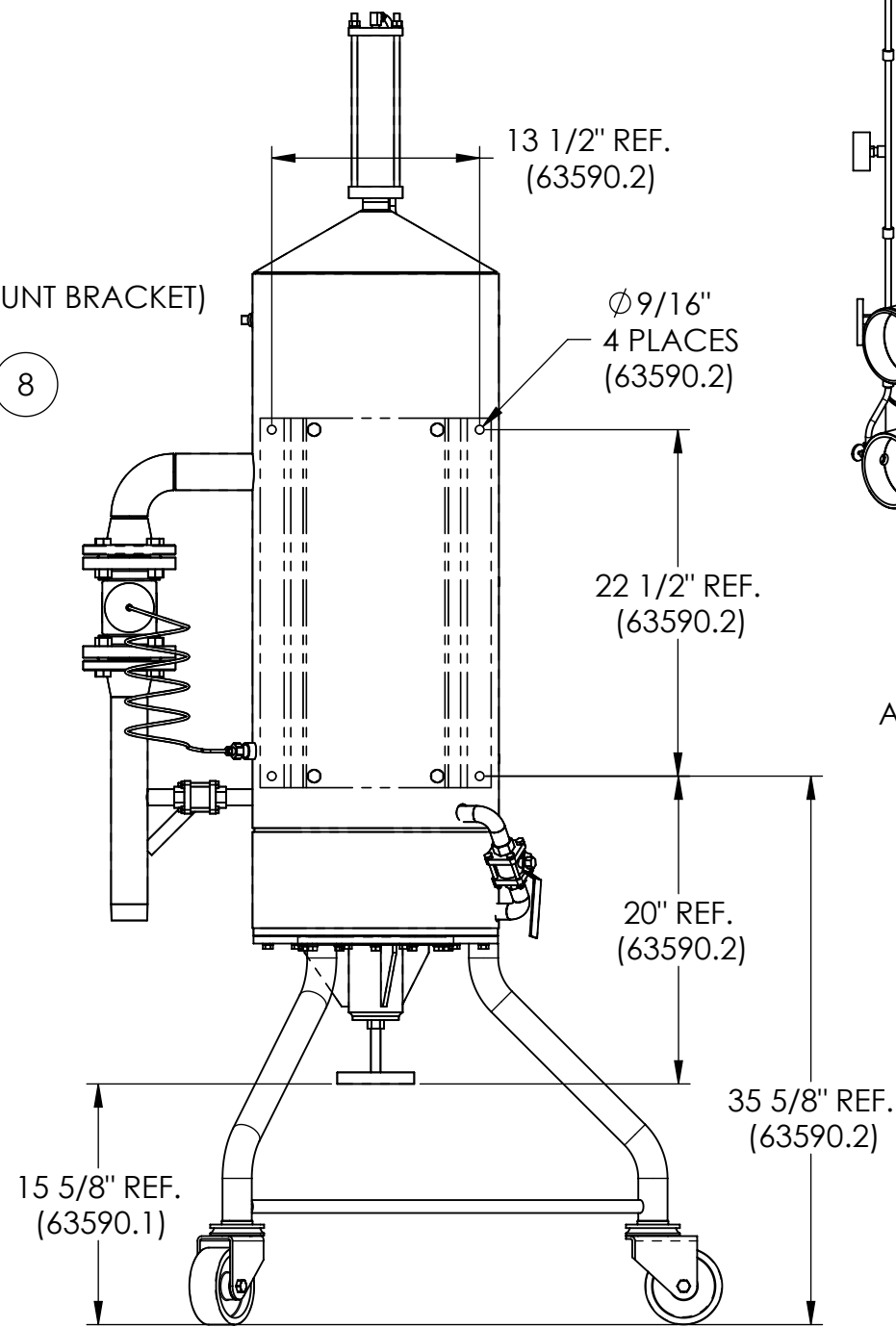
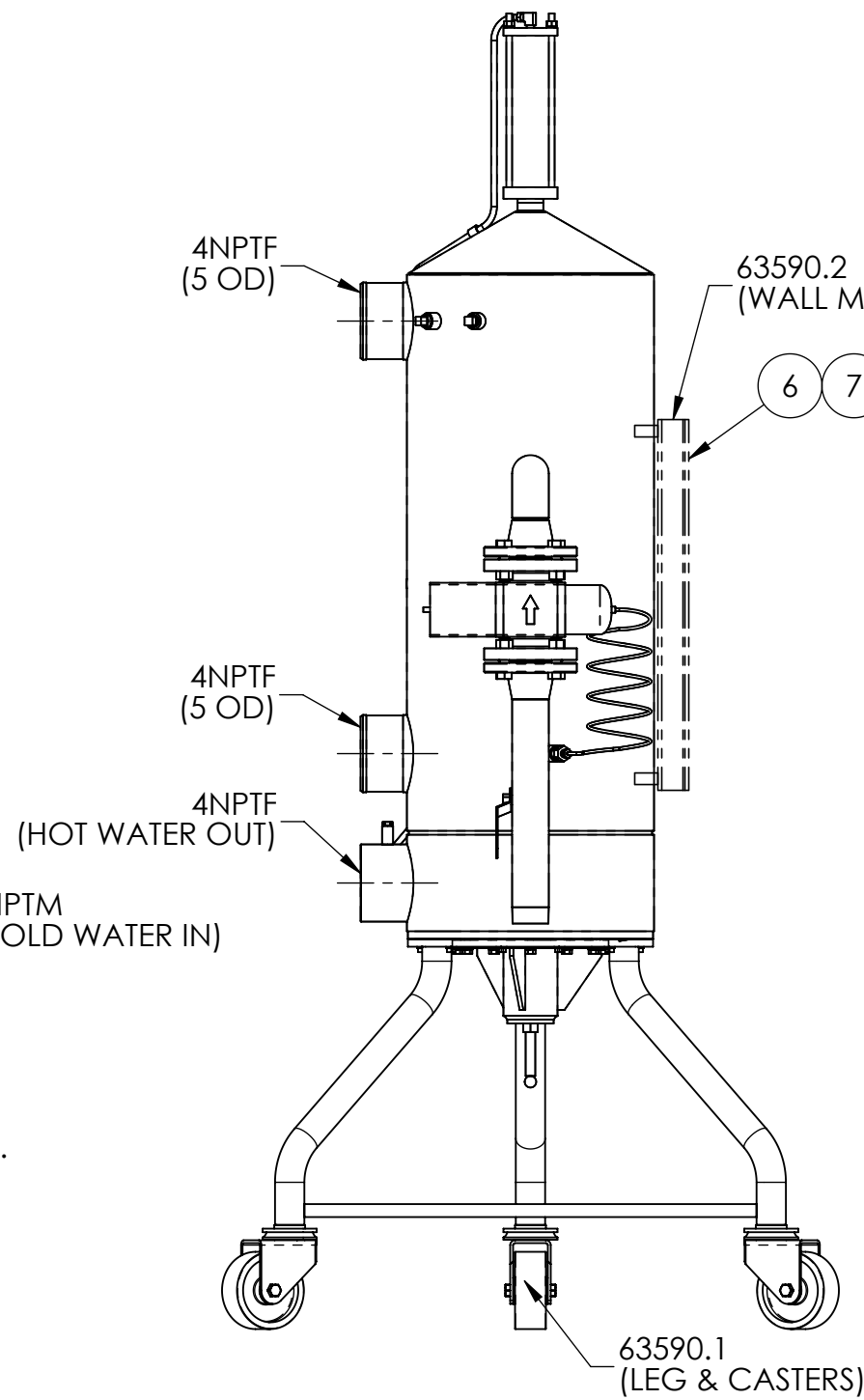
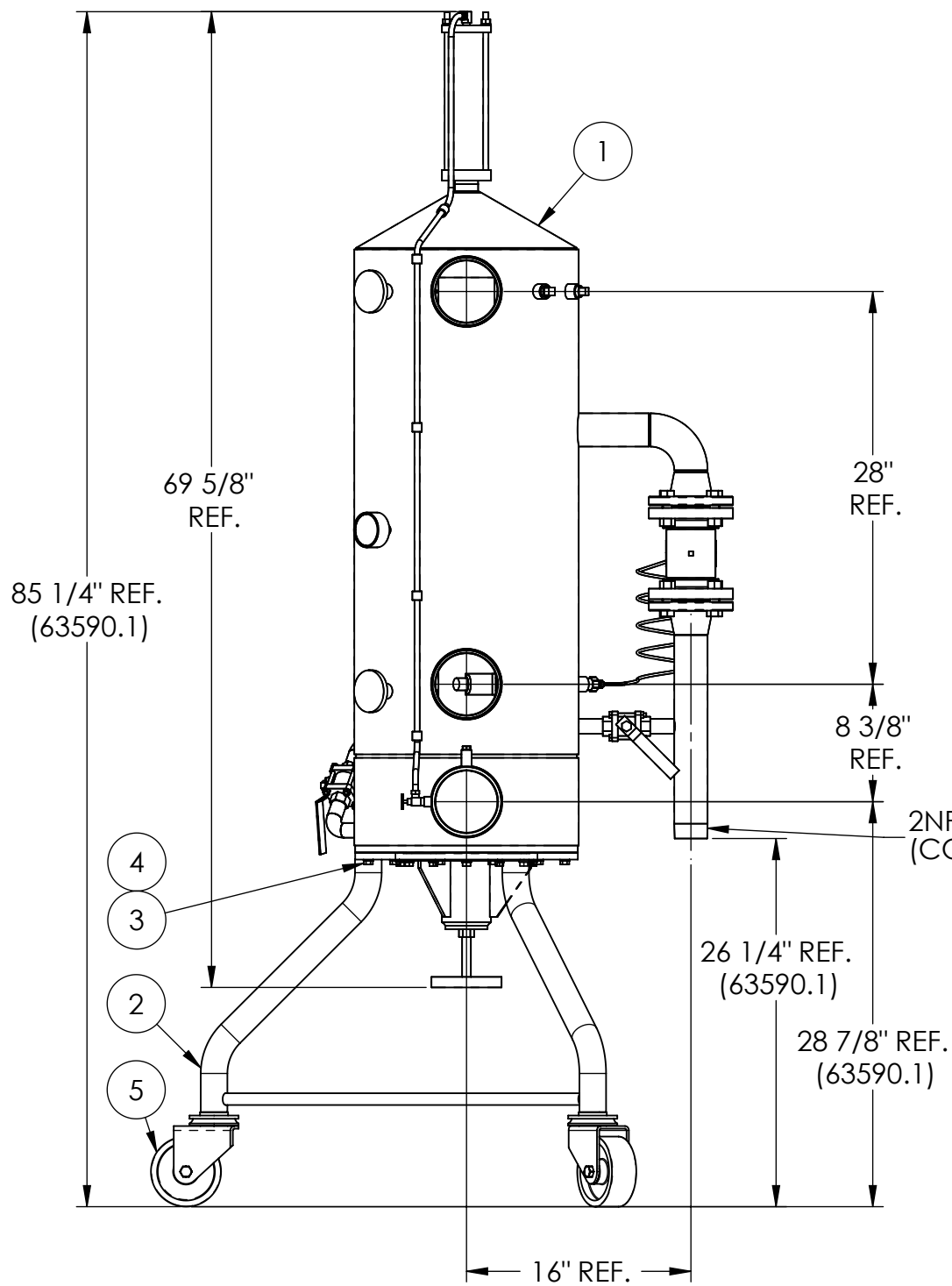
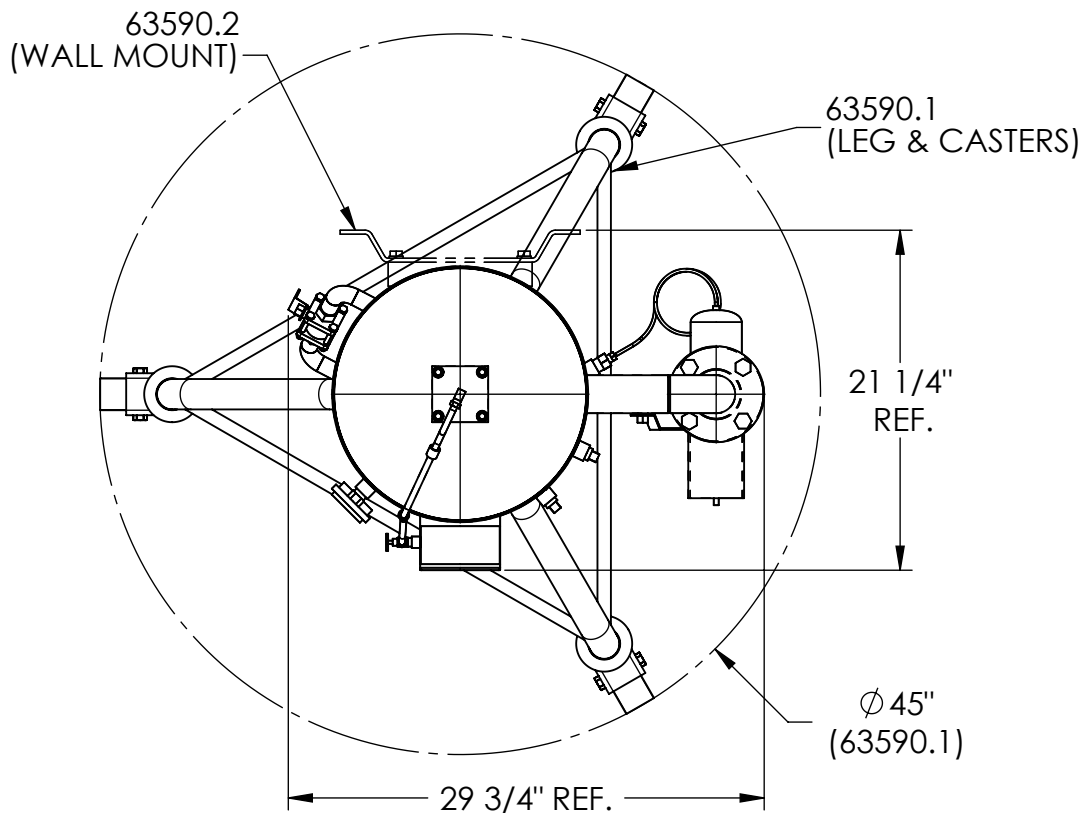
ITEM #	QTY PER ASM NO.		DESCRIPTION	PART NUMBER
	63585.1	63585.2		
1	1	1	COOLING COLUMN BODY WELD 2K/3K/4K (4NPT)	63561.____
2	1	1	TEMP CONT VALVE 1 1/2 FLANGE 75°-135°F	11094
3	2	2	FLANGE GASKET 1 1/2 - 1/16 FIBER (RING)	23024
4	8	8	HEX HD CAP SCR 1/2-13 X 2 GD5	H-035
