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Mechanical Parts and Service

72044SR2, SR3

PELLERIN MILNOR CORPORATION Post Office Box 400, Kenner, Louisiana 70063–0400, U.S.A.

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1 General Service & Safety-Related Components

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PELLERIN MILNOR CORPORATION
LIMITED STANDARD WARRANTY

We warrant to the original purchaser that MILNOR machines including electronic hardware/software (hereafter referred to as "equipment"), will be free from defects in material and workmanship for a period of one year from the date of shipment (unless the time period is specifically extended for certain parts pursuant to a specific MILNOR published extended warranty) from our factory with no operating hour limitation. This warranty is contingent upon the equipment being installed, operated and serviced as specified in the operating manual supplied with the equipment, and operated under normal conditions by competent operators.

Providing we receive written notification of a warranted defect within 30 days of its discovery, we will—at our option—repair or replace the defective part or parts, EX Factory (labor and freight specifically NOT included). We retain the right to require inspection of the parts claimed defective in our factory prior to repairing or replacing same. We will not be responsible, or in any way liable, for unauthorized repairs or service to our equipment, and this warranty shall be void if the equipment is tampered with, modified, or abused, used for purposes not intended in the design and construction of the machine, or is repaired or altered in any way without MILNOR's written consent.

Parts damaged by exposure to weather, to aggressive water, or to chemical attack are not covered by this warranty. For parts which require routine replacement due to normal wear—such as gaskets, contact points, brake and clutch linings, belts, hoses, and similar parts—the warranty time period is 90 days.

We reserve the right to make changes in the design and/or construction of our equipment (including purchased components) without obligation to change any equipment previously supplied.

ANY SALE OR FURNISHING OF ANY EQUIPMENT BY MILNOR IS MADE ONLY UPON THE EXPRESS UNDERSTANDING THAT MILNOR MAKES NO EXPRESSED OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR USE OR PURPOSE OR ANY OTHER WARRANTY IMPLIED BY LAW INCLUDING BUT NOT LIMITED TO REDHIBITION. MILNOR WILL NOT BE RESPONSIBLE FOR ANY COSTS OR DAMAGES ACTUALLY INCURRED OR REQUIRED AS A RESULT OF: THE FAILURE OF ANY OTHER PERSON OR ENTITY TO PERFORM ITS RESPONSIBILITIES, FIRE OR OTHER HAZARD, ACCIDENT, IMPROPER STORAGE, MIS-USE, NEGLECT, POWER OR ENVIRONMENTAL CONTROL MALFUNCTIONS, DAMAGE FROM LIQUIDS, OR ANY OTHER CAUSE BEYOND THE NORMAL RANGE OF USE. REGARDLESS OF HOW CAUSED, IN NO EVENT SHALL MILNOR BE LIABLE FOR SPECIAL, INDIRECT, PUNITIVE, LIQUIDATED, OR CONSEQUENTIAL COSTS OR DAMAGES, OR ANY COSTS OR DAMAGES WHATSOEVER WHICH EXCEED THE PRICE PAID TO MILNOR FOR THE EQUIPMENT IT SELLS OR FURNISHES.

THE PROVISIONS ON THIS PAGE REPRESENT THE ONLY WARRANTY FROM MILNOR AND NO OTHER WARRANTY OR CONDITIONS, STATUTORY OR OTHERWISE, SHALL BE IMPLIED.

WE NEITHER ASSUME, NOR AUTHORIZE ANY EMPLOYEE OR OTHER PERSON TO ASSUME FOR US, ANY OTHER RESPONSIBILITY AND/OR LIABILITY IN CONNECTION WITH THE SALE OR FURNISHING OF OUR EQUIPMENT TO ANY BUYER.

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1.1 How to Get the Necessary Repair Components

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You can get components to repair your machine from the approved supplier where you got this machine. Your supplier will usually have the necessary components in stock. You can also get components from the Milnor® factory.

Tell the supplier the machine model and serial number and this data for each necessary component:

- The component number from this manual
- The component name if known
- The necessary quantity
- The necessary transportation requirements
- If the component is an electrical component, give the schematic number if known.
- If the component is a motor or an electrical control, give the nameplate data from the used component.

To write to the Milnor® factory:

Pellerin Milnor Corporation
Post Office Box 400
Kenner, LA 70063-0400
UNITED STATES

Telephone: 504-712-7775
Fax: 504-469-9777
Email: parts@milnor.com

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1.2 Trademarks

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These words are trademarks of Pellerin Milnor® Corporation and other entities:

Table 1. Trademarks

AutoSpot™	GreenFlex™	MilMetrix®	PulseFlow®
CBW®	GearTrace™	MilTouch™	RAM Command™
Drynet™	GreenTurn™	MilTouch-EX™	Recirc*ONE*®
E-P Express®	Hydro-cushion™	MilRAIL®	RinSave®
E-P OneTouch®	Mentor®	Miltrac™	SmoothCoil™

Table 1 Trademarks (cont'd.)

E-P Plus®	Mildata®	MilVision™	Staph Guard®
Gear Guardian®	Milnor®	PBW™	

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1.3 Safety — Divided Cylinder and Staph Guard® Washer-Extractors

BNWVUS08.C01 0000279015 D.2 A.2 3/16/20, 3:40 PM Released

1.3.1 Safety Alert Messages—Internal Electrical and Mechanical Hazards

BNWVUS01.C03 0000235064 D.2 A.2 A.3 1/2/20, 2:19 PM Released

The following are instructions about hazards inside the machine and in electrical enclosures.

WARNING: **Electrocution and Electrical Burn Hazards** — Contact with electric power can kill or seriously injure you. Electric power is present inside the cabinetry unless the main machine power disconnect is off.

- Do not unlock or open electric box doors.
- Do not remove guards, covers, or panels.
- Do not reach into the machine housing or frame.
- Keep yourself and others off of machine.
- Know the location of the main machine disconnect and use it in an emergency to remove all electric power from the machine.

WARNING: **Entangle and Crush Hazards** — Contact with moving components normally isolated by guards, covers, and panels, can entangle and crush your limbs. These components move automatically.

- Do not remove guards, covers, or panels.
- Do not reach into the machine housing or frame.
- Keep yourself and others off of machine.
- Know the location of all emergency stop switches, pull cords, and/or kick plates and use them in an emergency to stop machine motion.

1.3.2 Safety Alert Messages—External Mechanical Hazards

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The following are instructions about hazards around the front, sides, rear or top of the machine.

WARNING: **Crush Hazards —** Suspended machines only—Spaces between the shell and housing can close and crush or pinch your limbs. The shell moves within the housing during operation.

- Do not reach into the machine housing or frame.
- Keep yourself and others clear of movement areas and paths.

1.3.3 Safety Alert Messages—Cylinder and Processing Hazards

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The following are instructions about hazards related to the cylinder and laundering process.

WARNING: **Crush Hazards —** Contact with the turning cylinder can crush your limbs. The cylinder will repel any object you try to stop it with, possibly causing the object to strike or stab you. The turning cylinder is normally isolated by the locked cylinder door.

- Do not attempt to open the door or reach into the cylinder until the cylinder is stopped.
- Do not place any object in the turning cylinder.
- Do not operate the machine with a malfunctioning door interlock.
- Divided cylinder machines only—Keep yourself and others clear of cylinder and goods during inching or Autospot operation.
- Do not operate the machine with malfunctioning two-hand manual controls.

WARNING: **Confined Space Hazards —** Confinement in the cylinder can kill or injure you. Hazards include but are not limited to panic, burns, poisoning, suffocation, heat prostration, biological contamination, electrocution, and crushing.

- Do not attempt unauthorized servicing, repairs, or modification.

WARNING: **Explosion and Fire Hazards —** Flammable substances can explode or ignite in the cylinder, drain trough, or sewer. The machine is designed for washing with water, not any other solvent. Processing can cause solvent-containing goods to give off flammable vapors.

- Do not use flammable solvents in processing.
- Do not process goods containing flammable substances. Consult with your local fire department/public safety office and all insurance providers.

1.3.4 Safety Alert Messages—Unsafe Conditions

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1.3.4.1 Damage and Malfunction Hazards

BNWVUS04.C02 0000235092 D.2 A.2 A.3 12/11/20, 8:32 AM Released

1.3.4.1.1 Hazards Resulting from Inoperative Safety Devices

BNWVUS04.C03 0000235091 D.2 A.2 A.4 12/11/20, 8:32 AM Released

DANGER: **Entangle and Sever Hazards —** Cylinder door interlock—Operating the machine with a malfunctioning door interlock can permit opening the door when the cylinder is turning and/or starting the cycle with the door open, exposing the turning cylinder.

- Do not operate the machine with any evidence of damage or malfunction.

WARNING: **Multiple Hazards —** Operating the machine with an inoperative safety device can kill or injure personnel, damage or destroy the machine, damage property, and/or void the warranty.

- Do not tamper with or disable any safety device or operate the machine with a malfunctioning safety device. Request authorized service.

WARNING: **Electrocution and Electrical Burn Hazards —** Electric box doors—Operating the machine with any electric box door unlocked can expose high voltage conductors inside the box.

- Do not unlock or open electric box doors.

WARNING: **Entangle and Crush Hazards —** Guards, covers, and panels—Operating the machine with any guard, cover, or panel removed exposes moving components.

- Do not remove guards, covers, or panels.

1.3.4.1.2 Hazards Resulting from Damaged Mechanical Devices

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WARNING: **Multiple Hazards —** Operating a damaged machine can kill or injure personnel, further damage or destroy the machine, damage property, and/or void the warranty.

- Do not operate a damaged or malfunctioning machine. Request authorized service.

WARNING: **Explosion Hazards —** Cylinder—A damaged cylinder can rip apart during extraction, puncturing the shell and discharging metal fragments at high speed.

- Do not operate the machine with any evidence of damage or malfunction.

WARNING: **Explosion Hazards** — Inner door latches (divided cylinder machines)—A damaged or improperly seated latch can cause the inner door to open during operation, damaging the cylinder and shell. A damaged cylinder can rip apart during extraction, puncturing the shell and discharging metal fragments at high speed.

- Ensure that the inner door is securely latched after loading and unloading.
- Do not operate the machine with any evidence of damage or malfunction.

WARNING: **Explosion Hazards** — Clutch and speed switch (multiple motor machines)—A damaged clutch or speed switch can permit the low speed motor to engage during extract. This will over-speed the motor and pulleys and can cause them to rip apart, discharging metal fragments at high speed.

- Stop the machine immediately if any of these conditions occur: • abnormal whining sound during extract • skidding sound as extract ends • clutches remain engaged or re-engage during extract

1.3.4.2 Careless Use Hazards

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1.3.4.2.1 Careless Operation Hazards—Vital Information for Operator Personnel (see also operator hazards throughout manual)

BNWVUS04.C06 0000235126 D.2 A.2 A.4 12/11/20, 8:32 AM Released

WARNING: **Multiple Hazards** — Careless operator actions can kill or injure personnel, damage or destroy the machine, damage property, and/or void the warranty.

- Do not tamper with or disable any safety device or operate the machine with a malfunctioning safety device. Request authorized service.
- Do not operate a damaged or malfunctioning machine. Request authorized service.
- Do not attempt unauthorized servicing, repairs, or modification.
- Do not use the machine in any manner contrary to the factory instructions.
- Use the machine only for its customary and intended purpose.
- Understand the consequences of operating manually.

1.3.4.2.2 Careless Servicing Hazards—Vital Information for Service Personnel (see also service hazards throughout manuals)

BNWVUS04.C07 0000235125 D.2 A.2 A.4 12/11/20, 8:32 AM Released

WARNING: **Electrocution and Electrical Burn Hazards** — Contact with electric power can kill or seriously injure you. Electric power is present inside the cabinetry unless the main machine power disconnect is off.

- Do not service the machine unless qualified and authorized. You must clearly understand the hazards and how to avoid them.
- Abide by the current OSHA lockout/tagout standard when lockout/tagout is called for in the service instructions. Outside the USA, abide by the OSHA standard in the absence of any other overriding standard.

WARNING: **Entangle and Crush Hazards —** Contact with moving components normally isolated by guards, covers, and panels, can entangle and crush your limbs. These components move automatically.

- Do not service the machine unless qualified and authorized. You must clearly understand the hazards and how to avoid them.
- Abide by the current OSHA lockout/tagout standard when lockout/tagout is called for in the service instructions. Outside the USA, abide by the OSHA standard in the absence of any other overriding standard.

WARNING: **Confined Space Hazards —** Confinement in the cylinder can kill or injure you. Hazards include but are not limited to panic, burns, poisoning, suffocation, heat prostration, biological contamination, electrocution, and crushing.

- Do not enter the cylinder until it has been thoroughly purged, flushed, drained, cooled, and immobilized.

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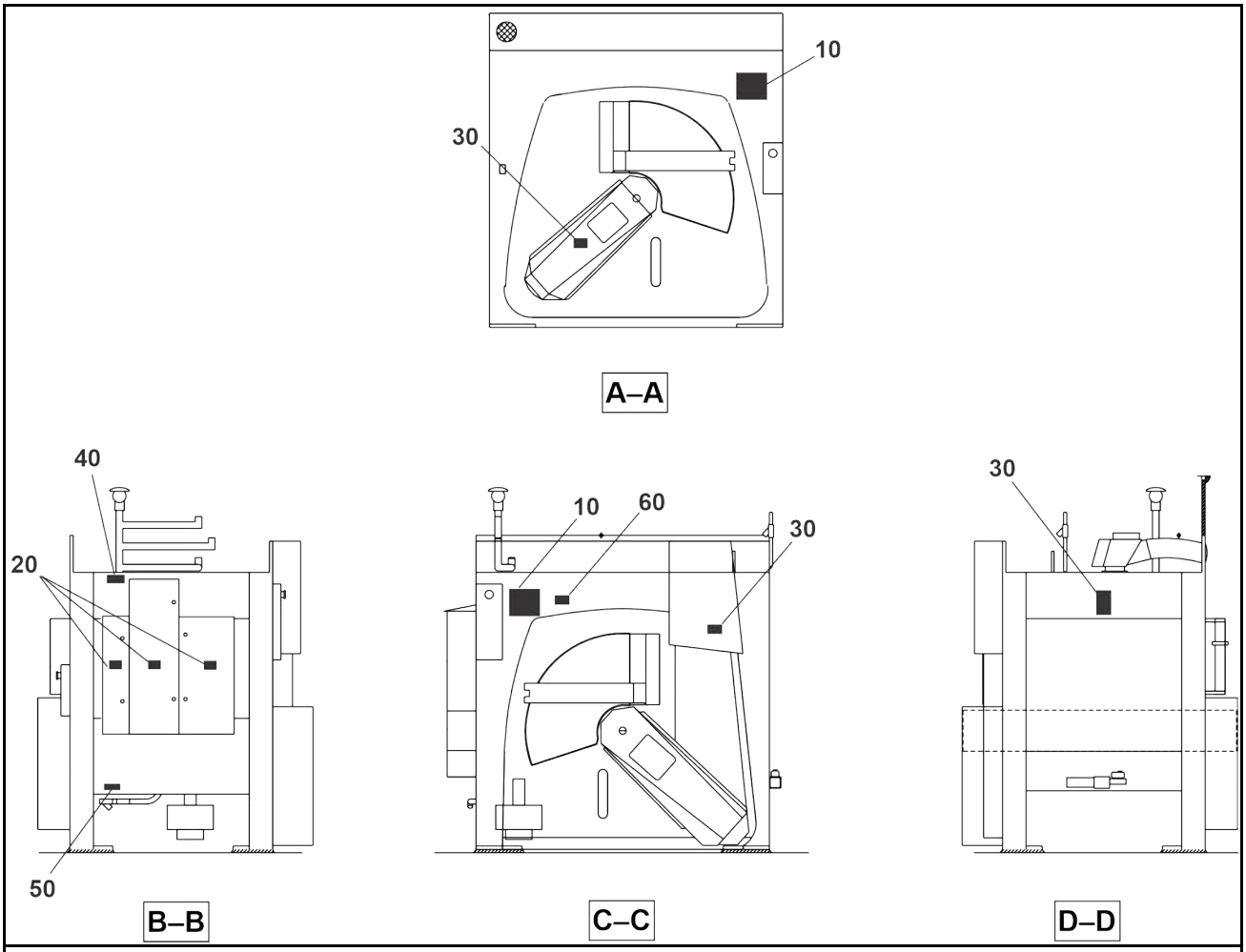
Safety Placard Use and Placement

2 Sheets

60044SR2, 60044SR3, 72044SR2

NOTE: Replace placard immediately, if removed or unreadable. Approximate locations of placards are shown. If aluminum placard, mounting holes are provided on machine. Use #8 self-tapping screws.



Legend

A-A . . Rear view
B-B . . Left view
C-C . . Front view
D-D . . Right view

Safety Placard Use and Placement

2 Sheets

60044SR2, 60044SR3, 72044SR2

Table 2. Parts List—Safety Placard Use and Placement

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Components				
all	10	01 10627A	NPLT:DIV-CYL/STAPH WARN-TCATA	
all	20	01 10377A	NPLT:ELEC HAZARD LG-TCATA	
all	30	01 10689A	NPLT:BELT HAZARD SM TCATA	
all	40	01 10648A	NPLT:GEAR HAZARD-TCATA	
all	50	01 10685A	NPLT:BURN HAZARD-TCATA	
all	60	01 10699B	NPLT:SERV HZRD-ALUM-TCATA	

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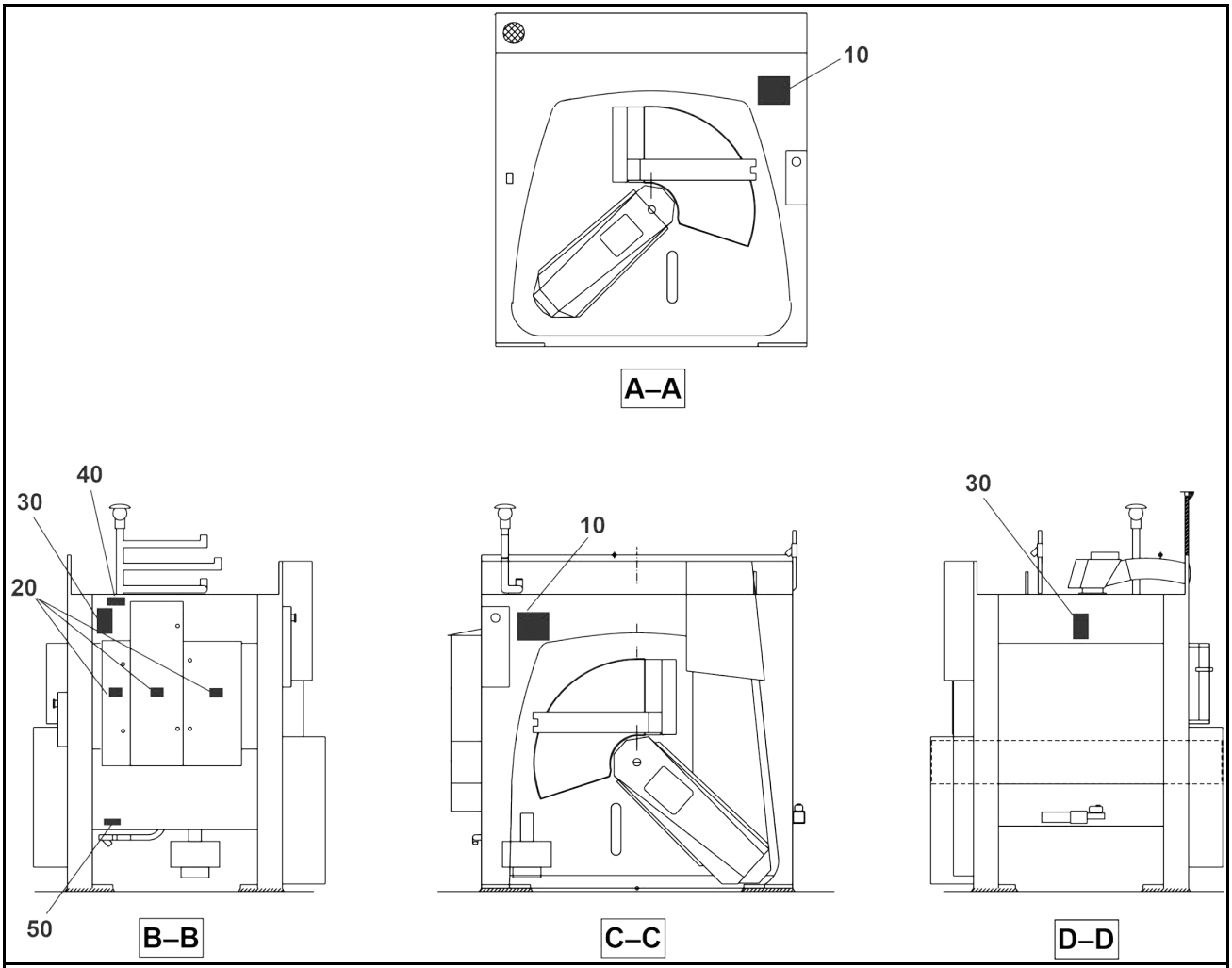
Safety Placard Use and Placement ISO

2 Sheets

60044SR2, 60044SR3, 72044SR2

NOTE: Replace placard immediately, if removed or unreadable. Approximate locations of placards are shown. If aluminum placard, mounting holes are provided on machine. Use #8 self-tapping screws.



Legend

A–A . . Rear view
B–B . . Left view
C–C . . Front view
D–D . . Right view

Safety Placard Use and Placement ISO

2 Sheets

60044SR2, 60044SR3, 72044SR2

Table 3. Parts List—Safety Placard Use and Placement ISO

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Components				
all	10	01 10627X	NPLT:DIVCYL SG WARNING FRT ISO	
all	20	01 10377	NPLTE:"WARNING" 4X4	
all	30	01 10628X	NPLT:NONTILT W/E WARNING SIDE	
all	40	01 10648X	NPLT:ACTUATED VALVE WARN-ISO	
all	50	01 10649X	NPLT:HOT BEHIND CVR WARN-ISO	

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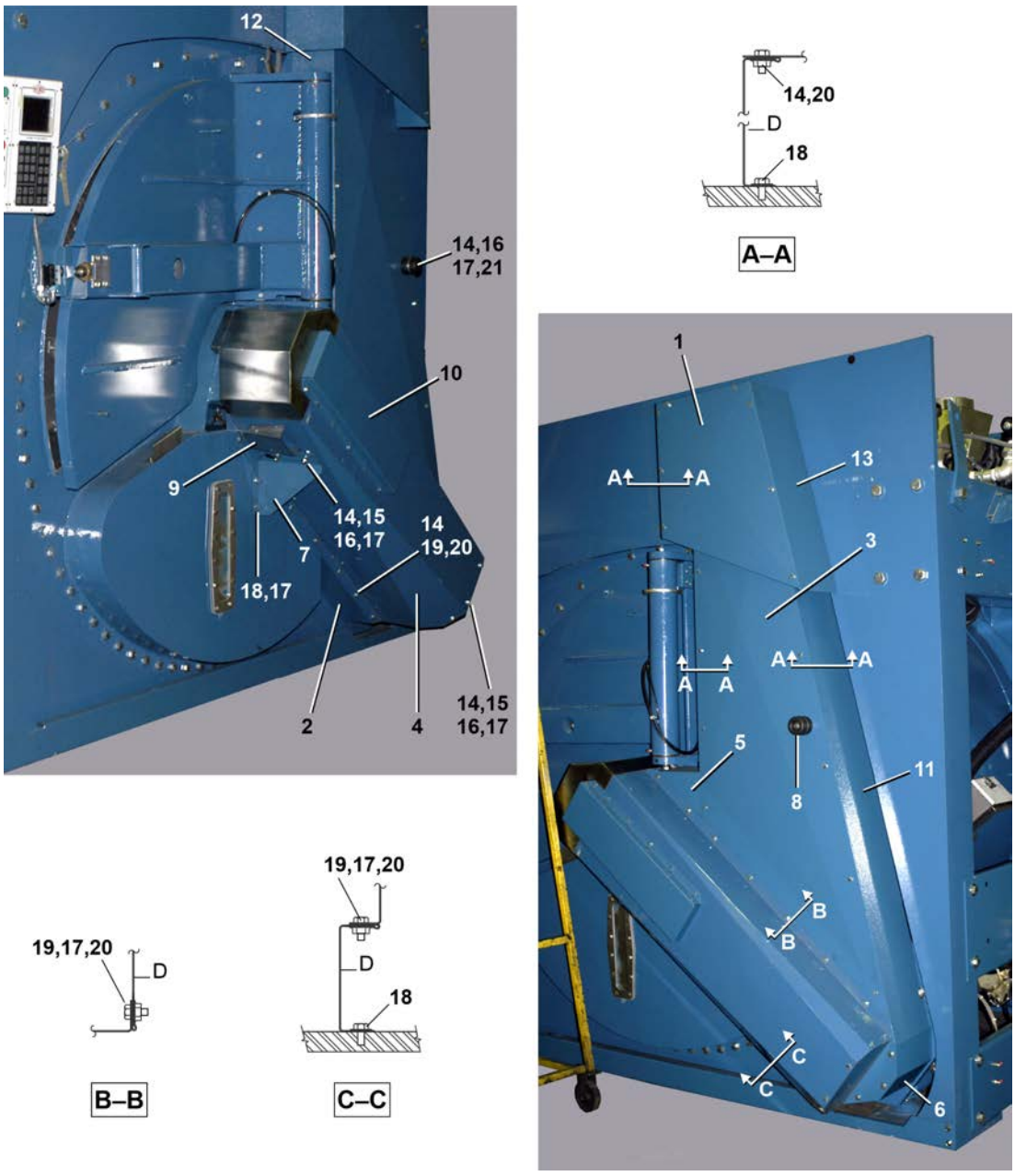
Belt Guards

3 Sheets

72044SR2

Figure 1. Soil Side



Legend

A–A . . Detail view, typical
B–B . . Detail view, typical
C–C . . Detail view, typical
D . . . Inside

Belt Guards

3 Sheets

72044SR2

Figure 2. Clean Side

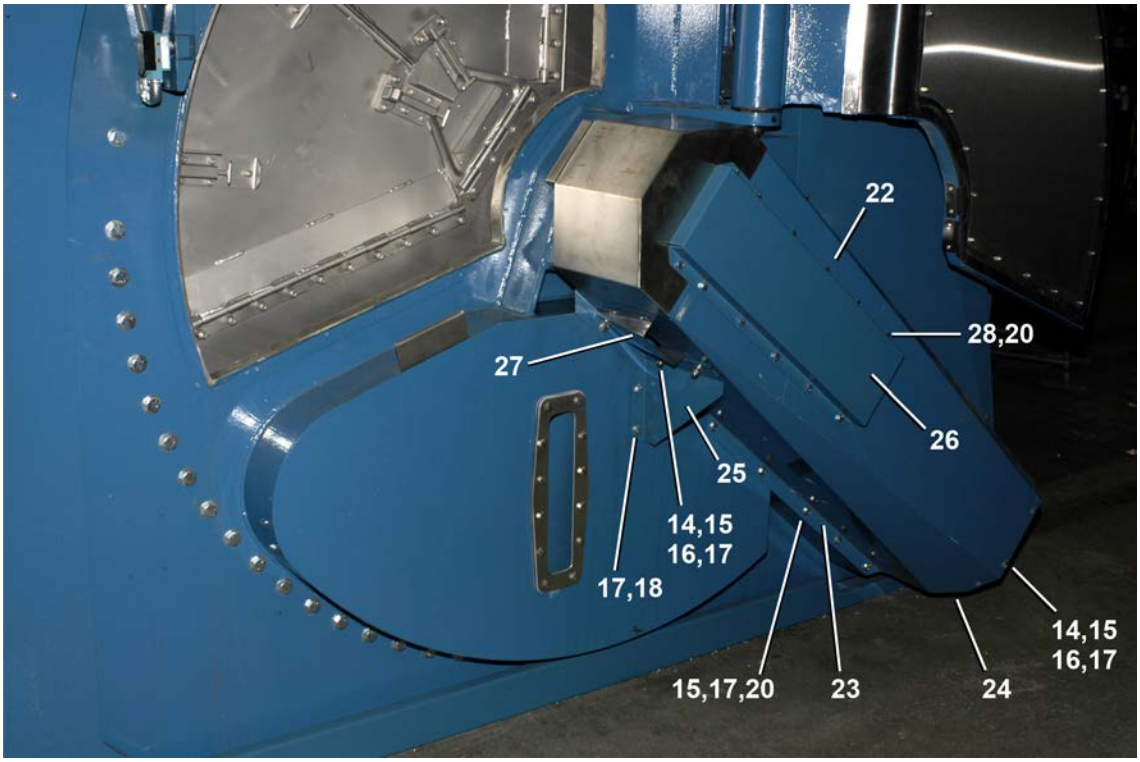


Table 4. Parts List—Belt Guards

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Reference Assemblies				
	A	AD 36 027	BLTGUARD ASSY-SOILSIDE=72"SG	
Components				
all	1	03 06273	HOOD COVER=BELTGUARD SS	
all	2	03 06274A	BOTTOM FILLER BELTGRD 72SGSS	
all	3	03 06275	COVER UPPER-BELTGUARD SS	
all	4	W3 06276	*BELTGUARD WELDMENT SS	
all	5	03 06278	TOP FILLER=BELTGUARD SS	
all	6	03 06279	BOTTOM WELD COVER SS	
all	7	03 06282	SUPPORT=BOTTOM-BELTGUARD SS	
all	8	60C075	TRUCK BUMPER 2+1/2ODW3/8HO.613	
all	9	02 175039	DRIP SHEILD=BELTGD=60+72 SG	
all	10	03 06416	AUTOSPOT COVER BELTGUARD CS	

Belt Guards

3 Sheets

72044SR2

Table 4 Parts List—Belt Guards (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
all	11	03 06269	RIGHT SIDE J=BELTGUARD SS	
all	12	03 06271	LEFT SIDE J=BELTGUARD SS	
all	13	03 06272	HOOD =BELTGUARD SS	
all	14	15K085	HEXCAPSCR 3/8-16UNC2AX3/4 GR5	
all	15	15G205	HXNUT 3/8-16UNC2B ZINC GR2	
all	16	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	17	15U240	FLATWASHER(USS STD) 3/8" ZNC P	
all	18	15P200	TRDCUT-F HXWASHD 3/8-16X3/4NIK	
all	19	15K110	HEXCAPSCR 3/8-16UNC2AX1.5 GR5-	
all	20	17N071	NUT J-TYP #C33896-3816-3B 3/8"	
all	21	15K105	HXCAPSCR 3/8-16UNC2A1.25 GR5 P	
all	22	W3 06270	*BELTGUARD=WELD CS	
all	23	03 06274	BOTTOM FILLER BELTGUARD SS	
all	24	03 06277	BELTGUARD WELD COVER CS	
all	25	03 06281	SUPPORT=BOTTOM BELT GUARD	

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1.4 Torque Requirements for Fasteners

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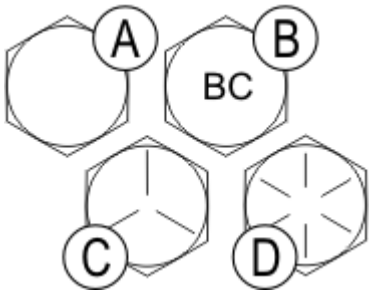
The document about the assembly gives the torque requirements for other fasteners. **If fastener torque specifications or threadlocker requirements in an assembly document are different from this document, use the assembly document.**

Figure 3. The Bolts in Milnor® Equipment

The Marks on Bolt Heads	Legend
	**A . . .** SAE Grades 1 and 2, ASTM A307, and stainless steel **B . . .** Grade BC, ASTM A354 **C . . .** SAE Grade 5, ASTM A449 **D . . .** SAE Grade 8 and ASTM A354 BD

1.4.1 Torque Values

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These tables give the standard dimension, grade, threadlocker, and torque requirements for fasteners frequently used on Milnor® equipment.

NOTE: Data from the Pellerin Milnor® Corporation “Bolt Torque Specification” (bolt_torque_milnor.xls/2002096).

1.4.1.1 Fasteners Made of Carbon Steel

BNUUUN02.C03 0000222448 D.2 B.3 A.3 1/2/20, 2:14 PM Released

1.4.1.1.1 Without a Threadlocker

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Table 5. Torque Values for Standard Fasteners with Maximum 5/16-inch Diameters and No Lubricant

	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
Dimension	Pound-Inches	N-m	Pound-Inches	N-m	Pound-Inches	N-m	Pound-Inches	N-m
1/4 x 20	66	7	101	11	143	16	126	14
1/4 x 28	76	9	116	13	163	18	–	–
5/16 x 18	136	15	209	24	295	33	258	29
5/16 x 24	150	17	232	26	325	37	–	–

Table 6. Torque Values for Standard Fasteners Larger Than 5/16-inch Diameters and No Lubricant

	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
Dimension	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m
3/8 x 16	20	27	31	42	44	59	38	52
3/8 x 24	23	31	35	47	50	68	–	–
7/16 x 14	32	43	49	66	70	95	61	83
7/16 x 20	36	49	55	75	78	105	–	–
1/2 x 13	49	66	75	102	107	145	93	126
1/2 x 20	55	75	85	115	120	163	–	–
9/16 x 12	70	95	109	148	154	209	134	182
9/16 x 18	78	106	121	164	171	232	–	–
5/8 x 11	97	131	150	203	212	287	186	252
5/8 x 18	110	149	170	231	240	325	–	–
3/4 x 10	172	233	266	361	376	510	329	446
3/14 x 16	192	261	297	403	420	569	–	–
7/8 x 9	167	226	429	582	606	821	531	719
7/8 x 14	184	249	473	641	668	906	–	–
1 x 8	250	339	644	873	909	1232	796	1079
1 x 12	274	371	704	954	994	1348	–	–
1 x 14	281	381	723	980	1020	1383	–	–
1 1/8 x 7	354	480	794	1077	1287	1745	1126	1527
1 1/8 x 12	397	538	891	1208	1444	1958	–	–
1 1/4 x 7	500	678	1120	1519	1817	2464	1590	2155
1 1/4 x 12	553	750	1241	1682	2012	2728	–	–
1 3/8 x 6	655	888	1469	1992	2382	3230	2085	2827
1 3/8 x 12	746	1011	1672	2267	2712	3677	–	–
1 1/2 x 6	869	1178	1949	2642	3161	4286	2767	3751
1 1/2 x 12	979	1327	2194	2974	3557	4822	–	–

Table 7. Torque Values for Plated Fasteners with Maximum 5/16-inch Diameters and No Lubricant

	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
Dimension	Pound-Inches	N-m	Pound-Inches	N-m	Pound-Inches	N-m	Pound-Inches	N-m
1/4 x 20	49	6	76	9	107	12	95	11
1/4 x 28	56	6	88	10	122	14	–	–
5/16 x 18	102	12	156	18	222	25	193	22
5/16 x 24	113	13	174	20	245	28	–	–

Table 8. Torque Values for Plated Fasteners Larger Than 5/16-inch Diameters and No Lubricant

Dimension	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m
3/8 x 16	15	20	23	31	33	44	29	38
3/8 x 24	17	23	26	35	37	49	–	–
7/16 x 14	24	32	37	50	52	71	46	61
7/16 x 20	27	36	41	55	58	78	–	–
1/2 x 13	37	49	56	76	80	106	70	93
1/2 x 20	41	55	64	85	90	120	–	–
9/16 x 12	53	70	81	110	115	153	101	134
9/16 x 18	59	79	91	122	128	174	–	–
5/8 x 11	73	97	113	150	159	212	139	186
5/8 x 18	83	110	127	172	180	240	–	–
3/4 x 10	129	173	200	266	282	376	246	329
3/14 x 16	144	192	223	297	315	420	–	–
7/8 x 9	125	166	322	430	455	606	398	531
7/8 x 14	138	184	355	474	501	668	–	–
1 x 8	188	250	483	644	682	909	597	796
1 x 12	205	274	528	716	746	995	–	–
1 x 14	210	280	542	735	765	1037	–	–
1 1/8 x 7	266	354	595	807	966	1288	845	1126
1 1/8 x 12	298	404	668	890	1083	1444	–	–
1 1/4 x 7	375	500	840	1120	1363	1817	1192	1590
1 1/4 x 12	415	553	930	1261	1509	2013	–	–
1 3/8 x 6	491	655	1102	1470	1787	2382	1564	2085
1 3/8 x 12	559	758	1254	1672	2034	2712	–	–
1 1/2 x 6	652	870	1462	1982	2371	3161	2075	2767
1 1/2 x 12	733	994	1645	2194	2668	3557	–	–

1.4.1.1.2 With a Threadlocker

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Table 9. Threadlocker by the Diameter of the Bolt (see below Note)

LocTite Product	Dimension			
	1/4-inch	1/4- to 5/8-inch	5/8- to 7/8-inch	1-inch +
LocTite 222	OK			
LocTite 242		OK		
LocTite 262			OK	
LocTite 272			High temperature	
LocTite 277				OK

NOTE: The acceptable bolt size ranges for various LocTite® threadlocking products is the LocTite manufacturer's **general** recommendation. Specific applications sometime require that a LocTite product is applied to a bolt size outside the ranges shown here. For example, Milnor® specifies LocTite 242 for use on certain 1" bolt applications and has confirmed this usage with the LocTite manufacturer. You may see variances such as this in the documentation for specific machine assemblies.

Table 10. Torque Values if You Apply LocTite 222

	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
Dimension	Pound-Inches	N-m	Pound-Inches	N-m	Pound-Inches	N-m	Pound-Inches	N-m
1/4 x 20	60	7	96	11	132	15	108	12
1/4 x 28	72	8	108	12	144	16	–	–

Table 11. Torque Values if You Apply LocTite 242

	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
Dimension	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m
5/16 x 18	11	15	17	23	25	34	22	30
5/16 x 24	13	18	19	26	27	37	27	37
3/8 x 16	20	27	31	42	44	60	38	52
3/8 x 24	23	31	35	47	50	68	–	–
7/16 x 14	32	43	49	66	70	95	61	83
7/16 x 20	36	49	55	75	78	106	–	–
1/2 x 13	49	66	75	102	107	145	93	126
1/2 x 20	55	75	85	115	120	163	–	–
9/16 x 12	70	95	109	148	154	209	134	182
9/16 x 18	78	106	121	164	171	232	–	–
5/8 x 11	97	132	150	203	212	287	186	252
5/8 x 18	110	149	170	230	240	325	–	–

Table 12. Torque Values if You Apply LocTite 262

	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
Dimension	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m
3/4 x 10	155	210	240	325	338	458	296	401
3/4 x 16	173	235	267	362	378	512	–	–
7/8 x 9	150	203	386	523	546	740	477	647
7/8 x 14	165	224	426	578	601	815	–	–

Table 13. Torque Values if You Apply LocTite 272 (High-Temperature)

	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
Dimension	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m
1 x 8	350	475	901	1222	1272	1725	1114	1510
1 x 12	383	519	986	1337	1392	1887	–	–

Table 13 Torque Values if You Apply LocTite 272 (High-Temperature) (cont'd.)

	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
Dimension	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m
1 x 14	393	533	1012	1372	1428	1936	–	–
1-1/8 x 7	496	672	1111	1506	1802	2443	1577	2138
1-1/8 x 12	556	754	1247	1691	2022	2741	–	–
1-1/4 x 7	700	949	1568	2126	2544	3449	2226	3018
1-1/4 x 12	774	1049	1737	2355	2816	3818	–	–
1-3/8 x 6	917	1243	2056	2788	3335	4522	2919	3958
1-3/8 x 12	1044	1415	2341	3174	3797	5148	–	–
1-1/2 x 6	1217	1650	2729	3700	4426	6001	3873	5251
1-1/2 x 12	1369	1856	3071	4164	4980	6752	–	–

Table 14. Torque Values if You Apply LocTite 277

	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
Dimension	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m
1 x 8	325	441	837	1135	1181	1601	1034	1402
1 x 12	356	483	916	1242	1293	1753	–	–
1 x 14	365	495	939	1273	1326	1798	–	–
1-1/8 x 7	461	625	1032	1399	1674	2270	1464	1985
1-1/8 x 12	516	700	1158	1570	1877	2545	–	–
1-1/4 x 7	650	881	1456	1974	2362	3202	2067	2802
1-1/4 x 12	719	975	1613	2187	2615	3545	–	–
1-3/8 x 6	851	1154	1909	2588	3097	4199	2710	3674
1-3/8 x 12	970	1315	2174	2948	3526	4781	–	–
1-1/2 x 6	1130	1532	2534	3436	4110	5572	3597	4877
1-1/2 x 12	1271	1723	2852	3867	4624	6269	–	–

1.4.1.2 Stainless Steel Fasteners

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Table 15. Torque Values for Stainless Steel Fasteners 5/16-inch and Smaller

	316 Stainless		18-8 Stainless		18-8 Stainless with Loctite 767	
Dimension	Pound-Inches	N-m	Pound-Inches	N-m	Pound-Inches	N-m
1/4 x 20	79	9	76	9	45	5
1/4 x 28	100	11	94	11	56	6
5/16 x 18	138	16	132	15	79	9
5/16 x 24	148	17	142	16	85	10

Table 16. Torque Values for Stainless Steel Fasteners Larger Than 5/16-inch

Dimension	316 Stainless		18-8 Stainless		18-8 Stainless with Loctite 767	
	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m
3/8 x 16	21	28	20	27	12	16
3/8 x 24	23	31	22	29	13	18
7/16 x 14	33	44	31	42	19	25
7/16 x 20	35	47	33	45	20	27
1/2 x 13	45	61	43	58	26	35
1/2 x 20	47	64	45	61	27	37
9/16 x 12	59	81	57	77	34	46
9/16 x 18	66	89	63	85	38	51
5/8 x 11	97	131	93	125	56	75
5/8 x 18	108	150	104	141	62	84
3/4 x 10	132	179	128	173	77	104
3/4 x 16	130	176	124	168	75	101
7/8 x 9	203	275	194	263	116	158
7/8 x 14	202	273	193	262	116	157
1 x 8	300	406	287	389	172	233
1 x 14	271	367	259	351	156	211
1-1/8 x 7	432	586	413	560	248	336
1-1/8 x 12	408	553	390	529	234	317
1-1/4 x 7	546	740	523	709	314	425
1-1/4 x 12	504	683	480	651	288	390
1-1/2 x 6	930	1261	888	1204	533	722
1-1/2 x 12	732	992	703	953	422	572

1.4.2 Preparation

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WARNING: Fire Hazard — Some solvents and primers are flammable.

- Use threadlocker and primers with sufficient airflow.
- Do not use flammable material near ignition sources.

1. Clean all threads with a wire brush or a different tool.
2. Remove the grease from the fasteners and the mating threads with solvent. Make the parts dry.

NOTE: LocTite 7649 Primer™ or standard solvents will remove grease from parts.

3. Apply a spray of LocTite 7649 Primer™ or equal on the fasteners and the mating threads. Let the primer dry for one minute minimum.

1.4.3 How to Apply a Threadlocker

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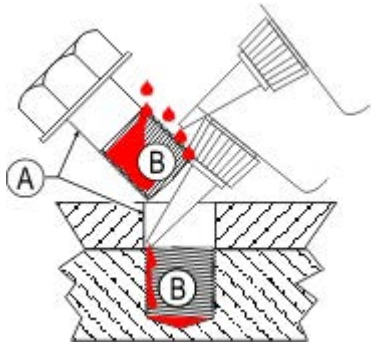
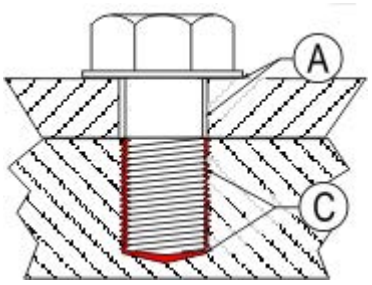
CAUTION: **Malfunction Hazard —** Heat, vibration, or mechanical shocks can let the fasteners loosen if you do not apply the threadlocker correctly. Loose fasteners can cause malfunctions of the equipment.

▶ Read the threadlocker manufacturer's instructions and warnings. Obey these instructions.

Apply the threadlocker only to the areas where the fastener threads and the mating threads engage.

Figure 4. Apply Threadlocker in a Blind Hole

Application	Coverage
	

Legend

A . . . No threadlocker here
B . . . Apply here
C . . . Fill all space with threadlocker

1.4.3.1 Blind Holes

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1. Apply the threadlocker down the threads to the bottom of the hole.
2. Apply the threadlocker to the bolt.
3. Tighten the bolt to the value shown in the correct table (Table 9: Threadlocker by the Diameter of the Bolt (see below Note), page 25 to Table 15: Torque Values for Stainless Steel Fasteners 5/16-inch and Smaller, page 27).

1.4.3.2 Through Holes

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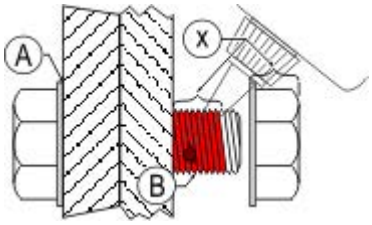
1. Put the bolt through the assembly.
2. Apply the threadlocker only to the bolt thread area that will engage the nut.

3. Tighten the bolt to the value shown in the correct table (Table 9: Threadlocker by the Diameter of the Bolt (see below Note), page 25 to Table 15: Torque Values for Stainless Steel Fasteners 5/16-inch and Smaller, page 27).

Figure 5. Apply Threadlocker in a Through Hole

Application	Legend
	**A . . .** No threadlocker here **B . . .** Apply the threadlocker to this area **X . . .** Nut depth

1.4.3.3 Disassembly

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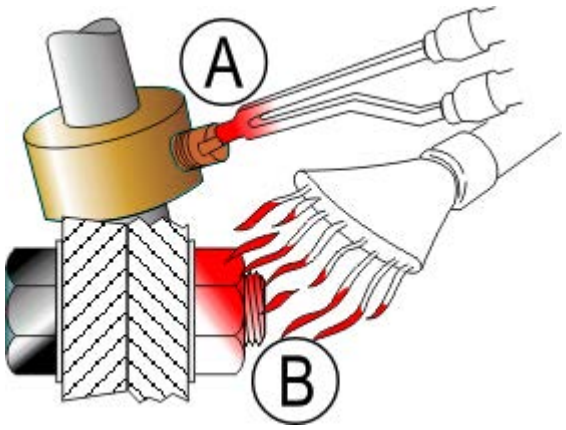
For high-strength threadlocker, apply heat for five minutes. Disassemble with hand tools while the parts are hot.

For low-strength and moderate-strength threadlocker, disassemble with hand tools.

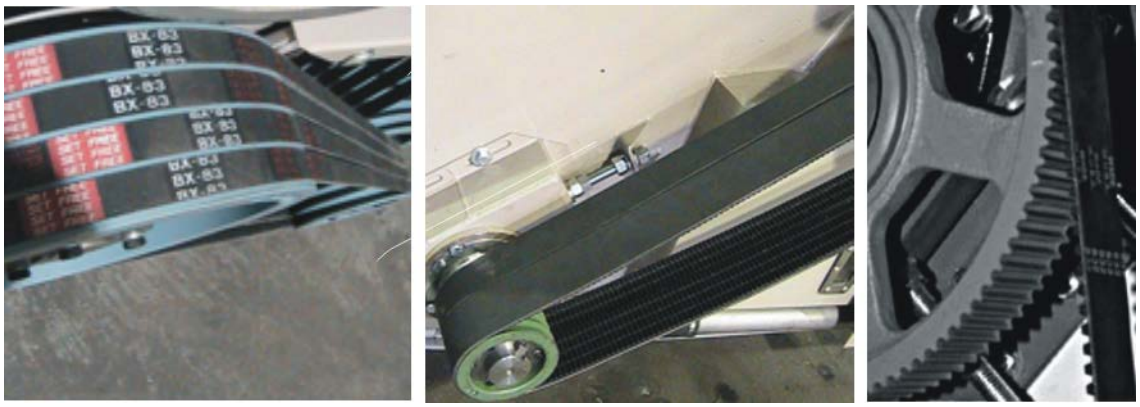
Figure 6. Use heat for disassembly of fasteners with threadlocker.