5	8	8	HEX NUT 1/2-13 GD5 ZINC	H-017
6	2	2	BALL VALVE 3/4 SOC WELD - 3-PIECE	11143
7	1	1	METERING PLATE COOLING COLUMN	23016
8	1	1	COOLING COLUMN GASKET	23017
9	1	1	DIAPHRAGM - COOLING COLUMN	23138
10	1	1	BACKUP PLATE	23325
11	1	1	UPPER SPRING GUIDE	23174
12	13	13	HEX HD CAP SCR 3/8-16 X 1 1/4 GD5 ZINC	H-010
13	1	1	SPRING CASE - COOLING COLUMN	43281
14	1	1	ADJUSTING HANDLE - COOLING COLUMN	23018
15	1	1	HEX NUT 5/8-11 GD5 ZINC	H-025
16	1	1	SPRING CAP	23172
17	1	1	SPRING - COOLING COLUMN	11038
18	16	16	LOCK WASHER 3/8 ZINC	H-029
19	2	2	THERMOMETER 50-300F COOLING COLUMN	11049
20	1	1	PRESS GAGE 0-30PSI COOLING COLUM	11048
21	2	2	PIPE PLUG 1/2NPT SQ HD	P-122
22	1	1	PIPE CAP 1 1/4in w/ 1/4NPT	24213
23	2	2	COMP FTG 3/8T X 1/4NPTM 90° (POLY) BRASS	P-105
24	1	1	NEEDLE VALVE 1/4NPT BRASS	P-41
25	1	1	TUBING 1/4 ID X 1/16 W CLEAR VINYL /FT	11079
26	1	1	BREATHER VENT 1/4NPTM SINTERED BRONZE	12797