Apply Heat to a Small Area	Legend
	**A . . .** How to apply heat to a small fastener **B . . .** How to apply heat to a large fastener

2 Drive Assemblies

2.1 Drive Pulley and Belt Maintenance

Figure 7. Examples of drives this instruction applies to: one or more V-belts, attached V-belts and tooth belts



NOTICE: "Remove power from the machine" means use the necessary safety procedure for your location. In the USA, this is the OSHA lockout/tagout (LOTO) procedure. More local requirements can also apply.

WARNING: **Risk of Injury or death** — A machine in operation without safety guards is dangerous. Drive belts can pull in your body or clothing.

- Remove power from the machine when you do work on the mechanisms.
- Stay out of the machine frame when you do a test on the machine.
- Replace all covers before you put the machine into operation.

TIP: Read these documents from the Gates Corporation (`www.gates.com`) to know more about pulley and belt maintenance: "Belt Drive Preventive Maintenance & Safety Manual" and "Preserve your investment - Check Engine Belts Often."

2.1.1 Pulley Requirements

- Keep pulleys free of dirt, oil and other contamination.
- Replace pulleys with groove damage.
- Align pulleys and shafts.
- Keep run-out in tolerance.

2.1.1.1 Condition of Grooves on Pulleys

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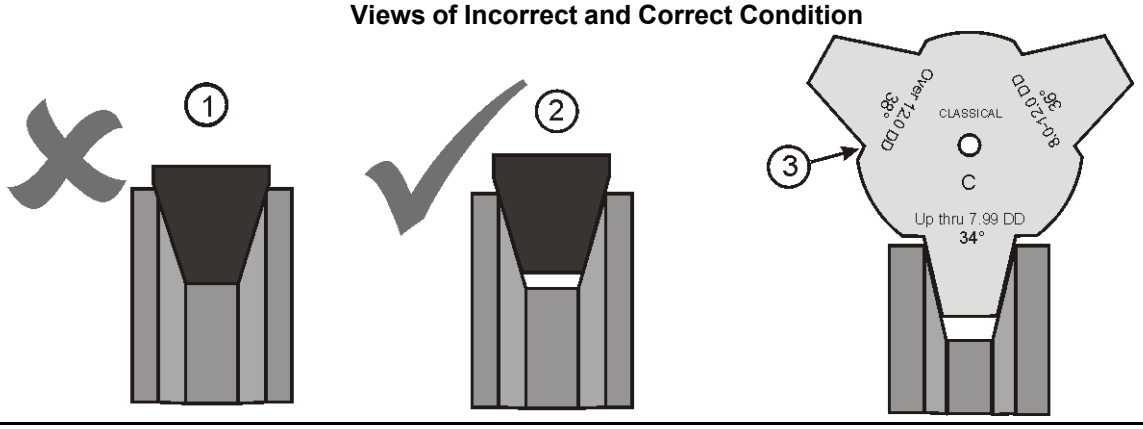
Replace a pulley if:

- the grooves have burrs, cracks, or worn areas that can cause damage to the belts.
- the belts touch the bottom of the groove at any point (Figure 8, page 32).

Figure 8. Pulley Groove Condition



Legend

1. Incorrect: Too much pulley wear. The belt touches the bottom of the groove.
2. Correct: The belt does not touch the bottom of the groove.
3. Use a sheave (pulley) gage to see if grooves are worn.

2.1.1.2 Pulley and Shaft Position

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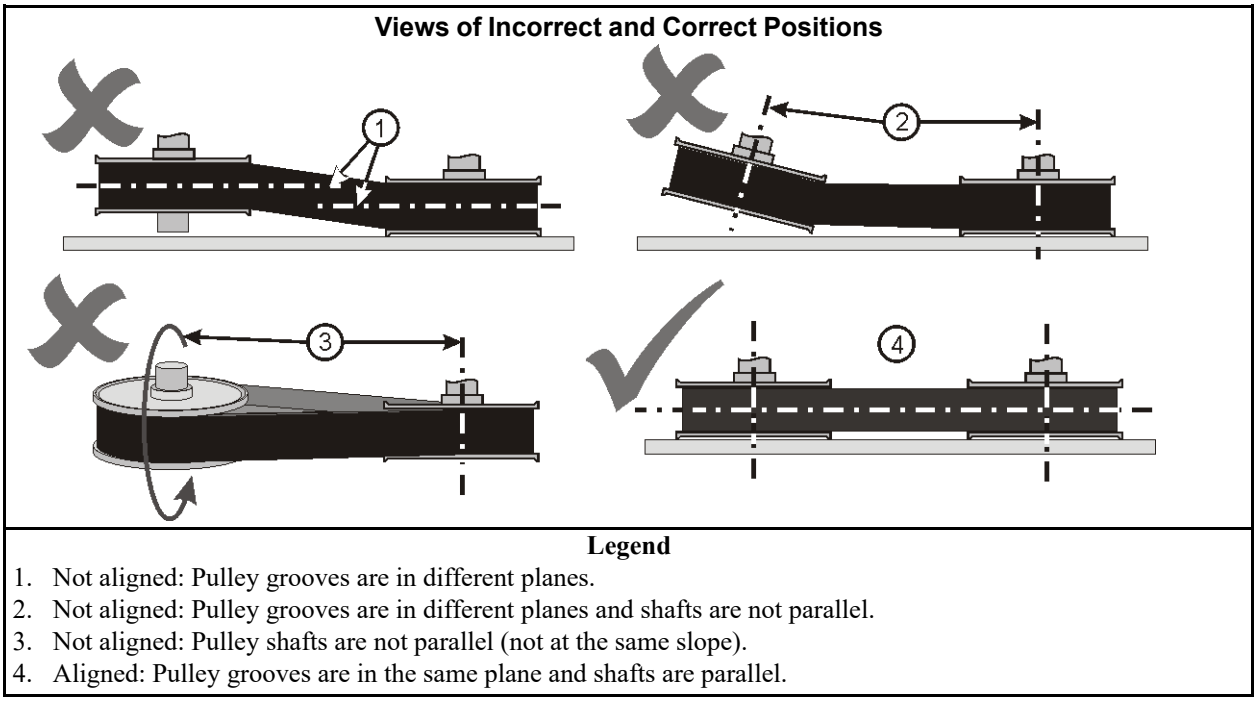
Align To adjust parts until they are in a correct position to other parts.

- Always align components when you replace a motor, bearing housing, pulley, or belt.
- The belts must not twist or make unusual noises or show vibration.

Figure 9. Pulley and Shaft Position



Legend

1. Not aligned: Pulley grooves are in different planes.
2. Not aligned: Pulley grooves are in different planes and shafts are not parallel.
3. Not aligned: Pulley shafts are not parallel (not at the same slope).
4. Aligned: Pulley grooves are in the same plane and shafts are parallel.

2.1.1.3 Keep Run-Out in Tolerance

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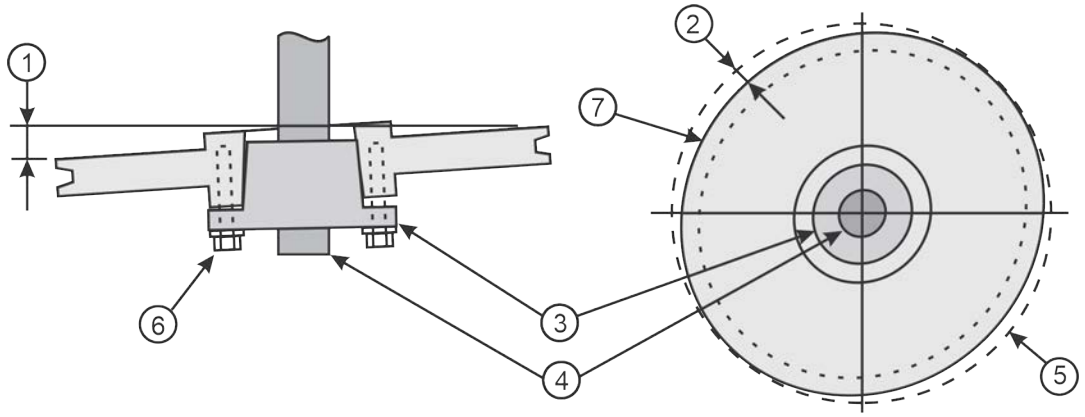
Axial run-out The difference between the minimum and maximum distance between the face of a pulley and a plane perpendicular to the pulley shaft (Figure 10, page 34, item 1). Incorrect installation or damage can cause a pulley to be not at a 90 degree angle to the shaft.

Radial run-out The difference between the minimum and maximum diameter in one turn (Figure 10, page 34, item 2). If a force causes damage to a pulley, it can bend. It will not have a circular shape.

Figure 10. Run-out

Views of Axial and Radial Run-out

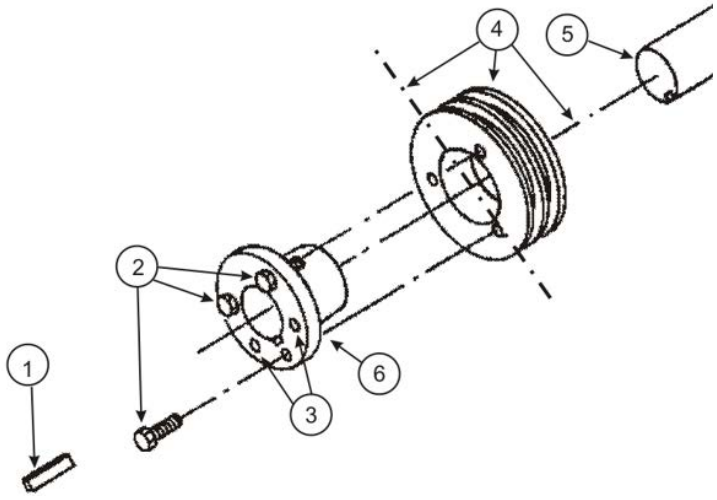


Legend

1. Axial run-out. This pulley is bent or not perpendicular to the shaft. This condition must not be more than 1 mil for each inch (0.1 mm for each dm) of the pulley diameter.
2. Radial run-out. This pulley is not circular. This condition must be less than 10 mils (0.25 mm).
3. Bushing
4. Shaft
5. A circle
6. Bushing bolts
7. Sheave

Figure 11. Typical Pulley Assembly

View of Pulley Components



Legend

1. Key
2. Bushing bolts. Tighten bolts in a pattern that gives the same torque. This will give minimum axial run-out.
3. Push-off holes
4. Pulley. Measure the radial run-out of the pulley after you assemble. Make sure that the center of the pulley is the same as the center of the shaft.
5. Shaft. Make sure that the shaft is not bent.
6. Bushing

2.1.2 Belt Requirements

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- Replace damaged belts.
- The pulleys must stay aligned when you adjust the belt tension.
- Do not use belts made from cut belts.

- For a drive with more than one belt:
  - Replace all of the belts together.
  - Do not mix new and used belts.
  - Do not mix belts from more than one manufacturer.

CAUTION: **Risk of damage —** A screwdriver or metal tool can cause damage to the belt.

- ▶ Do not push the belt on with a tool.

2.1.2.1 Condition of Belts

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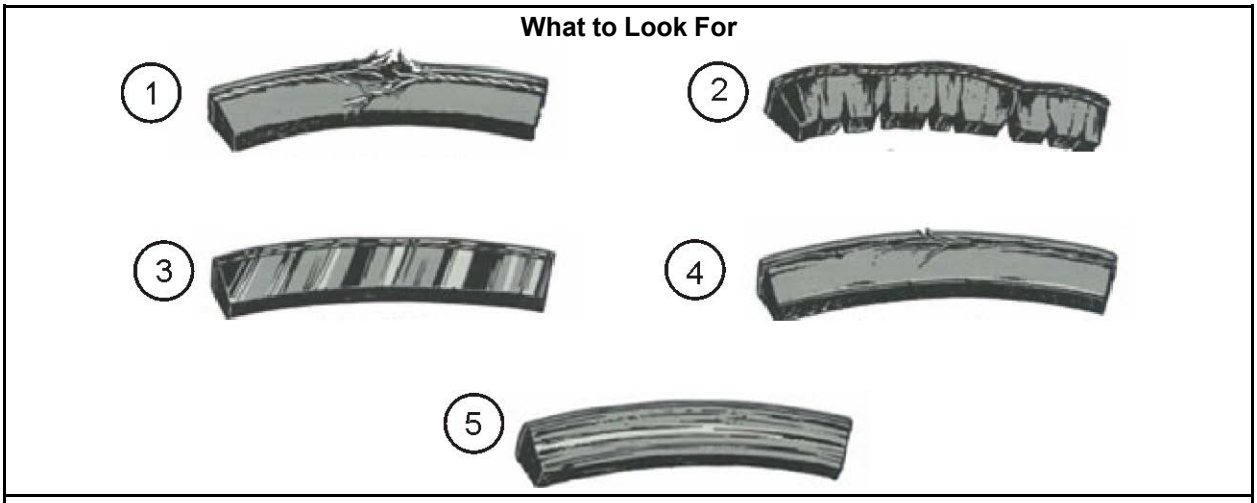
Slippage when the pulley turns more quickly than the belt can move

Slippage occurs if belts are not aligned (see Section 2.1.1.2 , page 32) or by incorrect tension explained in Section 2.1.1.2 , page 32. Slippage can cause belts to become too hot. Belts must not have a temperature more than than 140F (60° C).

TIP: The belt storage area must be cool and dry with no sun light.

TIP: New and used belts can look the same. These belts will have different strength properties and a small difference in length.

Figure 12. Types of Belt Damage



Legend

1. Broken cord—The belt was pushed across the groove with a metal tool.
2. Cracks—The belt is too large for the pulley.
3. Shiny sidewalls—slippage, oil, grease.
4. The belt layers disconnect—oil, grease.
5. Bands on sidewalls—rough surface or particles in the pulley groove.

2.1.2.2 Tension of Belts

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This data does not apply to belts where a spring holds the correct belt tension. Manual tension adjustment is not necessary for this type of drive.

The correct belt tension is the lowest tension that prevents belt slippage with a full load condition. If the belt is too tight, this can cause damage to the belt, the pulleys, bearings, and other drive components. If the belt is too loose, this can cause belt slippage. Incorrect belt tension or belt slippage can cause components to make an unusual noise.

When you install a new belt, use these rules to get the correct belt tension:

- Set the tension of the belt when you replace a motor, bearing housing, pulley, or belt.
- Replace all belts on a pair of pulleys when you replace one of them.
- After adjustment, operate the machine in all of its standard conditions to make sure that the belt operates correctly. For example, operate a washer-extractor in its full speed range with a full load of wet goods.
- Adjust the tension when you first install a belt. Do the adjustment again after 24 and 48 hours of operation. All belts will become longer after a short time. A V-belt will move down in the grooves of the pulleys. These conditions will cause the tension to decrease.

When you do scheduled maintenance, examine the belts for correct tension. With operation, belts become longer.

2.1.3 The pulleys must stay aligned when you adjust the belt tension

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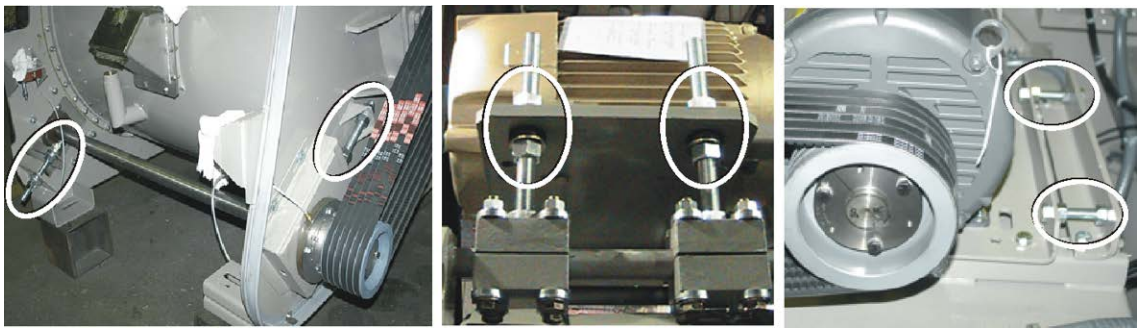
Some tension mechanisms do not have an effect on pulley and shaft requirements. Pulleys will stay aligned when you adjust them. Figure 13, page 37 is an example of these. Where tension mechanisms are a pair of threaded rods, you must adjust the nut, on each rod carefully. If not, the pulleys will not stay aligned. Examples of this type are shown in Figure 14, page 37.

Figure 13. A Tension Mechanism that will not Change the Angle of the Pulleys

Figure 14. Some Pairs of Tension Mechanisms that Can Change the Angle of the Pulleys



2.1.4 How to Do Maintenance on Pulleys and Belts

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Table 17. Typical Tools for Pulley and Belt Maintenance

Tool	Function	Related Data
Torque wrench	Make the bushing bolts the same torque to get the minimum axial run-out.	Figure 11, page 34, item 2
Laser, straight edge, or string	Align pulleys	Tools are listed in order of preference. Section 2.1.1.2 , page 32 and Figure 15, page 39
Bubble level	Align shafts	Section 2.1.1.2 , page 32 and Figure 16, page 40
Dial indicator	Measure run-out	Section 2.1.1.3 , page 33 and Figure 17, page 40

Table 17 Typical Tools for Pulley and Belt Maintenance (cont'd.)

Tool	Function	Related Data
Sheave (pulley) gage	Examine pulley wear	Figure 8, page 32.
Infrared thermometer	Examine belt temperature	Section 2.1.2.1 , page 35.

2.1.4.1 Typical Steps to Replace Pulleys and Belts

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Preparation Remove power from the machine.

Belt removal Use the belt tension mechanism to decrease the distance between the pulleys until you have sufficient clearance. Figure 13, page 37 and Figure 14, page 37 show typical belt tension mechanisms.

Pulley removal On the typical type of pulley and bushing shown in Figure 11, page 34, use the push-off holes to remove the pulley easily. On special types of pulleys (example: large drive pulley and cone), look at the parts document in the maintenance manual for more data. Some pulleys are too heavy for only one person to hold.

Pulley installation Figure 11, page 34 shows the typical pulley and bushing components. Make sure that you keep run-out tolerances when you assemble and tighten the components.

Belt installation Decrease the distance between the pulleys to put the belt on easily. Assemble the components carefully. Make sure that the components are aligned. Adjust the belt tension so the belt is tight.

Test Before you connect power again, make sure that you remove all tools. Operate the machine with a full load. If the belts slip, increase belt tension with the machine shut down and power removed. Then test again. Make sure that the machine is safe before you put it into regular operation.

2.1.4.2 Examples of Procedures Used at the Milnor® Factory to Align Pulleys

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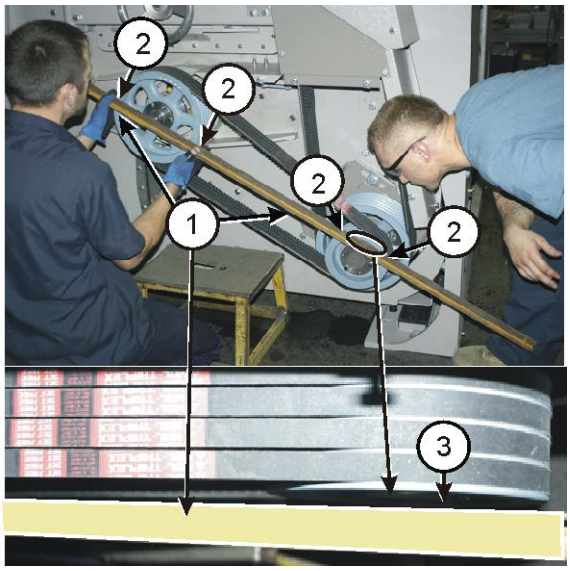
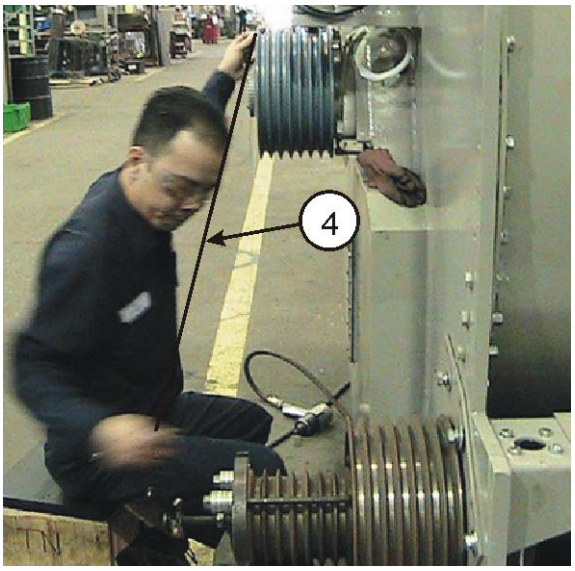
Figure 15. Use a straight edge, a string, or a laser to make sure that all pulleys are in the same plane.

Straight edge



String



Legend

1. Straight edge.
2. Four points where the straight edge must touch the pulleys.
3. Space between the straight edge and the pulley. This shows that the pulleys are not in the same plane.
4. You can use a string as a straight edge if you hold it tight.
5. Magnet-mounted laser
6. Three targets to point the laser at.

Laser

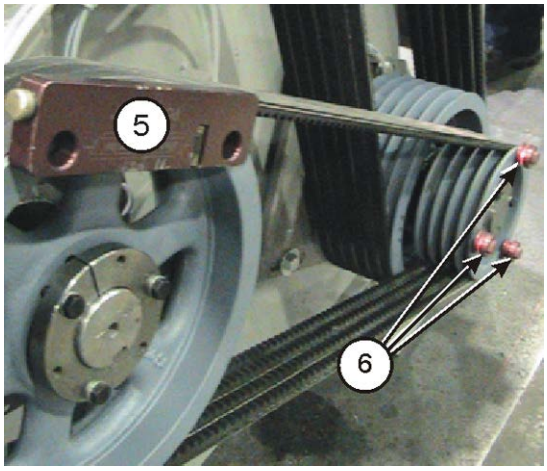
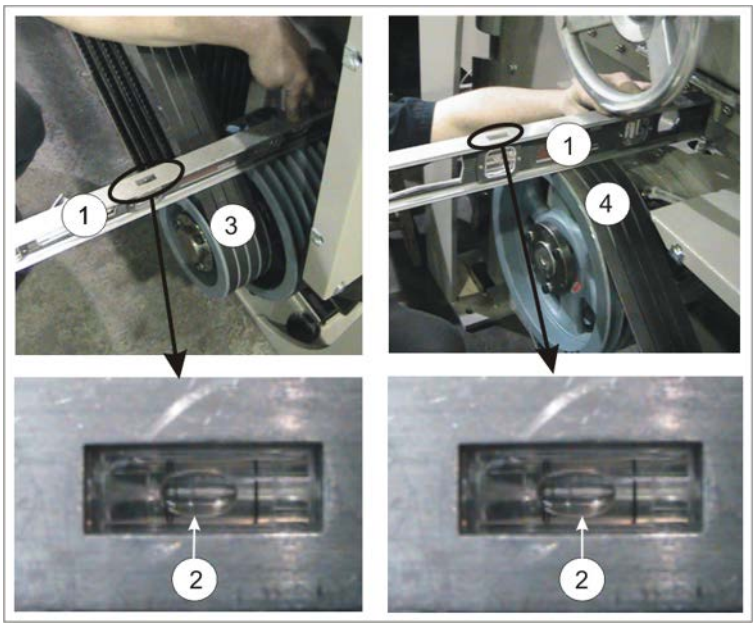


Figure 16. Use a level to make sure that the pulleys are at the same slope.

A level on the top of two pulleys

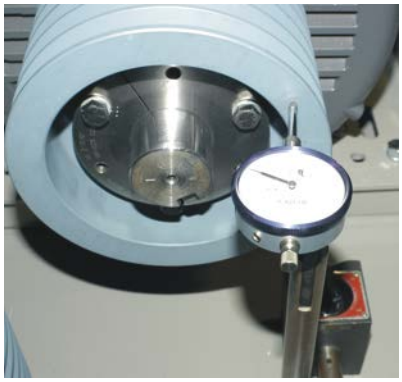


Legend

1. Bubble level: Use this tool to make sure that the slopes of pulleys are equal. This is to make sure that you do not have the condition in Figure 9, page 33, item 3. Mechanisms shown in Figure 14, page 37 can change the pulley slopes.
2. If the slopes of the pulleys are equal, the bubble will be in the same position for each pulley. The bubbles do not have to be in the center of the level.
3. A pulley
4. A second pulley on the same drive

Figure 17. Dial indicator used to find the axial and radial run-out of a pulley.

Axial Run-out (1)



Radial Run-out (2)

Legend

1. Dial indicator in position to measure axial run-out
2. Dial indicator in position to measure radial run-out

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2.2 Disk Brake Maintenance

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NOTICE: "Remove power from the machine" means use the necessary safety procedure for your location. In the USA, this is the OSHA lockout/tagout (LOTO) procedure. More local requirements can also apply.

You can do these types of maintenance on the disk brake:

- do an inspection of the brake as specified in the maintenance schedule,
- replace the friction pads,

- do an overhaul on the calipers,
- replace the hydraulic fluid,
- adjust the connection between the brake cylinder and the air cylinder.

For the first four types of maintenance, you must remove air from (bleed) the hydraulic circuit.

Section 2.2.6 : Operation of Brake Systems, page 52 tells how to operate the disk brakes. You can use it in some of the types of maintenance in this procedure.

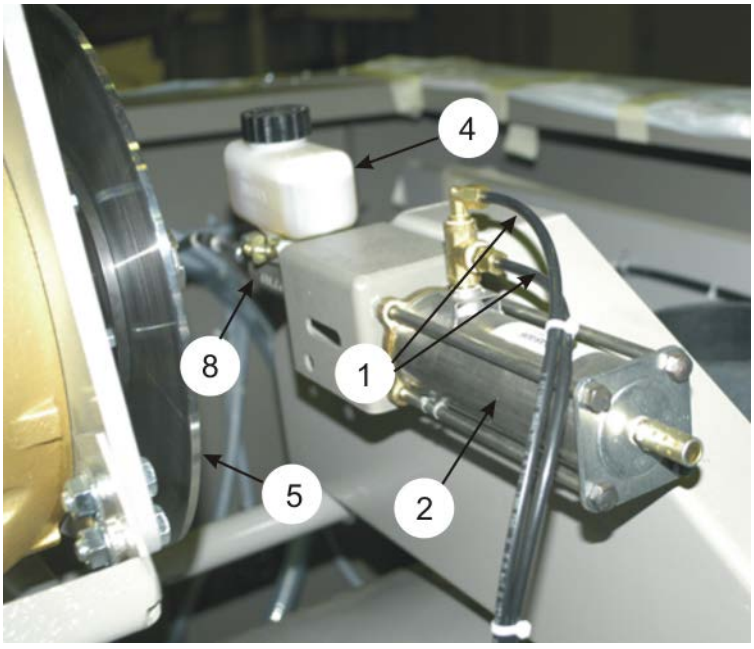
WARNING: **Risk of injury or death —** A machine in operation without safety guards is dangerous.

- ▶ You must be an approved maintenance technician.
- ▶ Use special caution when this instruction tells you to do work with electrical power on. Remove power from the machine for all other maintenance. Obey safety codes.
- ▶ Replace all guards and covers.

TIP: During parts of this procedure when you open up the calipers or hydraulic lines, put a cloth under the calipers to catch hydraulic fluid and parts that will fall. For safety, fully remove spilled hydraulic fluid after brake maintenance. This will help you easily identify leaks.

Figure 18. A typical hydraulic brake system

The air cylinder

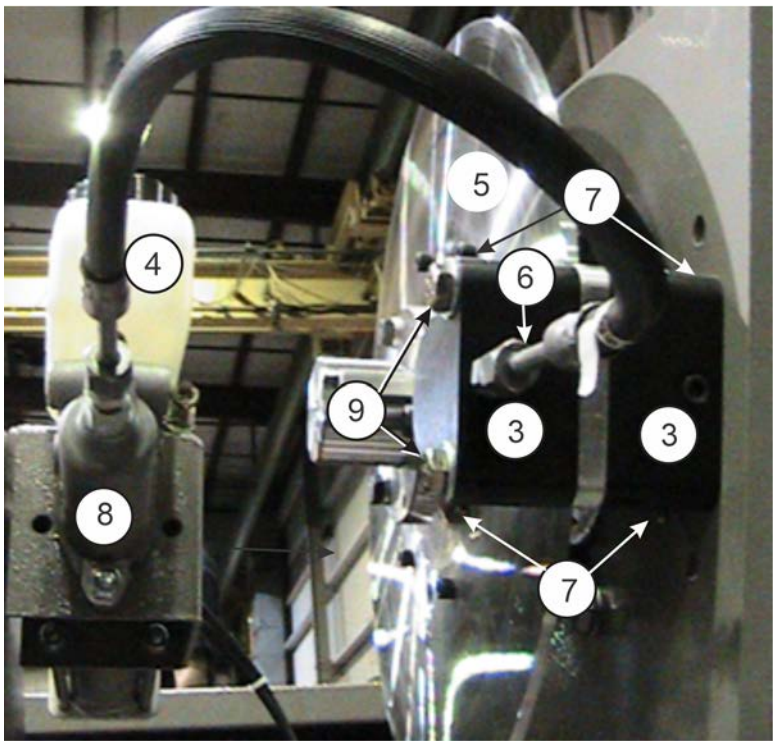


Legend

1. Tubing for air
2. Air cylinder
3. Caliper body halves (Figure 19, page 45, item 2)
4. Hydraulic reservoir
5. Rotor disk
6. Hydraulic inlet
7. Valves to drain fluid and bleed the brake
8. Hydraulic cylinder
9. Bolts to attach the caliper (Figure 19, page 45, item 1)

A typical hydraulic brake system (cont'd.)

The hydraulic cylinder and the caliper



2.2.1 The Inspection of the Brake

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NOTE: The brakes shown in this document can look different from your equipment.

NOTE: Do this inspection when the maintenance schedule tells it is necessary. Do this inspection after you replace friction pads or do a caliper overhaul.

1. Examine the fluid in the reservoir. Change the hydraulic fluid if it smells, has contamination, or has an unusual color. See Section 2.2.4 : How to Change Hydraulic Fluid and Remove (Bleed) Air from the Brake Circuit , page 46.

   NOTE: Brake fluid can become defective from heat in the brake system. Brake fluid absorbs water from air. Water in the brake system causes corrosion.

   If necessary, add new DOT 3 fluid to 0.25 inch (6.35 millimeters) from the top of the reservoir. Follow the precautions on the container.

2. Examine the rotor disk surface (Figure 18: A typical hydraulic brake system, page 41 , item 5). Replace the disk if it is worn or if it is not flat.

3. Examine the brake pads (Figure 19: The Caliper Components, page 45 , item 4). To do this, you will remove/replace the calipers and bleed the hydraulic system. See Section 2.2.3 : How

to Do a Caliper Overhaul, page 45 and Section 2.2.4 : How to Change Hydraulic Fluid and Remove (Bleed) Air from the Brake Circuit , page 46.

a. **Remove power from the machine (see above notice).**
b. Remove the bolts (Figure 18, page 41, item 9) that attach the caliper halves (Figure 18, page 41, item 7).
c. Remove the caliper halves.
d. Replace the pads as told in Section 2.2.2 : How to Do a Friction Pad Replacement, page 43 if
   - the pads make an unusual noise when you apply the brake
   - if the rotor is worn or damaged
   - if the pad thickness is less than 1/16 inches (2 mm) (Figure 19, page 45, item 14) above the mounting screw (Figure 19, page 45, item 3). Always replace the two brake pads at the same time.
e. Put the caliper halves in their positions on the brake assembly. Tighten the mounting bolts to 30 foot-pounds (41 Newton-meters).
f. Bleed the hydraulic systems as told in Section 2.2.4 : How to Change Hydraulic Fluid and Remove (Bleed) Air from the Brake Circuit , page 46.
g. Supply electrical power to the machine.

4. Examine the condition of all of the brake system.
   a. Make sure that brake mounting components are tightly installed.
   b. Make sure that fittings are tight. Make sure that there are no leaks.

2.2.2 How to Do a Friction Pad Replacement

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You must have the necessary replacement friction pads for your machine. Refer to the brake parts document in your machine manual. You will find part numbers for components or overhaul/repair kits. The overhaul/repair kit contains O-rings, pads, and other components.

1. **Remove power from the machine (see above notice).**
2. Remove the used fluid. See Section 2.2.4 : How to Change Hydraulic Fluid and Remove (Bleed) Air from the Brake Circuit , page 46.
3. Remove the two bolts that attach the caliper (Figure 18, page 41, item 9) and the two caliper halves (Figure 18, page 41, item 3) to get access to the friction pads. Do not disconnect the hydraulic line (Figure 18, page 41, item 6).
4. If there are leaks, see Section 2.2.3 : How to Do a Caliper Overhaul, page 45 before you continue.
5. Replace each friction pad:
   a. Remove the brass screw (Figure 19, page 45, item 3) that attaches the pad to the piston.
   b. Attach the new pad to the piston. Tighten the screw.
   c. Make sure that the screw head is fully in the recess in the pad.

6. Make sure that the connection o-rings are clean and in their positions (Figure 19, page 45, item 7).
7. Put the caliper halves in their positions on the brake assembly. Tighten the mounting bolts to 30 foot-pounds (41 Newton-meters).
8. Bleed the brake. See Section 2.2.4 : How to Change Hydraulic Fluid and Remove (Bleed) Air from the Brake Circuit , page 46.
9. Supply electrical power to the machine.

2.2.3 How to Do a Caliper Overhaul

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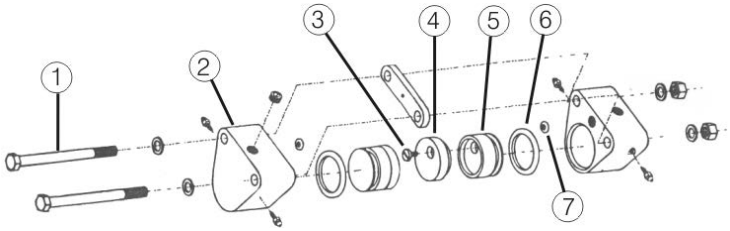
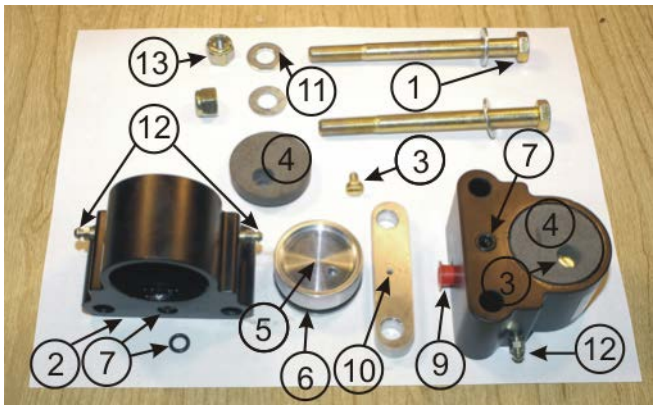
Figure 19. The Caliper Components

The Expanded View (Shows the Piston and the O-rings)



The Caliper and the Pad



Legend

1. The bolts to attach the caliper (Figure 18, page 41, item 9)
2. Caliper body halves (Figure 18, page 41, item 3)
3. Brass screw
4. Friction pad
5. Piston
6. The Piston O-ring
7. The connection O-ring and its position
8. Plug for the hydraulic inlet
9. A hydraulic inlet (connected on one caliper, a plug (item 8) on the other)
10. The hole in the spacer
11. Washer
12. One of the four valves to bleed the fluid
13. Nut
14. The pad thickness must be more than than 1/16 inches (2 mm) above item 3

Fittings for the Hydraulic Inlet

Look at the pad thickness above the top of the screw

TIP: Hydraulic fluid flows from one caliper to the other caliper. Fluid flows through the connection O-rings (Figure 19, page 45, item 7) and the hole in the spacer (Figure 19, page 45, item 10). When you disconnect the calipers, hydraulic fluid can flow from the hole at the connection O-rings. Air can get in the line. After you connect the calipers, you must bleed the system.

You must have the necessary kit for the overhaul of your machine. Refer to the brake parts document in your machine's manual.

1. **Remove power from the machine (see above notice).**
2. Get access to the caliper halves (see Section 2.2.2 : How to Do a Friction Pad Replacement, page 43).
3. Do an overhaul on each caliper:
   a. Remove and discard the connection O-rings (Figure 19, page 45, item 7) on the caliper bodies.
   b. Apply compressed air to the fitting for the hydraulic inlets (see Figure 19, page 45, item 8) to push the pistons out.
   c. Replace the piston O-rings (Figure 19, page 45, item 6).
   d. Put the pistons in the caliper body. Carefully tap the pistons with a wood or rubber hammer to install it.
   e. Replace the connection O-rings. (Figure 19, page 45, item 7)
   f. Replace the friction pads (see Section 2.2.2 : How to Do a Friction Pad Replacement, page 43).
4. Replace the caliper halves as specified in Section 2.2.2 : How to Do a Friction Pad Replacement, page 43.
5. Bleed the brake circuit (see Section 2.2.4 : How to Change Hydraulic Fluid and Remove (Bleed) Air from the Brake Circuit , page 46).
6. Supply electrical power to the machine.

2.2.4 How to Change Hydraulic Fluid and Remove (Bleed) Air from the Brake Circuit

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Risks and Precautions

WARNING: **Risk of injury** — Machine power must be on for these procedures.

- Stay away from operating mechanisms.

CAUTION: **Risk of injury and damage** — This procedure releases pressurized brake fluid.

- Keep brake fluid out of your eyes and mouth. Wear eye protection.
- Follow procedures carefully to prevent damage to the face of the disk or the pistons.

CAUTION:

Risk of malfunction — Air in hydraulic fluid will compress. Compressed air in the brake line will cause brake malfunctions.

▶ Remove (bleed) air from the brake circuit before you operate the machine.

Requirements—These personnel and items are necessary for this procedure:

- Two technicians
- An 8-ounce container of new brake fluid
- Alternative procedures to remove air and used brake fluid:
  - a suction pump (faster procedure) (see Figure 20: Pumps Used to Remove Hydraulic Fluid Quickly, page 48)
  - with pressure in the hydraulic cylinder and gravity (see Figure 21: Typical Tools to Remove Air (Bleed) Brakes and Used Hydraulic Fluid, page 48)

TIP: The Vacula suction pump can do the work more quickly than by gravity and pressure in the hydraulic cylinder. It is also cleaner because all of the hydraulic fluid goes into the container supplied. It helps you not spill the hydraulic fluid.

- If you use a suction pump as shown in Figure 20, page 48, follow the manufacturer's instructions.
- If you use the tools as shown in Figure 21, page 48, follow the instructions in Section 2.2.4 : How to Change Hydraulic Fluid and Remove (Bleed) Air from the Brake Circuit , page 46.

Figure 20. Pumps Used to Remove Hydraulic Fluid Quickly

Alternative Pumps for Suction of Hydraulic Fluid

1

2

Legend

1. A manual suction pump
2. The Vacula suction pump uses compressed air and holds used hydraulic fluid.

Figure 21. Typical Tools to Remove Air (Bleed) Brakes and Used Hydraulic Fluid

These tools use gravity and pressure in the hydraulic cylinder

Legend

1. a clean 12 ounce container
2. a flexible hose to attach from the bleed valves to a container
3. a wrench for the bleed valves (Figure 19, page 45, item 12)
4. a suction device to remove brake fluid from the reservoir

1. Use the tools in Figure 21: Typical Tools to Remove Air (Bleed) Brakes and Used Hydraulic Fluid, page 48 to remove the used hydraulic fluid and clean the line. Do these steps:
   a. Use a suction tool (Figure 21, page 48, item 4) to remove the used fluid from the reservoir. Clean the contamination.
   b. Connect the tubing (Figure 21, page 48, item 2) and container (Figure 21, page 48, item 1) to the valve on the caliper (Figure 18, page 41, item 7).
   c. Open the valve.
   d. Add new fluid to flush out the lines.
   e. Apply/release the brake (see Section 2.2.6 : Operation of Brake Systems, page 52) approximately 5 to 15 times. This will flush the used fluid out of the lines.
   f. Close the valve.

   NOTE: These steps will cause air to go into the line.

2. Add new hydraulic fluid and remove (bleed) air from the brake circuit.

   NOTE: This procedure uses pressure in the hydraulic cylinder and the tools in Figure 21: Typical Tools to Remove Air (Bleed) Brakes and Used Hydraulic Fluid, page 48 .

   a. Fill the reservoir with new DOT 3 brake fluid. When you do the remaining steps, continue to add new fluid to the reservoir. Do not let the reservoir become more than half empty. You must make sure that the reservoir has fluid to prevent air flow into the system from the reservoir
   b. Apply electrical power to the machine. Release the brake.
   c. See the part of the machine reference manual that tells how to operate the outputs manually.
   d. Put a small quantity of new brake fluid (approximately inches (50 mm)) in the 12 ounce container (Figure 21, page 48, item 1).
   e. Do these steps for each bleed valve (Figure 18, page 41, item 1) . Two technicians are necessary. This will move the fluid in one direction and push air out of the line:
      - Attach a clean tube to the valve. Put the other end in the container (Figure 21, page 48, item 1) below the fluid.
      - Make sure that the reservoir is full of fluid.
      - Apply the brake (See Section 2.2.6 : Operation of Brake Systems, page 52).
      - Open the bleed valve. (Figure 19, page 45, item 12)
      - Look for air bubbles in the container when you push the air and fluid out through the tube.
      - Close the valve.
      - Release the brake.
      - Continue the steps above until no more air comes out of the line.

f. Add fluid to the top of the reservoir. Replace the cap.

g. Operate the brake many times. Make sure that it operates correctly.

2.2.5 How to Adjust the Connection between the Brake Cylinder and the Air Cylinder

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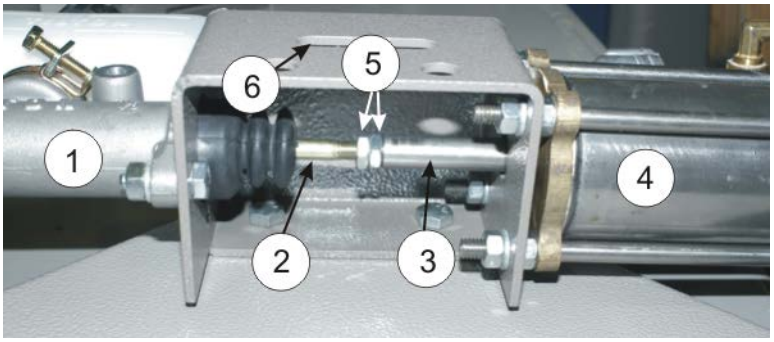
If you removed the brake cylinder or the air cylinder, you must adjust this connection.

Figure 22. The Connection between the Brake Cylinder and the Air Cylinder

A view of the brake rod and related components

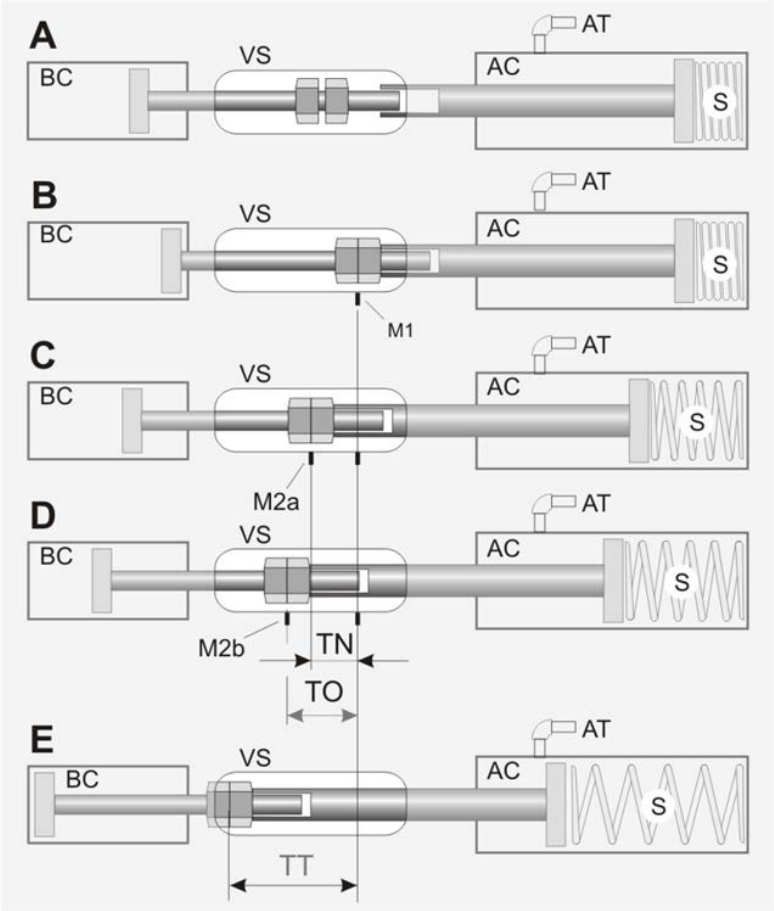


Legend

1. The brake cylinder
2. The rod for the brake cylinder
3. The rod for the air cylinder
4. The air cylinder
5. Two nuts to lock the rods together
6. The slot to see the nuts

Figure 23. The Adjustment between the Brake Rod and the Air Cylinder

Schematic Views of Different Conditions



Legend

AC . . Air cylinder (Figure 22, page 50, item 4)
BC . . Brake cylinder (Figure 22, page 50, item 1)
VS . . Slot to see the nuts (Figure 22, page 50, item 6)
A . . . Before travel adjustment—Rods not locked by nuts (Figure 22, page 50, item 5)
B . . . After travel adjustment—the brake released (See Section 2.2.6.2 : How to Release the Brake for Machines with a "Brake Release" Output, page 53)
C . . . Brake applied—NEW pads (See Section 2.2.6.1 : How to Apply the Brake for Machines with a "Break Release" Output, page 52)
D . . . Brake applied—OLD pads
E . . . This will occur if you apply the brake with the hydraulic line removed
TN . . Rod travel, new pads
TO . . Rod travel, very worn pads
TT . . Full travel with the hydraulic line removed
M1 . . First mark at the view slot—the brake released
M2a . . Second mark—one possible position—the brake applied
M2b . . Second mark—a different position—the brake applied
AT . . Air tubing (See Figure 18: A typical hydraulic brake system, page 41 , item1). Air releases the brake.
S . . . Spring applies the brake

1. Adjust for maximum rod travel.
   a. Operate the master switch to energize control power.
   b. Make sure that the air pressure that releases the brake (Figure 24: A Typical First and Second Brake on a Divided Cylinder Machine, page 53 , item 1) is 85 -100 PSI (5.95 - 07.0 kg/cm-cm).
   c. Make sure that the nuts that lock the rods together (Figure 22, page 50, item 5) are loose.
   d. Release the brake (see Section 2.2.6 : Operation of Brake Systems, page 52). Let the air cylinder rod fully retract into the air cylinder as shown in Figure 23, page 51, item A.
   e. Turn the brake rod into the air cylinder rod until the brake rod comes out of the brake cylinder fully. See Figure 23, page 51, item B.
   f. Lock the brake rod (Figure 22, page 50, item 2) to the air cylinder rod (Figure 22, page 50, item 3) with two nuts (Figure 22, page 50, item 5).
2. Make sure that the brake will continue to operate while the pads wear.
   a. Release the brake. On the view slot, put a mark at the position of the lock nuts. (Figure 23, page 51, item M1).
   b. Apply the brake. See Section 2.2.6 : Operation of Brake Systems, page 52.
   c. Put a mark at the position of the lock nuts when the brake is applied. This can be at position M2a, M2b, or between M2a and M2b. When the pads wear, this position will move.
   d. Make sure that the distance the rod moves when you apply the brake is 0.75 to 1.0 inches (19-25 mm). If the travel is more than this, the brake piston can hit the mechanical stop before the brake engages fully. This condition is shown in Figure 23, page 51, item E (dimension TT).

2.2.6 Operation of Brake Systems

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Look at the electrical schematics of your machine to find how your brake is controlled. Some machines release the brake when you close the door. Some machines have a control relay to release or apply the brake.

2.2.6.1 How to Apply the Brake for Machines with a "Break Release" Output

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1. Turn the "brake release" control output off to de-energize the air valve to remove air pressure to the air cylinder (Figure 18: A typical hydraulic brake system, page 41 , item 1).
2. With no air pressure, a spring in the air cylinder will apply force to the hydraulic cylinder (Figure 18: A typical hydraulic brake system, page 41 , item 8). This will apply pressure to the brake pads (Figure 19: The Caliper Components, page 45 , item 4) against the rotor disk (Figure 18: A typical hydraulic brake system, page 41 , item 5). (Figure 23: The Adjustment between the Brake Rod and the Air Cylinder, page 51 , item C,D)

NOTE: If electrical power or compressed air is missing, hydraulic pressure will apply the brake.

2.2.6.2 How to Release the Brake for Machines with a "Brake Release" Output

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1. Turn the control output called "brake release" on to energize the air cylinder valve.
2. Air pressure compresses the spring and releases the brake. (Figure 23: The Adjustment between the Brake Rod and the Air Cylinder, page 51 , item B)

2.2.6.3 How to Apply and then Release the Brake Quickly

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There are two air tubes at (Figure 18: A typical hydraulic brake system, page 41 , item 1). One supplies compressed air from an air valve. The other sends this compressed air to a pressure switch. If you remove one of the two tubes when compressed air is there, you will apply the brake.

1. Disconnect the air tubing (Figure 18: A typical hydraulic brake system, page 41 , item 1).
2. Turn the "brake release" output on. The air valve will supply compressed air to one of the tubes. (Figure 18: A typical hydraulic brake system, page 41 , item 1).
3. Quickly move one of the compressed air tubes (Figure 18: A typical hydraulic brake system, page 41 , item 1) on and off the air cylinder.
4. After you complete this procedure, connect the air tubing.

2.2.6.4 How the Brake Operates on Divided Cylinder Machines

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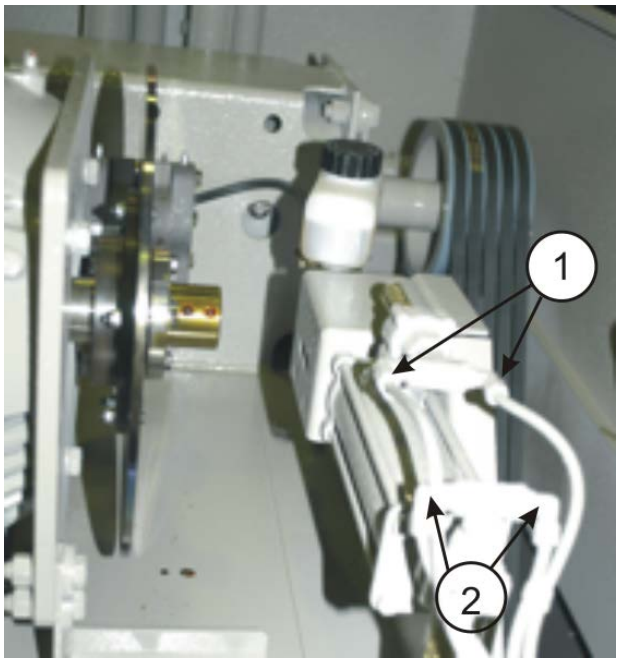
Figure 24. A Typical First and Second Brake on a Divided Cylinder Machine

Two pairs of air tubing connect to different ends of the air cylinder.



Legend

1. Tubing for air that releases the first brake (85 -100 PSI) (5.95 - 07.0 kg/cm-cm)
2. Tubing for air that applies the second brake (10 – 12 PSI) (0.7-0.84 kg/cm-cm)

- On divided cylinder machines, two pair of air tubes connect to different ends of the air cylinder.
- When the cylinder turns, air pressure at Figure 24: A Typical First and Second Brake on a Divided Cylinder Machine, page 53 , item 1 compresses the spring and releases the brake.
- When you operate the stop control, air pressure at 1 is removed. Then the spring in the air cylinder applies the brake.
- If you open the door, the 2nd brake is applied. Then the air pressure at Figure 24: A Typical First and Second Brake on a Divided Cylinder Machine, page 53 , item 2 and the spring apply the brake.

2.2.6.5 The Second Brake

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If your machine has a second brake which uses air pressure and spring pressure, it will have a pressure regulator. Make sure that you adjust the air pressure of the second brake (Figure 24: A Typical First and Second Brake on a Divided Cylinder Machine, page 53 , item 2) to 10 – 12 PSI (0.7-0.84 kg/cm-cm).

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Drive Chart

3 Sheets

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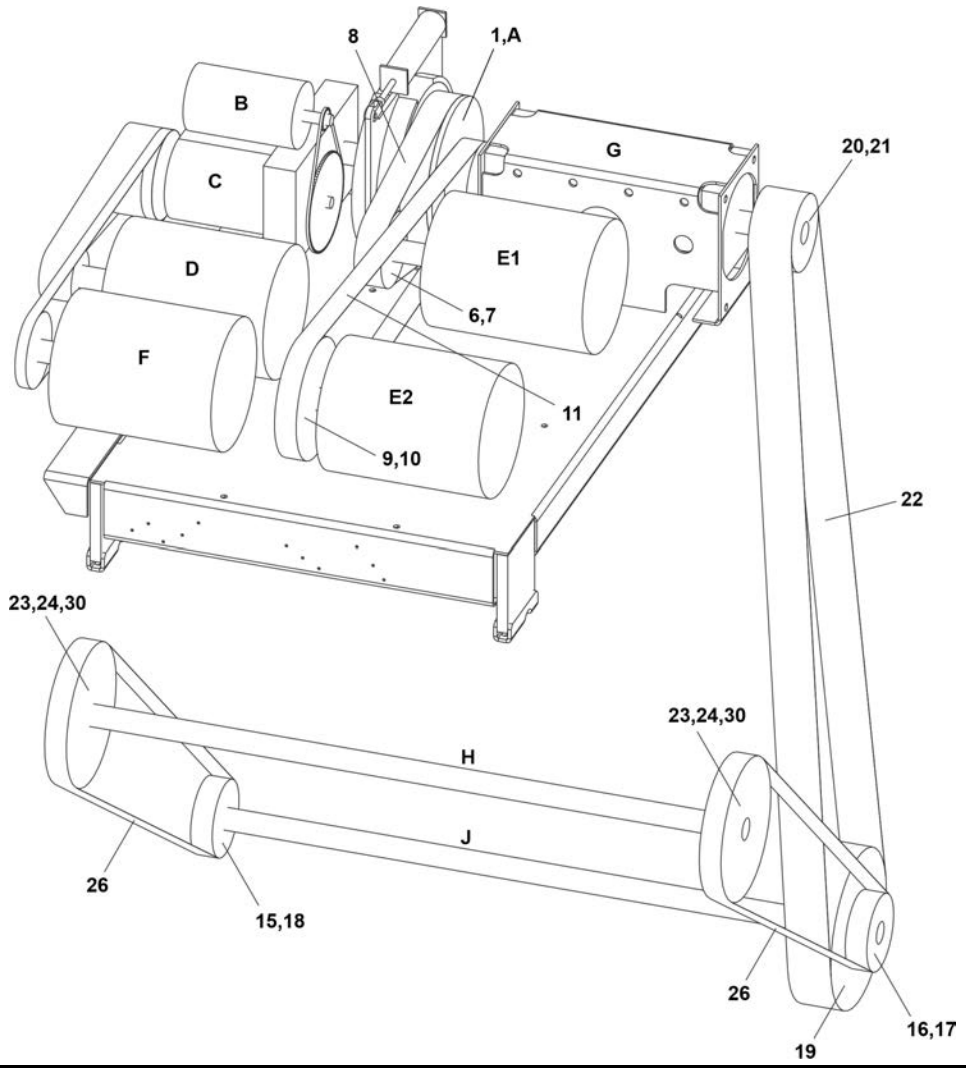
Figure 25. Drive Chart



Legend

A . . . Clutch drum pulley
B . . . Autospot motor
C . . . Gear reducer
D . . . Wash motor
E1 . . E1 motor
E2 . . E2 motor
F . . . Drain motor
G . . . Jackshaft
H . . . Main shaft
J . . . Idler shaft

Drive Chart

3 Sheets

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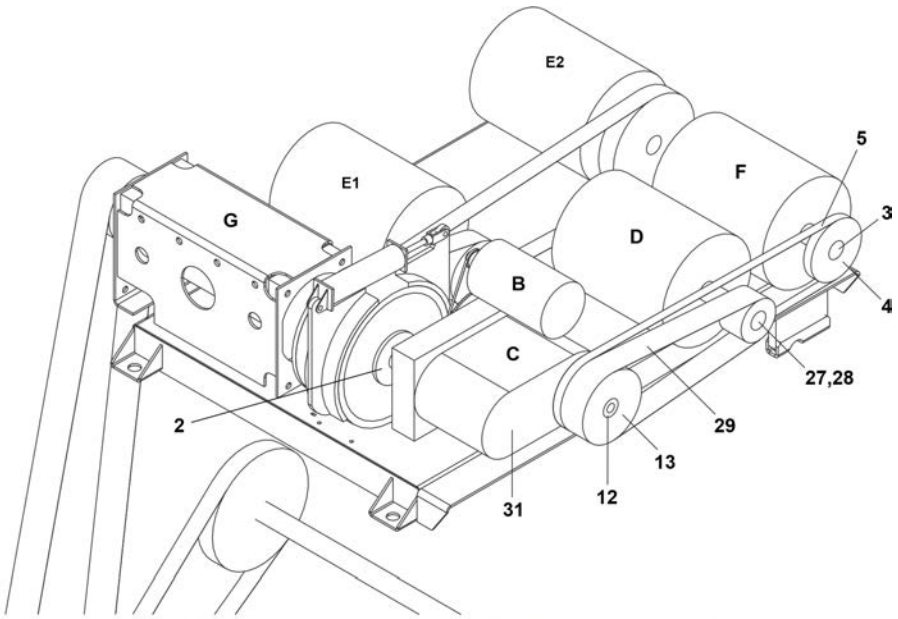
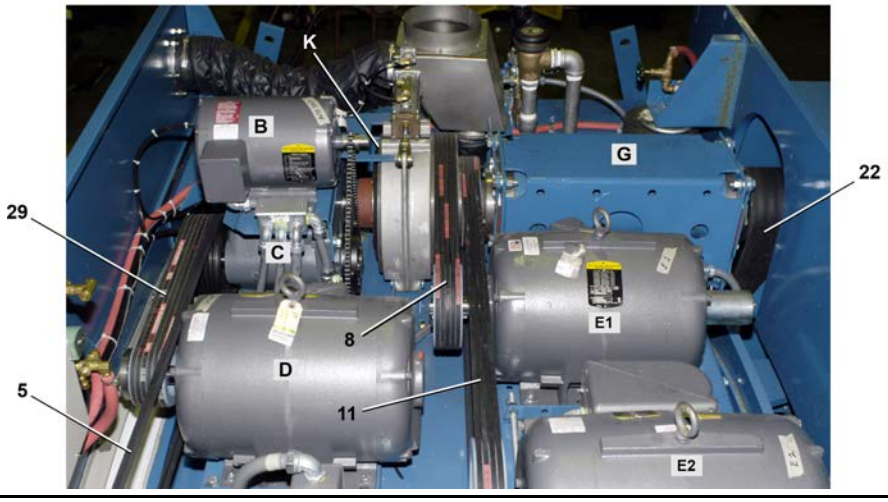
Figure 26. Drive Chart - Rear View and Top View

Detail of Belts





Legend

B . . . Autospot motor
C . . . Gear reducer
D . . . Wash motor
E1 . . E1 motor
E2 . . E2 motor
F . . . Drain motor
G . . . Jackshaft
K . . . Clutch drum

Drive Chart

3 Sheets

72044SR2, SR3

Table 18. Parts List—Drive Chart

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Reference Assemblies				
	A	D36 00360	*DRIVECHART=7244SG2 60CYC	
Components				
all	1	X3 06039	CLUTCH DRUM+VPUL 72MM	
all	2	X2 15106	FLANGE=CLUTCH DRIVE 2.5	
all	3	56Q1GSDS	1+3/8" BUSH VPUL QD TYPE SDS	
all	4	560685R2SE	VPUL 2G3V6.85 (SDS) TYPE QD	
all	5	56VR0900M2	VBELT 3V900 EA=1BLT	USES 2 BELTS
all	6	56Q1MSK	1+5/8" BUSH VPUL QD TYPE SK	
all	7	560685R5SK	VPUL 5G3V6.85 (SK) TYPE QD	
all	8	56VR067S	VBELT 3V670	USES 5 BELTS
all	9	56Q1RSK	1+7/8" BUSH VPUL QD TYPE SK	
all	10	561110R4SK	VPUL 4G3V11.1(SK) TYPE QD	
all	11	56VR112S	VBELT 3V1120	USES 4 BELTS
all	12	56Q1GSF	1+3/8" BUSH VPUL QD TYPE SF	
all	13	02 19201D	V-PUL 8G3V7.95 QD TYPE "SF"	
all	14	15K226C	SOKCAPSCR 5/8-11X3 BLK	
all	15	56Q3DR2S	3+3/16" SPLIT BUSH BROWNING #R2	
all	16	54V400	BUSHING=3-15/16=SPECIAL	
all	17	15E250	STRSQMACHKEY 1X6 C1018	
all	18	03 06330	VPUL BROWN 7C7.0 (R2)35#EA	
all	19	X3 06330A	VPUL=7GR 7PDX14.5PD=72SG	
all	20	56Q2HQ2S	2+7/16"SPLIT BUSH'N BROWN "Q2"	
all	21	56070C7Q2	VPUL 7C7.0 Q2=SPCL B#7C70Q	
all	22	56VC190XBA	SETOF 1-3RCX190+1-4RCX190VBAND	SET OF 2 VBAND BELTS
all	23	56Q2TF	2+15/16" BUSH VPUL QD TYPE F	
all	24	56130C7FA	VPUL 7C13.0(F)TYPE QD=SPECIAL	
all	26	56VC120XBA	SETOF 1-3RCX120+1-4RCX120VBAND	SET OF 2 VBAND BELTS
all	27	56Q1GSK	1+3/8" BUSH VPUL QD TYPE SK	
all	28	560470R6SK	VPUL 6G3V4.7 (SK) TYPE QD	
all	29	56VR053X	VBELT 3VX530	USES 6 BELTS
all	30	02 175021	KEY-3/4"SQX6+1/2"LONG-60WE	
all	31	54S025A	MILNOR, 10,17:1, AIR SEAL 30HP GEAR RED	

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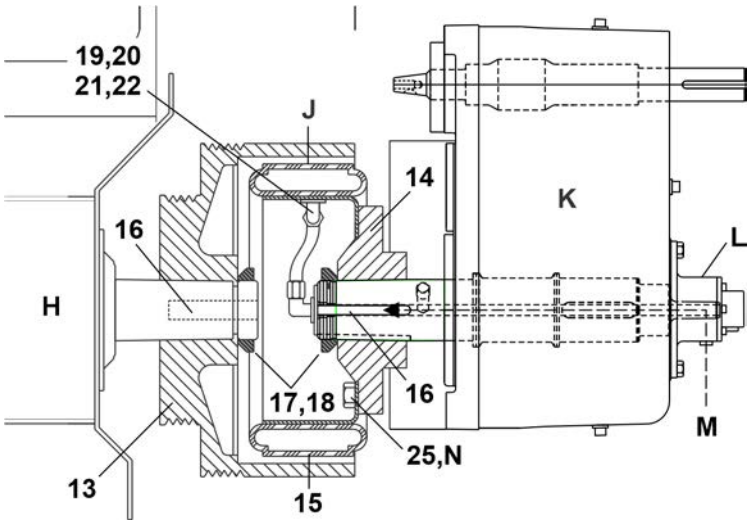
Drive Base

5 Sheets

72044SR2

Section A-A: Jackshaft, Air Clutch, Gear Reducer, Reducer Air Seal



Legend

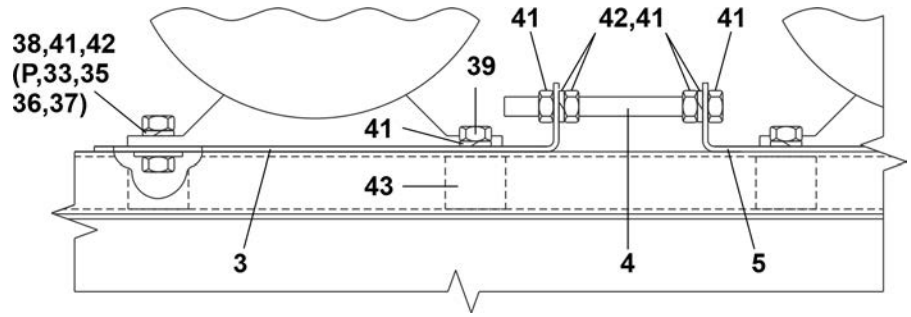
B . . . See detail B
C . . . See detail C
D . . . See detail D
DM . . Drain motor
E1 . . E1 motor
E2 . . E2 motor
H . . . Jackshaft
J . . . Air clutch, see BPWG7I03
K . . . Gear reducer
L . . . Reducer air seal, see BPWG7I04
M . . . Air to air clutch
N . . . 11 instances
WM . . Wash motor

Drive Base

5 Sheets

72044SR2

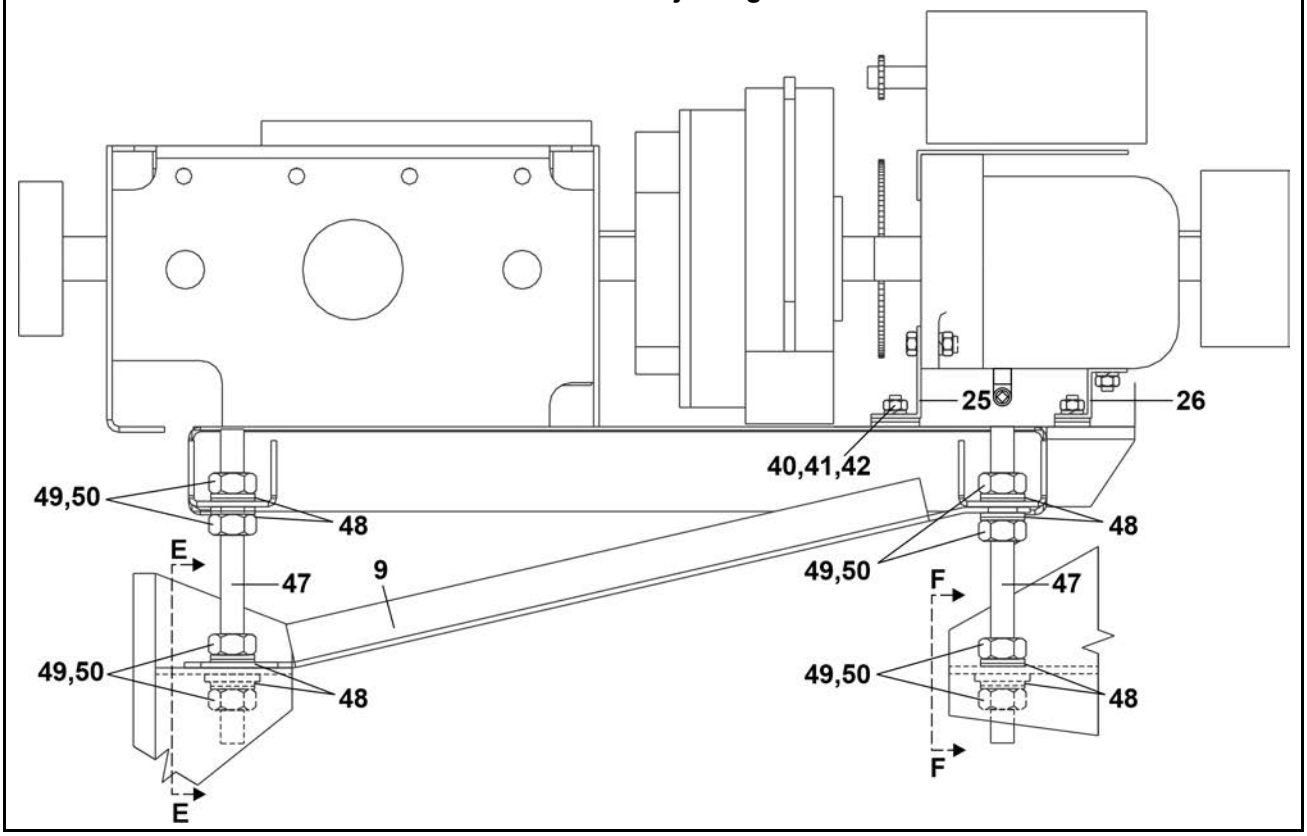
Detail B: Typical Motor Mounting



Legend

P . . . Alternate

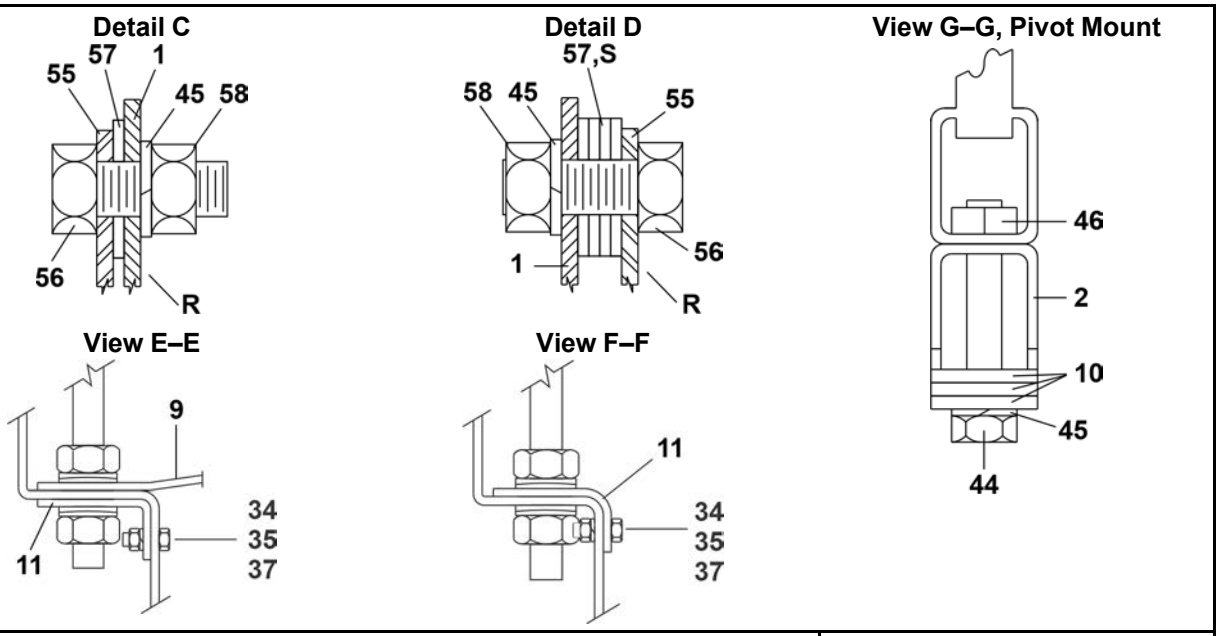
Motor Mount Adjusting Bolts



Drive Base

5 Sheets

72044SR2



Legend

R . . . 4 instances

S . . . Uses 4

Drive Base

5 Sheets

72044SR2

Table 19. Parts List—Drive Base

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Reference Assemblies				
	A	SA 36 024	*DRIVE BASE ASSY=72"SGD	REFERENCE
	B		FRONT MOTORS	E1 & E2
	C		REAR MOTORS	WASH & DRAIN
Components				
all	1	W2 18717A	*DRVBSE=60+72SP (50+60C)TMKN	
all	2	X2 18634	CLAMP=MACHINED DR HINGPIN	
B	3	02 19285	MTRPLATE 184/215T BEND@PRINT	
C	3	05 20131A	MTRPLATE 284/286T BEND@PRINT	
B	4	17R022A09A	THRD ROD 1/2-13UNCX9"LG ZN PL	
C	4	17R022A14A	THRD ROD 1/2-13UNCX14LG ZN PL	
B	5	02 19287	MTRPLATE FR256T BEND@PRINT	
C	5	02 19286	MTRPLATE 254/256T BEND@PRINT	
all	9	02 18733	BRACE=SWAY 60"SGH	
all	10	02 18706	REINFORCEMENT=HINGE PINCLAMP	
all	11	03 25626	FORK=MTR MNT ADJ SCREW 52	
all	12	02 19380	MOTOR MOUNT=SHIM 72 SGH	
all	13	X3 06039	CLUTCH DRUM+VPUL 72MM	
all	14	X2 15106	FLANGE=CLUTCH DRIVE 2.5	
all	15	54H150	RUBBER AIRCLUTCH EATON 12ER350	
all	16	15E230	STRMACHKEY 3/8SQX2+1/2 TOL.+0	
all	17	56AHW12	W12 BEARING LOCKWASHER	
all	18	56AHN12	N12 BEARING LOCKNUT	
all	19	53A060A	NUT BRASS 5/16 COMP#61A-5	
all	20	53A060	SLEEVE 5/16 COMP IMP#60-F	
all	21	53A040B	BODY=EL90MALE5/16X.25#B69A-5B	
all	22	5SB0G0EDEO	NPTHEXBUSH 3/8X1/4 GALCI 125#	
all	23	03 01234	COVER=CENT-SW SHAFT PLATED	
all	24	15N154D	RDMACSCR 10-24UNC2AX5 ZINC GR2	
all	25	03 06247	BRACKET-REDUCER MTG=SGD	
all	26	02 19131	BRACKET=FRONT REDUCER MOUNT	
all	27	5SCC0GNF	NPT COUP 3/8 GALMAL 150#	
all	28	5N0GCLSG42	NPT NIP 3/8XCLS TBE GALSTL S40	
all	29	5SP0GFFSSV	NPT PLUG 3/8 SQSOLIDVENTBLKSTL	

Drive Base

5 Sheets

72044SR2

Table 19 Parts List—Drive Base (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
all	30	5SL0GNFA	NPTELB 90DEG 3/8 GALMAL 150#	
all	31	5SP0GGFSS	NPT PLUG 3/8 SQ SOLID GALSTL	
all	32	5N0G04KG42	NPT NIP 3/8X4.5 TBEGALSTL SK40	
all	33	15K095	HXCPSCR 3/8-16UNC2AX1 GR5 ZINC	
all	34	15K110	HEXCAPSCR 3/8-16UNC2AX1.5 GR5-	
all	35	15U240	FLATWASHER(USS STD) 3/8" ZNC P	
all	36	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	37	15G205	HXNUT 3/8-16UNC2B ZINC GR2	
all	38	15K147	HXCAPSCR 1/2-13UNC2X1 GR5 ZINC	
all	39	15K151	HXCAPSCR 1/2-13UNC2AX1.25 GR5	
all	40	15K182	HEXTAPSCR 1/2-13X2ZINC GR5 FUL	
all	41	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	42	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	43	02 19283	NUT=1/2-13UNCX1+1/2SQ SPEC	
all	44	15K227	HXCAPSCR 5/8-11UNC2AX4 GR5 ZIN	
all	45	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	46	15G236	SQNUT 5/8-11UNC2B SAE ZINC GR2	
all	47	17R125A15K	STUD=DRIVEBASEADS 1+1/4X15.5	
all	48	17W125	1+1/4"SPHERICAL WASHER SET	
all	49	15U425	LOCKWASHER MEDIUM 1+1/4"ZINC P	
all	50	15G261	HVHXNUT 1+1/4-8UNC2B ZINC GR2H	
all	51	5N0E02AG42	NPT NIP 1/4X2 TBE GALSTL SK40	
all	52	96M055	DELTROL QUICK EXHAUST VLV.1/4"	
all	53	5N0ECLSBE2	NPT NIP 1/4XCLS TBE BRASS 125#	
all	54	27A005	MUFFLER 3/8" BANTAM B38	
all	55	02 19383	BEARHOUSE MT PLATE FRONT	
all	56	15K221	HEXCAPSCR 5/8-11 UNC2X2GR5 ZIN	
all	57	15U314	FLATWASHER(USS STD) 5/8" ZNC P	
all	58	15G238	HXNUT 5/8-11UNC2B SAE ZINC GR2	

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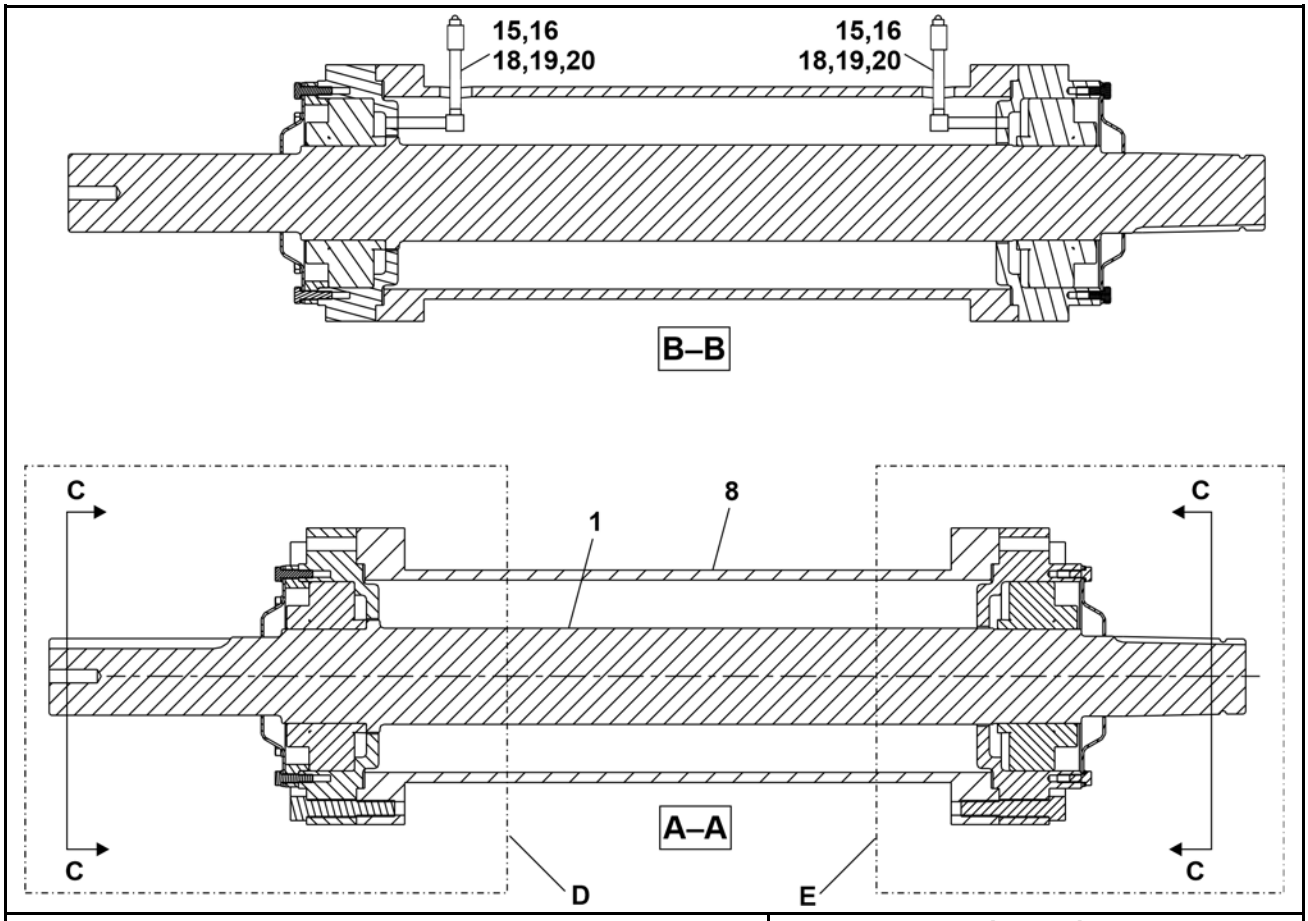
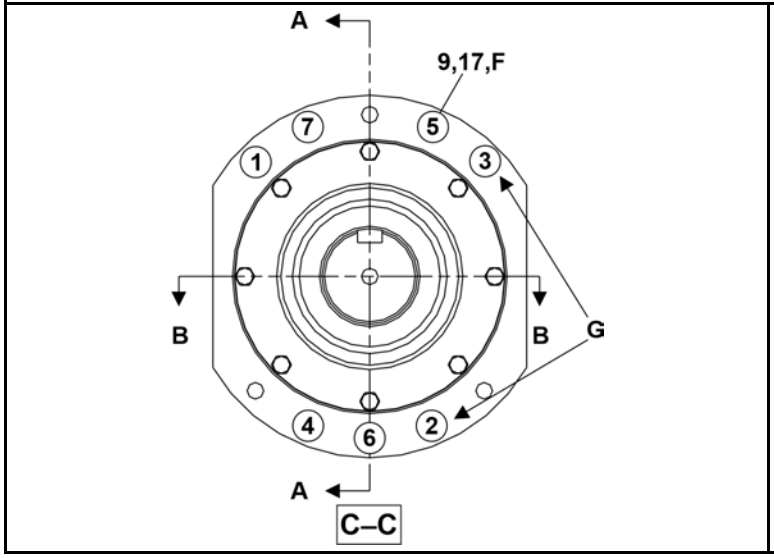
Jackshaft

3 Sheets

72044WR2, 72044SR2

Figure 27. Cross Section Views





Legend

D . . . See Detail D

E . . . See Detail E

F . . . 14 instances

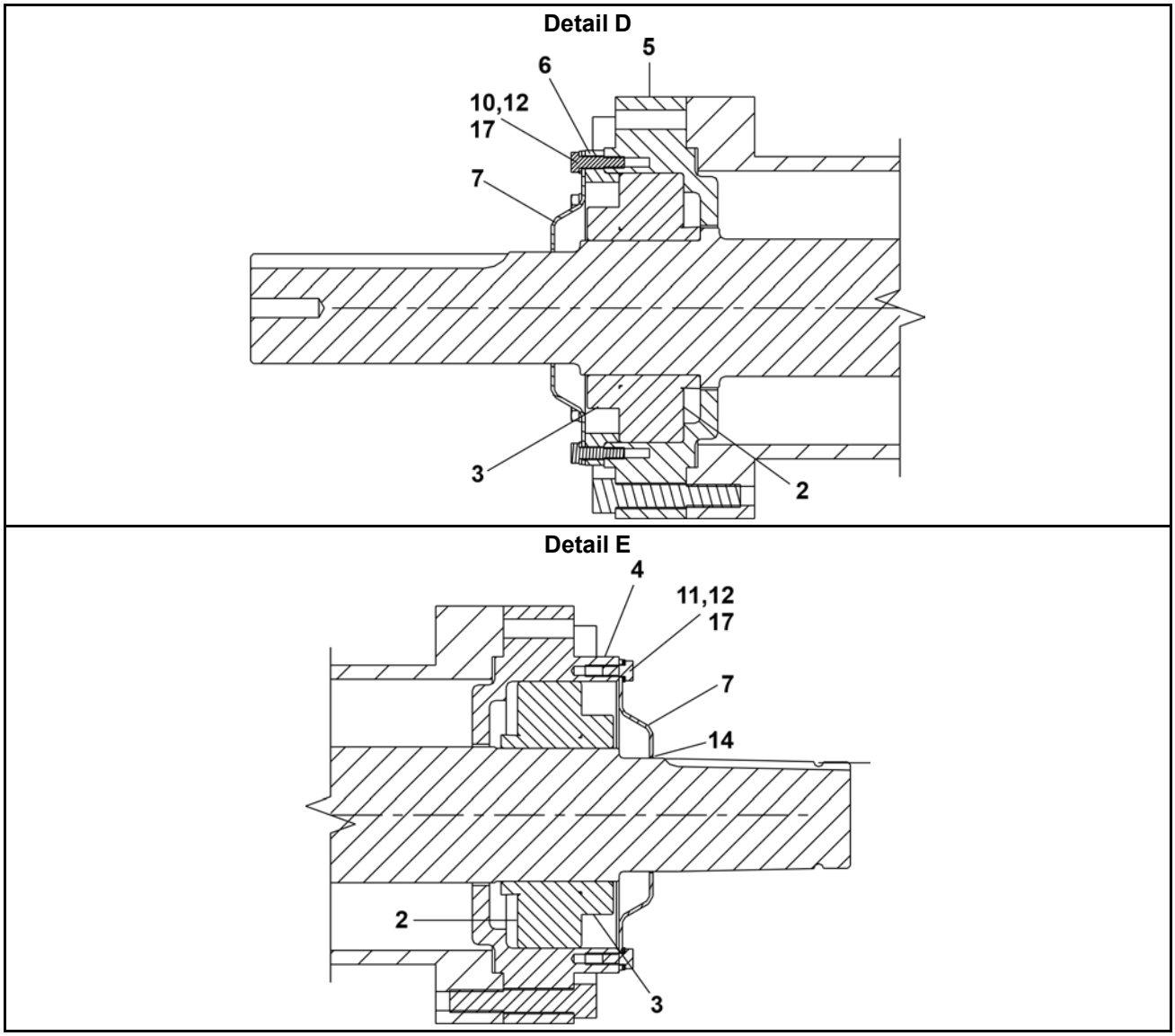
G . . . Insert all 1/2” fasteners hand tight. Then torque in the sequence shown, front and back.

Jackshaft

3 Sheets

72044WR2, 72044SR2

Figure 28. Detail Views



Jackshaft

3 Sheets

72044WR2, 72044SR2

Table 20. Parts List—Jackshaft

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Reference Assemblies				
	A	ABJ25004	JKSHAFT-BRGHOUS-SPHRCL BNG	
Components				
all	1	X2 18711E	JACKSHAFT SPHERICAL BRNG	
all	2	54A988	SKF BRNG #22217EK/C3	
all	3	54A989	17 X 2.938 SNW ADAPTER ASSY	
all	4	X2 19381D	BRNG HOLDER=SPHRCL BRNG-REAR	
all	5	X2 19381C	BRNG HOLDER=SPHRCL BRNG-FRT	
all	6	X2 15702A	RETAINER-SPHRCL BRNG	
all	7	02 19384	COVER=BRG HOUSE FT+REAR	
all	8	X2 19378	BRGHSG SUP=TIMKENS MACHINED	
all	9	15K193	SOKCAPSCR 1/2-13X2.75GR8 HK	
all	10	15U180	LOCKWASHER MEDIUM 1/4 ZINCPL	
all	11	15K030	HEXCAPSCR 1/4-20UNC2X1/2 GR5 Z	
all	12	15K041	HXCAPSCR 1/4-2OUNC2AX1 GR 5 ZI	
all	14	02 19196	RING=GREASE SLNGR JKSHFT BLK	
all	15	51A001	ADAPTER 1/8 PT BRASS	
all	16	5SL0CBEC	NPTELB 90DEG STRT 1/8 BRASS125	
all	17	20C007G	THDLOCKSEAL LCT24231 RMUBL50CC	
all	18	5N0C04AG42	NPT NIP 1/8X4 TBE GALSTL SK40	
all	19	5SCC0CBE	NPT COUP 1/8 BRASS 125# 103A-A	
all	20	54M025	HYDFIT 1/8"-90 ALEMITE 1613-B	

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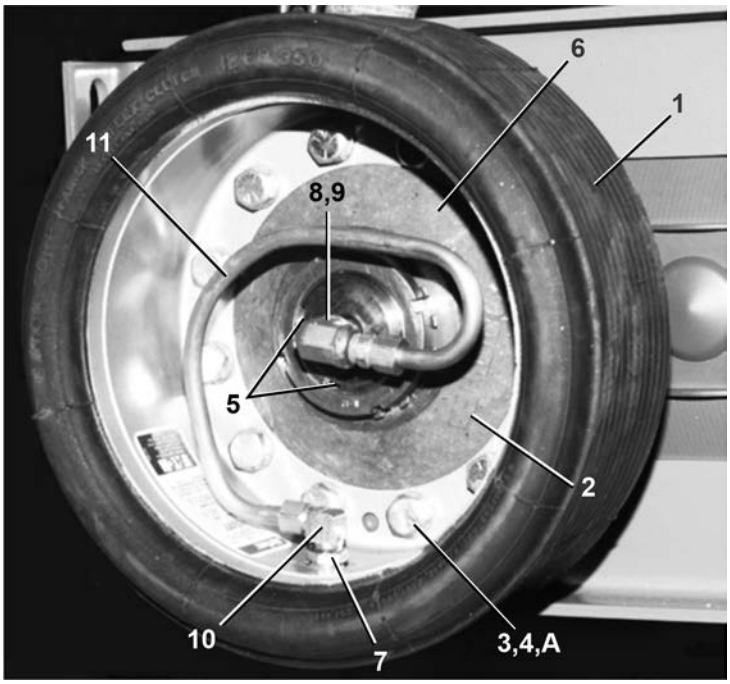
Air Clutch

1 Sheet

72044WR2, 72044SR2



Legend

A . . . 12 instances

Table 21. Parts List—Air Clutch

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
			Reference Assemblies	
	A	A28 18000	CLUTCH DRUM-AIR ASSY=60+72WE	
			Components	
all	1	54H150	RUBBER AIRCLUTCH EATON#12ER350	
all	2	X2 15106	FLANGE=CLUTCH DRIVE 2.5	
all	3	15K151	HXCAPSCR 1/2-13UNC2AX1.25 GR5	
all	4	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	5	15E230	STRMACHKEY 3/8SQX2+1/2 TOL.+0	
A	6	53A023	MALECON3/8X.25COMP ANCHR#68-64	
A	7	5SB0G0EDEO	NPTHEXBUSH 3/8X1/4 GALCI 125#	
A	8	5SL0EBEA	NPTELB 90DEG 1/4 BRASS 125#	
A	9	5N0E01KBE2	NPT NIP 1/4X1.5TBE BRASS STD.	
A	10	53A043G	EL90 3/8X1/4COMP.AND#69A-6B	
A	11	90A021	COPERTUBE 3/8"ODX.032X50' EA=1	

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Reducer Air Seal

1 Sheet

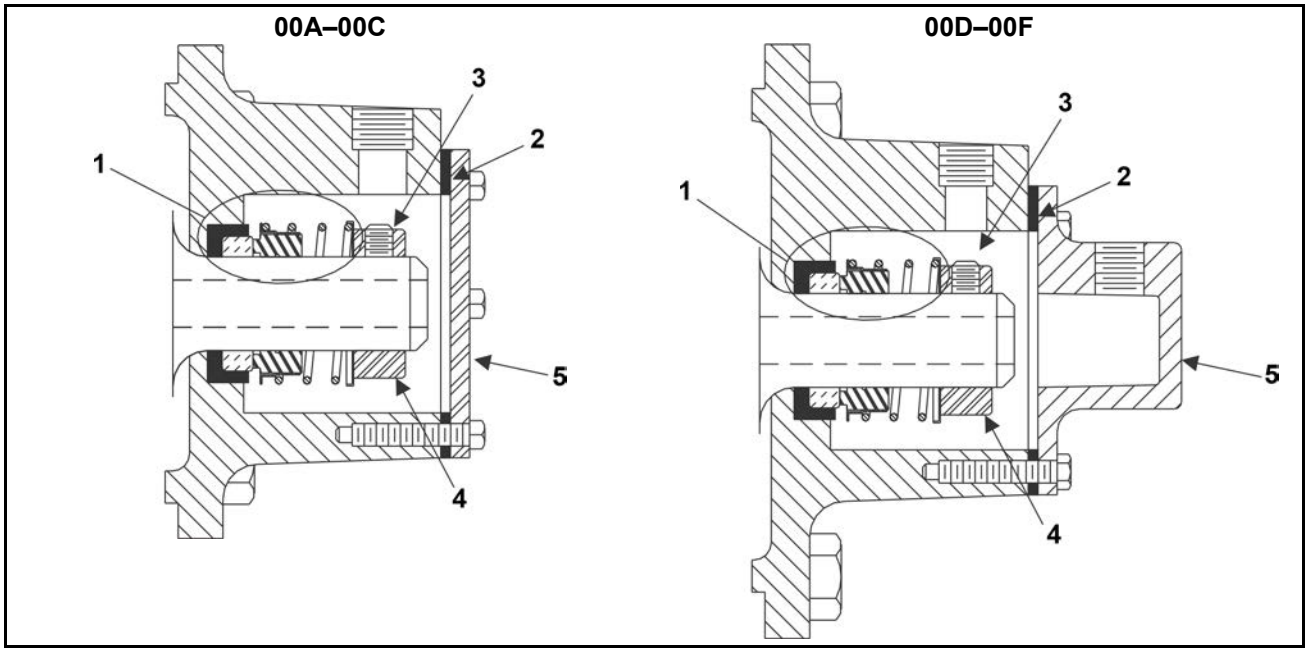

Table 22. Parts List—Reducer Air Seal

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Reference Assemblies				
	A	54S014HC	MILNOR: 15.40:1 TAPERED OUTPUT	3621,3626,4226,4832,4836
	B	54S012HC	REDUCER 15.4 DORRIS #1115-25HC	SHUTL36/40/48R+L
	C	54S015	REDUCER 19.6 SKK/DOR 3220-60C	4226DYE
	D	54S022A	MILNOR, 19.59:1, AIR SEAL	4231,4244,5238
	E	54S023B	MILNOR, 10.17:1 AIR SEAL 7.5	6044WR2/WR3
	F	54S025A	MILNOR, 10,17:1, AIR SEAL 30HP GEAR RED	6442,6446,7244,6440,6450
Components				
BF	1	24S020	MECHSHFT SEAL CRANE 3/4"TYPE#2	(PART OF KIT ITEM 6)
B-F	2	02 15111	GASKET AIRSEALHOUSING COVER	(PART OF KIT ITEM 6)
B-F	3	15Q077	SOKSETSCR 1/4-20X1/4 ZINC ALLE	(PART OF KIT ITEM 6)
B-F	4	02 10380	Z SHAFT COLLAR FOR AIR SEAL	(PART OF KIT ITEM 6)
A-C	5	02 15108	COVER=ROTARY AIRSEAL HOUSING	
D-F	5	02 15108A	CVR,OUTPUT,ENDCAP MILNOR 23/25	
all	6	K10 0002	KIT=ROTARY AIR SEAL	ITEMS 1–4

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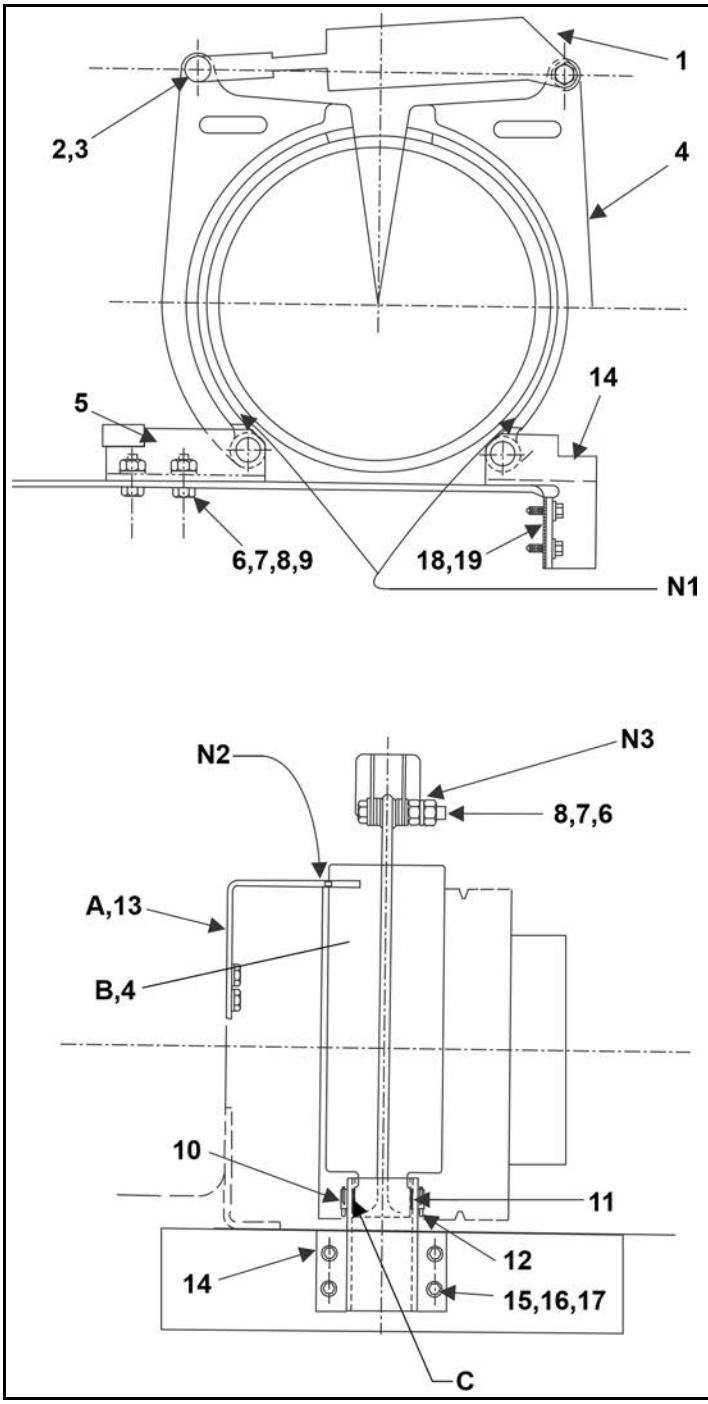
Upper Brake Assembly

2 Sheets

72044SR2/SR3



Legend

A . . . Stop

B . . . Shoe

C . . . Do not lubricate. Make sure nyliners are in place.