NOTE: Complete item 1 part number by adding the last digit of the assembly number to the blank.
Example: For assembly number 63585.1, item 1 part number would be 63561.1

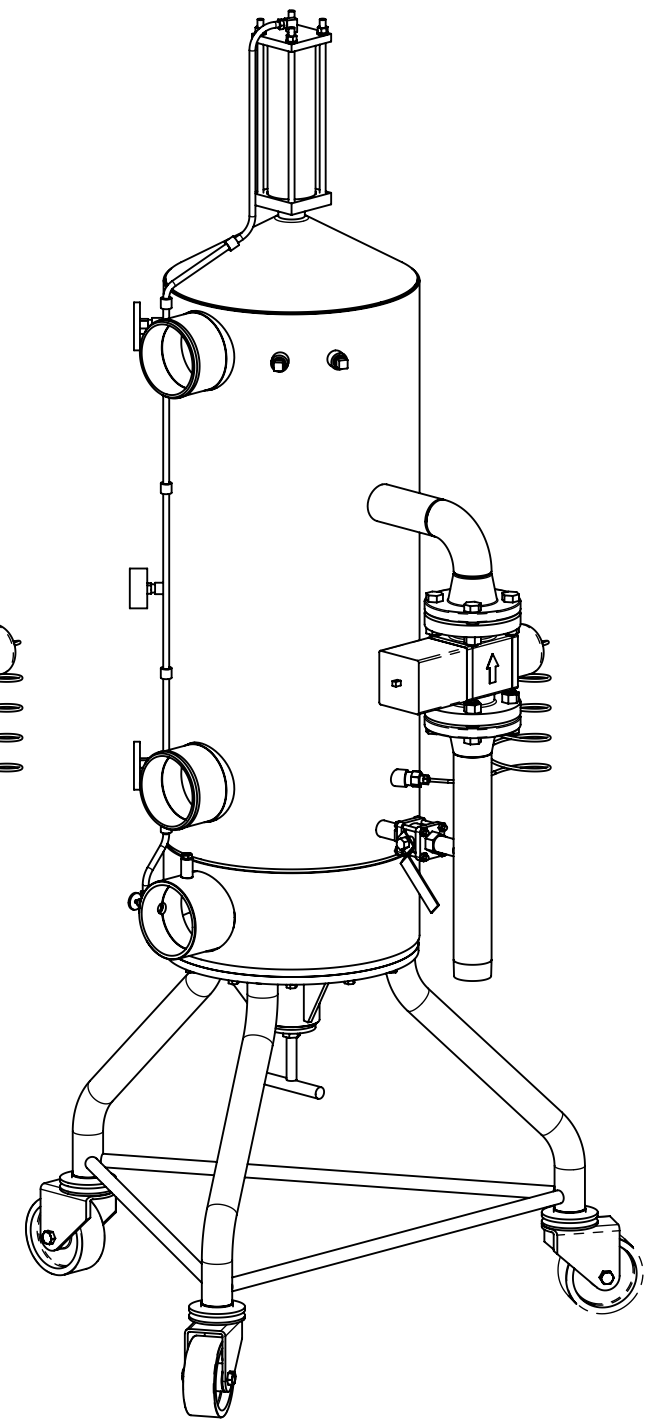
7.0 Replacement Parts

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF POWER TEST INC. ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF POWER TEST INC. IS PROHIBITED.

QTY PER ASM NO		ITEM NUMBER	PART NUMBER	DESCRIPTION
63590.2	63590.1			
1	1	1	63563.____	COOLING COLUMN BODY ASM 2JC VALVE (4NPT)
0	1	2	63525	LEG WELDMENT-COOLING COLUMN
0	12	3	H-009	HEX HD CAP SCR 3/8-16 X 1 GD5
0	12	4	H-029	LOCK WASHER 3/8 ZINC
0	3	5	14594	CASTER-SWIVEL 5 X 2 POLY w1x4 POST 500LB
1	0	6	44221	WALL MOUNTING PLATE - COOLING COLUMN
4	0	7	H-028	LOCK WASHER 1/2 ZINC
4	0	8	H-0345	HEX HD CAP SCR 1/2-13 X 1 GD5



ASSEMBLY: 63590.2



ASSEMBLY: 63590.1

- NOTE:
1. COMPLETE THE DRAWING NUMBER AND ITEM 1 PART NUMBER BY ADDING THE LAST DIGIT OF THE ASSEMBLY NUMBER, TO BE PRODUCED, TO THE BLANKS PROVIDED
2. 63590.1 INCLUDES LEG ASM & CASTERS
63590.2 INCLUDES WALL MOUNT BRACKET