N1 . . Adjust anchor by sliding back and forward so that brake lining clears drum in open position and contacts drum in closed position.

N2 . . When the Brake is off, the back of the shoe pushes against the Limit Bracket (Stop) to prevent the brake from rattling. Center the opening in the stop with the shoe so that the shoe pushes on the stop in the open position and doesn't drag on the drum.

N3 . . Tighten these jam nuts enough to take out the excess clearance. Do Not Over Tighten, the Air Cylinder must move freely.

Upper Brake Assembly

2 Sheets

72044SR2/SR3

Table 23. Parts List—Upper Brake Assembly

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Reference Assemblies				
	A	G40 00200C	BRKE ASSY= DOUBLEACT/SAFETY 72	72044SR2/SR3
Components				
all	1	A40 01000A	BRKE CYL=DOUBLE ACT/SAFETY	
all	2	17A040	CLEVIS PIN 1/2"X1+3/8" DRILLED	
all	3	15H045	STDCOTTERPIN 1/8X1 SS18-8	
A	4	SA 28 131N	85131C*BRAKESHOE(NON-ASB)72SG+WETCH	
all	5	02 18986	95521B ANCHOR=BRAKE END 1/60SGH	
all	6	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	7	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	8	15U490	FLTWASH 1+1/2X17/32X1/4 ZINC	
all	9	15K173A	HXCAPSCR 1/2-13UNC2AX1.75 GR5 PLATD	
all	10	17A045	CLEVIS PIN 3/4"X 3" DRILLED +ZNC	
all	11	54E223	NYLNR12L12-FBUSH3/4X13/16X3/4	
all	12	15H051	STDCOTTERPIN 1/8X1+1/2ZINCPL	
all	13	04 00331	95391C LIMIT BKT=BRAKEASSY=SAFETY	
all	14	02 18987	81047C ANCHOR=BRAKE END 1/60SGH	
all	15	15K105	HXCAPSCR 3/8-16UNC2A1.25 GR5 PLATED	
all	16	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	17	15U240	FLATWASHER(USS STD) 3/8" ZNC PLT	
all	18	02 18984	81047A SHIM=BRAKE END 16GA	
all	19	02 18984A	85403B SHIM BRAKE END 10GA	AS REQUIRED

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2.3 Main Bearing and Seal Replacement for Divided Cylinder Machines

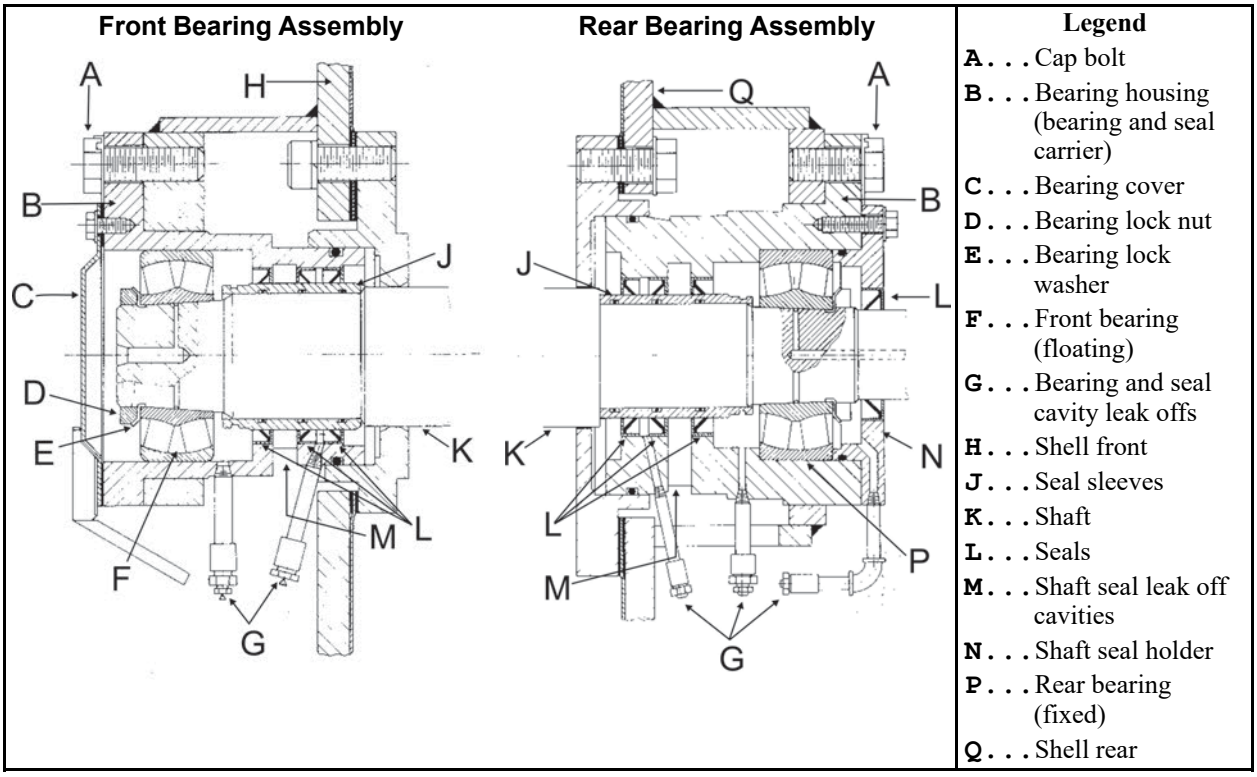
BNWVUM02.C01 0000278612 D.2 A.5 A.3 3/12/20, 11:54 AM Released

This section applies to the front and rear cylinder shaft bearings of all divided cylinder machines (Rapid Load, Staph Guard®, dye machines, etc.). It does not apply to jackshaft bearings, idler shaft bearings or bearings on open pocket machines.

The bearings covered by this section are double row, spherical roller, self aligning bearings; Koya, SKF, FMC, Torrington or equal. Referring to Figure 29, page 70, the rear (clean side on Staph Guard® models) bearing is firmly held in the bearing housing (bearing and seal carrier) by the shaft seal holder, preventing axial movement. The front (soil side on Staph Guard® models) bearing is free to move axially in the bearing housing to accommodate thermal expansion of the shaft during operation and is thus the “floating” bearing. Both bearings are held in place on the tapered portion of the shaft by a bearing lock washer and lock nut.

The front and rear bearings are each protected from contamination from wash water by three spring loaded, lip type seals and a shaft seal leak off cavity (that carries off any water that leaks past the main water seals) as shown in Figure 29, page 70.

Figure 29. Cross Section View of Front and Rear Bearing Assemblies (Bearing Assembly for 60" and 72" WED Shown. Others similar.)



Access to the bearings and seals for lubrication is provided by the various grease passages. Excess lubricant is excreted through the bearing and seal cavity leak offs as shown on Figure 29, page 70. The bearings and seals must be lubricated regularly and the leak off cavities flushed out

periodically through the plugged cleanout connections, in strict accordance with the preventive maintenance procedures elsewhere.

If bearing replacement becomes necessary due to wear, it is essential that the bearings **and seals** are replaced. Seal replacement requires removal of the bearing housing and seal sleeve. (In rare instances where the seals are known to be in good condition, it is not necessary to remove the bearing housing, seals or seal sleeve when a bearing is replaced.) **A pulling fixture is required to remove the bearing housing. A set of guide rods, a seal sleeve setting fixture and a bearing setting fixture are required for reinstallation of the housing.** These tools are available for rental or purchase from the Milnor® factory and are pictured elsewhere in this section. Contact the factory two weeks in advance of repairs, when ordering these tools.

This maintenance is performed in the following order:

1. Remove old bearing(s). When removing both bearings, remove the front (soil side) bearing first.
2. Remove bearing housings, seal sleeves, and seals.
3. If both bearings were removed, install the bearing housing, seal sleeve, seals, and new bearing on the rear (clean side).
4. Install the bearing housing, seal sleeve, seals, and new bearing on the front (soil side).
5. Tighten bearing(s).

See the Main Bearing Assembly drawing for your machine for bearing component part numbers.

2.3.1 Removing the Bearing (Front or Rear)

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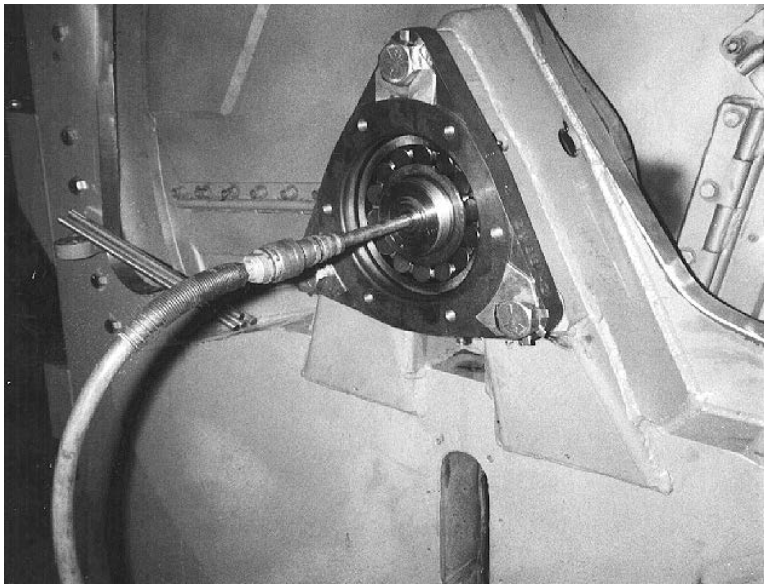
1. Loosen, then remove the main drive belts and cylinder shaft pulley (if applicable) by lowering the drive base with the jacking bolts. Do not attempt to pry belts off with a pry bar or by rolling the sheave. Remove the bearing cover (or shaft seal holder) to expose the bearing.
2. Bend back the locking tang on the bearing lock washer then remove the lock nut and lock washer.
3. The center tapped hole in the shaft end is an oil passage through which oil may be forced between the tapered shaft and the bearing inner race. Install a pipe fitting into this tapped hole as shown in Figure 30: Connection From Hydraulic Pump to Assist in Bearing Removal, page 72 . Using a “Porta Power” or similar hand operated hydraulic pump, force fluid into the passage. Pump hard to build up fluid pressure. This pressure will cause the inner race to expand slightly; just enough to free the tapered surfaces and allow the bearing to slip off easily. If the bearing is not readily removed, remove the front water level inspection plate and use a timber to pry up the cylinder to remove cylinder weight from the bearings. Once the bearing is removed, the cylinder drops only approximately 1/32" before the shaft comes to rest on the shaft support.
4. Slide the bearing off of the shaft and if it is to be reused, place it on a clean surface and cover with a clean, lint free cloth.

Figure 30. Connection From Hydraulic Pump to Assist in Bearing Removal



2.3.2 Removing the Bearing Housing (Bearing and Seal Carrier), Seal Sleeve, and Seals (Front or Rear)

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These procedures require the use of a pulling fixture and guide rods available from the Milnor® factory. With the bearing cover (or shaft seal holder) and the bearing removed, proceed as follows:

1. Remove the three bearing housing cap bolts and the grease lines from the bearing housing front plate. Install guide rods in two of the bolt holes, as shown in Figure 31, page 72.
2. Install the pulling fixture as shown in Figure 32, page 72, by placing each of the four threaded rods through a hole in the steel plate with hexnuts to the outside of the plate then screwing each rod into the appropriate tapped hole in the bearing housing (same holes as used to mount the bearing cover or shaft seal holder).

Figure 31. Two Bearing Housing Guide Rods in Position

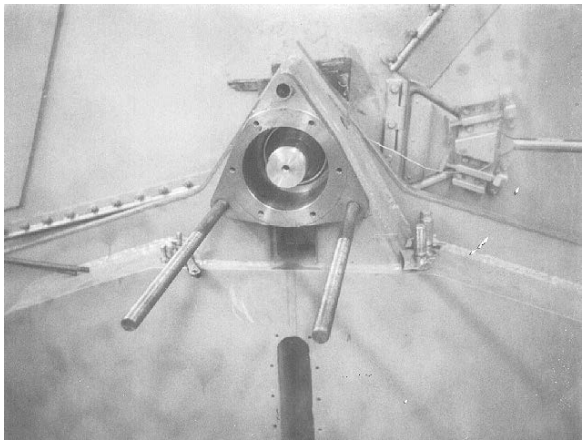
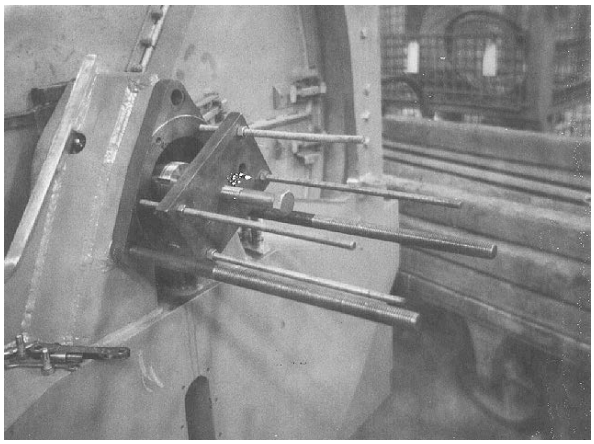


Figure 32. Bearing Housing Pulling Fixture in Position



NOTE: Step 2a or 2b below will cause the bearing housing to slide away from the shell. Shims were placed under one or more of the three bearing housing pads during factory assembly to align the housing and insure its being exactly parallel with the shaft. **When removing the bearing housing, be sure to keep these shims separate and identified so that they may be returned to their proper location, otherwise the bearing and seal will be out of line and may be damaged after a short operating period.** As a precaution in case the shims are lost during disassembly, you will find stamped next to the bearing housing the proper thickness of shims required (if any) under each adjacent bearing housing pad. The stamped number indicates the shim thickness in thousandths of an inch. For example, the number "38" indicates that 38/1000 (.038") shims would be required under this pad.

a. Tighten all four hex nuts on the threaded rods such that the pulling fixture plate is pressed against the shaft end. With an impact wrench, tighten down on the center bolt until the housing slides out, or

b. If no impact wrench is available, simply continue to tighten down on each of the four hex nuts behind the pulling fixture plate, alternately and progressively, until the housing slides out. It may be necessary to place a spacer (approx. two inches long) between the plate and the shaft to provide enough clearance between the plate and the bearing housing.

3. Once the bearing housing is free of the shell, carefully slide it off of the guide rods and place on a clean work surface.
4. The seal sleeve will almost always remain on the shaft when the housing is removed. Remove the seal sleeve **taking care not to damage or scar it** and place it on a clean work surface.

2.3.3 Precautions for Bearing Replacement

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The most important ingredient in successful bearing and seal installation is **cleanliness**. The bearing housing must be free of all **foreign** matter. The grease and leak off passages must be blown clear and all **foreign** matter removed. You must have a clean work area. Keep your hands and tools free from grit and grime. Wash your hands before starting and as required during these procedures. **Foreign** matter is, without doubt, the most frequent cause of bearing failure, and one over which the manufacturer has no control.

Where cleaning is required, bearings, bearing housings and seal sleeves may be cleaned with the following solvents or cleaning agents (in strict accordance with the manufacturer's recommendations as such substances are generally toxic and/or explosive under certain conditions):

Benzene	Gasoline	Naptha
Chlorethane	Kerosene	Tricholorethylene
Freons	Mineral Spirts	

Do not, however, expose any components to the above substances for more than 24 hours and only use at room temperature. Never use the following solvents or cleaning agents: alcohols, cresols, phenols, flouro propanols, or other similar chemicals or mixtures.

NOTE: Hammer blows, overheating, or improper use of force can damage precision parts.

2.3.4 Replacing the Bearing Housing, Seal Sleeve, and Seals (Front or Rear)

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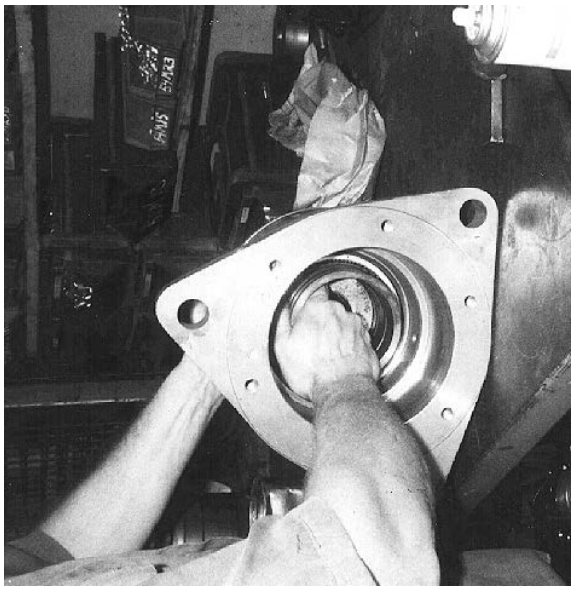
1. With the seal sleeve removed, press all old seals out of the bearing housing. Remove the large o-ring from the outside of the housing. Thoroughly clean the bearing housing and flush out all grease passages to make certain they are unblocked. Remove the o-rings from the inside of the seal sleeve and clean the seal sleeve.
2. While the bearing housing is disassembled, charge all grease passages with grease. This will assure that there are no blockages.
3. Replace the o-rings in the seal sleeve and the large o-ring on the outside of the bearing housing. Replace with new o-rings if the old ones are worn.
4. Press new seals into the bearing housing. You may gently work the seals in with a mallet and metal drift as shown in Figure 33, page 74.

   CAUTION: Each seal must be of the proper material and face the proper direction. The type of material and direction the seal faces may differ from one seal to another within the same bearing housing and also from one type of machine to another. It is essential to consult the Main Bearing Assembly drawing for your machine for the proper part number and direction to face each seal.
5. Slip the seal sleeve into the bearing housing as shown in Figure 34, page 74, using care not to damage or fold under any of the seal lips. Be sure to insert the sleeve in the proper direction (see Bearing Assembly drawing).

Figure 33. Installing Seals in Bearing Housing

Figure 34. Installing Seal Sleeve in Bearing Housing

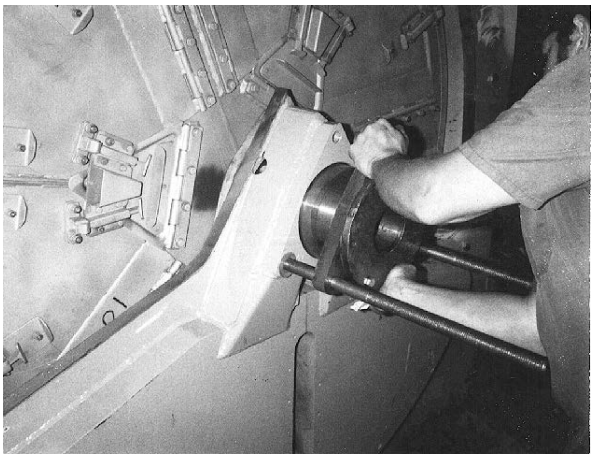


NOTE: If both housings are being installed, install the rear housing first.

6. With two of the three temporary guide rods in position on the shell, place the bearing housing onto the guide rods and install the seal sleeve setting fixture on to the bearing housing as shown in Figure 35, page 75. The seal sleeve setting fixture prevents the seal sleeve from being pushed out of the housing as the housing is inserted into the shell. Note that the seal sleeve setting fixture and the bearing setting fixture are very similar, but the seal sleeve setting fixture has a longer hub.
7. With a clean, lint free cloth, apply a coating of light machine oil to the outside of the housing, to assist in installation. Push the housing into the shell as shown in Figure 36, page 75. Once the housing is far enough into the shell to support itself, place any shims back into position between the housing and the shell. Remove, then replace guide rods if required to place shims under bearing housing pads.

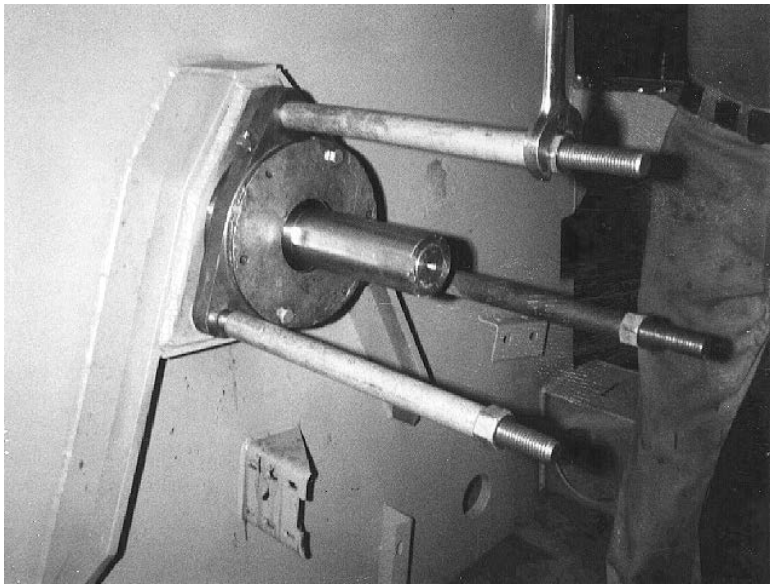
Figure 35. Installing the Bearing Housing Setting Fixture onto Housing (42" machine shown)

Figure 36. Pushing the Bearing Housing into the Shell (60" Rapid-load machine shown)



8. Install the third guide rod, spacers if required, and hex nuts, using these to seat the housing fully, as shown in Figure 37, page 76. Remove the seal sleeve setting fixture.

Figure 37. Tightening the Bearing Housing into the Shell (42" machine shown)



9. Remove the guide rods and install the bearing housing cap bolts. See “Bolt Torque Requirements” elsewhere, for proper torques.
10. With the grease gun, pump grease into the inner portion of the bearing cavity, such that when the bearing is installed, the space between the bearing and the seals will be approximately 1/3 full of grease.
11. Proceed to Section 2.3.5 : Measuring Unmounted Clearance and Setting Bearing (Front or Rear), page 76, even if both the front and rear bearings are being replaced. Once the rear bearing is installed, the bearing housing replacement procedures may then be repeated for the front (soil side) bearing housing.

2.3.5 Measuring Unmounted Clearance and Setting Bearing (Front or Rear)

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The bearings used on Milnor® washer and dye extractors are the very best anti-friction devices available for these applications. However, the anti-frictional characteristics of the bearings will be reduced if they are not properly installed. It is of critical importance when installing these tapered roller bearings, to accomplish the following (A step by step procedure follows this synopsis):

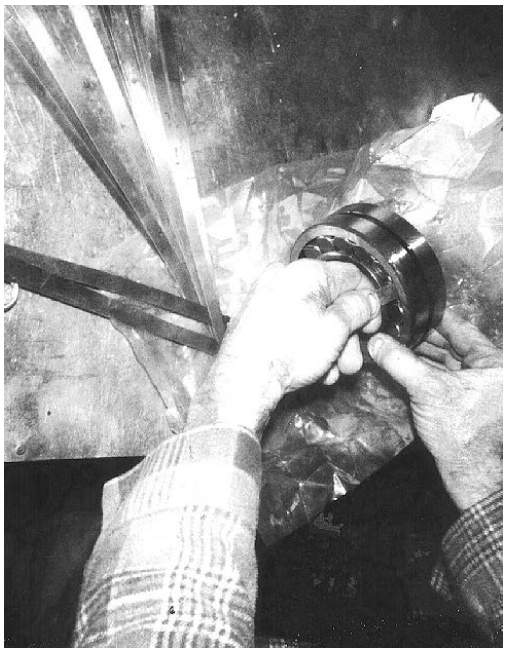
1. Accurately measure the unmounted internal clearance of the bearing (gap between the rollers and outer race before the bearing is installed). This is an essential quality control measure.
2. Calculate the final internal clearance by subtracting the specified clearance reduction (amount that the internal clearance must be reduced when the bearing is tightened onto the tapered shaft) from the unmounted clearance.
3. Tighten the bearing onto the shaft until the final internal clearance as calculated is achieved and verified by measurement.

These measurements are taken in thousandths of an inch. Although this requires precise work, attention to detail and a good set of feeler gauges, it is the only way to insure that the bearing will be tightened onto the shaft to precisely the right tension. If you have any questions on performing the measurements or adjustments described below, your local bearing supplier or the Milnor® factory can assist you. Although these procedures require precision over and above that normally required for laundry room maintenance, they are standard in bearing installation and absolutely essential:

NOTE: Step 4 requires a good set of feeler gauges including .001" through .010" in thousandths of an inch increments. Contact your local bearing supplier.

4. When you are ready to proceed (and not before), remove the new bearing from it's box or protective wrapping. Do not attempt to clean the bearing or wash out the preservative coating. On a clean work surface, stand the bearing on edge and insert a .003 feeler gauge into the bearing as shown in Figure 38, page 77. The gauge should be inserted just inside the outer race between two rollers and worked through to the opposite row of rollers. Rotate the inner race of the opposite row so that the end of the feeler gauge is caught between a roller and the outer race.

Figure 38. Measuring Bearing Unmounted Clearance (bridge for 42" machine shown)



5. Try to pull the gauge straight out. If it comes out, increase the size of the gauge by .001". If it does not come out, decrease the gauge by .001". The thickest feeler gauge that will come out is the unmounted internal clearance of the bearing.
6. Compare the measured clearance with the "Unmounted Clearance" in Table 24: Table of Bearing Clearances, page 78 . If the measured clearance is not within the range shown, do not use the bearing. Contact your bearing supplier for an exchange.

NOTE: The clearances listed in the chart are industry standards and therefore apply to all brands of bearings supplied by Milnor®. If other sources of bearings are used, refer to the manufacturer's instructions for proper clearances.

NOTE: To locate your bearing on the chart, match the first five characters of the manufacturer's part number (**not the** Milnor® **part number**) with those in the chart. For example, for a manufacturer's part number 22217LBK, find under "Manufacturer Part Number" the line "22217 . . ."

Table 24. Table of Bearing Clearances

Manufacturer Part Number	Unmounted Clearance		Clearance Reduction	
	Minimum	Maximum	Minimum	Maximum
22330...	.0071	.0091	.002	.003
22213...	.0030	.0039	.001	.002
22216...	.0028	.0037	.001	.002
22217...	.0044	.0057	.0015	.0025
22312...	.0030	.0039	.001	.002
22316...	.0037	.0049	.001	.002
22320...	.0044	.0057	.0015	.0025
22328...	.0063	.0081	.002	.003
23220...	.0044	.0057	.0015	.0025

7. Calculate and record the final internal clearance by deducting the "Clearance Reduction" for your bearing (see Table 24, page 78) from the measured clearance. For example, if you measured .004 and the clearance reduction is .001 to .002, then the final internal clearance should be between .002 and .003.
8. Hand pack the bearing with grease by rotating the inner race and rollers, forcing grease between all rollers.

NOTE: The bearing will be set into position in Step 9. If both front and rear bearings are being installed, the rear (clean side on Staph Guard® models) bearing should be set in position first because it is the fixed bearing.

9. Set the bearing into the housing (with the taper facing the proper direction) and seat the bearing using the bearing setting fixture. This fixture is installed in similar fashion to the seal sleeve setting fixture. If you have just set the rear bearing and the front bearing housing is yet to be installed, leave the bearing setting fixture in place for now.
10. If you have just set the rear bearing and the front bearing housing is yet to be installed, repeat all steps in bearing housing installation, measuring unmounted clearance and setting bearing, for the front bearing and housing. The bearing setting fixture should not be removed from the rear housing until it is needed to seat the front bearing. This will prevent rear bearing components from being pushed out of position by the shaft as the front housing components are seated. Remove the bearing setting fixture from the front housing once the bearing is seated.

2.3.6 Tightening Bearing(s) (Front and/or Rear)

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1. Once both bearings are seated, or if only one bearing was replaced, install the bearing lock washer(s) and lock nut(s). Use a hammer and a metal drift as shown in Figure 39, page 79, to tighten the lock nut. **It is imperative to only tap lightly and to assure that metal chips from the drift or lock nut do not fall off and contaminate the bearing.** If both bearings are

being tightened, work between the front and rear bearings and turn the basket by hand periodically, while tightening the lock nut(s).

2. After tightening the bearing(s) onto the tapered shaft, check the internal clearance as pictured in Figure 40, page 79, by working a feeler gauge between the outer race and a roller of the outer row then between the outer race and a roller of the inner row.

   NOTE: Sometimes, when setting the bearings, all the load is taken by only one row of rollers (although the load would quickly equalize on both rows after the machine has run for only a few minutes). If all the load is taken by one row, you will get an erroneous clearance reading. It is therefore, necessary to use the feeler gauge to measure the **clearance of both rows of rollers**. With the bearing in place on the machine it is admittedly rather difficult to get a feeler gauge back past the first row of rollers to measure the second **but it must be done**.

3. If one row of rollers is tight but the other has measurable clearance, tap lightly on the end of the shaft nearest the tight row of rollers to cause the shaft to shift axially and equalize the roller loading. Adjust the bearing tightness to achieve the internal clearance previously calculated.

4. When the proper internal clearance has been attained, lock the nut by bending over the matching tang on the lock washer, making sure that all unused tangs are bent as near the nut as possible so that they will not rub against the bearing roller cage.

   NOTE: Check each unused tab individually to insure this.

Figure 39. Tightening the Bearing Lock nut (42" machine shown)

Figure 40. Measuring the Mounted Internal Clearance of the Bearing (42" machine shown)

5. With the grease gun, fill the space between the bearing and the front of the housing 1/3 full of grease.

6. Install the bearing cover plate or shaft seal holder, as appropriate. When installing the shaft seal holder, take care not to damage the seal as it is gently pushed over the shaft. Cover the keyway on the end of the shaft with tape to prevent the sharp corners of the keyway from cutting the seal lip. Also, make sure that the seal lip does not turn over as it passes over rough areas.

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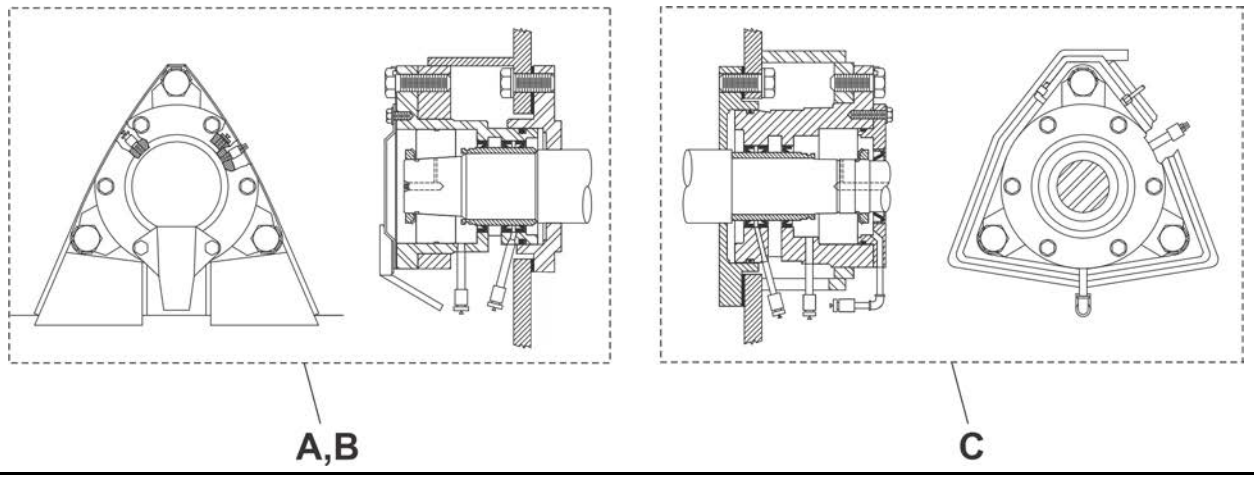
Shaft and Bearing Components

4 Sheets

72044WR2, 72044WR3, 72044SR2, 72044SR3

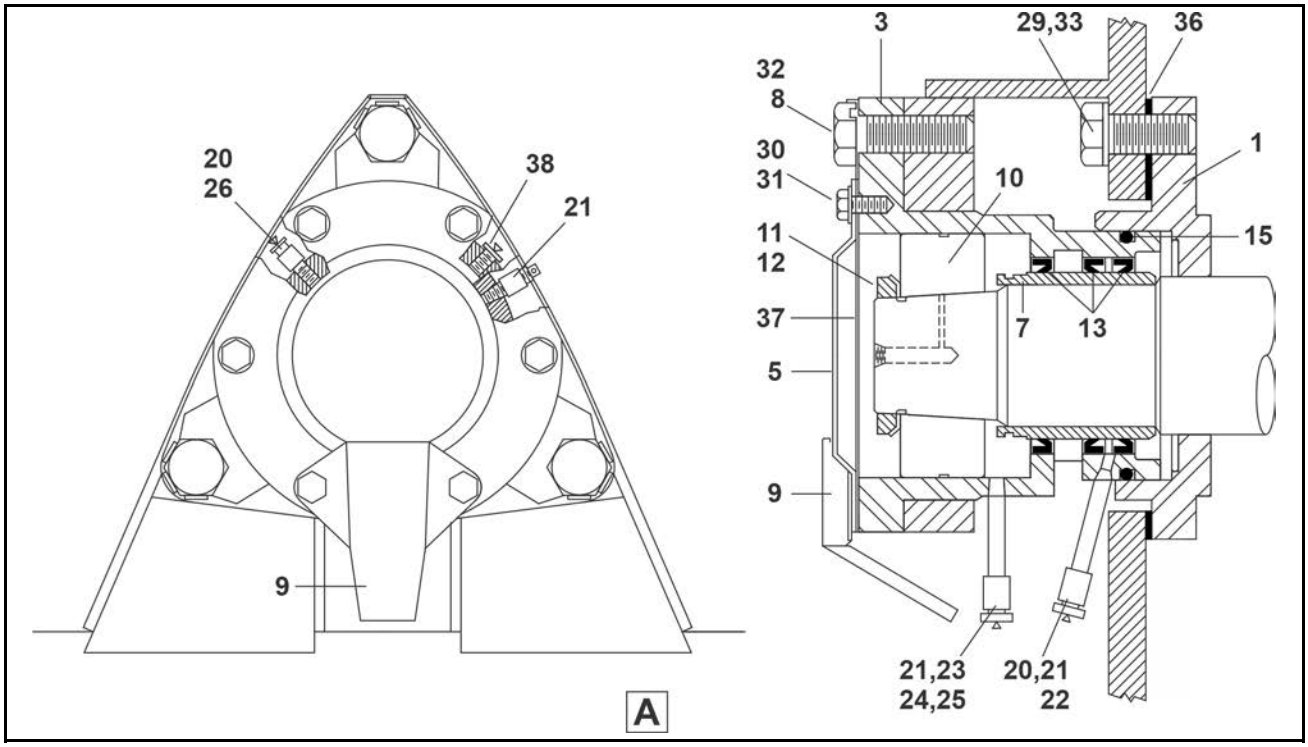
Figure 41. Shaft and Bearing Components



Legend

A . . . Front Bearing (Models: 72044WR2, 72044WR3)
B . . . Front Bearing (Models: 72044SR2, 72044SR3)
C . . . Rear Bearing (Models: 72044WR2, 72044WR3, 72044SR2, 72044SR3)

Figure 42. Front Bearing (Models: 72044WR2, 72044WR3)



Shaft and Bearing Components

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72044WR2, 72044WR3, 72044SR2, 72044SR3

Figure 43. Front Bearing (Models: 72044SR2, 72044SR3)

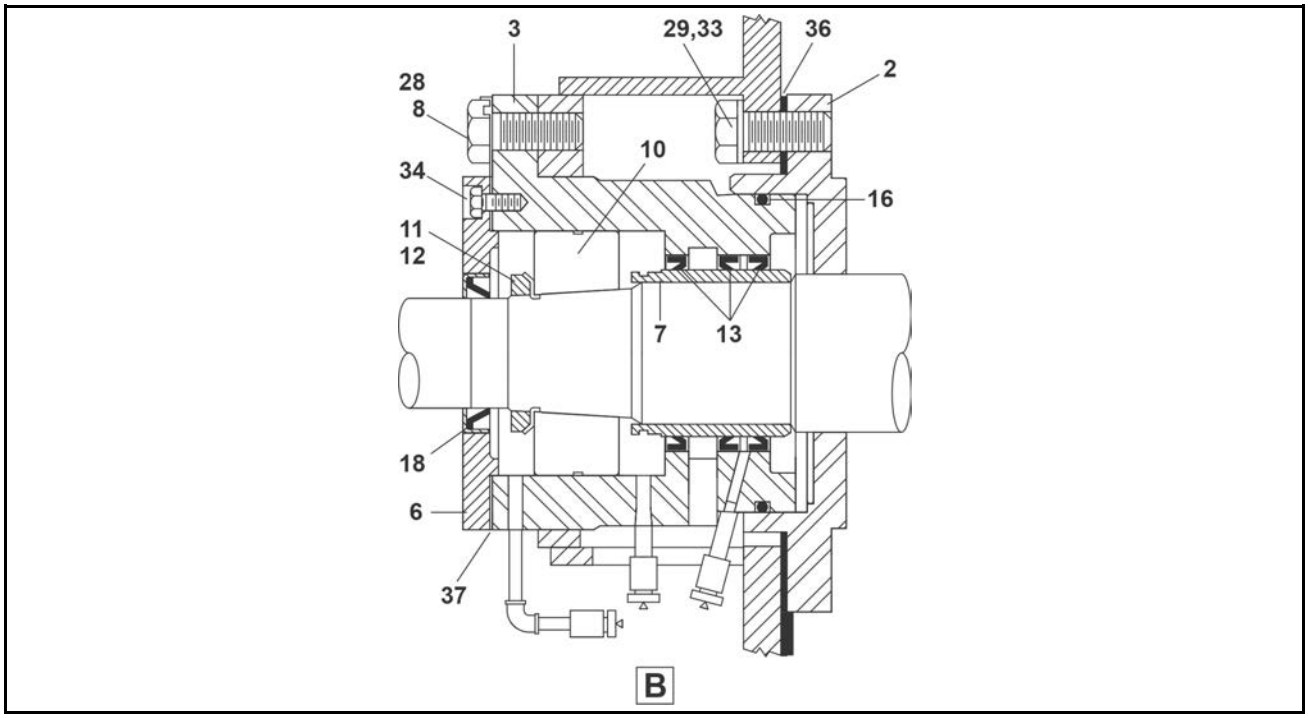
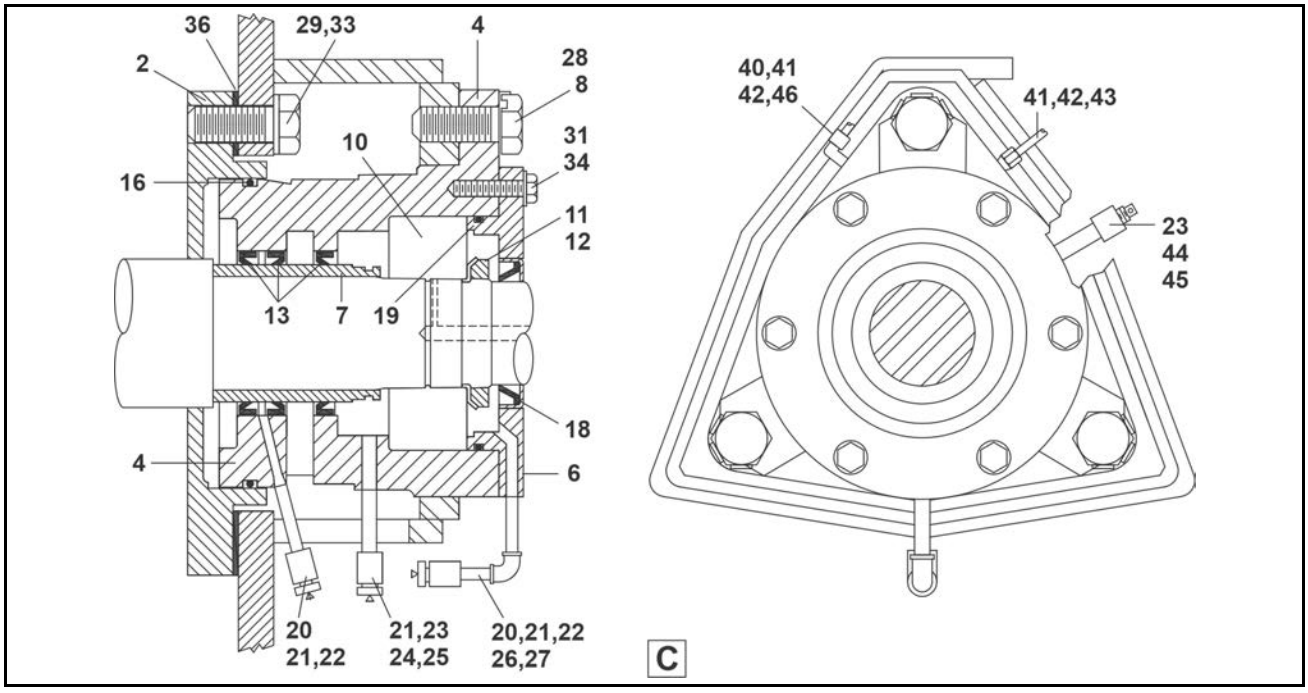


Figure 44. Rear Bearing (Models: 72044WR2, 72044WR3, 72044SR2, 72044SR3)



Shaft and Bearing Components

4 Sheets

72044WR2, 72044WR3, 72044SR2, 72044SR3

Table 25. Parts List—Shaft and Bearing Components

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
			Reference Assemblies	
	A	AD 36 022	BEARASY,MAIN FRONT 72WEU	72044WR2,72044WR3
	B	G36 05400	BEARASY MAIN REAR 7244WE2+3	72044WR2,72044WR3
	C	AD 36 040	BEARASY,MAIN (LOD+CLN) 72SGU	72044SR2,72044SR3
			Components	
A	1	X3 06047	SUPPORT=FRNTSHFT=72": C2-18843	
BC	2	X3 06003	SHAFT SUPPORT= 72"WE: C2-18592	
A	3	X3 06005	HOUSING=FRNT BRG+SIL:C2-18842	
C	3	X2 175005	BRGHOUSE=FRNT=SG: C2-18590	
B	4	X3 06369	HOUSING=REAR=BRG :C2-18590	
C	4	X2 175007	BRGHOUSE=REAR=WEH:C2-18590	
A	5	02 18618A	COVER=BEARING 60 WED	
B	6	X3 06370	HOLDER=REAR SEAL	
C	6	X2 175053	HOLDER=SEAL=60SG SS W/AUTOSP	
all	7	X3 06165	SLEEVE=SHAFT SEAL=2/72WEDU	
all	8	02 18219	LOCKWASH=MAIN BEARHOUSE ZINC	
A	9	02 18928	DRIPSHIELD=60" WE + ZINC	
AC	10	56S22316T	SPHEROLBRG KOYO#22316RKW33C3FY (3.1496"BORE)	
B	10	56S23220T	SPHEROLBRG NTN#23220BL1KD1C3	
AC	11	56AHN16	AN16 BEARING LOCKNUT	
B	11	56AHN20	AN20 BEARING LOCKNUT	
AC	12	56AHW16	W16 BEARING LOCKWASHER	
B	12	56AHW20	W20 BEARING LOCKWASHER	
all	13	24S114	SEAL 4.5X5.5X.50 JM# 9170 LUP	
A	15	60C161	ORING 6"IDX1/4CS BUNA-70 #437	
BC	16	60C172	ORING 8"IDX1/4CS BUNA70 #445	
B	18	24S112	SEAL 3.75X4.75X.500 CS/BUNA	
C	18	24S111	SEAL 3X4.00X.437#21158-2175	
B	19	60C166A	ORING 6+3/4IDX1/8"CS BUNA-N 70	
C	19	60C160J	ORING 6+1/4ID1/8CS BUNA70 #259	
all	20	5SCC0CBE	NPT COUP 1/8 BRASS 125# 103A-A	
all	21	54M029	RELIEFFIT 1/8STR ALEMITE 47200	
all	22	5N0C03AG42	NPT NIP 1/8X3 TBE GALSTL SK40	

Shaft and Bearing Components

4 Sheets

72044WR2, 72044WR3, 72044SR2, 72044SR3

Table 25 Parts List—Shaft and Bearing Components (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
BC	23	5SCC0EBE	NPT COUP 1/4 BRASS 150#PSI W/HEX	
BC	24	5N0E02KG42	NPT NIP 1/4X2.5 TBEGALSTL SK40	
all	25	5SB0E0CBEO	NPTHEXBUSH 1/4X1/8 BRASS 125#	
all	26	5N0C01KG42	NPT NIP 1/8X1.5 TBE GALSTL S40	
B	27	5SL0CBEA	NPTELB 90DEG 1/8 BRASS 125#	
C	27	5SL0ENFK	NPTELB 45DEG 1/4 GALMAL 150#	
all	28	15B243	HEXCAPSCR 1-8X2+1/2 GR5 ZINC	
all	29	15U400	LOCKWASHER MEDIUM 1" ZINCPL	
all	30	15K145	HXCAPSCR 1/2-13UNC2AX3/4 GR5 P	
all	31	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	32	15B236	HEXCAPSCR 1-8UNC2AX3 SAEGR5 ZN	
all	33	15K236	SOKCAPSCR 1-8X2.75 BLK	
all	34	15K170	HXCAPSCR 1/2-20UNFA X 1.5 GR 5	
all	34	15K180	HXCAPSCR 1/2-13UNCAX2 GR5 ZINC	
all	36	02 18768D	GASKET=SHAFT SUPT DA3	
all	37	02 18105	BEARING CAP GASKET	
all	38	54M015	GREASEFIT 60X36/60X44 1610BL	
all	40	53A039B	BODY=EL90MALE5/16X1/8 #B69A-5A	
all	41	53A508	SLEEVE DELRIN 5/16"OD#60PT-5	
all	42	53A509	TUBE INSERT 5/16"OD X .53"LG.	
all	43	53A019B	BODYMALECON5/16X1/8COM#B68A-5A	
all	44	5N0E01KBE2	NPT NIP 1/4X1.5TBE BRASS STD.	
all	45	51P008B	PLUG SQSLD 1/4"BLK LVENT STEEL	
all	46	53A060A	NUT BRASS 5/16 COMP#61A-5	