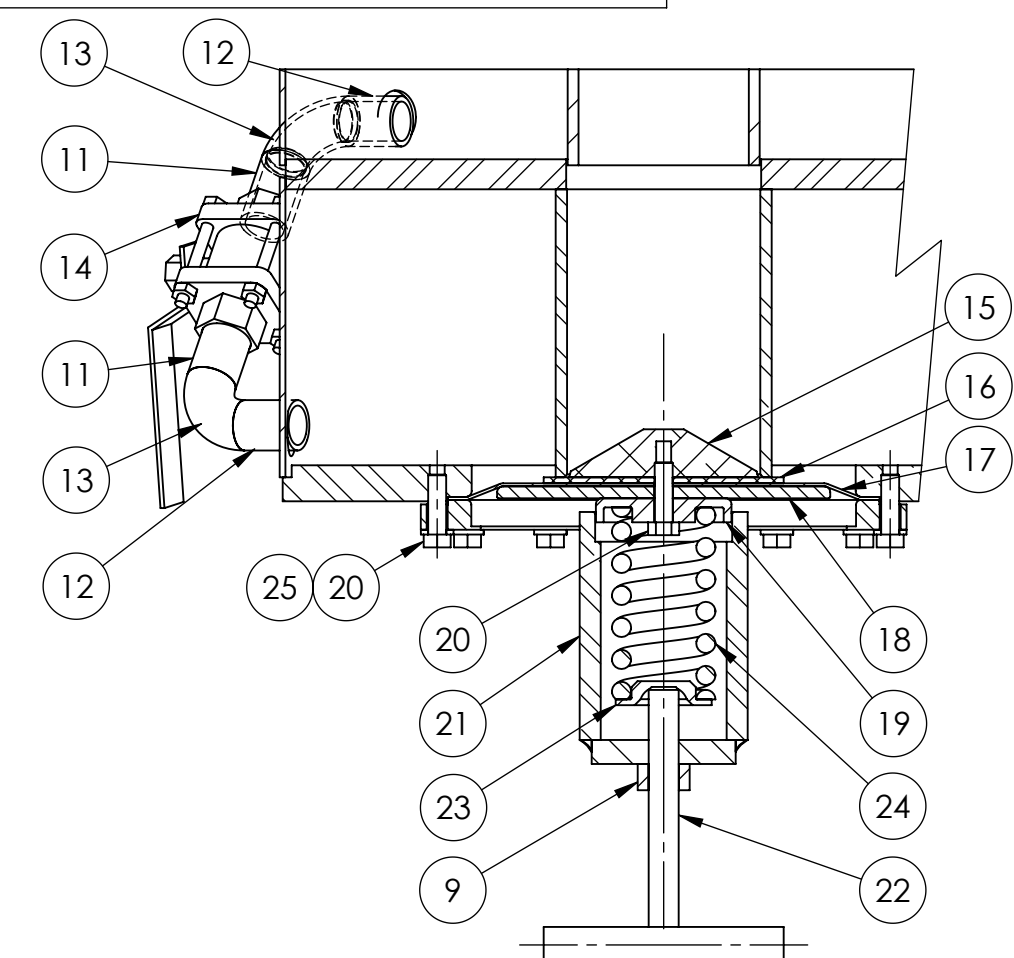
63590.1 EST. WT. 350 LBS.
63590.2 EST. WT. 315 LBS.

△ CORRECTED PART NUMBER IN BILL OF MATERIALS 63565.1/2 TO 63590.1/2

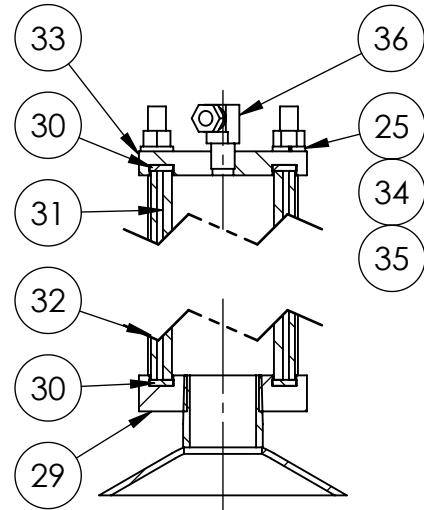
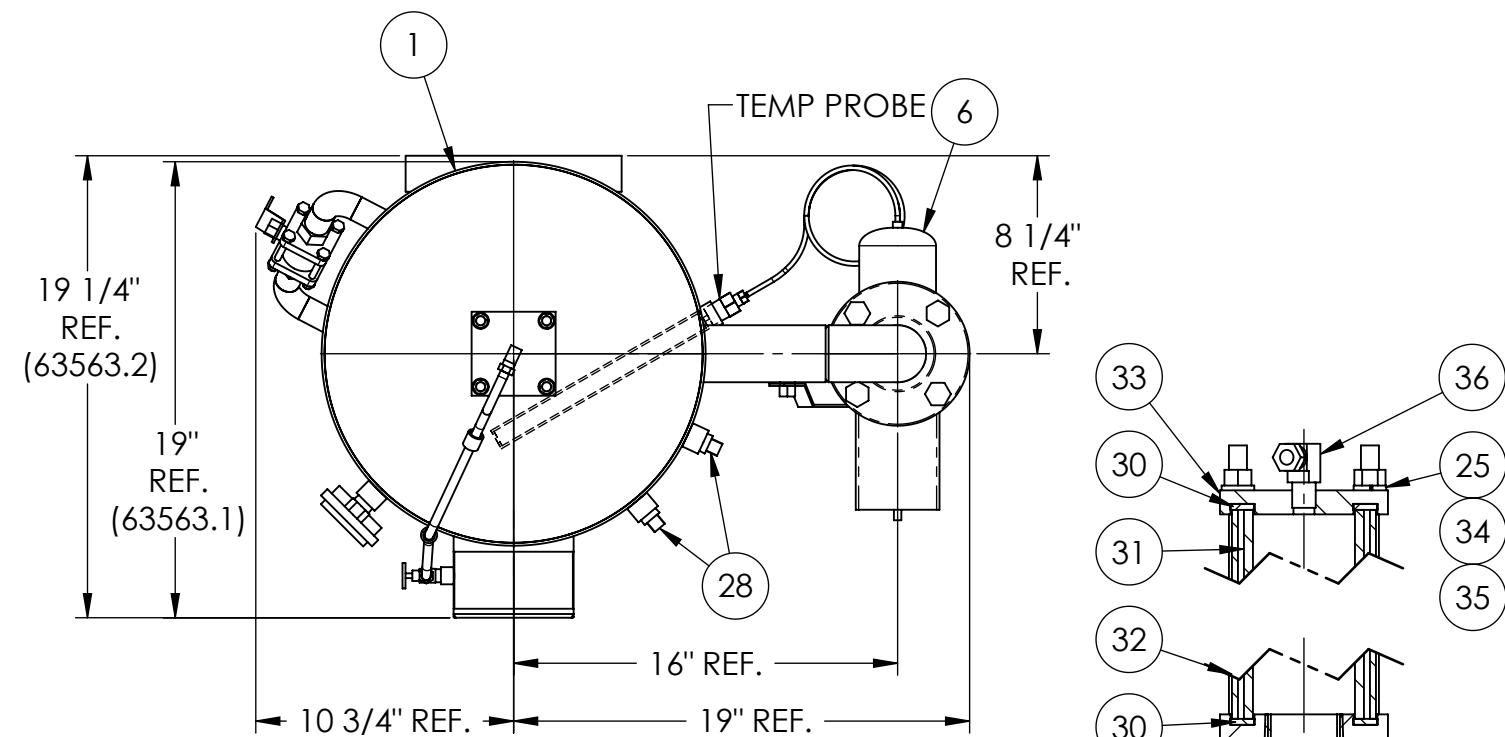
1	4/17/14	7625
REV	DATE	ECN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DECIMALS: .XX ± .01 .XXX ± .005 FRACTIONS: ± 1/32 ± 1° MATERIAL: -- FINISH: -- DO NOT SCALE DRAWING		CAD GENERATED DRAWING, DO NOT MANUALLY UPDATE APPROVALS: DRAWN: CML, DATE: 4/17/14 CHECKED: -- RESP