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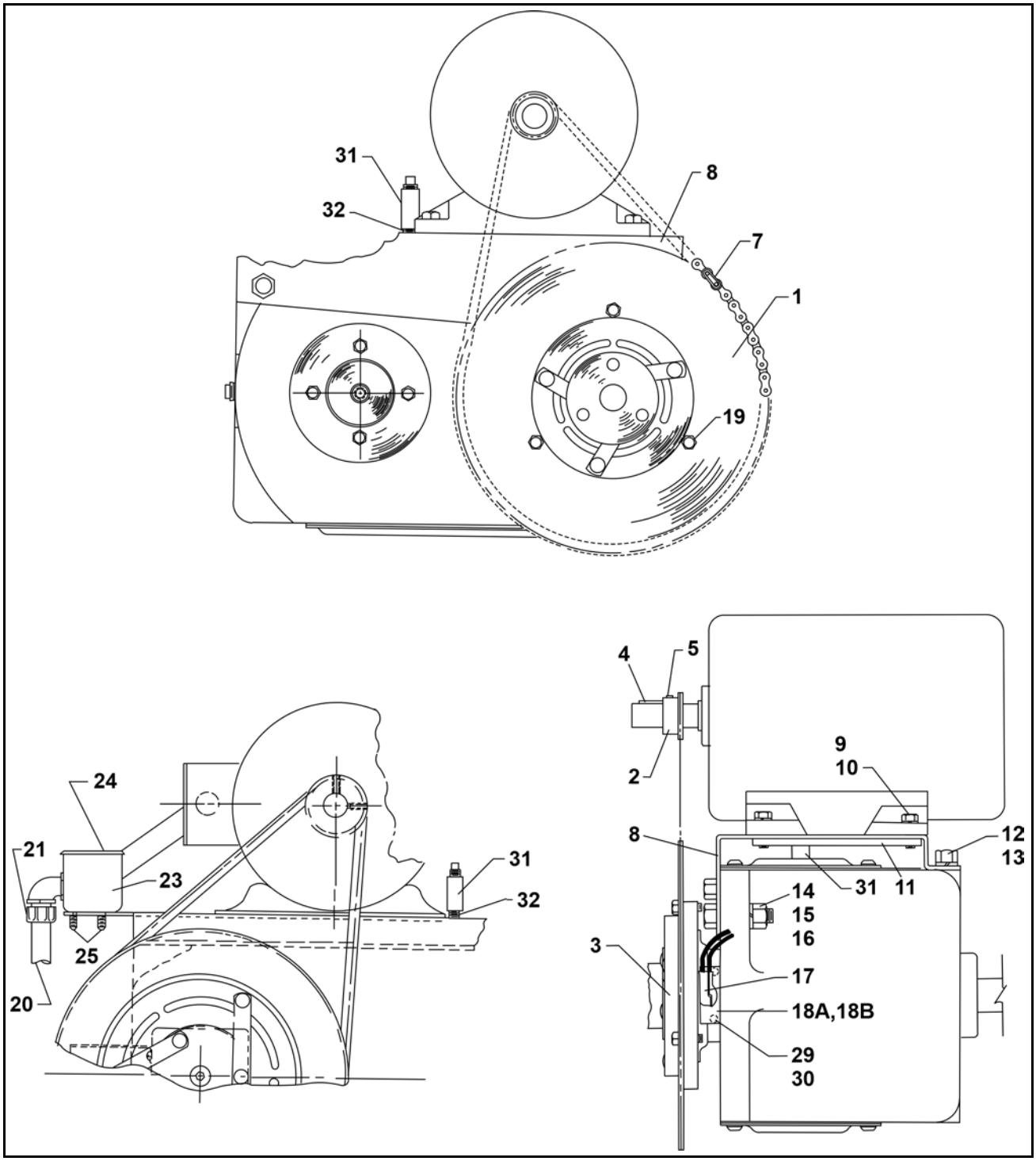
Autospot Drive Motor

2 Sheets

72044WR2, 72044SR2



Autospot Drive Motor

2 Sheets

72044WR2, 72044SR2

Table 26. Parts List—Autospot Drive Motor

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Reference Assemblies				
	A	G15 13400	MOTOR DRIVE ASSY=AUTOSPOT	7244SR2
	B	G28 15600	MOTOR DRIVE ASSY=AUTOSPOT	7244WR2
Components				
all	1	54N015	SPROCKET BROWN#35A96-6"BORE	
all	2	54N008	SPRKT BROWN#35-13X7/8" BORE	
all	3	54H164A	CLUTCH 12VDC MA-PM02B	
all	4	15E006	KEY #6 WOODRUFF 5/32X5/8 SAE10	
all	5	15Q068	SOKSETSCR CUP10-24X1/4ZINCALLE	
all	7	54G010B43P	ROLLCHAIN+CONNLINK 3/8"=AUTO	
A	8	02 15865	BASE=AUTOSPOT MOTOR BND@ PRT	
B	8	02 175036	BASE=AUTSPTMTR60+72WE BND@PT	
all	9	15K105	HXCAPSCR 3/8-16UNC2A1.25 GR5 P	
all	10	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	11	02 175027	TAPSTRIP=AUTOSPOT MOTORMOUNT	
all	12	15K211	HXCAPSCR 5/8-11UNC2AX1 GR5 ZIN	
all	13	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	14	15K180	HXCAPSCR 1/2-13UNCAX2 GR5 ZINC	
all	15	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	16	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	17	03 01275	COVER=AUTO CLUTCHWIRES	
all	18A	12M036L	1/2" 90-DEG SHORT ELLS	
all	18B	12M035	3/8" SCREW-IN CONNECTOR	
all	19	15K041	HXCAPSCR 1/4-2OUNC2AX1 GR 5 ZI	
A	20	12C0375FN	3/8" FLX NON-METAL CONDUIT	
A	21	12M040	3/8" X 90-DEG SEALTITE CONN.	
A	23	12H050	HANDYBOX 4X2+1/8X2+1/8	
A	24	12H095	HANDY BOX COVER 4+2+1/8	
A	25	15P185	TRDCUT-F HXHD 1/4-20UNC2AX3/4	
A	29	15U150	LOCKWASHER MEDIUM #10 ZINCPL	
A	30	15K018	SKCPSCR 10-24 UNC 3X3/8 BLK	
all	31	5SCC0GNF	NPT COUP 3/8 GALMAL 150#	
all	32	5N0G02AG42	NPT NIP 3/8X2 TBE GALSTL SK40	

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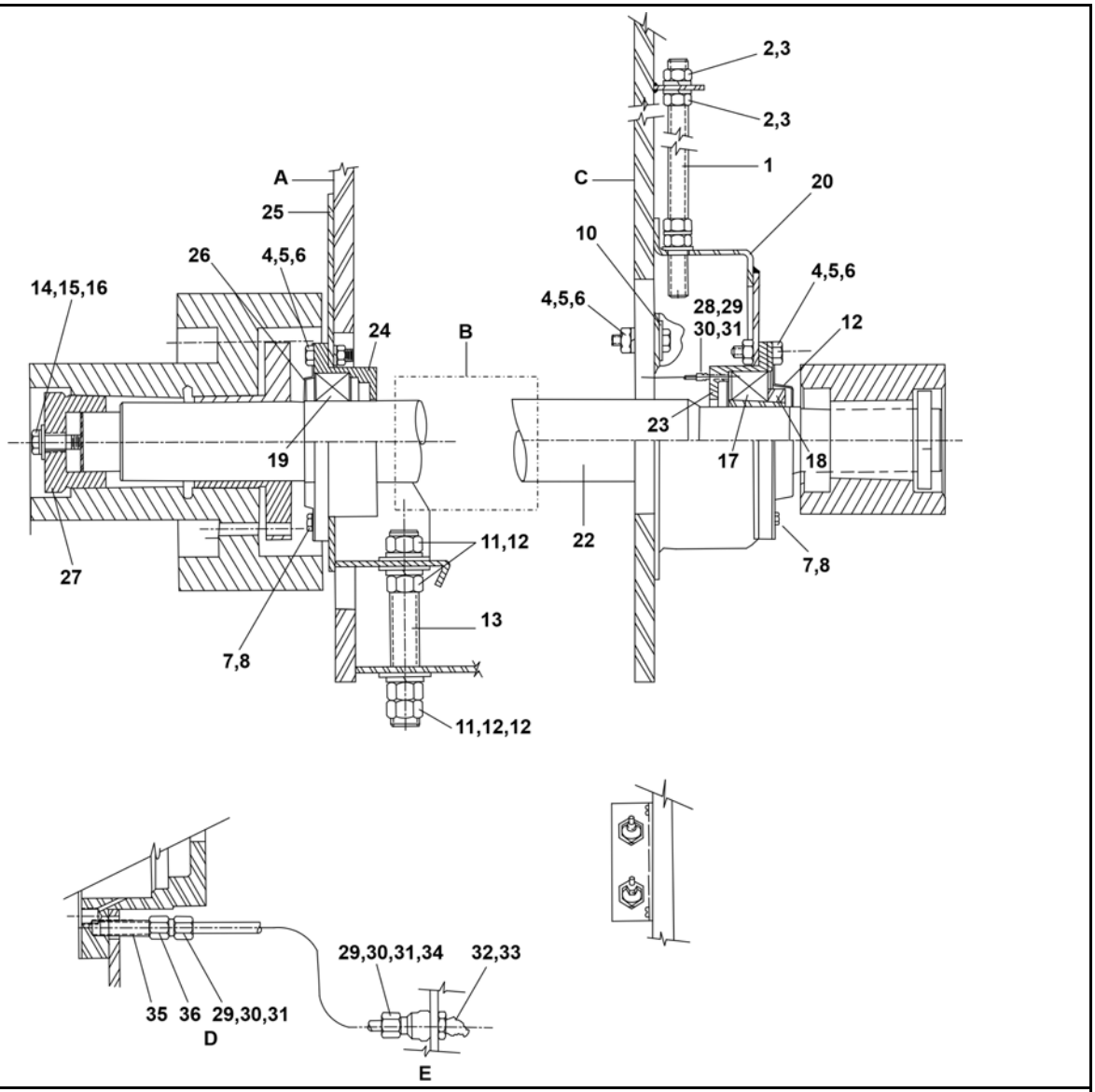
4 Inch Idler Shaft Bearing

2 Sheets

72044SR2

Figure 45. Cross section views



Legend

A . . . Soil side
B . . . For brake assembly, see BPWG6I08
C . . . Clean side
D . . . Lubrication
E . . . Typical

4 Inch Idler Shaft Bearing

2 Sheets

72044SR2

Table 27. Parts List—4 Inch Idler Shaft Bearing

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Reference Assemblies				
	A	ABI36002	95041# BEARASSY=IDLERSHAFT NOBRAKE	
Components				
all	1	02 19023	94353A DRIVE BASE ADJ. SCREW 13.5LG	
all	2	15G250	HXNUT 1-8UNC2B SAE ZNC GR2	
all	3	15U400	LOCKWASHER MEDIUM 1" ZINCPL	
all	4	15K225	05Z HEXCAPSCR 5/8-11X2+1/2	
all	5	15G238	HXNUT 5/8-11UNC2B SAE ZINC GR2	
all	6	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	7	15U180	LOCKWASHER MEDIUM 1/4 ZINCPL	
all	8	15K030	HEXCAPSCR 1/4-20UNC2X1/2 GR5 ZINC	
all	9	15P010	12Z PHILPAN TRDCUTSCRTYP10-24X1/2SS	
all	10	15U314	FLATWASHER(USS STD) 5/8" ZNC PLT	
all	11	15U450	FLATWASH.1345X3.25X1+11/16 ZINCPLTD	
all	12	15G268	HXFINJAMNUT 1+1/2-12UNF2B ZINC GR2	
all	13	03 06391A	94266B ROD=1.5UNFX10.5LG=TAKE-UP	
all	14	15K235A	03Z HEXCAPSCR 3/4-10X2.5 GR 8	
all	15	15U340	LOCKWASH MEDIUM 3/4 ZINCPL	
all	16	15U320	FLATWASHER(USS STD) 3/4" UNPLT	
all	17	56S22220T	04Z SPHEROLBRG NTN#22220BL1KD/C3	
all	18	56AHS20	SNW20 BRG ADAPT 3.5" CYL BORE	
all	19	56S22220S	04Z SPHEROLBRG NTN#22220BL1D1C3	
all	20	W2 18747E	92257C*TAKE-UP WLMT=4"IDLER SHAFTCS	
all	21	03 06444A	79337C CAP=BEARING IDLERSHAFT C.S.	
all	22	X3 06154A	92236# IDLER SHAFT 4"DIA 60+72SGU	
all	23	X2 18697A	79277C BEARHOUSE IDLER SHAFT FLOAT	
all	24	X2 18696A	94283C BEARHOUSE IDLER SHAFT LOCKED	
all	25	W3 06388D	91247D *TAKE-UP WLMT SOIL SIDE 4"SHA	
all	26	03 06444	79507C CAP=BEARING 4"IDLERSHAFT	
all	27	03 06445	94251B WEDGE=SHEAVE+SHAFT=60+72SGU	
all	28	53A005B	BODYMALCON1/4X1/8COMP #B68A-4A	
all	29	53A059A	NUT 1/4"BR.HOLYOKE AND #61A-4	
all	30	53A501	TUBEINSERT .170"OD	
all	31	53A500	1/4" SLEEVE DELRIN	

4 Inch Idler Shaft Bearing

2 Sheets

72044SR2

Table 27 Parts List—4 Inch Idler Shaft Bearing (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
all	32	54M020	GREASEFIT 30DEG 1611-B ALEMITE	
all	33	5SB0E0CBEO	NPTHEXBUSH 1/4X1/8 BRASS 125#	
all	34	53A007B	BODYFEMCON.25X.25COMP#B66A-4B	
all	35	5N0C01KG42	NPT NIP 1/8X1.5 TBE GALSTL S40	
all	36	53A005F	BODYFEMCON.25X1/8COMP#B66A-4A	

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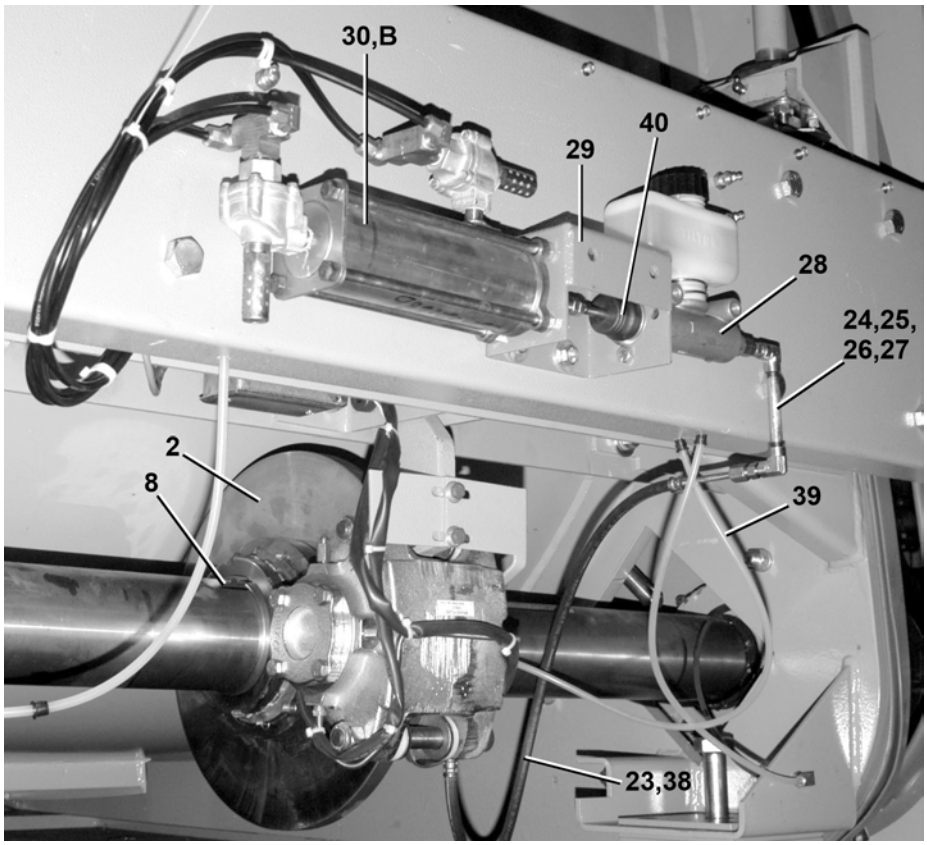
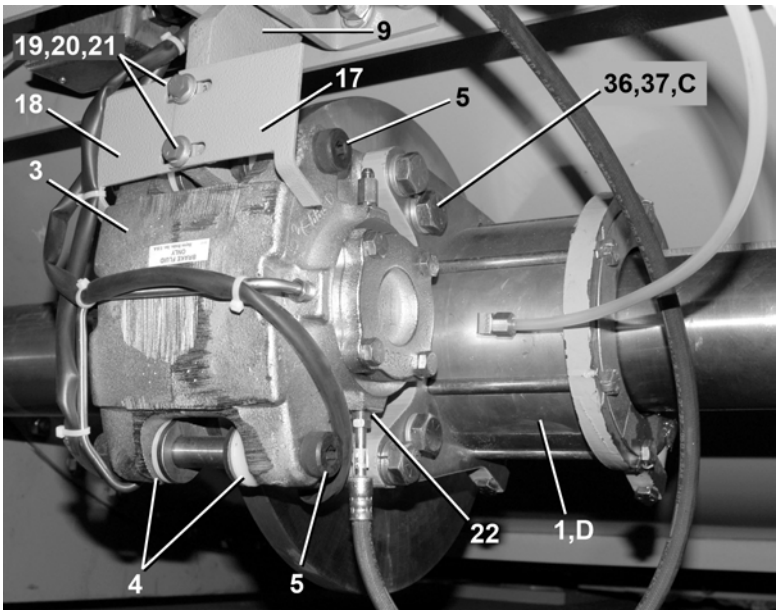
Lower Disc Brake Installation

5 Sheets

6044SR2, 6044SR3, 7244SR2





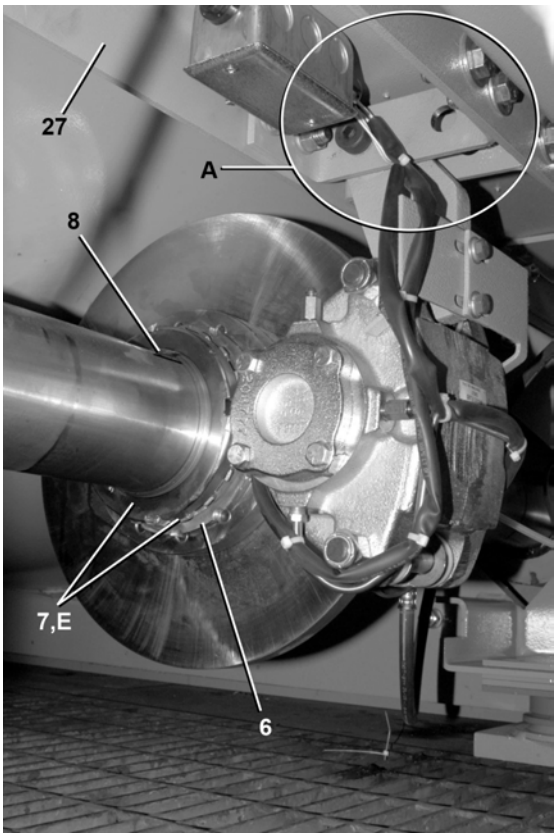
Legend

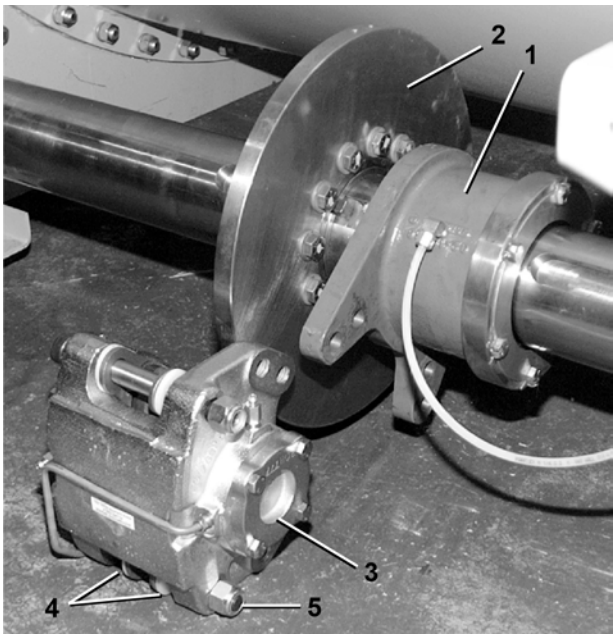
B . . . See BPWVUP01
C . . . 4 instances
D . . . See BPWG6B02

Lower Disc Brake Installation

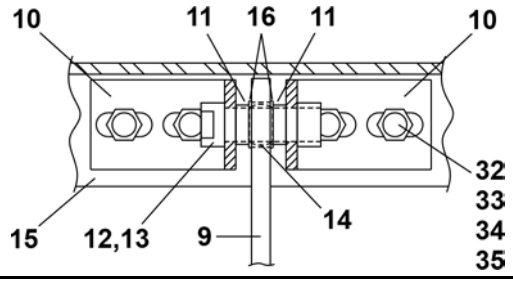
5 Sheets

6044SR2, 6044SR3, 7244SR2





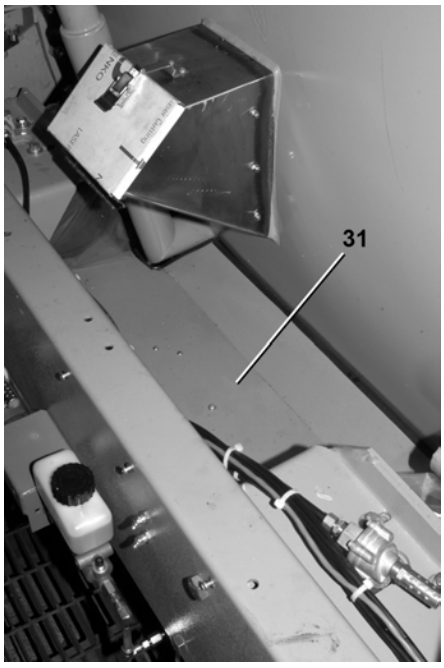
Detail A: Torque Arm Mounting



Legend

A . . . See detail A

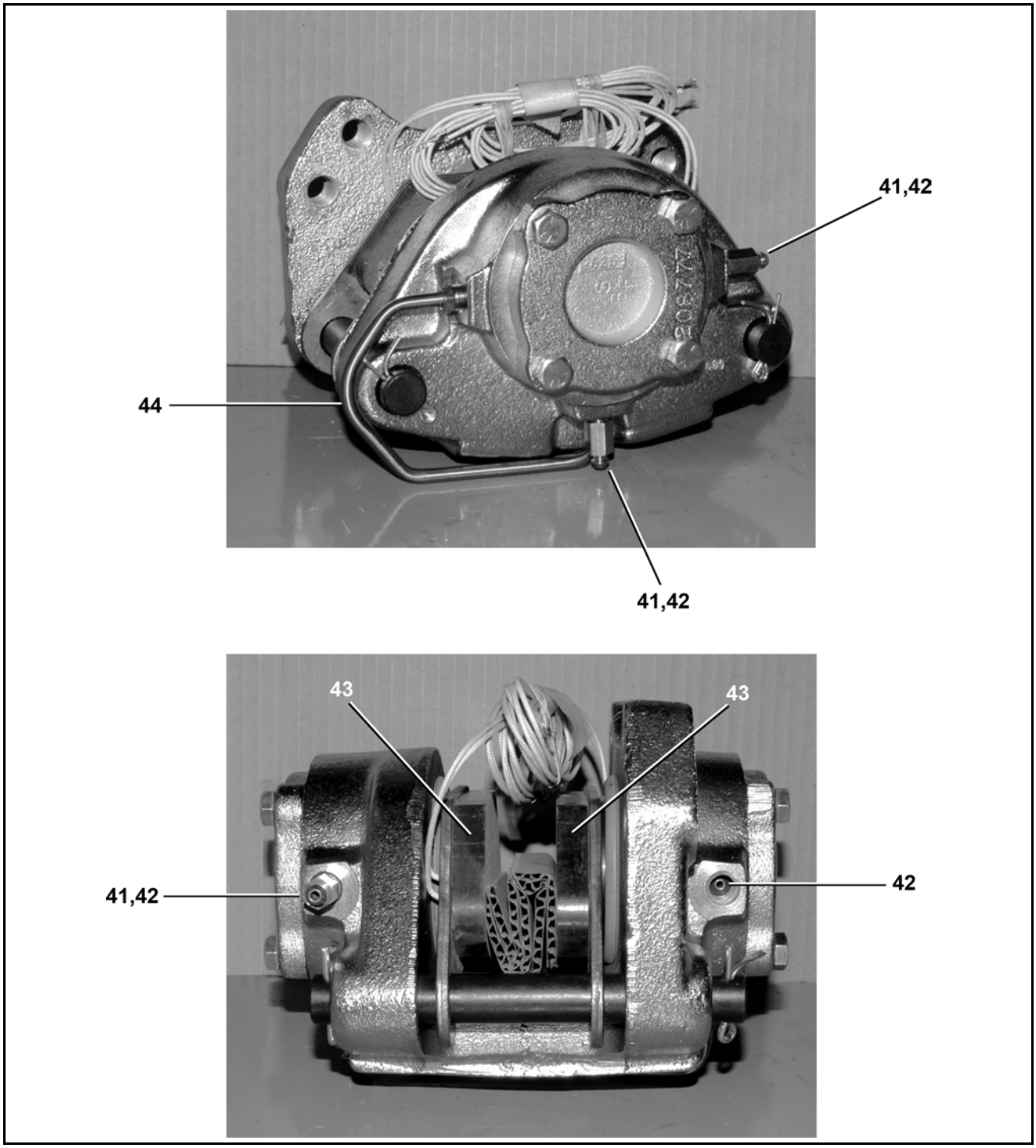
E . . . Adapter includes bearing locknut & washer



Lower Disc Brake Installation

5 Sheets

6044SR2, 6044SR3, 7244SR2



Lower Disc Brake Installation

5 Sheets

6044SR2, 6044SR3, 7244SR2

Table 28. Parts List—Lower Disc Brake Installation

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Reference Assemblies				
	A	GBR28001	INST=DISC BRAKE=60SG	6044SR2/SR3
	B	GBR36001	INST=DISC BRAKE=72SG	7244SR2
Components				
all	1	ABR28002A	ASSY=DISK BRAKE SPLIT BRNG	
all	2	ABR28003	DISC ASSY +BALANCE=60+725G	
all	3	54KC7961	CALIPER HYD FIXMT 12/20 ROTOR	
all	4	03 65203	DISC BRAKE PAD DAMPENER 1/8T	
all	5	15C098	HXSOKSTRPBLT 3/4X5+1/2X5/8-11	
all	6	01 09294	RETAIN RING-FLANGE(STEEL)+$4S	
all	7	56AHS22	SNW22 BRG ADAPTER 4" CYL BORE	
all	8	15E260	KEY-DISC BRAKE	
all	9	W2 19569	*WELD TORQUE ARM 60+72SG	
A	10	02 19570	BRKT=TORQUE ARM MOUNT	
B	10	03 06531	BRACKET=TORQUE ARM MT 72SG	
all	11	X4 22046C	7/8" DIA. SPACER=COBUCK	
all	12	15C095	HXSOKSTRPBLT 3/4X1+3/4X5/8-11	
all	13	15G238N	HXLOCKNUT NYL 5/8-11UNC STL/	
all	14	54AA00PBB	BUSH BALL 3/4 RBC-B12L	
A	15	02 19573	CHANNEL=TORQUE ARM MT	
B	15	03 06530	CHANNEL=TORQUE ARM MT 72SG	
all	16	17B132	INDUSTRIAL RETAIN.RING 4000-12	
all	17	02 19572A	RT BRKT=DISCBRAKE HOLDER FRNT	
all	18	02 19572	LT BRKT=DISCBRAKE HOLDER FRNT	
all	19	15K054	HXCAPSCR 5/16-18X3/4 GR5 XYLAN	
all	20	15U185	FLATWASHER(USS STD) 1/4" ZNC P	
all	21	15U210	LOKWASHER MEDIUM 5/16 ZINCPL	
all	22	54KC7961B0	O-RING 08-11070 BRAKE 2-660	
all	23	54KC7961H2	BRAKEHOSE #W2511 1/8X32" OAL	
all	24	52LY0CR001	HEXPIPNIP 1/8"XCLOSE#5404-2-2	
all	25	52JY0CR001	ELBOW 1/8"FEM.#5504-02-02	
all	26	5N0C03AS82	NPT NIP 1/8X3 TBE 304SS SK80	
all	27	52AY0ER003	STR.1/4"MJICX1/8"MP#2404-4-2	
all	28	54KMC1125U	MASTER CYL TILTON 74–1125U	

Lower Disc Brake Installation

5 Sheets

6044SR2, 6044SR3, 7244SR2

Table 28 Parts List—Lower Disc Brake Installation (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
all	29	W3 65238	*WLMT=MASTER BRAKE CYL BRKT	
all	30	AAC65002	2006292 AIRCYL BRAKE SINGLE MOTOR	
all	31	02 19576	SPLASH SHIELD=DISC BRAKE	
all	32	15K154A	HEXCAPSCR 1/2-13X1.5 G8 ZN	
all	33	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	34	15U280	FL+WASHER(USS STD)1/2 ZNC PL+D	
all	35	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	36	15K223A	HEXCAPSCR 5/8-11X2 GR8 ZIN	
all	37	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	38	54KC7961BG	BRAKE HOSE=1/8"X18"OAL # 50612	
all	39	54KC7961BH	BRAKE HOSE #W2261 1/8X18"OAL	
all	40	54KC7961BP	BRAKEFLUID/PISTON KIT #98-1198	Caliper repair part
all	41	54KC7961B0	O-RING 08-11070 BRAKE 2-660	Caliper repair part
all	42	54KC7961BS	BLEEDERSCREW#10-07721 #2-660	Caliper repair part
all	43	54KC7961RK	BRAKE PADS W/SENSOR #98-13982	Caliper repair part
all	44	54KC7961CT	CROSSOVERTUBEKIT HAY#B98-11700	Caliper repair part

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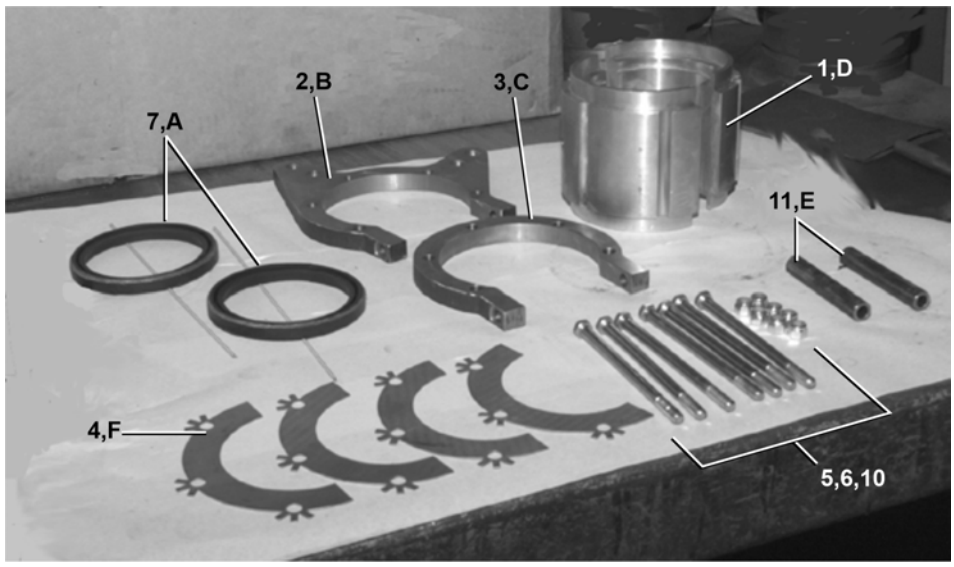
Lower Disc Brake Split Bearing Parts and Assembly

5 Sheets

6044SR2, 72044SR2/SR3

Figure 46. Bearing Components



Legend

A . . . Seals
B . . . Front flange
C . . . Rear flange
D . . . Split bushing
E . . . Spacers
F . . . Retainers

Table 29. Parts List—Lower Disc Brake Split Bearing Parts and Assembly

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
	A	ABR28002A	ASSY=DISK BRAKE SPLIT BRNG	
Components				
all	1	X2 19577	SPLIT BUSHNG=DISK BRAKE BRNG	
all	2	X2 19578	FRONT FLANGE=DISK BRAKE BRNG	
all	3	X2 19579	REAR FLANGE=DISK BRAKE BRNG	
all	4	02 10426B	WASH=SEAL RETAIN+LOCK+SPLIT	
all	5	15K142	HXCAPSCR 3/8-16X6 GR8ZC	
all	6	15G205	HXNUT 3/8-16UNC2B ZINC GR2	
all	7	24S126	SEAL 4X5X.5 JM#R-0400-10175RUP	
all	8	54M029	RELIEFFIT 1/8STR ALEMITE 47200	
all	9	53A031B	BODY-EL90MALE.25X1/8 #269C-42B	
all	10	15G218	HXLOKNUT NYL 3/8-16 STL/ZNC	
all	11	X2 19580	SPACER=DISC BRAKE BRNG	

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Assembly Procedure

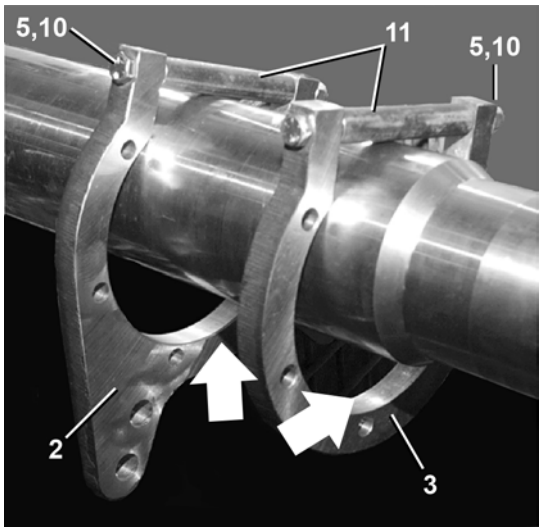
5 Sheets

6044SR2, 72044SR2/SR3

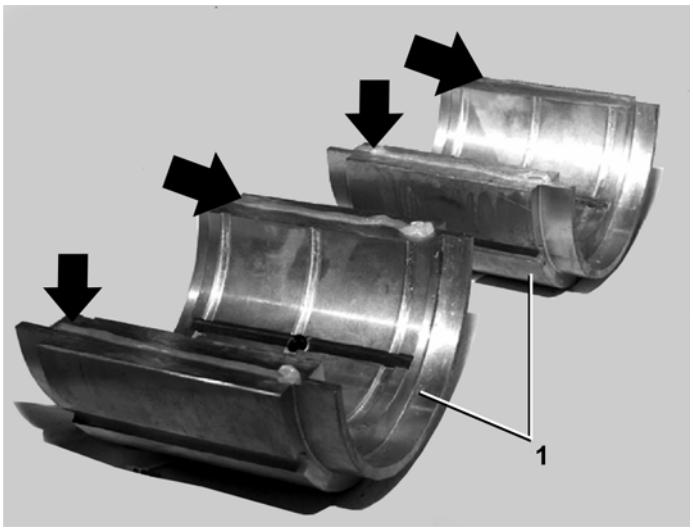
Use “Antiseize” lubricant on all threads.

Refer to the illustrations next to each step. Item numbers shown refer to the parts list.

1. Slide the front and rear flanges (Items 2 & 3) onto the shaft. Bore chamfers (large arrows) must face inward. Assemble spacers (Item 11) and ensure bolts are loose. (Only for new installation and complete replacement.)



2. Apply a thin bead of high temperature RTV silicone to the bronze bushing (Item 1) seams. Large arrows show surfaces on which to apply silicon.

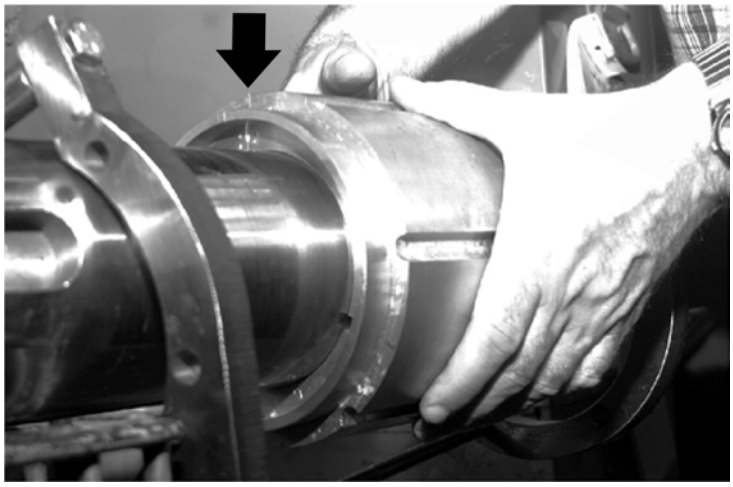


Assembly Procedure

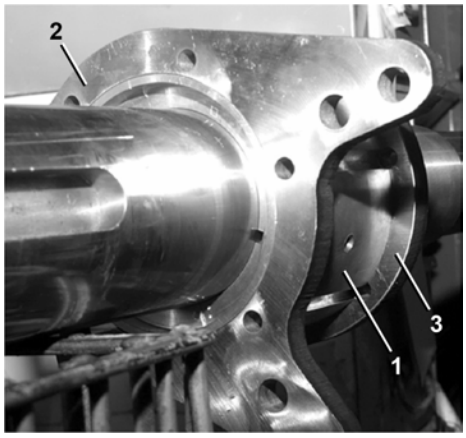
5 Sheets

6044SR2, 72044SR2/SR3

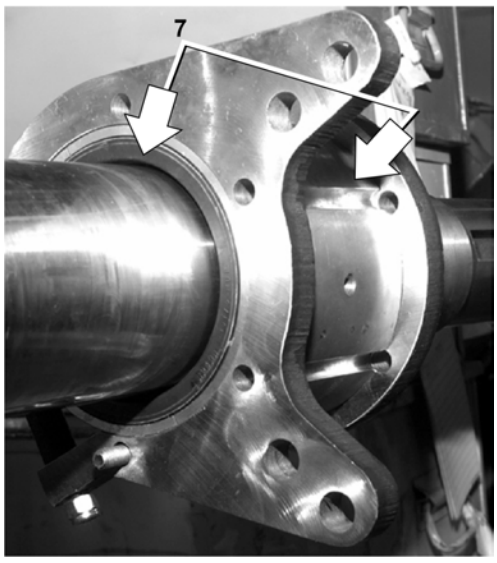
3. Put the two halves of the bronze bushing around the shaft. Ensure alignment by matching alignment marks (large arrow).



4. Push the front and rear flanges (Item 2 & 3) onto the bronze bushing (Item 1). Use only a hard rubber mallet. Ensure spacers are loose.
5. Rotate the bushing so the seams are approximately 90 degrees to the flange openings.



6. Insert the seals (Item 7) in two locations (large arrows). Use only hard rubber or plastic mallet.

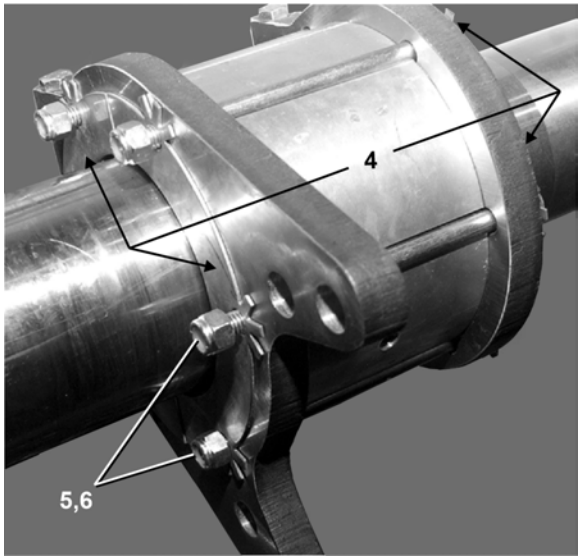


Assembly Procedure

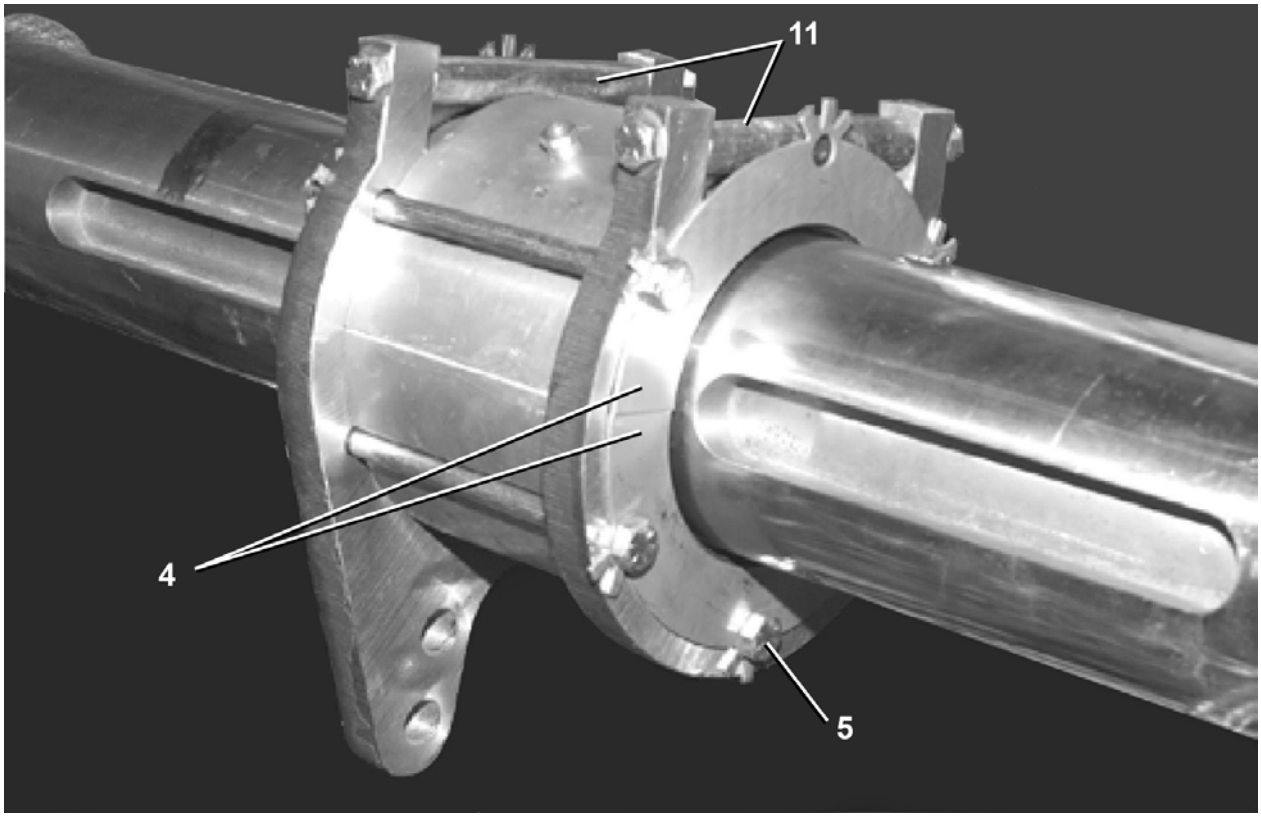
5 Sheets

6044SR2, 72044SR2/SR3

7. Install the seal retainers (Item 4) so they overlap the seams. Ensure the six bolts (Items 5 & 6) are loose.



8. Refer to the illustration below. Tighten the spacers (Item 11) until they no longer rotate. Constantly check assembly rotation around the shaft. Use only hand wrenches.

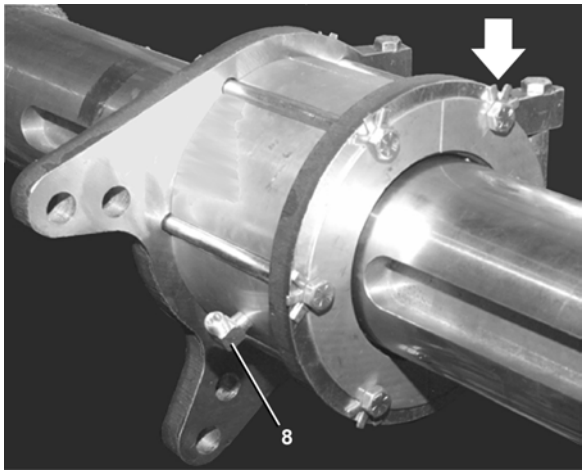


Assembly Procedure

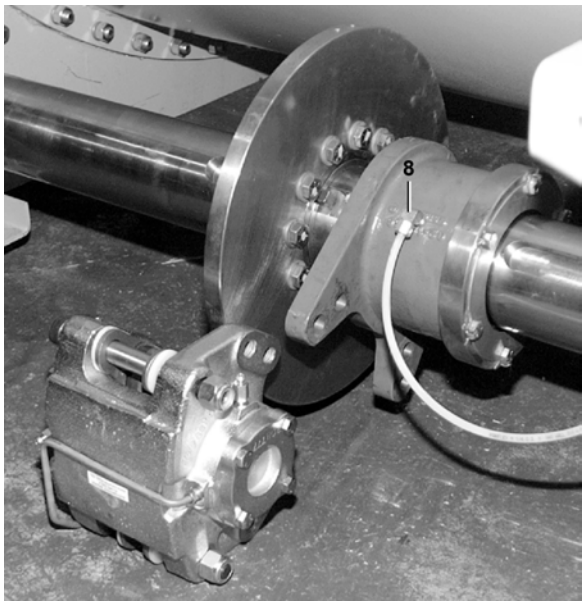
5 Sheets

6044SR2, 72044SR2/SR3

9. Refer to the illustration above. Ensure that the edges of the retainers (Item 4) meet but do not overlap. Tighten the bolts (Item 5) in an alternate pattern. Constantly check assembly rotation. Use only hand wrenches. If binding occurs, loosen the bolts and repeat.
10. With all bolts tightened rotate the assembly. Bend the star tabs (large arrow) on the retainers. The assembly should continue to rotate freely.



11. Assemble fittings (Item 8) and tubing for grease supply line. Refer to document BPWG6I08 for the lower disk brake shown in this illustration.



3 Frame & Suspension

3.1 Suspension Adjustments for Divided Cylinder Machines

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The suspension system on Milnor® Hydro-cushion™ machines is adjusted and thoroughly tested at the factory. It should not require subsequent adjustment unless the machine is distorted during shipment or installation or unless some component of the system, such as a Hydro-cushion™ cylinder is replaced.

There are two primary objectives when adjusting the suspension system on any Hydro-cushion™ machine model:

1. To position the shell in the proper location within the frame (hanging dimensions) to maximize freedom of movement of the shell and to insure proper draining, and
2. To adjust the length of up and down travel at each of the push-down locations (push down travel) so that the shell will not be distorted (racked) when pushed down.

All Milnor® Hydro-cushion™ machines contain the following suspension system components:

1. Hydro-cushion™ cylinder—which suspend the shell and cylinder within the frame and provide vibration damping during extraction.
2. Pneumatic push down devices (air bags)—which when inflated, force the shell downward where it is held against rigid pads during loading, unloading, washing, and draining.
3. Metal or rubber pads—some rigidly fixed to the shell and some rigidly fixed to the frame, which come in contact when the shell is pushed down.

The actual configuration of these components varies from model to model.

3.1.1 How Shell Adjustments are Made

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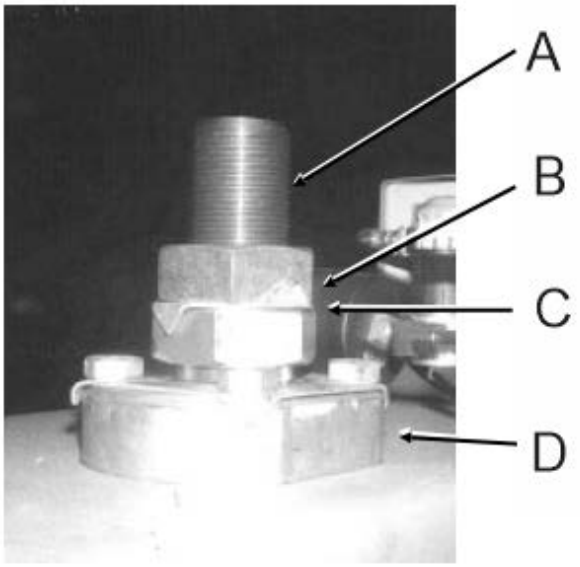
Regardless of machine model, repositioning of the shell is always accomplished by adjusting the nuts at the top of the upper Hydro-cushion™ shafts. To move the shell up or down at the location of any Hydro-cushion™, see Figure 47: Hydro-cushion™ Upper Shaft and Adjusting Nuts, page 100 and proceed as follows:

CAUTION: These procedures should be accomplished with power to the machine locked off.