ENG: -- PROD MAN: --		POWER TEST INC. ENGINE COOLING COLUMN 2100HP (4NPT) w LEGS / w WALL MOUNT SIZE: C, DWG. NO.: 63590.____, REV: 1 SCALE: 1:12, CAD FILE: --, SHEET 1 OF 1	
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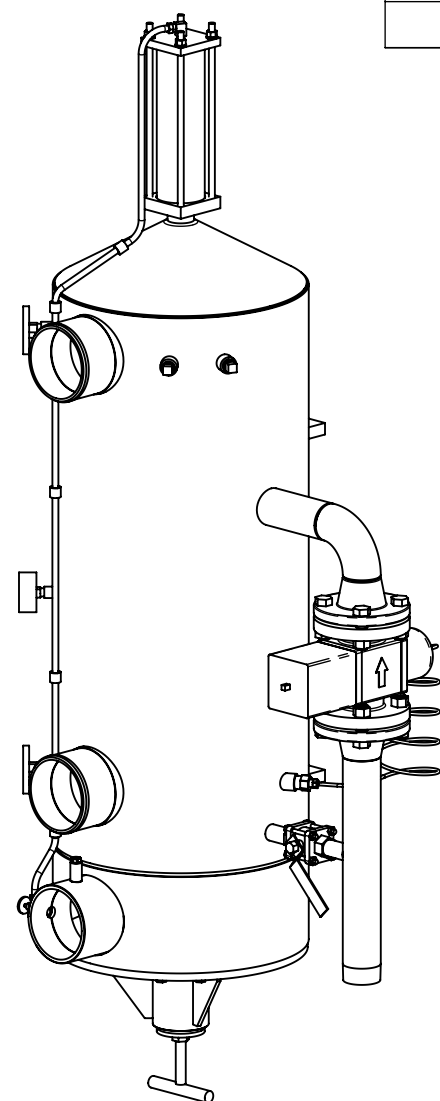
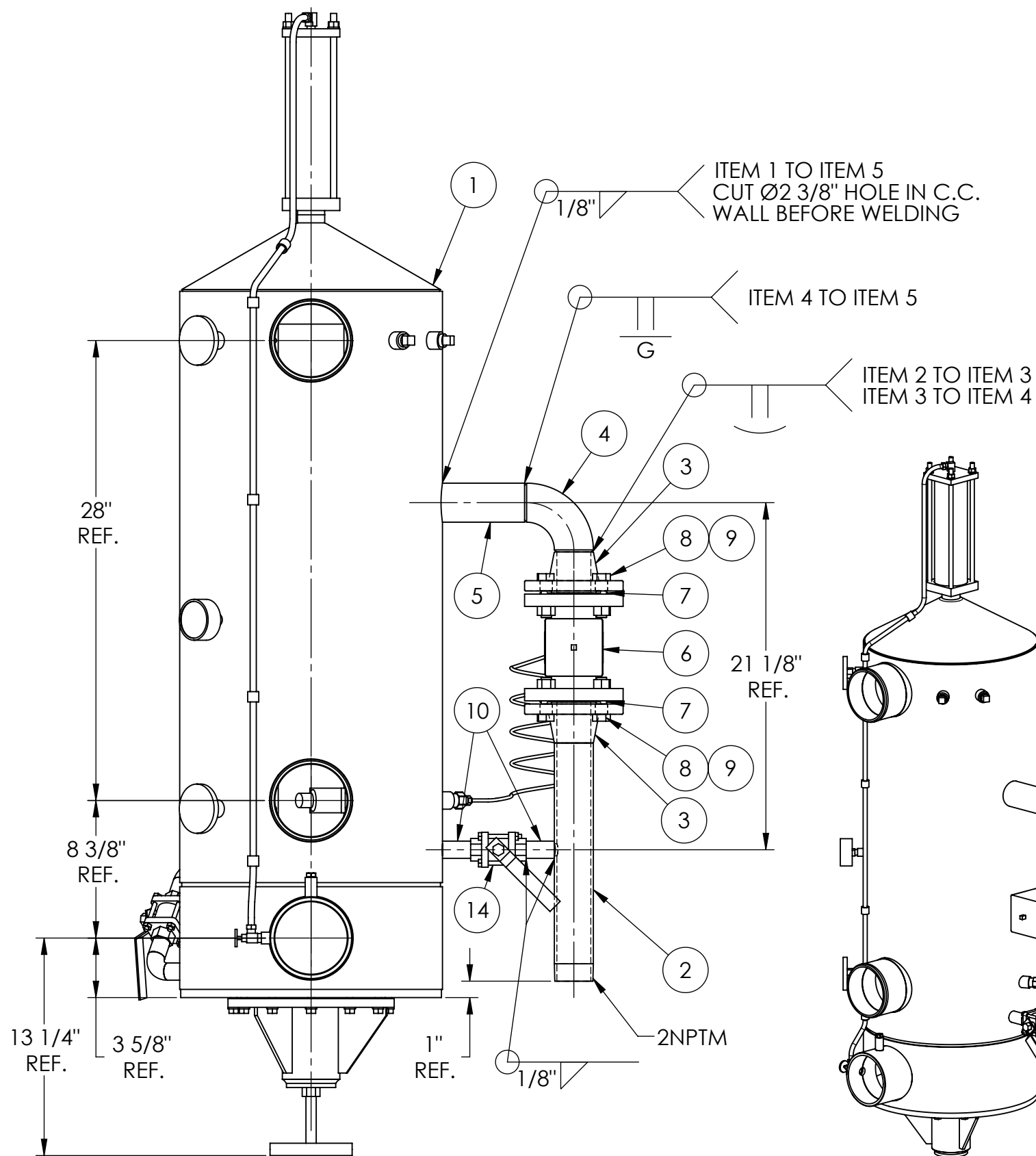
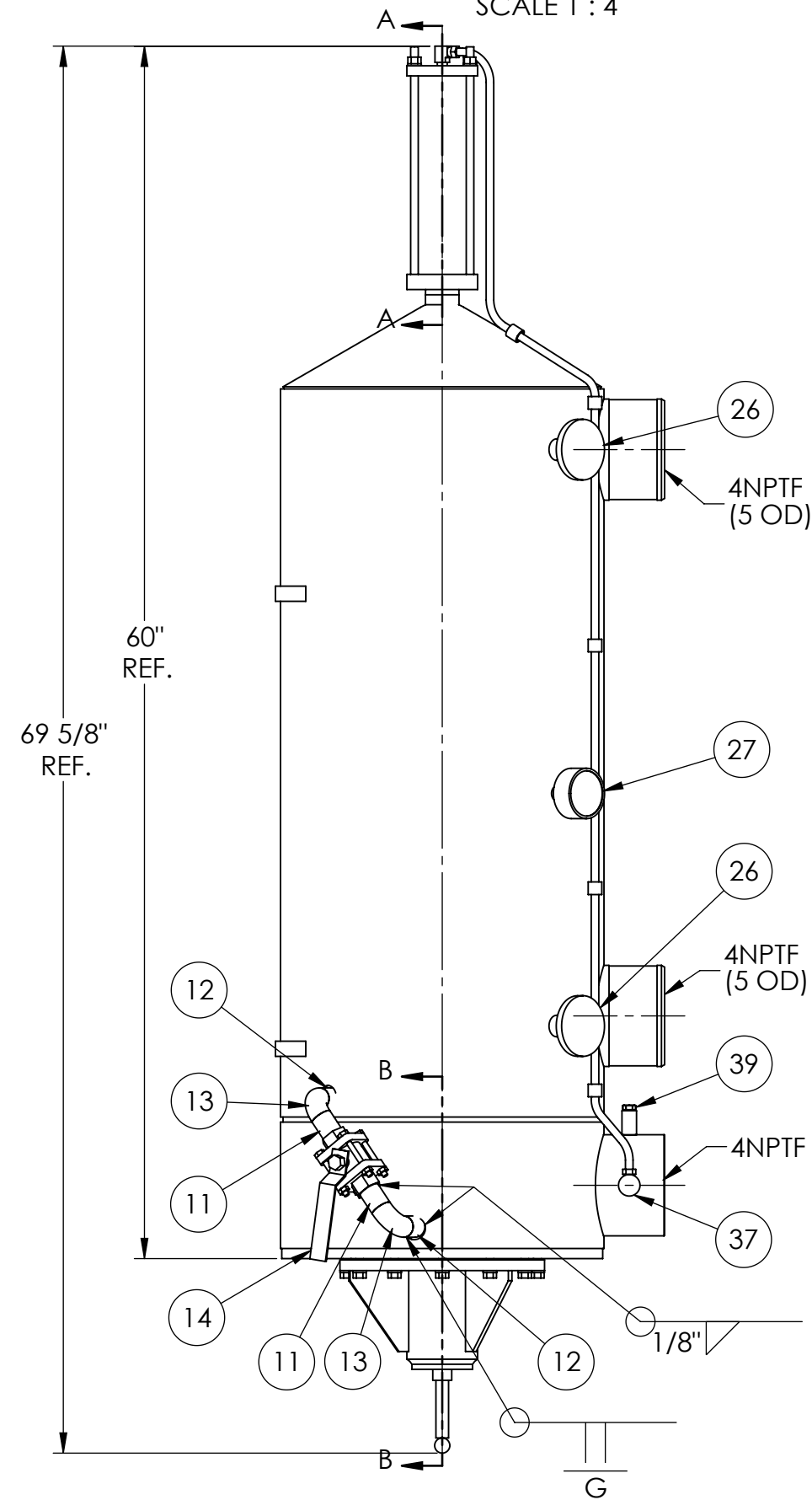
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SECTION B-B
SCALE 1 : 4



SECTION A-A
SCALE 1 : 4



SCALE: 1:12

ITEM NO.	QTY.	CUT LG.	PART NO.	DESCRIPTION
1	1		63561.	COOLING COLUMN BODY WELD 2K/3K/4K (4NPT)
2	1		24210	ENGINE COOLING COLUMN INLET PIPE (2NPT)
3	2		P-16	WELD NECK FLANGE 2in
4	1		P-11	PIPE BUTT WELD ELBO 2 90°
5	1	6	P-01	PIPE 2 SCH 40 BLK IRON /IN
6	1		11043	TEMP CONT VALVE 2 FLANGE 160°-205°F
7	2		23021	FLANGE GASKET 2 - 1/16 FIBER (RING)
8	8		H-019	HEX HD CAP SCR 5/8-11 X 2 1/4 GD5
9	9		H-025	HEX NUT 5/8-11 GD5 ZINC
10	2	2 3/16	P-05	PIPE 3/4 SCH 40 BLK IRON /IN
11	2	1 5/8	P-05	PIPE 3/4 SCH 40 BLK IRON /IN
12	2	1 1/4	P-05	PIPE 3/4 SCH 40 BLK IRON /IN
13	2		P-15	PIPE BUTT WELD ELBO 3/4 90°
14	2		11143	BALL VALVE 3/4 SOC WELD - 3-PIECE
15	1		23016	METERING PLATE COOLING COLUMN
16	1		23017	COOLING COLUMN GASKET
17	1		23138	DIAPHRAGM - COOLING COLUMN
18	1		23325	BACKUP PLATE
19	1		23174	UPPER SPRING GUIDE
20	13		H-010	HEX HD CAP SCR 3/8-16 X 1 1/4 GD5 ZINC
21	1		43281	SPRING CASE - COOLING COLUMN
22	1		23018	ADJUSTING HANDLE - COOLING COLUMN
23	1		23172	SPRING CAP
24	1		11038	SPRING - COOLING COLUMN
25	16		H-029	LOCK WASHER 3/8 ZINC
26	2		11049	THERMOMETER 50-300F COOLING COLUMN
27	1		11048	PRESS GAGE 0-30PSI COOLING COLUM
28	2		P-122	PIPE PLUG 1/2NPT SQ HD
29	1		23023	LOWER PLATE - SIGHT GLASS
30	2		23020	SIGHT GLASS GASKET
31	1		11042	SIGHT GLASS
32	1		11041	SIGHT GLASS GUARD
33	1		23022	UPPER PLATE - SIGHT GLASS
34	4		23050	STUD, 3/8" X 12" LG.
35	4		H-026	HEX NUT 3/8-16 GD5 ZINC
36	1		P-105	COMP FTG 3/8T X 1/4NPTM 90° (POLY) BRASS
37	1		P-41	NEEDLE VALVE 1/4NPT BRASS
38	1	5	11079	TUBING 1/4 ID X 1/16 W CLEAR VINYL /FT
39	1		12797	BREATHER VENT 1/4NPTM SINTERED BRONZE

NOTE:
1. COMPLETE THE DRAWING NUMBER AND ITEM 1 PART NUMBER BY ADDING THE LAST DIGIT OF THE ASSEMBLY NUMBER, TO BE PRODUCED, TO THE BLANKS PROVIDED
2. 63563.1 = USED WITH LEG & CASTER KIT
63563.2 = USED WITH WALL MOUNT KIT
3. ALL EXTERNAL TANK WELDS TO BE LEAK TIGHT
4. PRESSURE TEST TO 30psi
5. BREAK ALL EDGES

EST. WT. 285 LBS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DECIMALS: .XX ± .01 .XXX ± .005		CAD GENERATED DRAWING. DO NOT MANUALLY UPDATE	
APPROVALS		DATE	
DRAWN		JRC 2/07/11	
CHECKED			
MATERIAL			
FINISH			
DO NOT SCALE DRAWING		PROD MAN	

POWER TEST INC.

ENGINE COOLING
COLUMN BODY ASM
2JC VALVE (4NPT)

SIZE DWG. NO. 63563. REV 0
SCALE: 1:8 CAD FILE: SHEET 1 OF 1

REV	DATE	ECN



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