1. Straighten the tongues on the keyed lock washer using pliers, screw driver, etc.
2. Loosen the lock nut (upper hex nut) and move it all the way up to the top of the shaft, but do not remove it.

3. Use the adjusting nut (lower hex nut) to “crank” the shaft up or down as required.
4. Once final adjustment is made, while holding the adjusting nut to prevent it from turning, re-tighten the lock nut against the adjusting nut (with the lock washer between).
5. Rebend the tongues on the lockwasher as before, to prevent movement of the nuts.

Figure 47. Hydro-cushion™ Upper Shaft and Adjusting Nuts



Legend

A . . . Hydro-cushion™shaft
B . . . Locknut
C . . . Keyed lockwasher
D . . . Adjusting nut

3.1.2 Shell Hanging Dimensions and Adjustment Procedures

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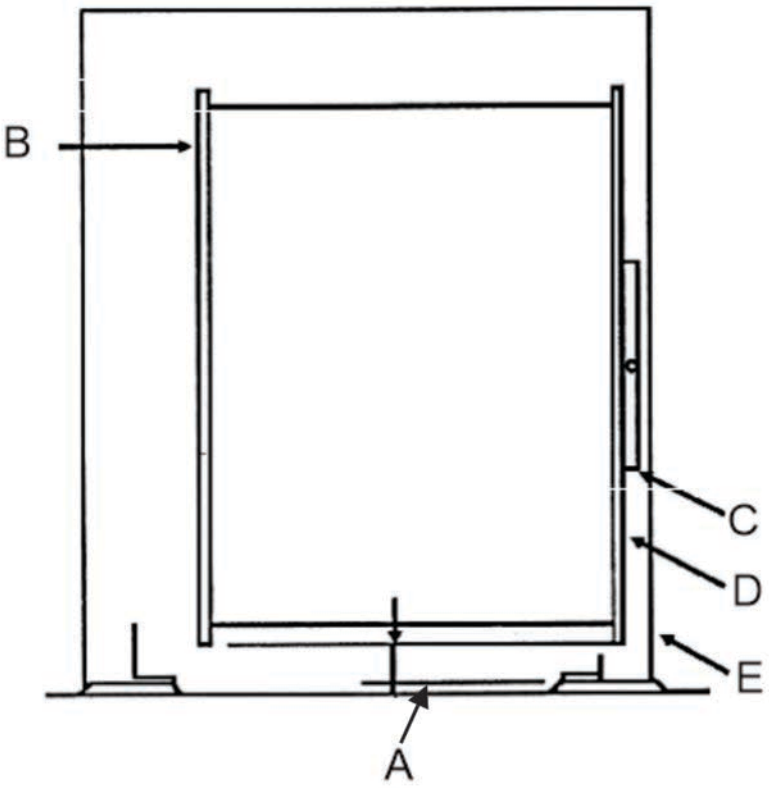
To adjust the shell of a divided cylinder machine, proceed as follows:

1. Locate the shell hanging dimension for your machine in Table 30: Hanging Dimensions, page 101 and adjust your machine accordingly. Take measurements on the left and right sides of the shell, to assure that the shell is horizontal, left to right.
2. The shell and cylinder should be level front to back. Check this with a bubble level, as shown in Figure 48: Shell Hanging for Divided Cylinder Machines (Left side view of 60044WE shown), page 101 .
3. If further adjustment is required in order to level the cylinder, make small adjustments at all four corners. For example, if the cylinder slopes down to the front, try raising the two front corners by 1/16" (2mm) and lowering the two rear corners by 1/16" (2mm). Always split the difference.

NOTE: Only slight deviations from the dimensions shown should be used to level the shell. If large deviations are required, this may indicate that the frame is out of level. If so, this condition must be corrected before attempting to level the shell.

Figure 48. Shell Hanging for Divided Cylinder Machines (Left side view of 60044WE shown)



Legend

A . . . Hanging Dimensions
B . . . Shell back
C . . . Bubble level
D . . . Shell front
E . . . Frame

Table 30. Hanging Dimensions

Machine Model	Dimension A
42031WE	4 1/8" (105)
42031SG	4 1/8" (105)
44044WE	4 1/8" (105)
42044SG	4 1/8" (105)
60031WE	3 5/8" (92)
60031SG	3 5/8" (92)
60044WE	3 5/8" (92)
60044SG	3 5/8" (92)
72044SG	3 3/4" (95)
72044WE	3 3/4" (95)

3.1.3 Push-Down Travel Dimensions and Adjustment Procedures

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CAUTION: Some of the following procedures require power to the machine. Take the necessary precautions to assure that no one operates the machine controls while personnel are adjusting the push-down components.

3.1.3.1 42" Divided Cylinder Machines

BNWVUM01.T03 0000278453 D.2 B.2 A.3 3/6/20, 9:06 AM Released

The push-down stops on these machines consist of brackets attached to the shell and rubber rest pads, mounted atop the base pads (see Figure 49: Push-down Travel Adjustment: 42" Div-cyls (42" Staph Guard®), page 103) which make contact when the shell pushes down. The rubber rest pads sit in metal pans and are raised or lowered by adding metal shims to or removing the shims from inside the pans. Extra shims and adhesive for securing the shims were supplied with your machine.

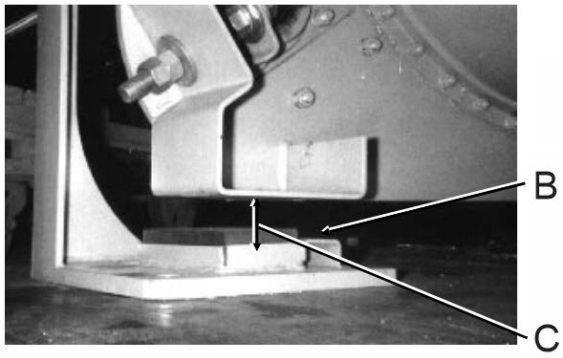
There is no specific push-down travel dimension for these machines; however, length of travel must be adjusted as follows:

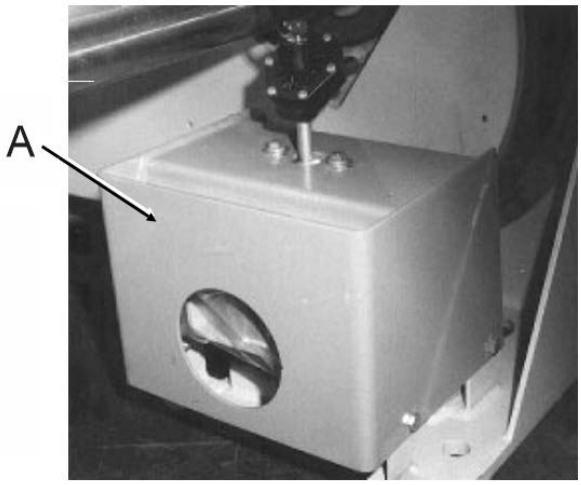
1. With the **Master switch** set to **off**, and the shell hanging free, measure the gap between each bracket and base pad.
2. Add or remove shims from the appropriate pads as required to make all four gaps equal and to insure that no rest pad protrudes completely from its metal pan.

Test for equal length of travel at all four locations as follows:

3. With four sheet metal shims of **equal** thickness, set one shim **on top of** each rubber rest pad, such that at least a one inch length of the shim overhangs the outside edge of the pad.
4. Set the **Master switch** to **manual**, causing the shell to push-down.

Figure 49. Push-down Travel Adjustment: 42" Div-cyls (42" Staph Guard®)





Legend

A . . . Push-down housing (rest pads and brackets within)
B . . . Rubber rest pad (shim between rubber pan and metal pan)
C . . . Gaps must be equal.

5. With the shell pushed down, attempt to pull each test shim out from between the bracket and rubber pad. The test shims should all be tight. If any shim(s) are not pinched tightly between the bracket and pad, take note of which one(s) are not.

   Make final adjustments as follows:

6. Set the **Master switch** to **off**, remove the test shims and make the necessary changes to the shims below the rubber pads as indicated by the above test.
7. Repeat Steps 3 through 6 as required, until this test is successful.
8. Once the adjustments are completed, secure all shims and rubber rest pads with the adhesive provided.

3.1.3.2 60" Divided Cylinder Machines

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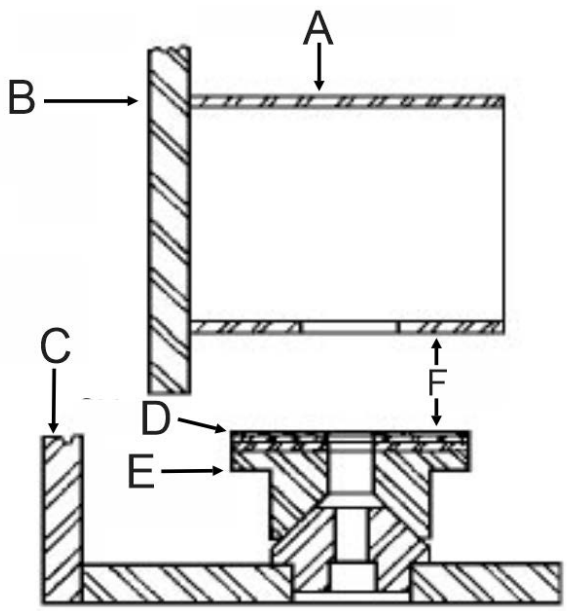
These machines have push-down stops on the four corners of the frame which appear as shown in Figure 50: Ring Weldments, page 104 . When pushed down, the ring weldments (which move with the shell) must seat firmly onto the plugs which are mounted atop the base pads. The push-down travel dimension must assure that 1) the ring weldments and plugs are far enough apart when the shell is not pushed down, so as not to interfere with the free movement of the shell, and 2) that all four stops are in solid contact when the shell is pushed down. To accomplish this, proceed as follows:

1. With the **Master switch** set to **off** and the shell hanging free, remove the bolts securing the ring weldments to the mounting brackets. Set each ring weldment on top of its respective plug, removing any shims which may have been used and placing them next to the ring weldment.

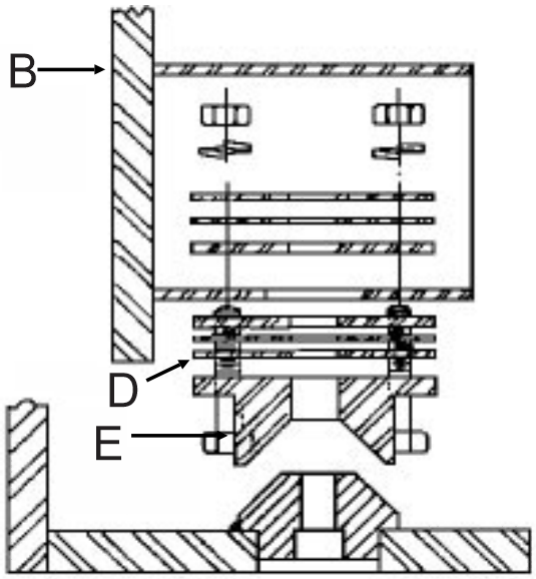
2. Measure the gap between the top of the ring weldment and the bottom of the mounting bracket, at each location.

Figure 50. Ring Weldments

Shimming Ring Weldments



Reconnecting Ring Weldments



Legend

A . . . Mounting bracket
B . . . Shell (hanging free)
C . . . Frame
D . . . Shims
E . . . Ring weldment
F . . . 2"

3. Stack shims on top of the ring weldment as required to make each gap **exactly 2 inches** as shown in the left side of Figure 50: Ring Weldments, page 104 . If the gap at any location is less than 2 inches without shims, the shell must then be raised in the frame, using the procedures previously described.
4. Once the proper arrangement of shims is made, remount the ring weldment and shims to the mounting bracket (see the right side of Figure 50: Ring Weldments, page 104). Any extra shims may be stacked on the top side of the mounting bracket plate to which the ring weldment is attached.

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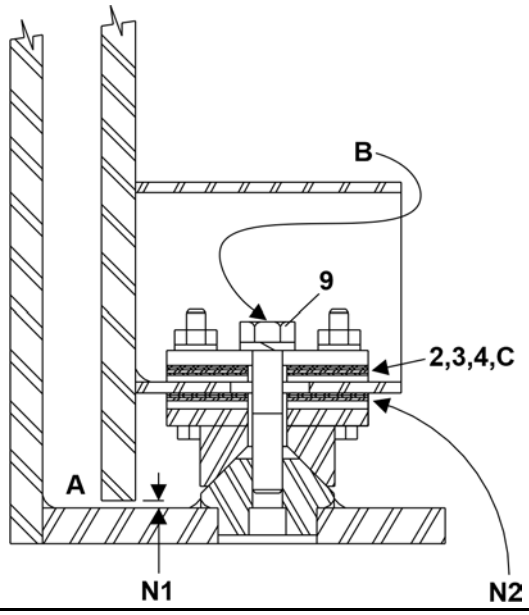
Hold Down Adjustment

2 Sheets

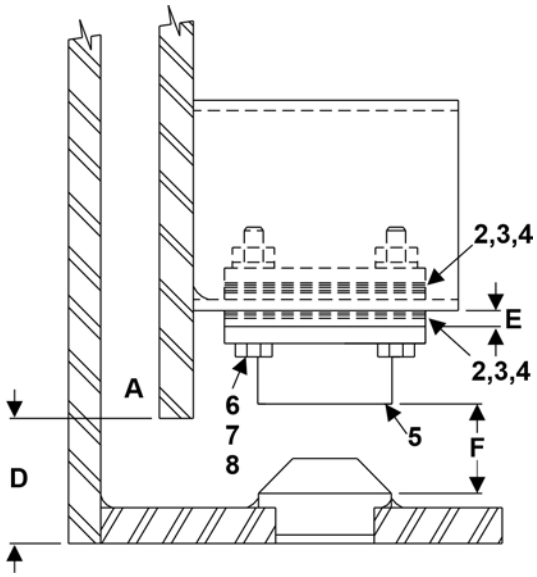
6044SR2/SR3, 6044WR2/WR3, 72044SR2/SR3, 72044WR2/WR3

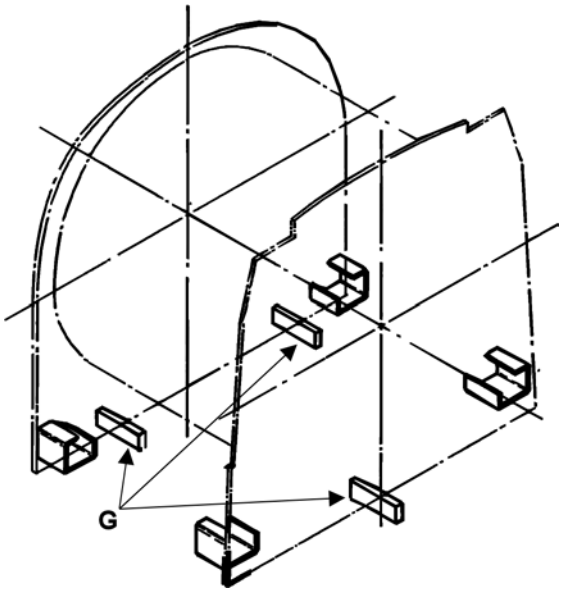
NOTE: For instruction: push down travel dimensions and adjustment procedures, see BNWVUM01

Cross Section: Machine Locked down for Shipment



Adjustment Complete, Machine Up





Legend

A . . . Machine Shell

B . . . Remove shipping bolt before running machine. See instructions for Adjustment of Hold Down

C . . . Place extra shims above

D . . . Unloaded 3-3/4”

E . . . 1/2” approx.

F . . . 2” travel of empty basket

G . . . Setting blocks for adjustment. Blocks must hold shell approximately 3/8” above base pads when machine is pushed down.

N1 . . Be sure shell does not bottom on basepad, there must be clearance at this point. Check each corner

N2 . . Place shims here to adjust ring weldment so that all four corners seat simultaneously.

Hold Down Adjustment

2 Sheets

6044SR2/SR3, 6044WR2/WR3, 72044SR2/SR3, 72044WR2/WR3

Table 31. Parts List—Hold Down Adjustment

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
none				
Components				
all	2	03 06216A	SHIM=HOLDOWN 1/4"THICK	
all	3	03 06216B	SHIM=HOLDOWN 10GA THICK	
all	4	03 06216C	SHIM=HOLDOWN 16GA THICK	
all	5	W3 06406	*RING=HOLD DOWN CENT-STAMPED	
all	6	15G238	HXNUT 5/8-11UNC2B SAE ZINC GR2	
all	7	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	8	15D125	HXTAPSCR 5/8-11X4-FLTHRD GR5	
all	9	15K300	HXCAPSCR 1-8UNC2A X4.5 SAE GR5	

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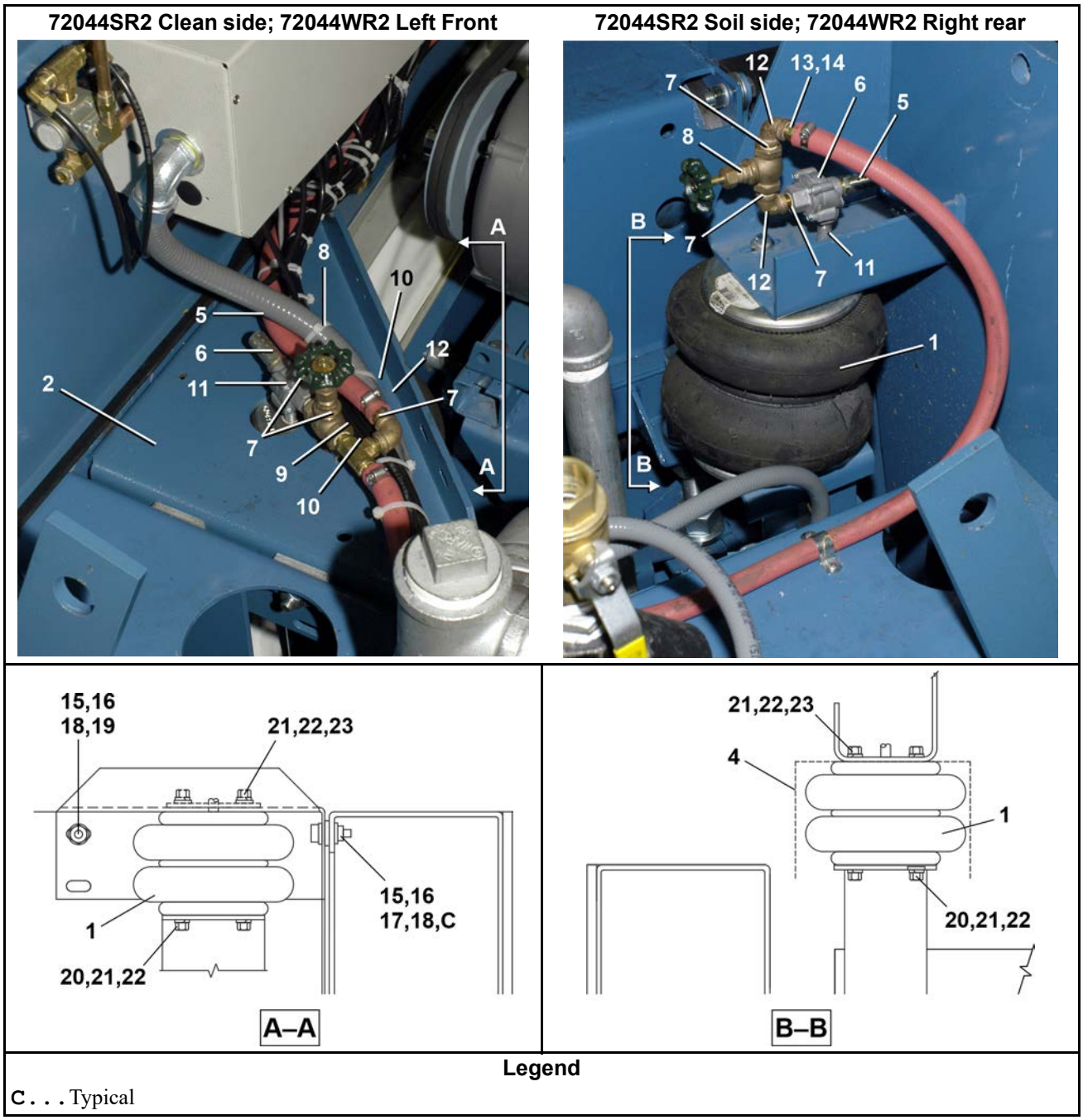
Push Down Components

3 Sheets

72044WR2, SR2

NOTE: The 72044SR2 model is shown. The 72044WR2 repair parts are identical.

Figure 51. Push Down installation and pneumatic fittings

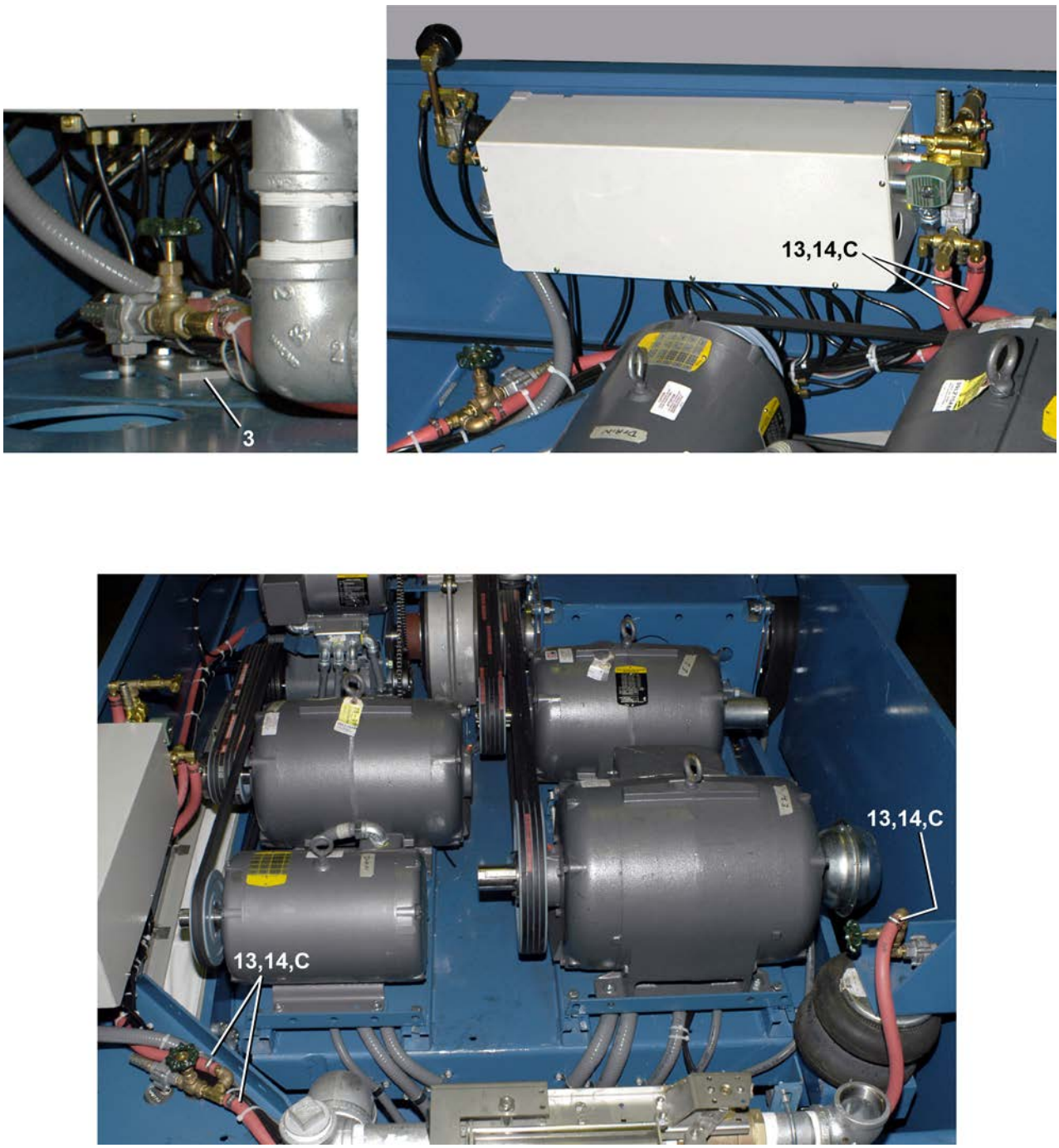


Push Down Components

3 Sheets

72044WR2, SR2

Figure 52. Push Down installation and pneumatic fittings



Legend

C . . . Typical

Push Down Components

3 Sheets

72044WR2, SR2

Table 32. Parts List—Push Down Components

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
			Reference Assemblies	
	A	AD 36 037	PUSH DOWN MT ASSY 72SGH	72044SR2
	B	AD 36 036	PUSHDOWN MOUNTING ASSY=72WED	72044WR2
			Components	
all	1	60B120	AIRMT S-20 2CONV F#W013586910	
all	2	03 06193	UP PUSH BRKT 72W+S BEND@PRNT	
all	3	03 06193A	ADJ.PLATE=20C AIRCUSHION	
all	4	69C050A	POLYETHYLENE BAG 9X6X13X.005	
all	5	27A005	MUFFLER 3/8" BANTAM B38	
all	6	96M055	DELTROL QUICK EXHAUST VLV.1/4"	
all	7	5N0ECLSBE2	NPT NIP 1/4XCLS TBE BRASS 125#	
all	8	96D026	1/4"GLOBEVAL BRZ125 STEAM	
all	9	51V015	TEE 1/4 FGDBRASS 101T7-444	
all	10	51E507	HOSESTEM BRASS 1/4MPX1/2HOSEID	
all	11	5N0E02KG42	NPT NIP 1/4X2.5 TBEGALSTL SK40	
all	12	5SL0ENFA	NPTELB 90DEG 1/4 GALMAL 150#	
all	13	60E085A210	HOSE- *AIR-1/2ID PE X210"LG	
all	14	27A090	HOSECLAMP 13/16-1.5"CADSC#HS16	
all	15	15K191	HXCAPSCR 1/2-13UNC2AX2.5 GR5 Z	
all	16	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	17	15U280	FL+WASHER(USS STD)1/2 ZNC PL+D	
all	18	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	19	15U490	FLTWASH 1+1/2X17/32X1/4 ZINC	
all	20	15K095	HXCPSCR 3/8-16UNC2AX1 GR5 ZINC	
all	21	15U240	FLATWASHER(USS STD) 3/8" ZNC P	
all	22	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	23	15K105	HXCAPSCR 3/8-16UNC2A1.25 GR5 P	

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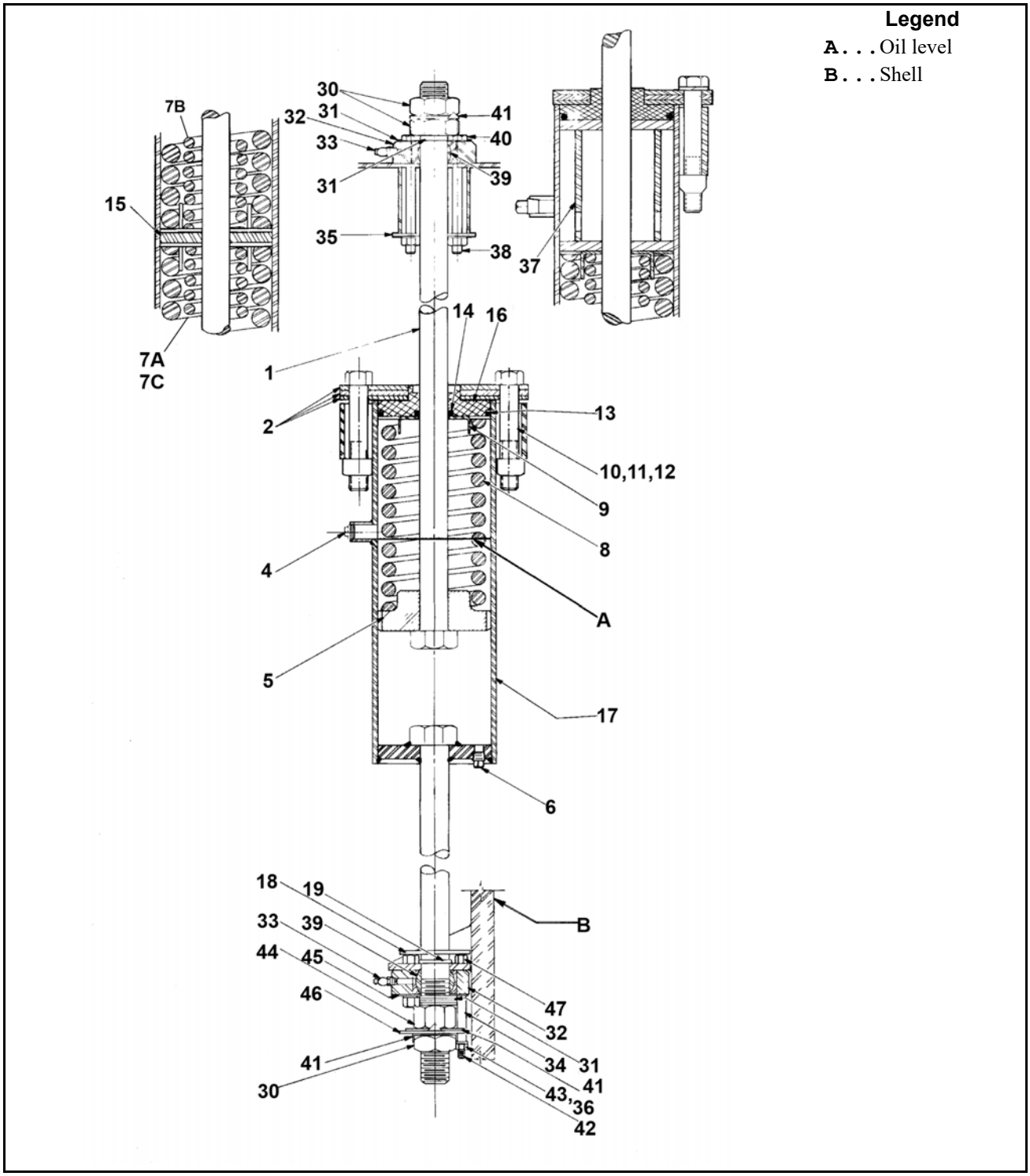
Suspension Cylinder Assemblies

3 Sheets

42031,42044,52038,60044,72044



Suspension Cylinder Assemblies

3 Sheets

42031,42044,52038,60044,72044

Table 33. Parts List—Suspension Cylinder Assemblies

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
			Reference Assemblies	
	B	SA 16 039	*HYDROCUSHION CYL ASSY-"B"	CYLINDER ASSY B
	C	SA 16 038	*HYDROCUSHION CYL ASSY-"C"	CYLINDER ASSY C
	D	SA 28 091	*HYDROCUSHION CYL ASSY-"D"	CYLINDER ASSY D
	F	SA 36 021	*HYDROCUSHION CYL ASSY-"F"	CYLINDER ASSY F
	G	SA 36 023	*HYDROCUSHION CYL ASSY-"G"	CYLINDER ASSY G
	H	SA 36 047	*HYDROCUSHION CYL ASSY-"H"	CYLINDER ASSY H
	K	SA 29 031K	*HYDROCUSHION CYL ASSY-"K"	CYLINDER ASSY K
			(To identify which cylinder is supplied with your machine, see BPWVUJ02 which should be located in the manual next to this document. Once you know which cylinder assembly you have, “B-K” listed above, identify your parts by referencing the “Used In” coding.)	
			Components	
ABCDK	1	02 18244	BOLT=HYDCYL 27+7/8LG+KEYWAY	
K	1	02 18244A	BOLT=HYDCYL 28+7/8LG+KEYWAY	
FGH	1	03 06201	BOLT=HYDCYL 41+7/8LG+KEYWAY	
all	2	02 18840A	UPCAP=HYDROCYL 42+52+60	
all	4	5SP0KGFSS	NPT PLUG 1/2 SOSOLID GALSTL	
BC	5	X2 15356	PISTON=HYDROCYL 6"- 6 NOTCH	
DFGHK	5	X2 18228	PISTON=HYDROCYL 6"- 3 NOTCH	
all	6	5SP0GHFHKM	NPT PLUG 3/8"-HEXCSMAGNETIC ZN	
FG	7A	03 06139	SPRING=IN HYDRO CYL 331LB/IN	FULL SPRING (PURPLE)
G	7B	03 06139A	SPRING=IN HYDRO CYL	PLUS 1/2 SPRING “G” ONLY (PURPLE)
H	7C	03 06338	SPRING INNER-GOLD 14"LONG	GOLD
B	8	02 16068	MAIN SPRING 212LB/IN RED	RED
C	8	02 16125	MAIN SPRING 300LB/IN BLACK	BLACK
D	8	02 19039	MAIN SPRING 480LB/IN GREEN	GREEN
FG	8	03 06138	SPRING=OUT HYDROCYL 667LB/IN	ORANGE
G	8	03 06138A	SPRING=OUT HYDRO CYL	ORANGE
H	8	03 06337	SPRING-OUTER-GOLD 14.5"LONG	GOLD
K	8	03 09016	MAIN SPRING 1035LB/IN BLUE	BLUE
ABCDFG-K	9	02 18619	BUSHING RETAINER + CAD	
H	9	03 06358	BUSHING RETAINER.CAD	
all	10	15B237	HXCAPSCR 1-8UNC2AX5.5 SAEGR5 Z	

Suspension Cylinder Assemblies

3 Sheets

42031,42044,52038,60044,72044

Table 33 Parts List—Suspension Cylinder Assemblies (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
all	11	15G255A	SQNUT 1-8UNC2B SAE ZINC GR2	
all	12	15U400	LOCKWASHER MEDIUM 1" ZINCPL	
all	13	60C159A	ORING 5.475ID 1/4CS BN70 #433	
all	14	24S040	SEAL URETHNE 1-7/16 2.25 13/32	
GH	15	M2 18690	LOWER CAP=HYDROCYL	
all	16	02 18839A	MACHBUSH HYDRCYL CAP #433-OR	
BC	17	SA 15 084	*HYDCUSH CYL WLDMT (18"X/12")	
DI	17	SA 28 090	*HYDCUSH CYL WLDMT (18"/23")	
FGH	17	W3 06203	*HYDCUSH CYL WLDMT (35"/12")	
K	17	W2 18233	*HYDCUSH CYL WLDMT (20"X22")	
all	18	02 175034	SHIELD-BALLBUSH-4/HYDRO MACH	
BDFGH	19	02 02230	6 WATER BARRIER (NEOPRENE)	
all	30	15G268	HXFINJAMNUT 1+1/2-12UNF2B ZINC	
all	31	02 18571A	PISTON ROD WASHER-.25"TK	
all	32	X3 06252	RETAINER-BALBUSH=4/72WEDU	
all	33	54M025	HYDFIT 1/8"-90 ALEMITE 1613-B	
all	34	27B240	SPCRROLL.5ID.813L.062T STLZNC	
all	35	02 18534	HOLDPLATE= BALLBUSH ZNC/CAD	
all	36	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
F	37	Y3 06200	SPACER=HYDRO-CUSHION CYL-MACH	
all	38	15K203	HXTAPSCR TFL 1/2-13X5 GR5 ZINC	
all	39	54A705	BALBRUSH 1.5 SKF#GEZ108ESAVE467	
all	40	15N037	HXCAPSCR 1/2-13UNC2AX6.5 GR5 Z	
all	41	02 18256	LOKWASH-TONGUE 8/WEH ZINC	
all	42	15K202	HEXCAPSCR 1/2-13UNC2AX5 GR5 ZIN	
all	43	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	44	15G231	HXFINJAMNUT 1/2-13UNC2B ZINC G	
all	45	02 18534	HOLDPLATE= BALLBRUSH ZNC/CAD	
all	46A	02 18795A	WASH-TIMING=HYDRO CYL 45DEG	USE ONE
all	46B	02 18795B	WASH-TIMING=HYDRO CYL 75DEG	USE ONE
all	47	15K191	HXCAPSCR 1/2-13UNC2AX2.5 GR5 Z	
FGH	48	AVH52001	ASSY=OILFIL SPOUT 72HYD CYL	

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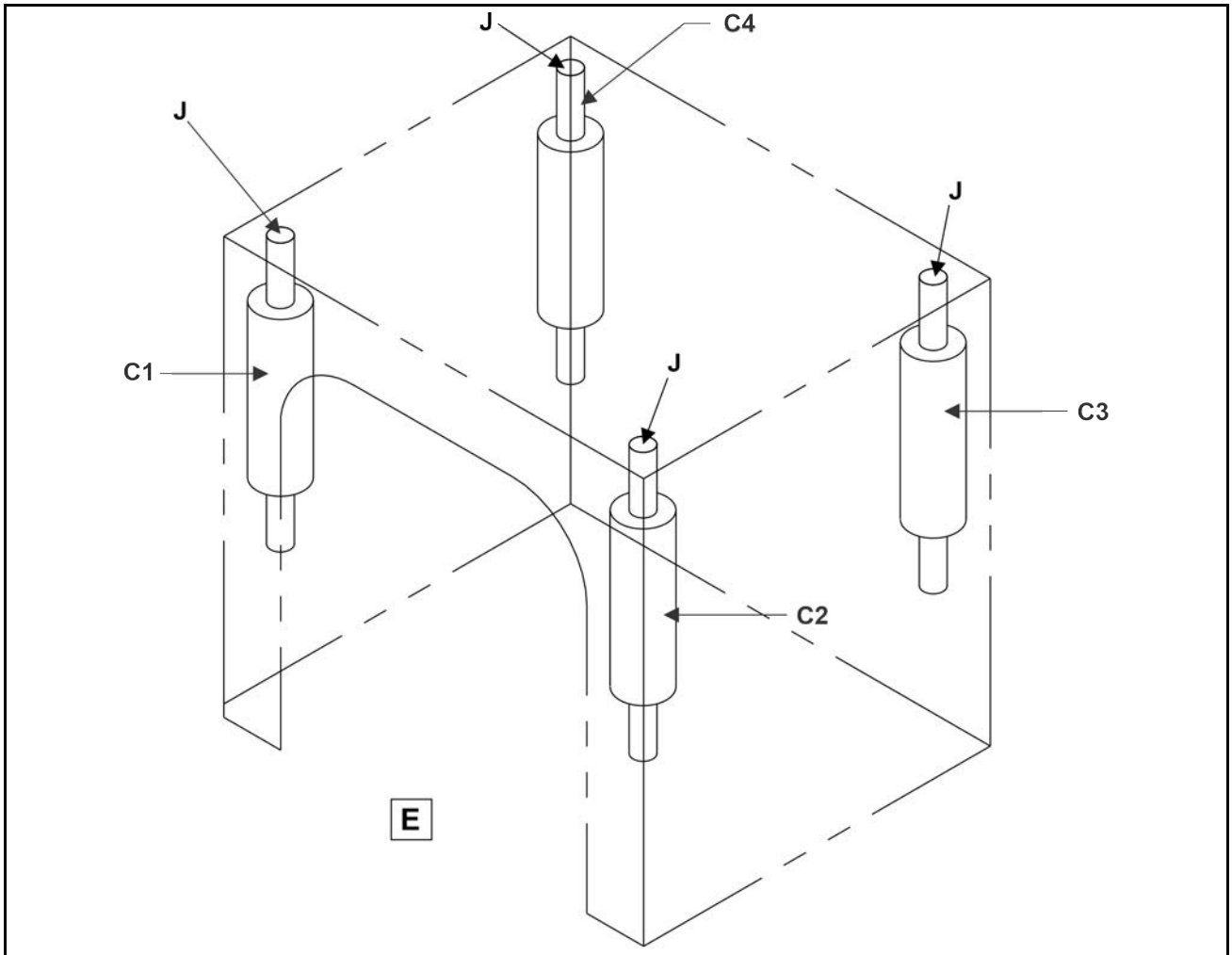
Suspension Cylinder Locations

2 Sheets



Legend

C1 . . Cylinder #1
C2 . . Cylinder #2
C3 . . Cylinder #3
C4 . . Cylinder #4
E . . . Front or soil side
J . . . A letter is stamped on the end of the upper bolt to designate the cylinder assembly.

Suspension Cylinder Locations

2 Sheets

NOTE: See BPWVUJ01. For repair parts: hydrocushion cylinder assembly “B” through hydrocushion cylinder assembly “K”

	Machine Models:								
Position	42031 CP2,NP2, WP2,WP3	42031 SP2, SP3	42044 CP2, NP2,WP2, WP3,D7P	42044 SP2/3; SR2/3	42044 WP2 SM, WP3 SM WR2,WR3	52038 WTL,WTN, WP1	60044 WP2/3 SM SP2/3 SM WR2/3 SR2/3	72044 WP2,WP3, DA1	72044 SP2,SP3 SR2/SR3
Cylinder #1	B	B	C	C	C	D	K	H	G
Cylinder #2	B	C	B	C	C	D	K	H	G
Cylinder #3	B	C	B	C	C	D	K	F	G
Cylinder #4	B	C	C	C	C	D	K	F	G

4 Shell, Cylinder & Door

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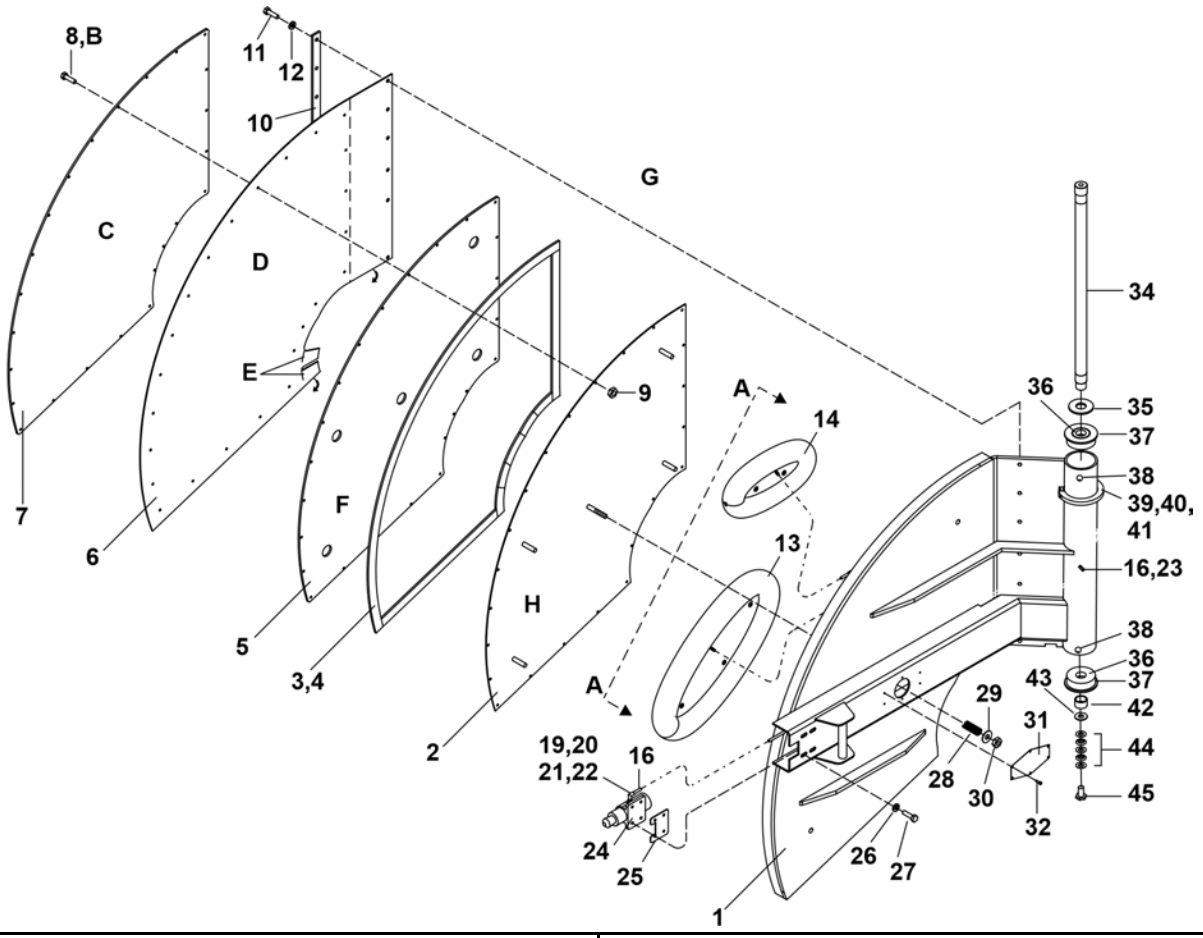
Shell Doors

4 Sheets

72044WR3, 72044SR2

Figure 53. Exploded Views



Adjust the Pressure Plate

1 . . . With the inner tubes deflated, tighten the tension nut (item 30), until two threads extend beyond the nut.

2 . . . Check the spring with air pressure applied to the inner tubes. Verify that the spring is not over compressed. If the spring height is only 3/4", it will be necessary to loosen the tension nut.

NOTE: The door spring should be slightly compressed. If the spring is compressed too much the air bags will not be able to inflate and properly seal the door.

Legend

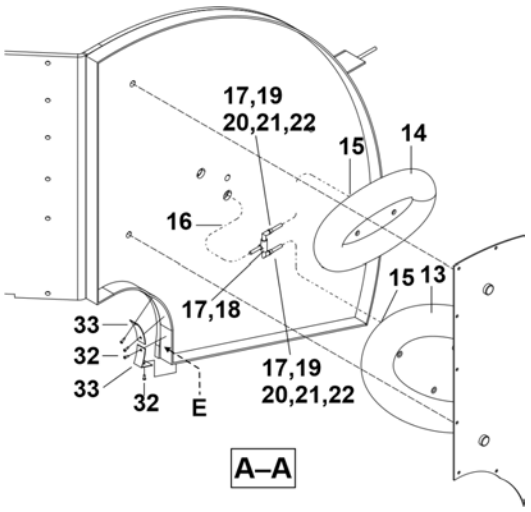
A–A . . Detail view A–A
B . . . 24 instances
C . . . Liner
D . . . Door gasket
E . . . Tabs: Fold gasket tabs over the edge of the door and anchor with holding strips (item 33) and screws on the final assembly.
F . . . Fill plate
G . . . Apply glue (4) to both surfaces
H . . . Pressure plate

Shell Doors

4 Sheets

72044WR3, 72044SR2

Figure 54. Detail View



Legend

A–A . . Detail view A–A

E . . . Tabs: Fold gasket tabs over the edge of the door and anchor with holding strips (item 33) and screws on the final assembly.

Table 34. Parts List—Shell Doors

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
			Reference Assemblies	
	A	SA 36 019	*SHELL DOOR ASY 72WE3+SG SOIL	7244WR3
				7244SR2 SOIL SIDE
	B	SA 36 020	*SHELL DOOR ASY 72SG CLEAN	7244SR2 CLEAN SIDE
			Components	
A	1	W3 06126	* SHELLDOOR 72SG2+3 SOILSIDE	
B	1	W3 06127	* SHELLDOOR 72SG2+3 CLEANSID	
A	2	W3 06304B	WLDMT=PRESSPLT DR 72SG SOIL	
B	2	W3 06303B	WLDMT=PRESSPLT DR 72SG CLEAN	
all	3	60A006P	PORON STRIP .25X1 1/4# W E=FT	
all	4	20C044	RUB/GASKET ADH 3M#EC1300 PINTS	
all	5	X3 06130C	FILL-PLATE=SHELLDOOR	
all	6	03 06130	GASKET=SHELL DOOR 2/72SG	
all	7	03 06130A	LINER=SHELLDOOR RT 72SGD SS	
all	8	15K039A	BUTSOKCPSCR 1/4-20X7/8 SS 18-8	
all	9	15G164	HX THIN LOCKNUT NYL1/4-20 SS	
all	10	03 06302	BAR=GASKET CLAMPING	
all	11	15N174	HXCAPSCR 1/4-20UNC X5/8SS18-8	
all	12	15U181	LOCKWASHER MEDIUM 1/4 SS18-8	
all	13	03 06225G	DOORTUBE-72SGA-OURTUBE	

Shell Doors

4 Sheets

72044WR3, 72044SR2

Table 34 Parts List—Shell Doors (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
all	14	02 18981G	DOOR TUBE-60SGH-PRES. TUBE E	
all	15	02 18181	FITTING-BRASS FOR INNER TUBE	
all	16	60E004TE	1/4"OD X.170"ID NYL(BLK)TUBING	
all	17	53A047H	MALCON 5/16X1/8POLY PH#68P-5-2	
all	18	51V010	TEE PIPE 1/8 BRASS FORGING TYP	
all	19	53A031XB	BODY-EL90MALE.25X25 #269C-4-4B	
all	20	53A500	SLEEVE DELRIN 1/4"OD#60PT-4	
all	21	53A501	TUBE INSERT .163"OD #63PT-4-40	
all	22	53A059A	NUT 1/4"BR.HOLYOKE AND #61A-4	
all	23	12P016	CABLE CLMP-BLACK UL APPROVED	
all	24	SA 15 028	* DOOR LATCH ASSY-DIVCYLS	
all	25	02 15633S	ADJPLATE=DOORLATCH SS	
all	26	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	27	15K085	HEXCAPSCR 3/8-16UNC2AX3/4 GR5	
all	28	01 09028	SPRING=BRAKE.88OD2.5FL95#/"	
all	29	15U280	FL+WASHER(USS STD)1/2 ZNC PL+D	
all	30	15G234	LOKNUT 1/2-13NC CAD FLXLOC#21F	
all	31	01 10020	NPLT SMALL "MILNOR" LOGO	
all	32	15P010	TRDCUT PHILPANHDSCR 10-24X1/2S	
all	33	02 175231	PLATE=SHELL DOOR GASKET	
all	34	03 06137	HINGE PIN 72 SG2,SG3,WE2&WE3	
all	35	03 06136	WASHER,BRG BACKUP 72SG	
all	36	54A974975	TIM #L68111/L68149-1.3775"BORE	
all	37	X3 06146	BEARING ADAPTER 60&72 SG DR.	
all	38	54M021	GRSFIT 1/8PIPE X 1/4STR 1607-B	
all	39	54JH15500A	HINGE COL SPLIT 5.50 FL TOP	
all	40	15K045E	SKCPSCR 1/4-20X2 BLK	
all	41	15Q091	SOKSETSCR CUP1/4-20X5/8BLK	
all	42	03 06132	BUSHING,HINGE PIN 60&72 SG	
all	43	15U314	FLATWASHER(USS STD) 5/8" ZNC P	
all	44	15U521	SPRINGWSHR.630ID 1.250D.051T	
all	45	15K214E	HXCAPSCR 5/8-11UNC2AX1.5 GR5 Z	

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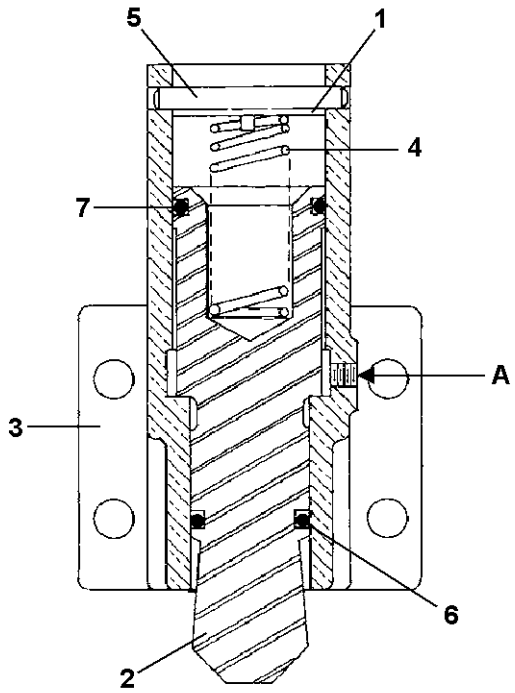
Door Latch

1 Sheet

Cross Section



Legend

A . . . Compressed air

Table 35. Parts List—Door Latch

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Reference Assemblies				
	A	SA 15 028	Assembly, Door latch	
Components				
all	1	02 15105	RETAINER RING	
all	2	02 15297	STRIKER	
all	3	02 15298	CYLINDER	
all	4	02 15836	SPRING	
all	5	15H090	PIN	
all	6	60C122	O-RING, 1”X1/8	
all	7	60C128	O-RING, 1+3/8X1/8	

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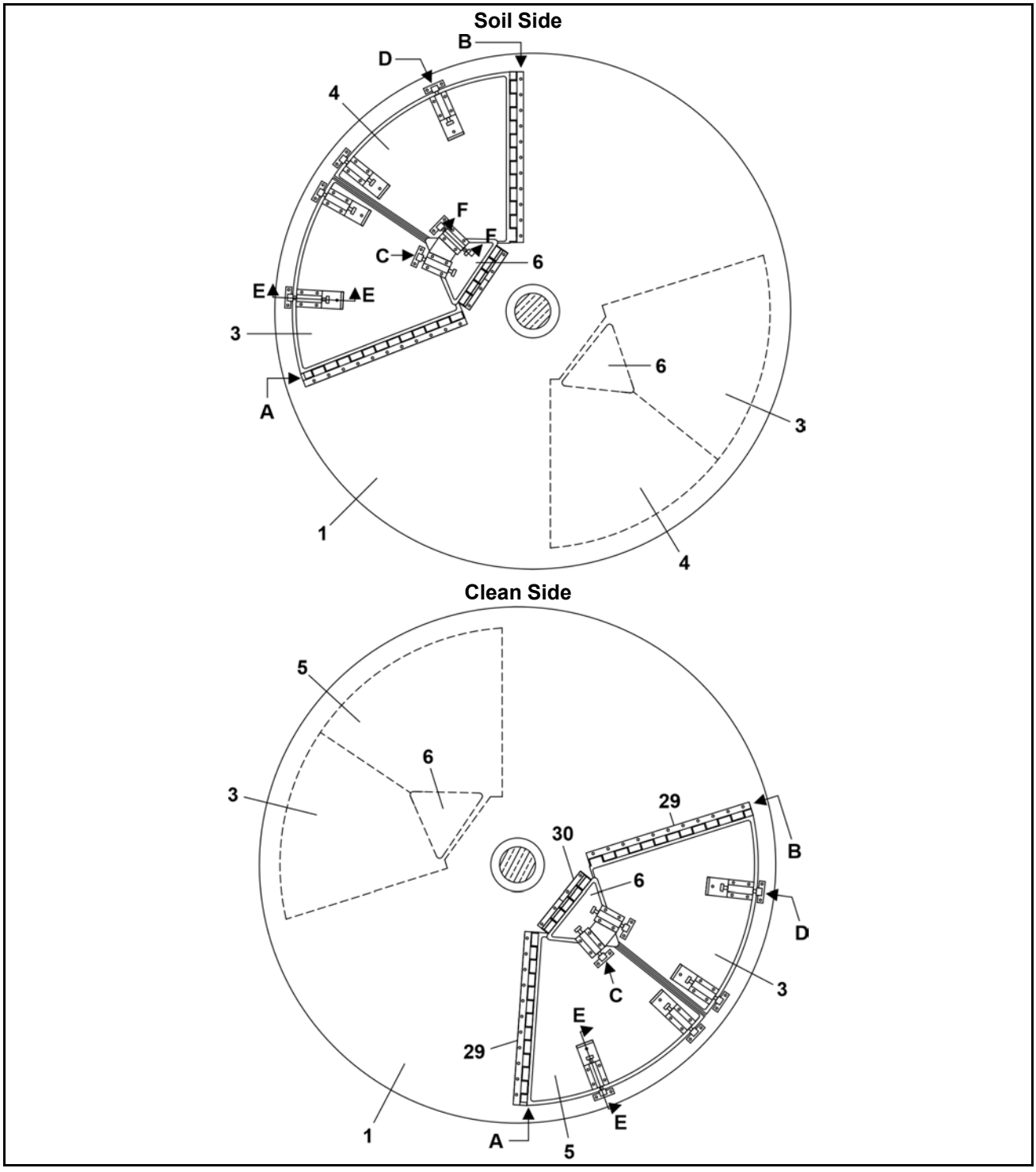
Cylinder Assembly and Cylinder Door Installation

5 Sheets

6044SR2, 7244SR2

Figure 55. Cylinder Assembly and Cylinder Door Installation

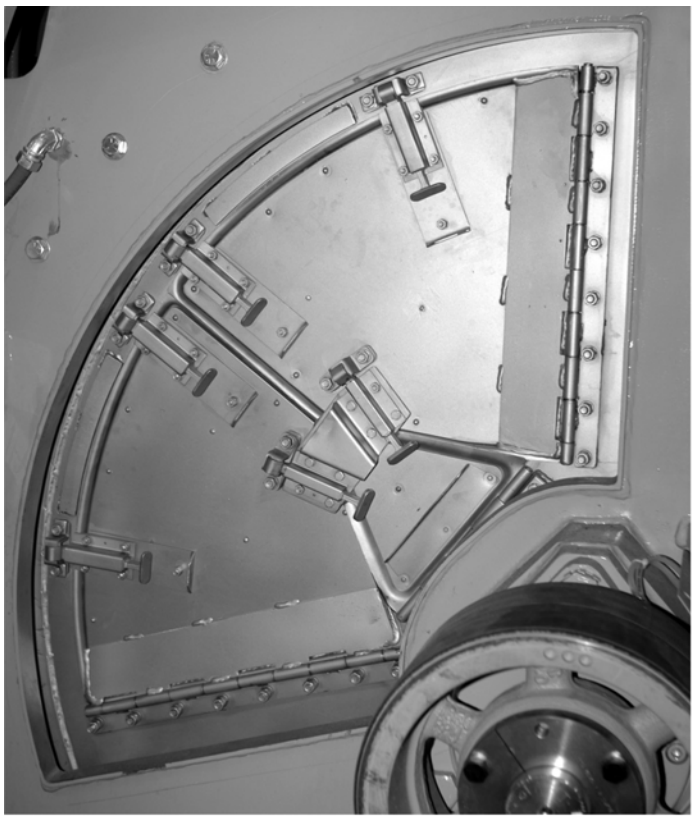


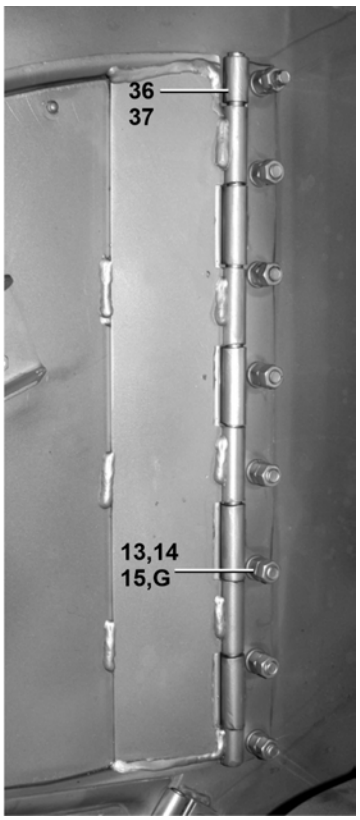
Cylinder Assembly and Cylinder Door Installation

5 Sheets

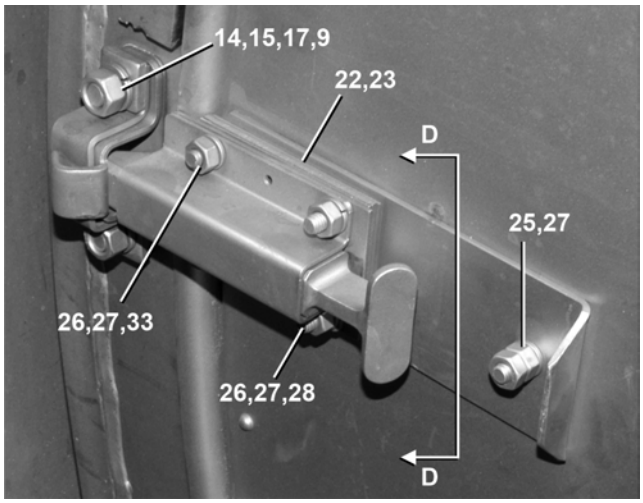
6044SR2, 7244SR2

Figure 56. Cylinder Doors Installed

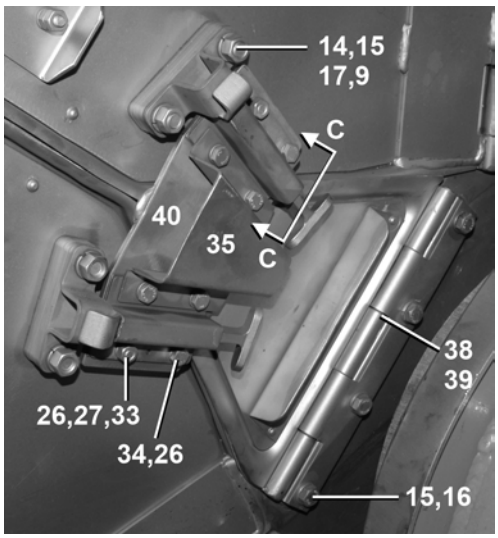




Large Door



Small Door



Legend

G . . . See detail A & B

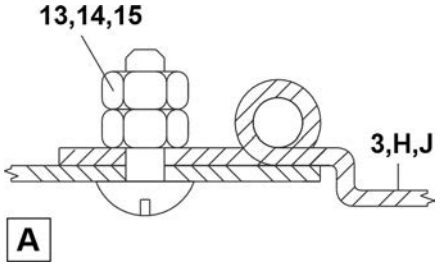
Cylinder Assembly and Cylinder Door Installation

5 Sheets

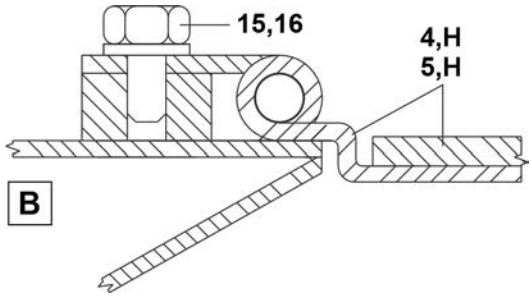
6044SR2, 7244SR2

Figure 57. Detail Views

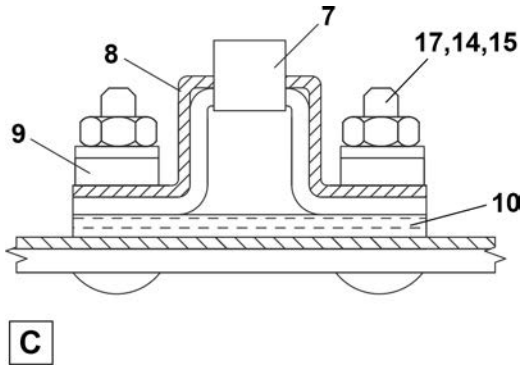
Installed View - Hinge, Lower door



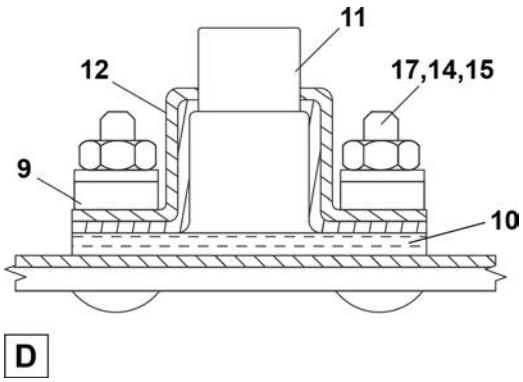
Installed View - Hinge, Upper door



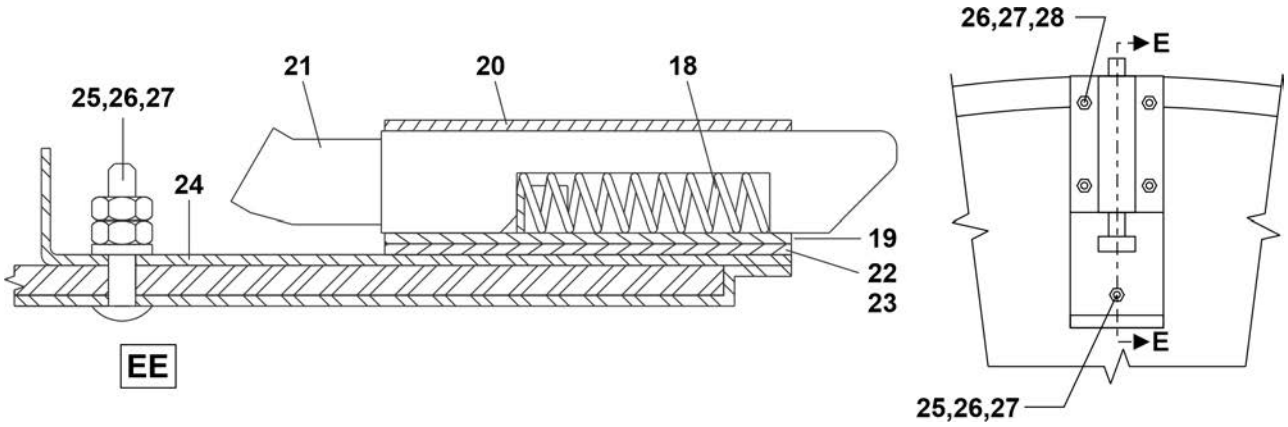
Installed View - Door Latch (Small door)



Installed View - Door Latch (Upper door, Lower door)



Cross Section - Door Latch - Large Doors



Legend

H . . . Soil side
J . . . Clean side

Cylinder Assembly and Cylinder Door Installation

5 Sheets

6044SR2, 7244SR2

Cross Section - Door Latch, Small Doors

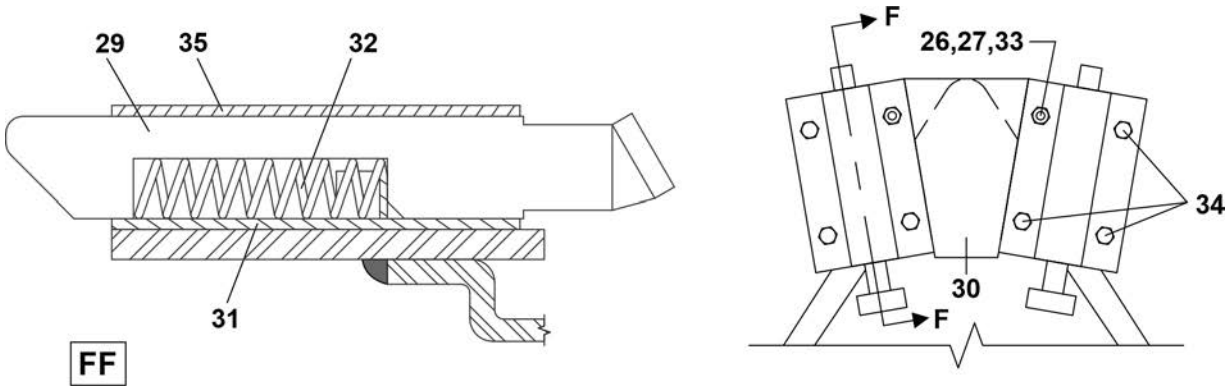


Table 36. Parts List—Cylinder Assembly and Cylinder Door Installation

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
	A	REFERENCE		6044SR2
	B	REFERENCE		7244SR2
			Components	
A	1	ACA19SG2A	* CYL ASSY=6044SG2 WELD/SHAFT	
B	1	ACA36SG2A	* CYL ASSY=7244SG2 WELD/SHAFT	
A	3	SA 28 110	CYLDOOR LOLT 60WE2+ MIN-REIF	
B	3	SA 36 003	CYLDOOR LOLT 72WE2+ MAX-REIF	
A	4	SA 28 111	CYLDOOR UPLT 60WE2+ MIN-REIF	
B	4	SA 36 004	CYLDOOR UPLT 72WE2+ MAX-REIF	
A	5	SA 28 112	CYLDOOR LORT 60WE2+ MIN-REIF	
B	5	SA 36 001	CYLDOOR LORT 72WE2+ MAX-REIF	
all	6	SA 28 116	CYLDOR ASY,SMALL =60+72SG2	
A	7	X3 06166	KEEPER=CYL DOOR LATCH(MONEL)	
B	7	X2 15201	KEEPER=CYLDOOR LATCH(MONEL)	
all	8	02 19183	COVER-DOORLATCH KEEP-OURMATL	
all	9	03 06174	KEEPER=DOORLATCH REINFORCE	
all	10	02 18977A	SHIM=CYL DRLATCH KEEPER-11GA	
all	10	02 18977B	SHIM=CYL DRLATCH KEEPER-14GA	
all	10	02 18977C	SHIM=CYL DRLATCH KEEPER-18GA	
all	11	X3 06166	KEEPER=CYL DOOR LATCH(MONEL)	
all	12	03 06167	COVER-LARGE CYLDOOR KEEPER	
all	13	15A015	CARRSCR 3/8-16X1+1/4 18-8 SS	
all	14	15G206	HEXNUT 3/8-16 UNC2 SS 18-8	

Cylinder Assembly and Cylinder Door Installation

5 Sheets

6044SR2, 7244SR2

Table 36 Parts List—Cylinder Assembly and Cylinder Door Installation (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
all	15	15U260	LOCKWASHER MEDIUM 3/8 SS18-8	
all	16	15K086	HXCAPSCR 3/8-16NCX3/4 SS18-8	
all	17	15K106E	BUTSOKCAPSCR 3/8-16NCX1+1/2 SS	
all	18	03 06156	SPRING=LARGE CYLDOOR LATCH	
all	19	X3 06152	PLATE = LARGE DOORLATCH	
all	20	03 06151	LATCHBODY-LARGE=CYLDOOR	
all	21	X3 06150	PLUNGER=LARGE CYLDOOR(CAST)	
all	22	03 06172	SHIM=DOOR LATCH-18GA	
all	23	03 06173A	SHIM=DOOR LATCH-11GA	
all	24	02 18869	SPACER-LATCH PULL BND@PRNT	
all	25	15K042	BUTSOKCAPSCR 1/4-20NCX1 SS18-8	
all	26	15U181	LOCKWASHER MEDIUM 1/4 SS18-8	
all	27	15G170	HEXNUT 1/4-20UNC2 SS18-8	
all	28	15K042K	BUTSOKCAPSCR 1/4-20UNCX1+1/4 S	
all	29	02 15040	PLUNGER=CYLDOOR LATCH(CAST)	
all	30	02 15041	BODY=CYLDOOR LATCH	
all	31	02 15077	PLATE = SMALL DOORLATCH	
all	32	02 15093	SPRING=DOOR LATCH 9.4#/INCH	
all	33	15N173	FLATMACSCR 1/4-20NCX5/8SS18-8	
all	34	15N158	HEXCAPSCR 1/4-20NCX1/2SS18-8	
all	35	02 18990	PLATE=STOP + COVER 2/60+72WD	
all	36	02 18864	PIN=LG CYL DOOR HINGE	LARGE PIN
all	37	W2 18855	WLMT=HINGE LRG CYL DR MULT	USED WITH ITEMS 3 & 5
all	37	W2 18866	WLMT=HINGE LRG CYL DR 2/60WE	USED WITH ITEM 4
all	38	02 18865	PIN=SM CYL DOOR HINGE	SMALL PIN
all	39	02 18858	HALFHINGE=60"WED CYLDOR SMAL	
all	40	02 18989	PLATE-LATCH MTG2/WED+2/SGD	

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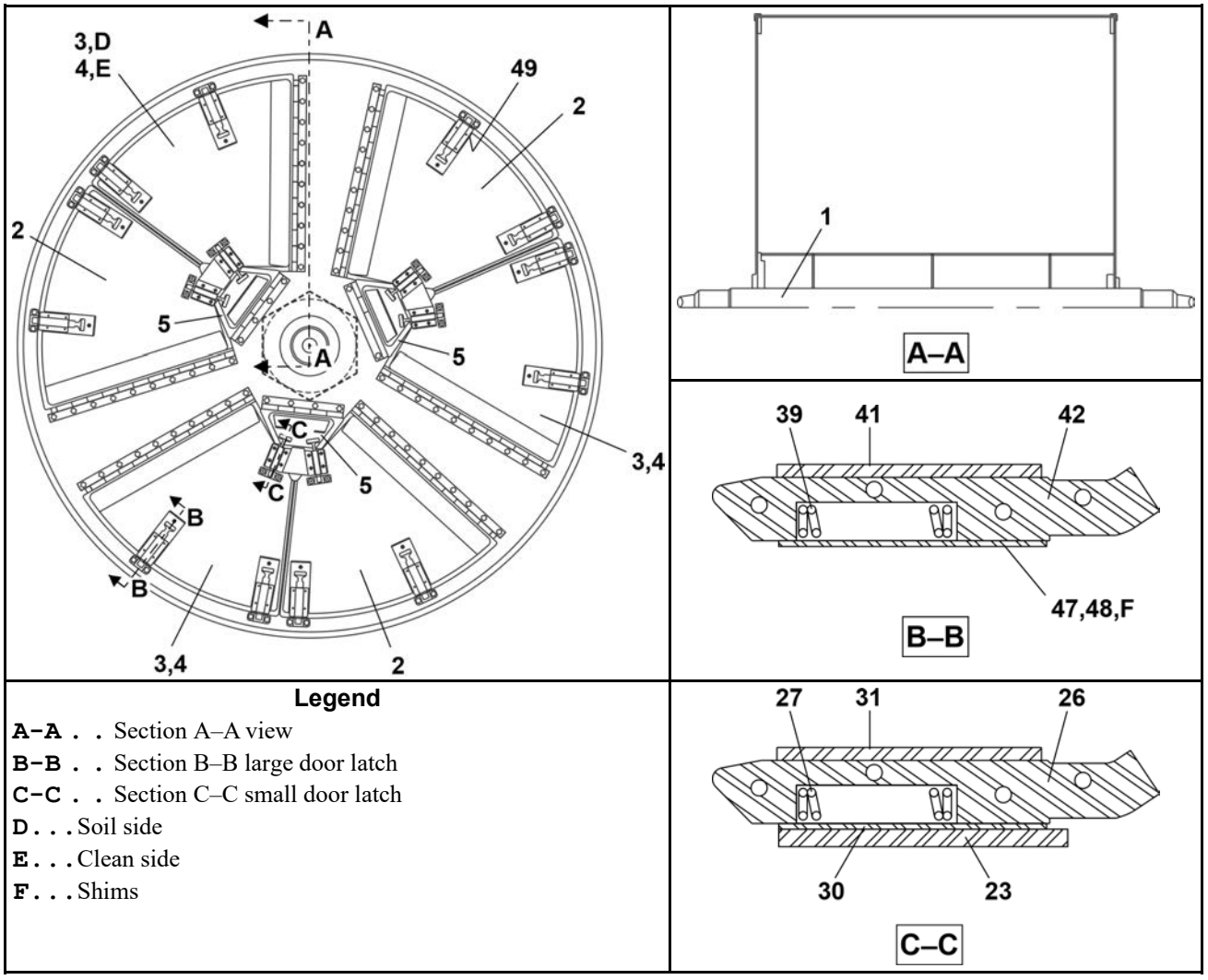
Cylinder Doors 3 pocket

5 Sheets

7244WR3, 7244SR3

Figure 58. Section Views



Legend

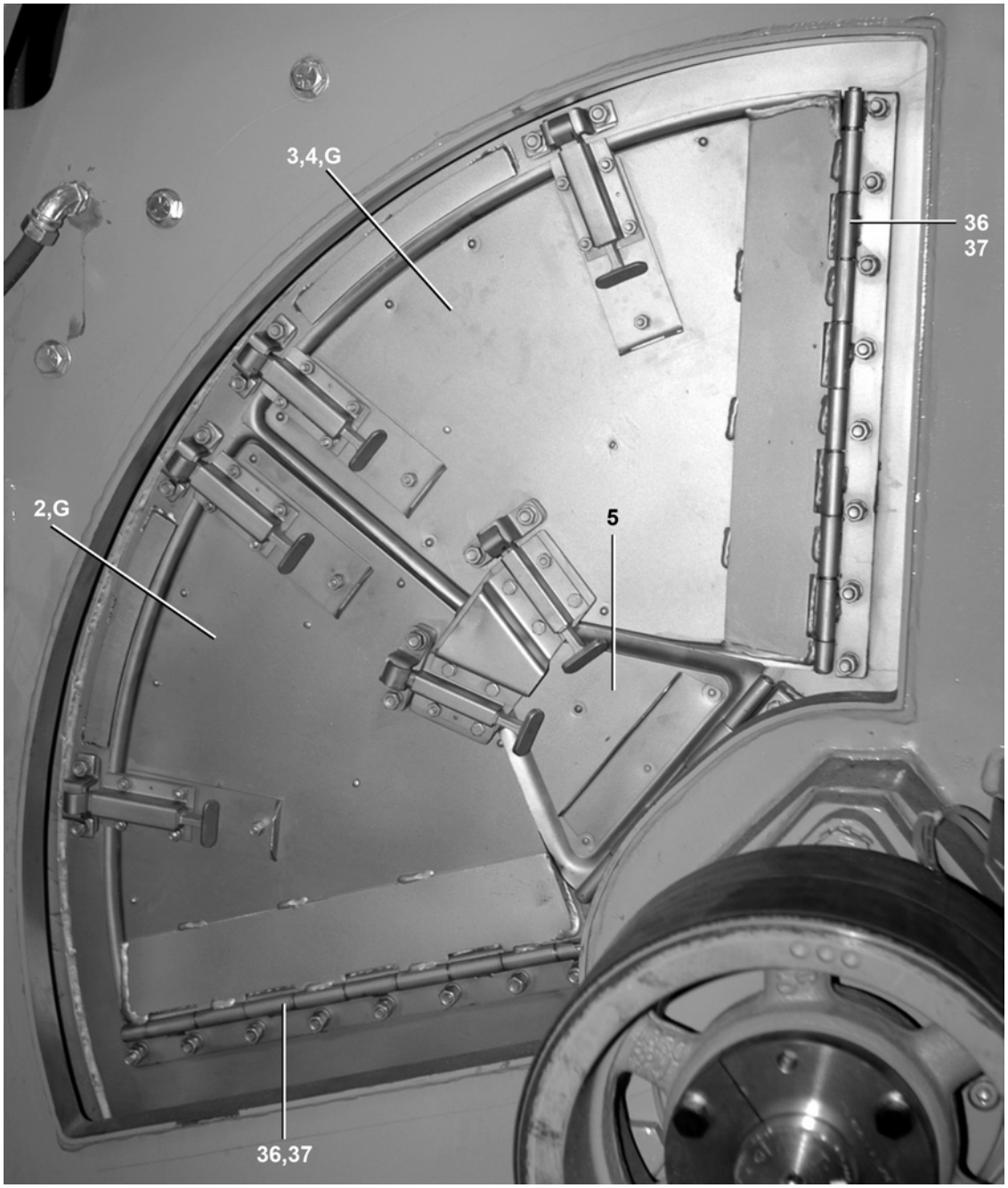
A–A . . Section A–A view
B–B . . Section B–B large door latch
C–C . . Section C–C small door latch
D . . . Soil side
E . . . Clean side
F . . . Shims

Cylinder Doors 3 pocket

5 Sheets

7244WR3, 7244SR3

Figure 59. Cylinder Doors



Legend

G . . . Large doors

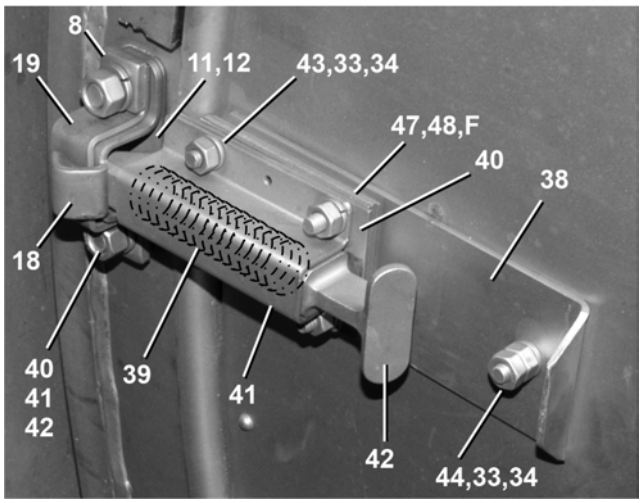
Cylinder Doors 3 pocket

5 Sheets

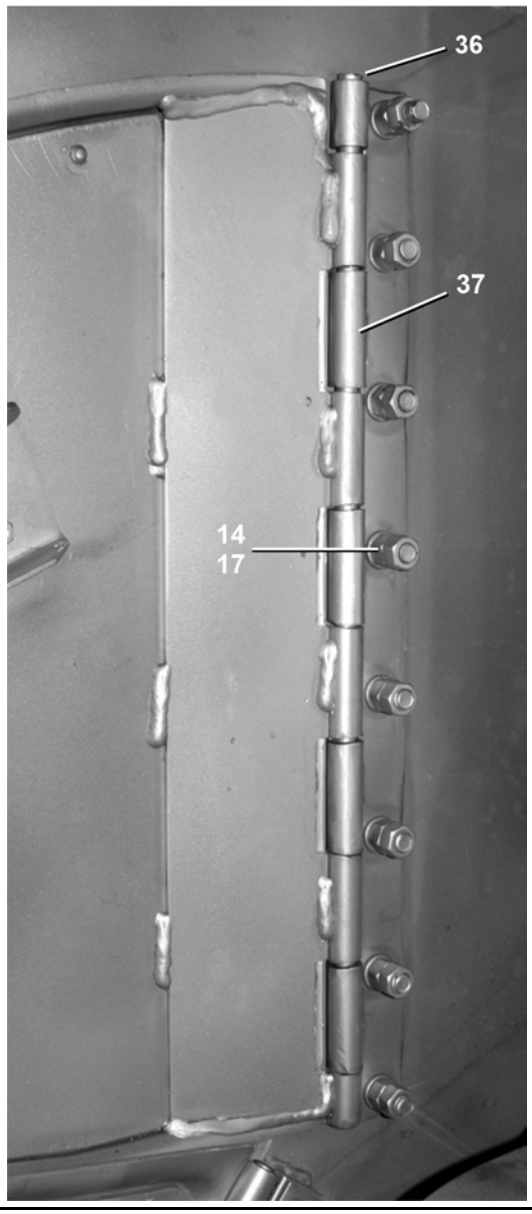
7244WR3, 7244SR3

Figure 60. Additional Views

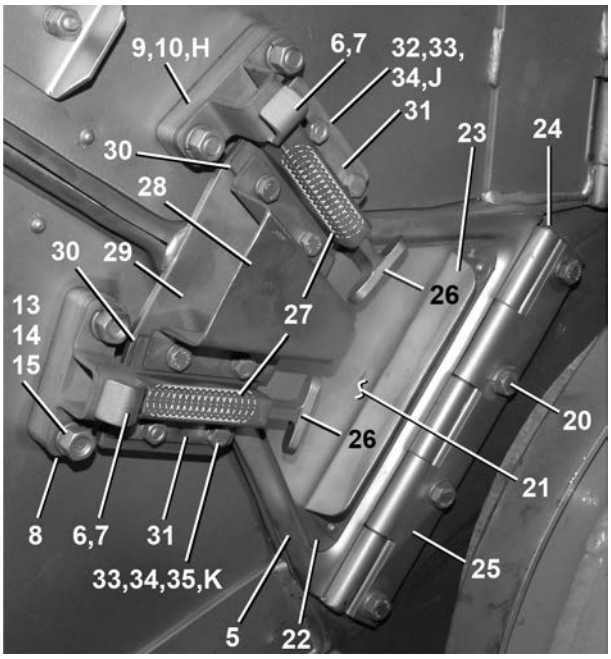
Large Door Latch



Large Door Hinge



Small Doors



Legend

F . . . Shims
H . . . Uses 3
J . . . 2 instances
K . . . 6 instances

Cylinder Doors 3 pocket

5 Sheets

7244WR3, 7244SR3

Table 37. Parts List—Cylinder Doors 3 pocket

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Reference Assemblies				
	A	ACA36SG3A	* CYL ASSY=7244SG3 WELD/SHAFT	
Components				
all	1	Y3 06162	MAINSHAFT 7244SG2+3	
all	2	SA 36 003	CYLDOOR LOLT 72WE2+ MAX-REIF	
all	3	SA 36 001	CYLDOOR LORT 72WE2+ MAX-REIF	
all	4	SA 36 004	CYLDOOR UPLT 72WE2+ MAX-REIF	
all	5	SA 28 116	* CYLDOR ASY,SMALL =60+72SG2	
all	6	X2 15201	KEEPER=CYLDOOR LATCH(MONEL)	
all	7	02 19183	COVER-DOORLATCH KEEP-OURMATL	
all	8	03 06174	KEEPER=DOORLATCH REINFORCE	
all	9	02 18962	STOP=CYLDOOR=42WEHU	
all	10	02 18977A	SHIM=CYL DRLATCH KEEPER-11GA	
all	11	02 18977B	SHIM=CYL DRLATCH KEEPER-14GA	
all	12	02 18977C	SHIM=CYL DRLATCH KEEPER-18GA	
all	13	15K106E	BUTSOKCAPSCR 3/8-16NCX1+1/2 SS	
all	14	15U260	LOCKWASHER MEDIUM 3/8 SS18-8	
all	15	15G206	HEXNUT 3/8-16 UNC2 SS 18-8	
all	16	15A015	CARRSCR 3/8-16X1+1/4 18-8 SS	
all	17	15K086	HXCAPSCR 3/8-16NCX3/4 SS18-8	
all	18	X3 06166	KEEPER=CYL DOOR LATCH(MONEL)	
all	19	03 06167	COVER-LARGE CYLDOOR KEEPER	
all	20	15K084S	HXCAPSCR 3/8-16NCX5/8 SS18-8	
all	21	02 18818	CYL DOOR SM 60+72 WEDU	
all	22	02 18854	PLATE=SM CYLDOOR REINFORCING	
all	23	02 18991	PULL=DOORLATCH 2/WED+4/SGD	
all	24	02 18865	PIN=SM CYL DOOR HINGE	
all	25	W2 18858	WLMT=HINGE SM CYL DR 2/60WED	
all	26	02 15040	PLUNGER=CYLDOOR LATCH(CAST)	
all	27	02 15093	SPRING=DOOR LATCH 9.4#/INCH	
all	28	02 18990	PLATE=STOP + COVER 2/60+72WD	
all	29	02 18989	PLATE-LATCH MTG2/WED+2/SGD	
all	30	02 15077	PLATE = SMALL DOORLATCH	
all	31	02 15041	BODY=CYLDOOR LATCH	

Cylinder Doors 3 pocket

5 Sheets

7244WR3, 7244SR3

Table 37 Parts List—Cylinder Doors 3 pocket (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
all	32	15N158	HEXCAPSCR 1/4-20NCX1/2SS18-8	
all	33	15U181	LOCKWASHER MEDIUM 1/4 SS18-8	
all	34	15G170	HEXNUT 1/4-20UNC2 SS18-8	
all	35	15N173	FLATMACSCR 1/4-20NCX5/8SS18-8	
all	36	03 06035	PIN=CYL DOOR HINGE 72WED	
all	37	W3 06031	WLMT=HINGE HALF 72WED CYL DR	
all	38	02 18869	SPACER-LATCH PULL BND@PRNT	
all	39	03 06156	SPRING=LARGE CYLDOOR LATCH	
all	40	X3 06152	PLATE = LARGE DOORLATCH	
all	41	03 06151	LATCHBODY-LARGE=CYLDOOR	
all	42	X3 06150	PLUNGER=LARGE CYLDOOR(CAST)	
all	43	15K042K	BUTSOKCAPSCR 1/4-20UNCX1+1/4 S	
all	44	15K042	BUTSOKCAPSCR 1/4-20NCX1 SS18-8	
all	47	03 06173A	SHIM=DOOR LATCH-11GA	
all	48	03 06172	SHIM=DOOR LATCH-18GA	
all	49	03 06317	STOP=CYLINDER DOOR LATCH	

5 Staph Guard®

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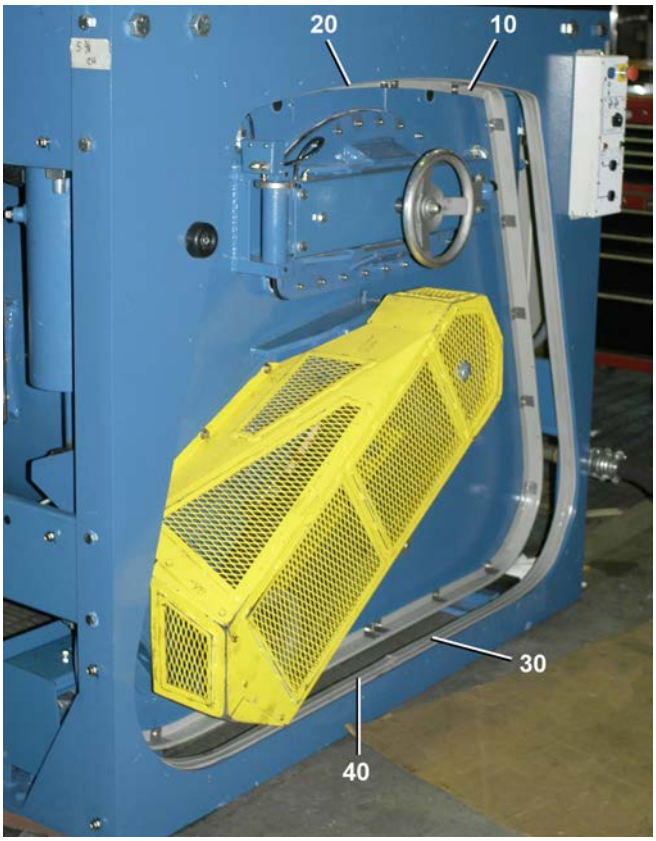
Staph Barrier Cleanside

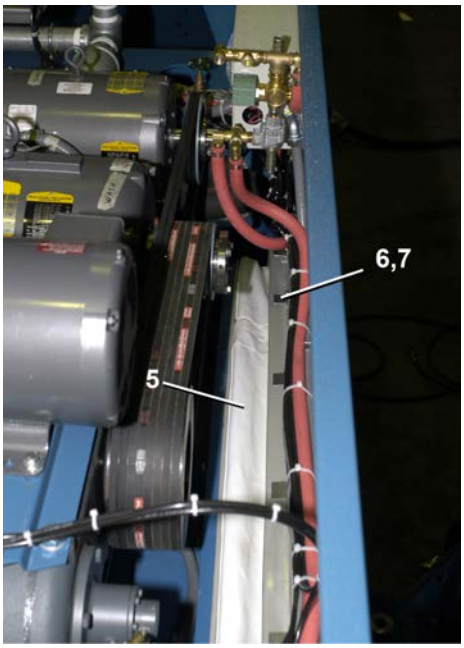
2 Sheets

6044SR2, 72044SR2



Legend

A . . . 80 instances



Staph Barrier Cleanside

2 Sheets

6044SR2, 72044SR2

Table 38. Parts List—Staph Barrier Cleanside

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
			Reference Assemblies	
	A	GBF60001	STAPH BARRIER CS 60SG	6044SR2
	B	GBF72001	STAPH BARRIER CS 72SG	6044SR2
			Components	
all	1	02 18781T	EXTRUSION SHELL CS LF 72SG	
all	2	02 18781V	EXTRUSION SHELL CS RT 72SG	
all	3	02 18781W	EXTRUSION FRAME CS LF 72SG	
all	4	02 18781X	EXTRUSION FRAME CS RT 72SG	
all	5	03 06105	BOOT ASSEMBLY=72SGH OUR MATL	
all	6	02 175032	CLAMP BOOT 60142 +60SG	
all	7	15P175	TRDCUT-F HXHD 1/4-20UNC2AX1/2	
B	8	02 21677	CLAMP=BOOT SHLFRT SEAM 3630S	

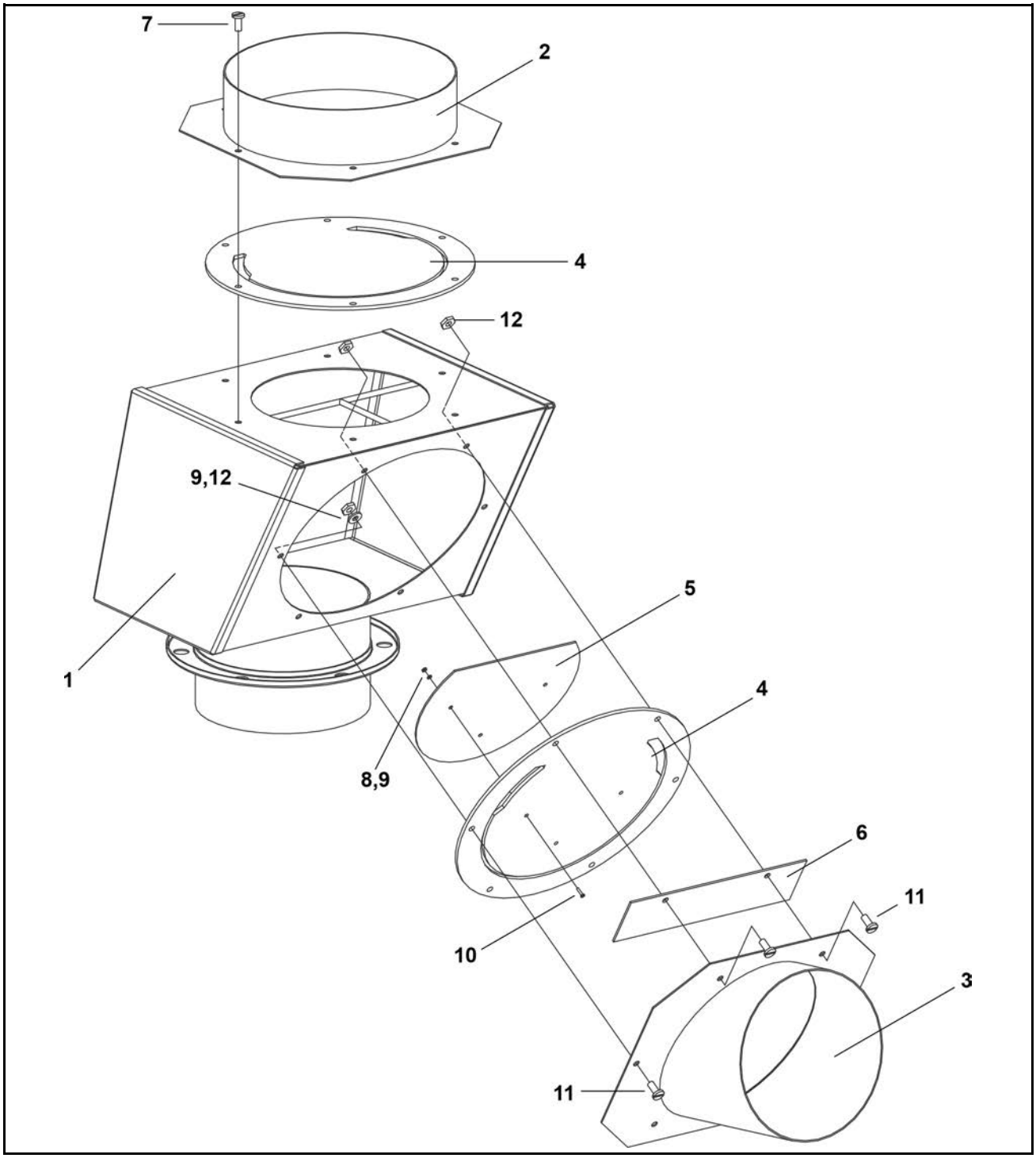
BPWG6P02 / 2020193 BPWG6P02.1 0000290575 D.2 A.2 5/5/20, 12:05 PM Released

Staphairtrol

3 Sheets

60044SR2, 72044SR2

Figure 61. Exploded Vew

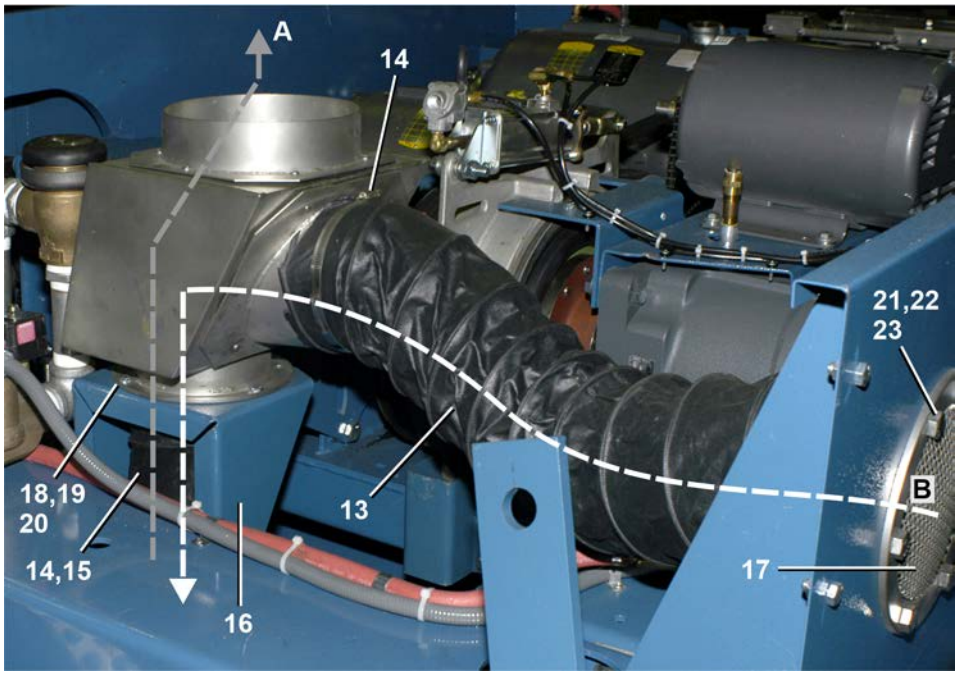


Staphairtrol

3 Sheets

60044SR2, 72044SR2

Figure 62. Installed View



Legend

A . . . Exhaust, soil side
B . . . Intake, clean side

Table 39. Parts List—Staphairtrol

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
Reference Assemblies				
	A	SA 28 126	* STAPHAIRTROL 6" #60+72SGU	
Components				
all	1	W2 18975	* WLMT,AIRTROL BODY =60+72SGU	
all	2	W2 18973	* WLMT,AIRTROL EXHAUST =60+72	
all	3	W2 18974	* WLMT,AIRTROL INTAKE=60+72SG	
all	4	02 15714	AIR TROL FLAPPER	
all	5	02 18930	PLATE-AIRTROL FLAPPER	
all	6	02 175025	PLATE-BACKUP=AIRTROL FLAPPER	
all	7	15P010	TRDCUT PHILPANHDSCR 10-24X1/2S	
all	8	15G071	MACHSCRLOKNUT 6-32 NM SER ZINC	
all	9	15U131L	FLATWASH #10L (US STD) BRASS	
all	10	15N050	RDMACSCR 6-32UNC2X1/2 SS18-8	

Staphairtrol

3 Sheets

60044SR2, 72044SR2

Table 39 Parts List—Staphairtrol (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
all	11	15N141	RDMACSCR 10-24NCX3/4 SLOTTED S	
all	12	15G130	HEXMACHSCRNUT 10-24UNC2 SS18-8	
all	13	60E320A18A	HOSE *6"ID FLEXAUST PE X 18"	
all	14	27A083	HOSECLAMP 5+1/8-7"CADSCR#HS104	
all	15	60E320A30A	HOSE *6"ID FLEXAUST PE X 30"	
all	16	03 06199A	BRT=AIRTROL+VENT MT. BD@PRT.	
all	17	W2 18496	* WLMT,AIRTROL INSCREEN=60+72	
all	18	15K039	HXCAPSCR 1/4-20UNC2AX3/4 GR5 Z	
all	19	15U185	FLATWASHER(USS STD) 1/4" ZNC P	
all	20	15G165	HXNUT 1/4-20UNC2BSAE ZC GR2	
all	21	15K153	HXCAPSCR 1/2 -13 X 1 +1/4 SS	
all	22	15U310	LOKWASHER REGULAR 1/2 SS18-8	
all	23	15G225	HEXNUT 1/2-13UNC2 SS18-8	

6 Control & Sensing

BPWG7Z01 / 2020226 BPWG7Z01.1 0000294481 D.2 A.3 5/29/20, 8:05 AM Released

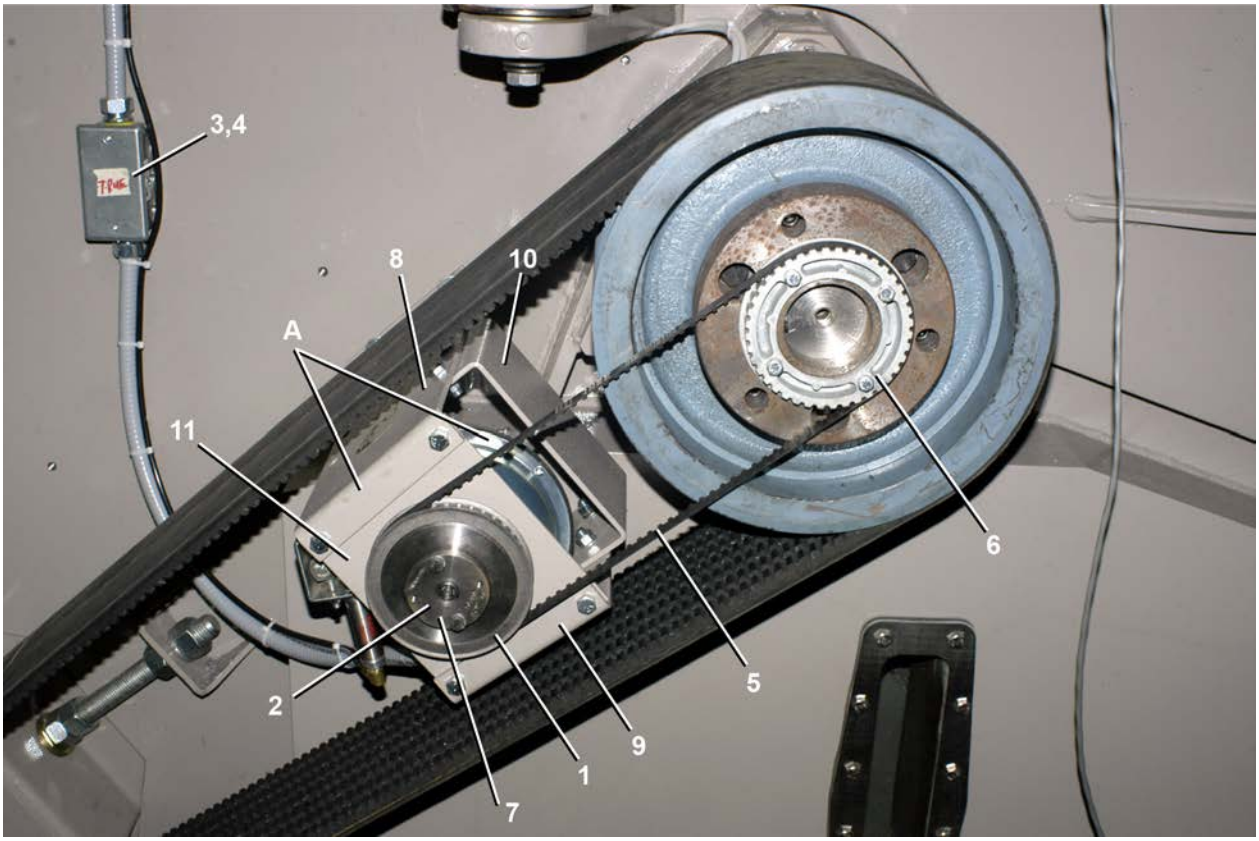
Air Operated Autospot and Sensing Unit

4 Sheets

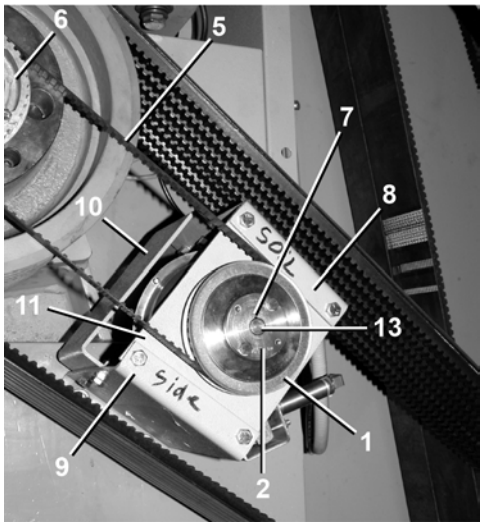
72044SR2

Figure 63. Sensing Unit Installation and Drive Components

Clean Side



Soil Side



Legend

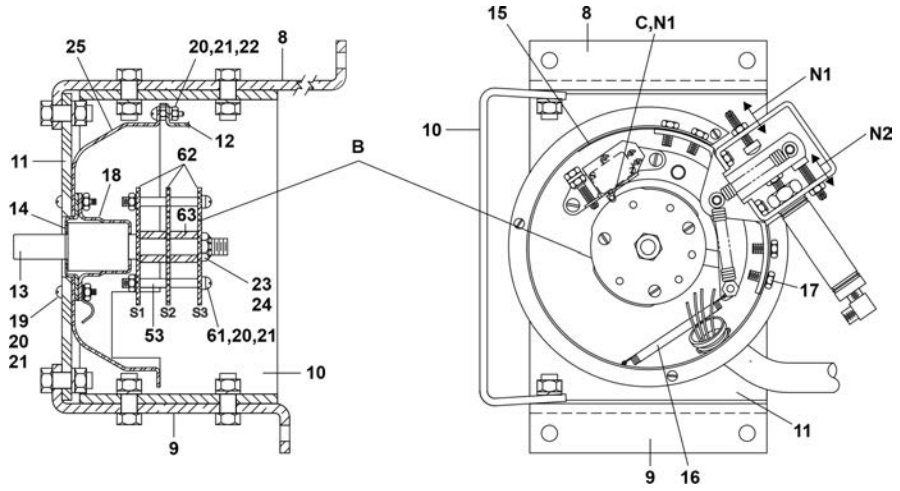
A . . . Sensing unit

Air Operated Autospot and Sensing Unit

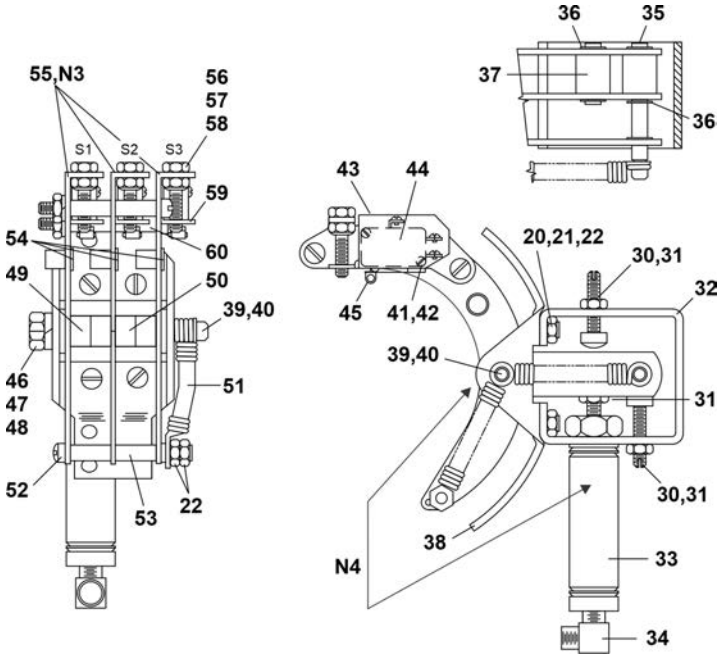
4 Sheets

72044SR2

Figure 64. Sensing Unit: Switch Assembly and Cam



Switch Assembly



Legend

B . . . Cam

C . . . Cam follower

N1 . . Adjust the cam follower to just contact the lower part of the cam when the air cylinder is actuated.

N2 . . Adjust the inner switch (S1) to clear the housing.

N3 . . Loosen locknuts and adjust allen head screws as necessary to spot the cylinder in the correct position. On some machines, S3 is not used.

N4 . . Lubricate once a month with a few drops of light lubricating oil.

Air Operated Autospot and Sensing Unit

4 Sheets

72044SR2

Table 40. Parts List—Air Operated Autospot and Sensing Unit

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
			Reference Assemblies	
	A	G36 06700	AIROP AUTOSPOT ASSEMBLY-72SG2	REFERENCE
	B	E36 00300	* SENSE UNIT AUTOSPOT 72SG2	INSTALLATION
	C	E15 03000	$ BASIC 2-SWITCH AUTOSPOT ASY	SWITCH
	D	E15 03100	$CAM AS42WE2+SG2+DY2+60-72SG2	CAM
			Components	
A	1	54X020	SYNCHRONUS GEARBELT SPRKT	
A	2	56Q0MHS	.627" BUSH VPUL TYPE H,D,OR QT"SPECIAL"	
A	3	12H050	HANDYBOX 4X2+1/8X2+1/8	
A	4	12H095	HANDY BOX COVER 4+2+1/8	
A	5	54C100	GEARBLT SYNC-COG DAYCO#420L050	
A	6	02 10191	PULLEY-TIMING-DRIVER	
A	7	15E007	KEY #7 WOODRUFF 3/4X1/8 SAE103	
B	8	03 06415	LONG SUPPORT=72SG AIROP AS	
B	9	03 06414	SHORT SUPPORT=72SG AIROP AS	
B	10	03 06412	STIFFENER=AIROP AUTOSPOT-SG	
B	11	03 06413	MTG PLATE=72SG AIROP ASS	
B	12	03 01344	COVER=AIROP AUTOSPOT	
B	13	03 01329	SHAFT=AIROPAUTOSPOT OUR MATL	
B	14	02 10508	BEARING HOUSING- PLATED- ZINC	
B	15	03 IF2X3	INSUL.AUTOSPOT/CENTRIFUGL.SW	
B	16	02 02463	SPRING-CHART HOLDING	
B	17	15P175	TRDCUT-F HXHD 1/4-20UNC2AX1/2	
B	18	02 10507	BEARING HOUSING- CUP- PLATED	
B	19	15N140	RDMACSCR 10-24UNC2AX3/4 ZINC G	
B	20	15G125	HXMACHSCRNUT 10-24UNC2B ZINC G	
all	21	15U150	LOCKWASHER MEDIUM #10 ZINCPL	
all	22	15N125	RDMACSCR 10-24UNC2AX1/2 ZC GR2	
all	23	15G219NTE	HXTHINLOKNUT 3/8-24NF NYL STL/	
B	24	15U238	LOKWAS INTOOTH 3/8" (US STD) 4	
B	25	03 01328	HOUSING=AIROP AUTOSPOT	
B	26	15K095	HXCPSCR 3/8-16UNC2AX1 GR5 ZINC	
B	27	15G205	HXNUT 3/8-16UNC2B ZINC GR2	
B	28	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	

Air Operated Autospot and Sensing Unit

4 Sheets

72044SR2

Table 40 Parts List—Air Operated Autospot and Sensing Unit (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
C	30	03 01343	SCREW-ADJ=AIROP AUTOSPOT	
C	31	15G177	HXNUT 1/4-28UNF2B SAE ZINC GR2	
C	32	03 01336	BKT-AIRCYL=AIRAUTOSPOT	
C	33	27C205	AIRCYL 3/4"BORE X 1"STROKE	
C	34	53A031B	BODY-EL90MALE.25X1/8 #269C-42B	
C	35	03 01357	PIVOT-SPRING=AIROP AUTOSPOT	
C	36	17B006	EXTRETRING IND#1000-25-ST-ZD Z	
C	37	03 01333	PIVOT=AIRCYL=AIROP AUTOSPOT	
C	38	03 01332	SUPPORT=AIROP AUTOSPOT	
C	39	15K020	SKCPSCR 10-24 UNC 3AX3/4 ALLOY	
C	40	15U131L	FLATWASH #10L (US STD) BRASS	
C	41	15N019	RDMACSCR 4-40UNC2AX5/8 ZINC GR	
C	42	15U040	LOCKWASHER MEDIUM #4 ZINCPL	
C	43	03 01335	INSULATOR=AIROP AUTOSPOT+$8S	
C	44	09R014A	MINI-SW SPDT STAKON #V-15G-1C26-K	
C	45	09R015	ACTUATOR MICRO SWITCH #JV-5	
C	45	03 01356	SHAFT-PIVOT=AIROP AUTOSPOT	
C	47	15G195	HXNUT 5/16-24UNF2B SAE ZINC GR	
C	48	15U210	LOKWASHER MEDIUM 5/16 ZINCPL	
C	49	54E005	FLGMTBRG 3/8X1/2X1/2 B#FB68-4	
C	50	54E007	PLNBRG 3/8X1/2X3/4 B#6-8-6	
C	51	03 01355	SPRING=EXT=AIROP AUTOSPOT	
C	52	15N154B	FILMACSCR 10-24UNC2AX2 ZINC GR	
C	53	27B207	SPCRROLL.202ID.688L.027T STLZC	
C	54	12P1AHSB	SNAPBUSH .437"MH X .312" T=1/8	
C	55	03 01330	ARM=SWLEVER=AIROP AUTOSPOT	
C	56	15G131	HXLIGHTLOKNUT 10-32 ESNA22NM02	
C	57	15G124C	HXMACHSCRNUT 10-32UNF BRASS	
C	58	15Q070C	SOKSETSCR CUP 10-32X1.25 18-8S	
C	59	03 01334	BKT=SW=AIROP AUTOSPOT	
C	60	27B206	SPCRROLL.202ID.625L.027T STLZC	
D	61	15N152	RDMACSCR 10-24UNC2AX1.25 ZINC	
D	62	03 01340	CAM=AIROP AUTOSPOT	
D	63	03 01339	SPACER=CAM=AIROP AUTOSPOT	

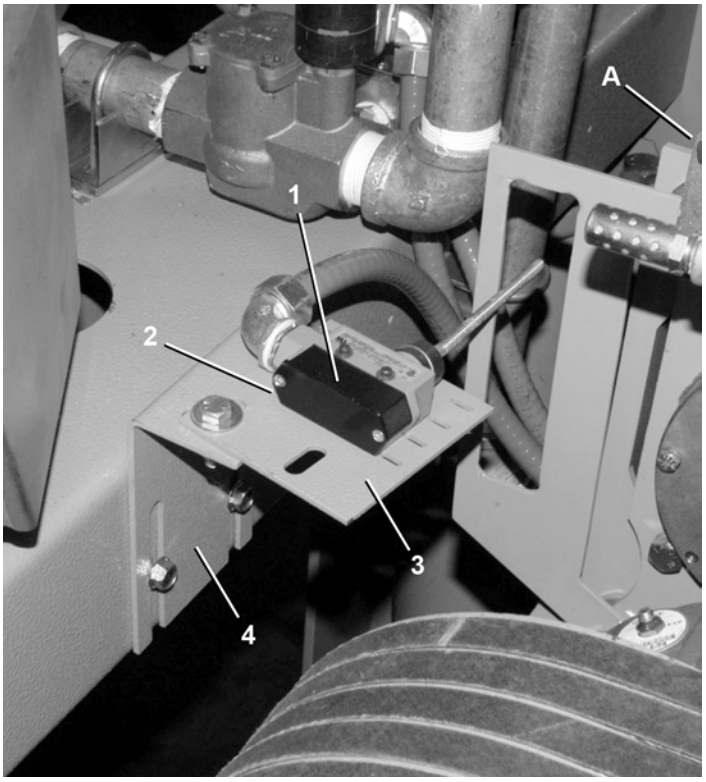
BPWG6Z01 / 2020195 BPWG6Z01.1 0000290657 D.2 A.4 5/7/20, 9:11 AM Released

Excursion Switch

1 Sheet

6044SR2, 6044SR3, 7244SR2

60044WR2 Shown



Legend

A . . . Jackshaft

Table 41. Parts List—Excursion Switch

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

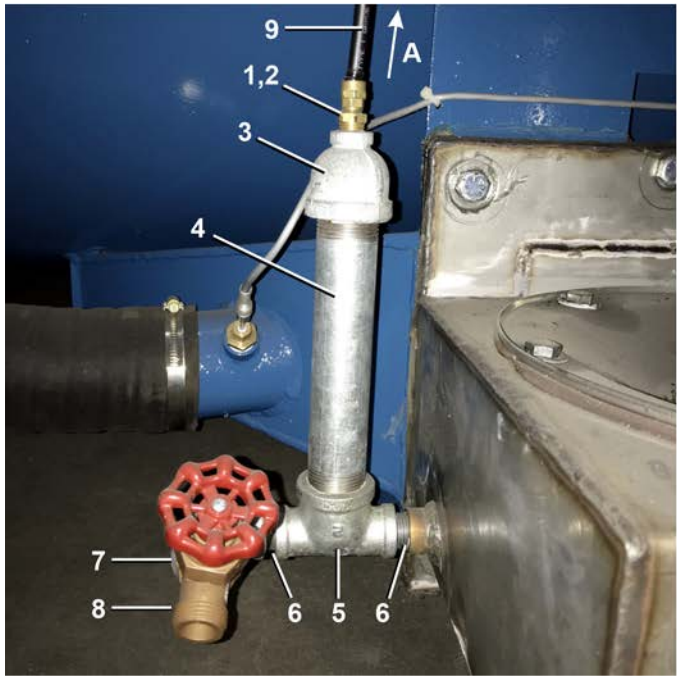
Used In	Item	Part Number	Description/Nomenclature	Comments
			Reference Assemblies	
	A	E03 33100B	EXCURSION SWITCH ASSY 60SGH	6044SR2, SR3
	B	E15 04000	* EXCURSION SWITCH ASSY=SGU	7244SR2
			Components	
A	1	09R008A	MICSW SPDT BZE6-2RN183	
B	1	09R008ASTD	* 09R008A+MOUNTING HDWRE+INST	
all	2	02 10391	COVER STRIP=MICRO SW #6-8	
all	3	02 15783A	*PLATE=EXCURSION SW MTG	
all	4	02 15980B	BRACKET=EXCURSION SW MT 72T	

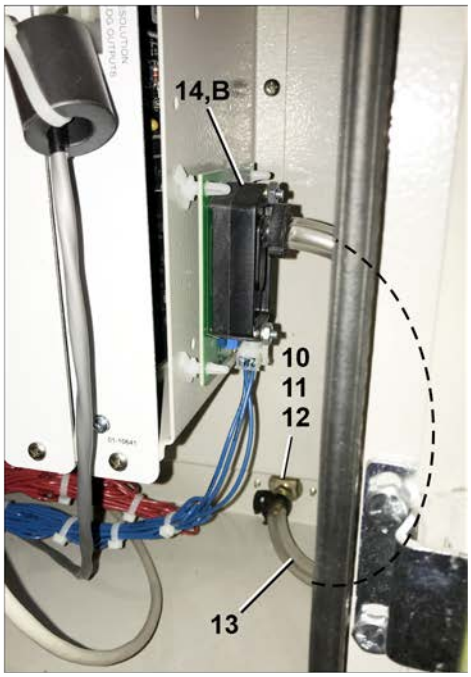
BPWVUZ01 / 2020043 BPWVUZ01.1 0000267913 D.2 A.3 1/21/20, 10:27 AM Released

Air Chamber Level Switch

1 Sheet

42044WR2,WR3,SR2,SR3; 6044WR2,WR3,SR2, SR3; 72044WR2, WR3, SR2, SR3





Legend

A . . . To transducer
B . . . Transducer

Table 42. Parts List—Air Chamber Level Switch

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
Reference Assemblies				
	A	AD 15 090A	AIRCHAMBER PRESWITCH INSTALL	
Components				
all	1	5SB0E0CBEO	NPTHEXBUSH 1/4X1/8 BRASS 125#	
all	2	53A047H	MALCON 5/16X1/8POLY PH#68P-5-2	
all	3	5SR1A0ENF	NPT RED 1X1/4 GALMAL 150#	
all	4	5N1A07AG42	NPT NIP 1X7 TBE GALSTL SK40	
all	5	5S0KNFA1A	NPT TEE 1/2X1/2X1" GALMAL 150#	
all	6	5N0KCLSG42	NPT NIP 1/2XCLS TBE GALSTLSK40	
all	7	5SL0PNFC0K	NPT 90D STREET 3/4X1/2 GAL150#	
all	8	96DB0PNA	HOSEBIBB 3/4" MALEINLT 45DEG. ACETAL	
all	9	60E005	TUBING BLK.POLY.5/160DX3/16ID	
all	10	51V010A	TEE 1/8"BRSEXTR BLOCTYP#2203P2	
all	11	51E502A	HOSESTEM BRASS 1/8MPT X3/16	

Air Chamber Level Switch

1 Sheet

42044WR2,WR3,SR2,SR3; 6044WR2,WR3,SR2, SR3; 72044WR2, WR3, SR2, SR3

Table 42 Parts List—Air Chamber Level Switch (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
all	12	5SP0CBEHS	NPT PLUG 1/8 HXCTRSNK BRASS	
all	13	60E004NA	TUBING CLEAR PVC 3/16"IDX5/16"OD	
all	14	08BNLTT	LEVEL TRANSDUCER BD->TEST	

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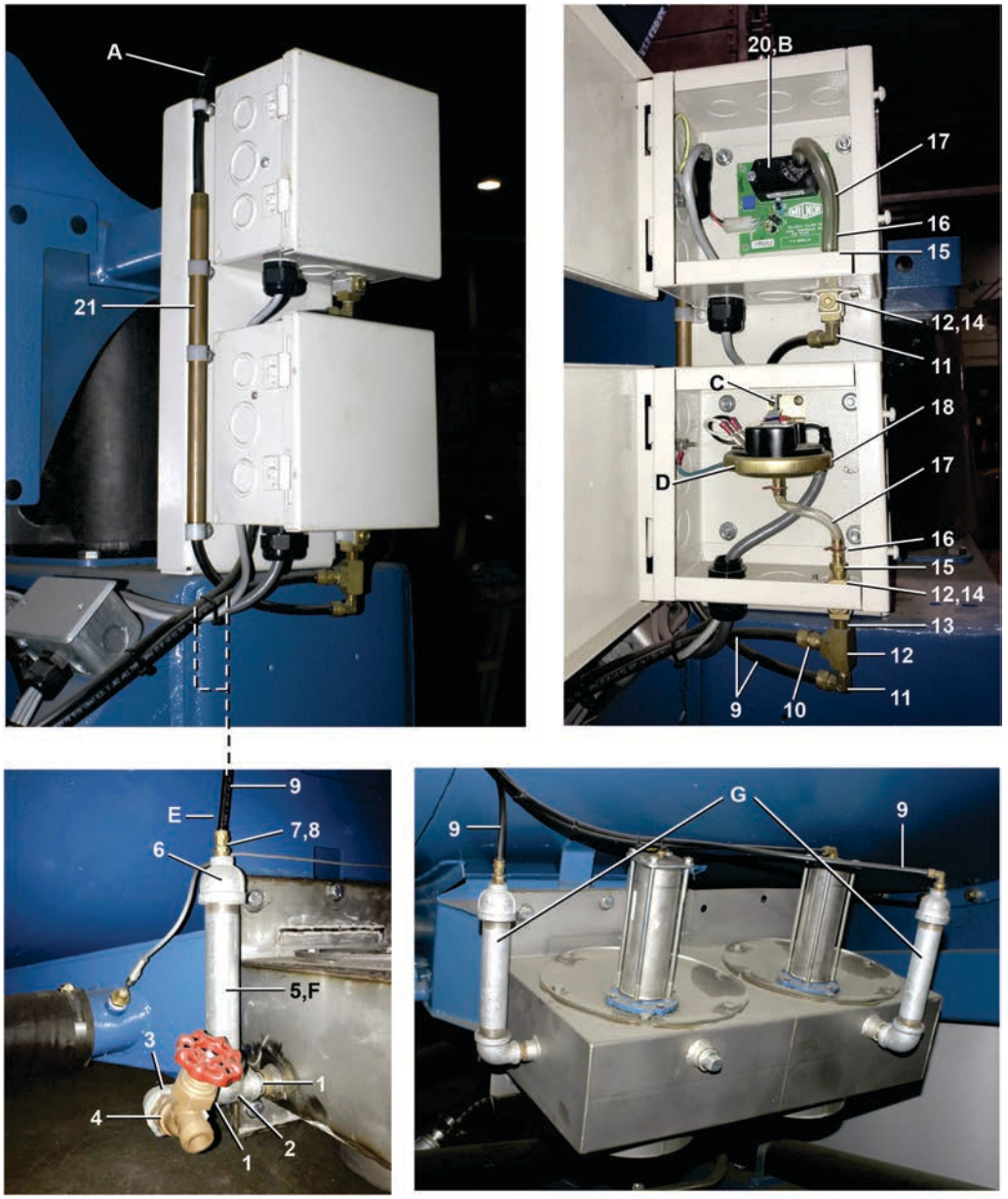
BPWSUZ01 / 2021354 BPWSUZ01.1 0000374579 D.2 B.1 9/13/21, 9:53 AM Released

Air Chamber Level Switch with Overflow Pressure Switch

2 Sheets

72044WR2,WR3,SR3 72046M5K, 48040M7K



Legend

A . . . Vent
B . . . Transducer
C . . . Manual adjustment
D . . . Overflow pressure switch
E . . . If only one air chamber, the air line must tee off to both switches.
F . . . Air chamber (typical)
G . . . Dual drain with two air chambers

Air Chamber Level Switch with Overflow Pressure Switch

2 Sheets

72044WR2,WR3,SR3 72046M5K, 48040M7K

Table 43. Parts List—Air Chamber Level Switch with Overflow Pressure Switch

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Reference Assemblies				
	A	ALS68002	72WP/SP PRESURE LEVEL SWITCH ASSY OVERFLOW	REFERENCE
	B	ALS48001	4840M7K LEVEL SWITCH ASSY	
Components				
all	1	5N0KCLSG42	NPT NIP 1/2XCLS TBE GALSTLSK40	
all	2	5S0KNFA1A	NPT TEE 1/2X1/2X1" GALMAL 150#	
all	3	5SL0PNFC0K	NPT 90D STREET 3/4X1/2 GAL150#	
all	4	96DB0PNA	HOSEBIBB 3/4" MALEINLT 45DEG. ACETAL	
all	5	5N1A07AG42	NPT NIP 1X7 TBE GALSTL SK40	
all	6	5SR1A0ENF	NPT RED 1X1/4 GALMAL 150#	
all	7	5SB0E0CBEO	NPTHEXBUSH 1/4X1/8 BRASS 125#	
all	8	53A047H	MALCON 5/16X1/8POLY PH#68P-5-2	
all	9	60E005	TUBING BLK.POLY.5/160DX3/16ID	
all	10	53A019B	BODYMALECON5/16X1/8COM#B68A-5A	
all	11	53A032	ELB90MAL5/16X1/8POLY #169P-5-2	
all	12	51V010A	TEE 1/8"BRSEXTR BLOCTYP#2203P2	
all	13	5N0CCLSB42	NPT NIP 1/8XCLS TBE BRASS STD	
all	14	5SP0CBEHS	NPT PLUG 1/8 HXCTRSNK BRASS	
all	15	51E502A	HOSESTEM BRASS 1/8MPT X3/16	
all	16	27A043	HOSECLAMP 5/16"DIA.SPRING#A-5S	
all	17	60E004NA	TUBING CLEAR PVC 3/16"IDX5/16"OD	
all	18	09N069	PRESS SW 4"WC INVENSYS 738-719	
all	19	27A047A	HOSE CLAMP 5/16" NOMINIAL MIN .256"	
all	20	08BNLTT	LEVEL TRANSDUCER BD->TEST	
all	21	5N0E11ABE2	NPT NIP 1/4X11 TBE BRASS STD	

BPWVUZ03 / 2020195 BPWVUZ03.1 0000290654 D.2 A.3 5/7/20, 9:15 AM Released

Temperature Probe

1 Sheet

6044WR2,WR3,SR2 72044WR2,WR3,SR3

Table 44. Parts List—Temperature Probe

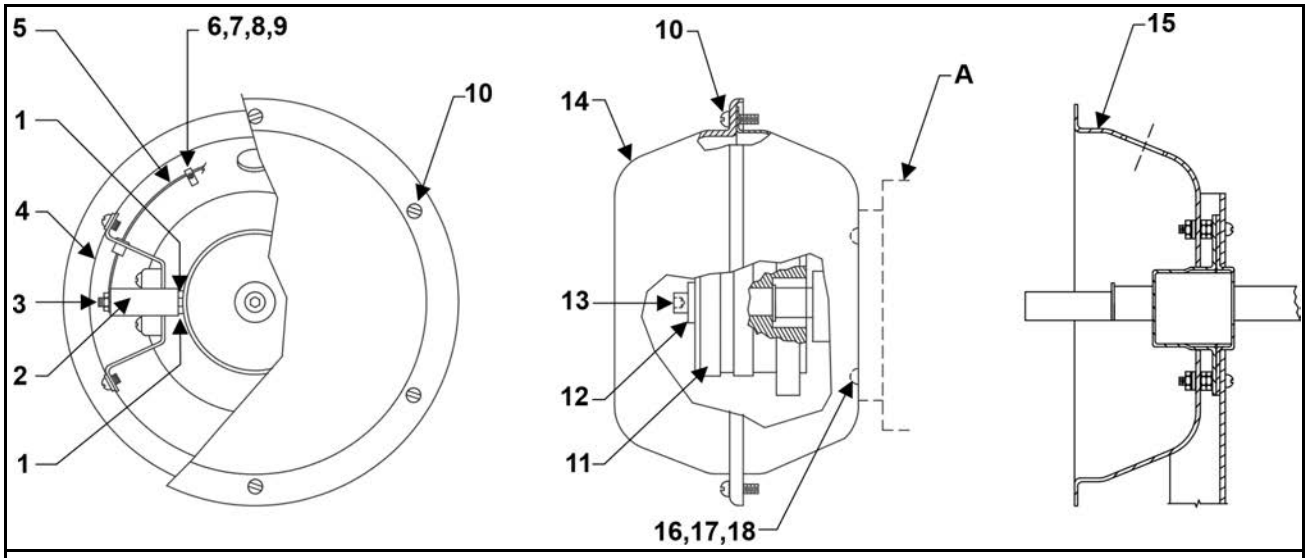
Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Components				
all	1	30R0043PB	TEMPERATURE PROBE ASSY=BRASS	

BPWG7Z02 / 2020234 BPWG7Z02.1 0000294740 D.2 A.4 6/3/20, 9:00 AM Released

Centrifugal Switch Assembly

1 Sheet

72044SR2, 72044SR3



Legend

A . . . May be mounted to extract motor.

Table 45. Parts List—Centrifugal Switch Assembly

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
			Reference Assemblies	
	A	G03 04500A	CENTSWITCH=MOTOR MT NO-PLATE	
			Components	
all	1	09X100	CARBONBRUSH -187 STMARY GR B86	
all	2	ESC0001	* CENT SWITCH BRUSHOLDER ASSY	
all	3	15G071	MACHSCRLOKNUT 6-32 NM SER ZINC	
all	4	03 IF2X3	INSUL.AUTOSPOT/CENTRIFUGL.SW	
all	5	60E005E	TUBNG,VNYL.3/8IDX.025"W#HT105C	
all	6	12P015C	CABLECLAMP 5/16-1/2	
all	7	15G070	HXMACHSCRNUT 6-32UNC2B ZINC GR	
all	8	15N045	RDMACSCR 6-32UNC2AX3/8 ZINC GR	
all	9	15U100	LOCKWASHER MEDIUM #6 ZINCPL	
all	10	15P010	TRDCUT PHILPANHDSCR 10-24X1/2S	
all	11	SAE03 012B	*SLIPRING+CENT SW.ASSY(LORES)	
all	12	15U342	FLTWASH .255/.260IDX.750DX.125	
all	13	15K036	SKSELL0KCP SCR 1/4-20X5/8	
all	14	02 15582	COVER=CENTSW-CADSTL	
all	15	03 01147	HOUSING CENTSW	

Centrifugal Switch Assembly

1 Sheet

72044SR2, 72044SR3

Table 45 Parts List—Centrifugal Switch Assembly (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
all	16	15N119	PHILPANMACSCR 10-32X1/2 NKL	
all	17	15U135	FLATWASH#10 .4370DX.203IDX.04T	
all	18	15U150	LOCKWASHER MEDIUM #10 ZINCPL	

BNWUUM01 / 2019345 BNWUUM01 0000250244 C.2 11/7/19, 10:43 AM Released

6.1 Vibration Safety Switch Adjustments

BNWUUM01.C01 0000250243 D.2 C.2 A.3 1/2/20, 2:19 PM Released

6.1.1 What the Vibration Safety Switch Does

BNWUUM01.C02 0000250242 D.2 C.2 A.3 1/2/20, 2:19 PM Released

The **vibration safety switch** in Figure 65: Vibration Switch, page 154 is an important safety feature. If properly adjusted, the switch will momentarily actuate as a result of repeated machine movement caused by an out-of-balance condition. Table 46, page 153 below illustrates the effect of the **vibration safety switch** actuation.

Table 46. Effect of Tripping Vibration Safety Switch

Machine Model	Function of Vibration Safety Switch
30015, 30020, and 30022	Disables high speed extract
All microprocessor-controlled washer-extractors not listed above, and all dye machines	De-energizes three-wire relay, effectively terminating machine operation

6.1.2 Adjustments

BNWUUM01.C03 0000250240 D.2 C.2 B.2 11/7/19, 10:43 AM Released

When the machine leaves Milnor®, the actuator arm is tie-wrapped to prevent damage (except on 30015, 30020, and 30022 models). **This tie wrap must be removed after the machine is set into position but before the machine is operated.**

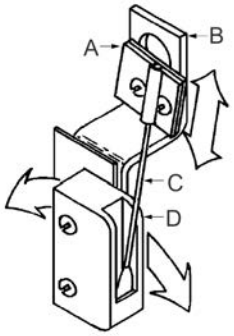
Adjustment of this switch from the factory setting is not recommended; however, it should be checked for proper functioning and adjusted if its proper setting is lost.

As shown in Figure 65: Vibration Switch, page 154 , the unit consists of a **sensitive micro-switch** with an extended actuating arm supporting an eccentric weight. The weight may be adjusted by moving it up and down on the arm and by rotating it on the arm. In addition, the **micro-switch** itself may be tilted from side to side.

The sensitivity of the switch increases as the eccentric weight is raised on the actuating arm and decreases as the weight is lowered.

The unit should be adjusted so that the actuating arm will always reset by itself, this being accomplished by rotating either the switch or the weight to give just enough bias to cause the switch to reset. Check the adjustment by moving the arm to the left then slowly releasing it. Make sure the micro-switch clicks when the arm is **slowly** released, thus indicating that it has reset. In the released position, the arm should rest **lightly** but definitely against the stop on the **micro-switch** case that prevents any further arm movement to the left.

Figure 65. Vibration Switch



Legend

A . . . Eccentric weight (adjusts up and down)
B . . . Mounting bracket
C . . . Actuating arm
D . . . Microswitch (adjusts side to side)

For machines with rigid mounted shells, where the machine is bolted to a very substantial foundation, very little machine movement will occur for a given degree of out-of-balance. Under such conditions it may be better to adjust the switch to be very sensitive. With less substantial foundations (e.g., ones where the sub-soil is mushy or springy or otherwise not as desirable), considerably greater machine movement will occur for a given degree of out-of-balance, in which case a less sensitive **vibration switch** setting may be indicated.

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Vibration Safety Switch

1 Sheet

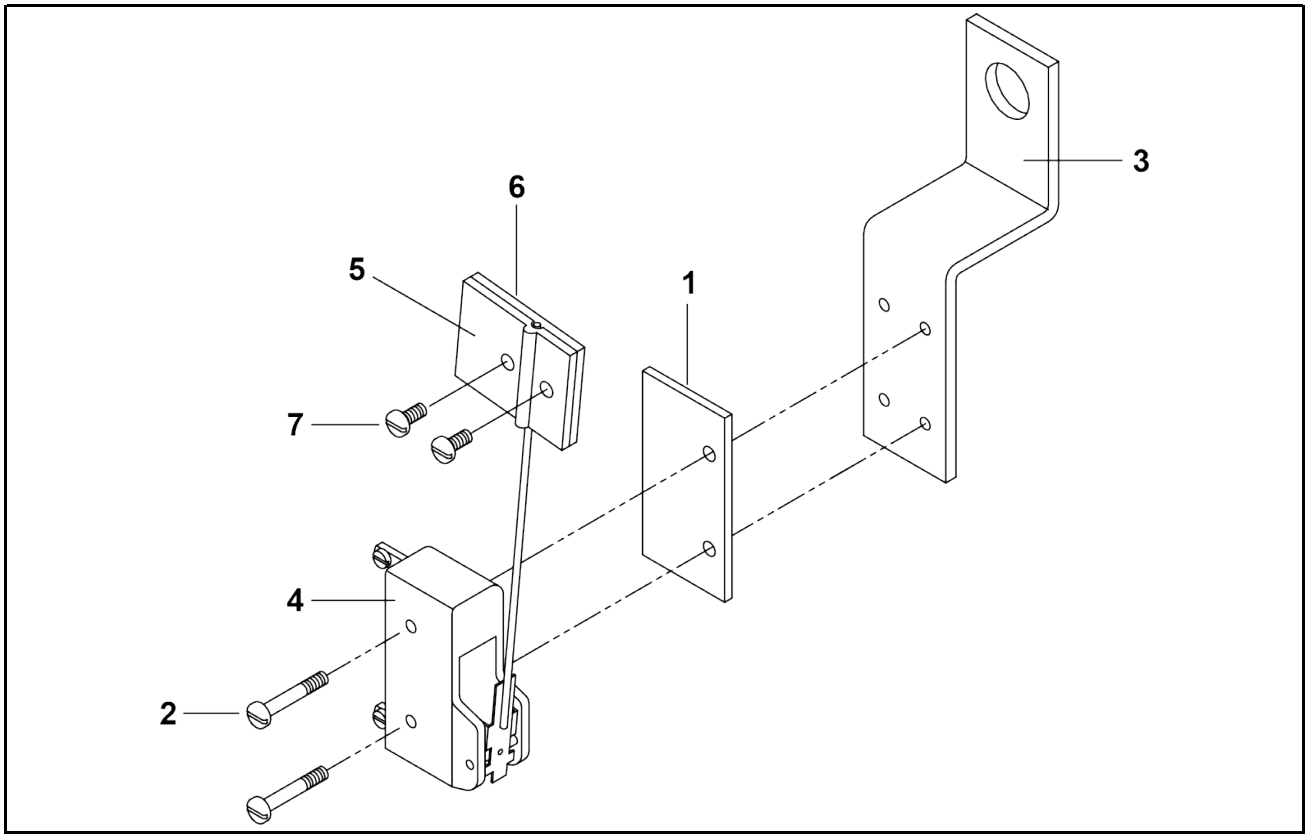

Table 47. Parts List—Vibration Safety Switch

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Reference Assemblies				
	A	SAE03 151	* ASSY-VIBRATION SWT=LG CONTR	
Components				
all	1	02 02038	PLATE INSULATING SMALL 9NOV51	
all	2	15P008	TRDCUT PANHD 6-32X1 NIKSTL +WA	
all	3	02 15119	BRACKET=VIBSW CAD	
all	4	09R020	SWITCH NC VIBR#WZ-2RW84429-P52	
all	5	03 01059	VIBSWITCH CLAMP CADSTL	
all	6	03 01058	VIBSWITCH WEIGHT-CADSTL	
all	7	15P101	TRDCUT-F PANHD 8-32X3/8 NIKSTL	

7 Chemical Supply Devices

BPWG7C01 / 2020244 BPWG7C01.1 0000295532 D.2 A.3 6/10/20, 3:40 PM Released

Peristaltic Supply Manifold

1 Sheet

72044WR2, 72044SR2

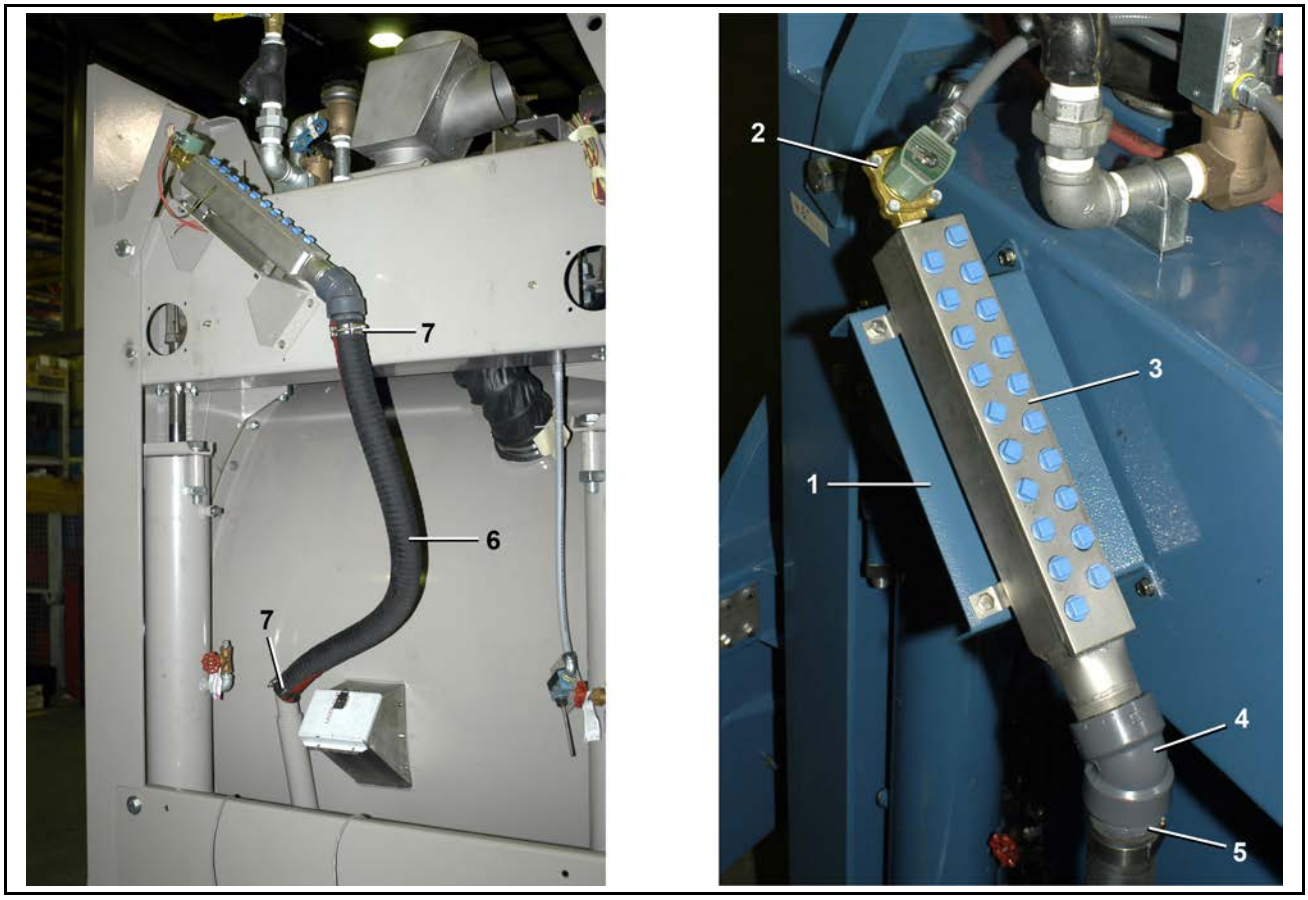

Table 48. Parts List—Peristaltic Supply Manifold

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Reference Assemblies				
	A	GWL52005C	INST=PERIS CONN 72SP/WP	72044WR2,72044SR2
Components				
all	1	03 25267E	PERISTALTIC MOUNTING BRACKET	
all	2	96TDC2AA37	1/2"N/C2WY120V50/60C VLV(DRYVC)	
all	3	W8 01254	*ASSY=PERIST CONNECT 20 HOLES	
all	4	5SL2AP8K	NPT EL45DEG 2"PVC SH80 FPTXFPT	
all	5	5SCC2AP8	NPT COUP 2" PVC SK80	
all	6	60E255A70A	HOSE=2"ID X 70"LG(NO DWG)	
all	7	27A072	T-BOLT HOSECLAMP2.16-2.47CADSC	

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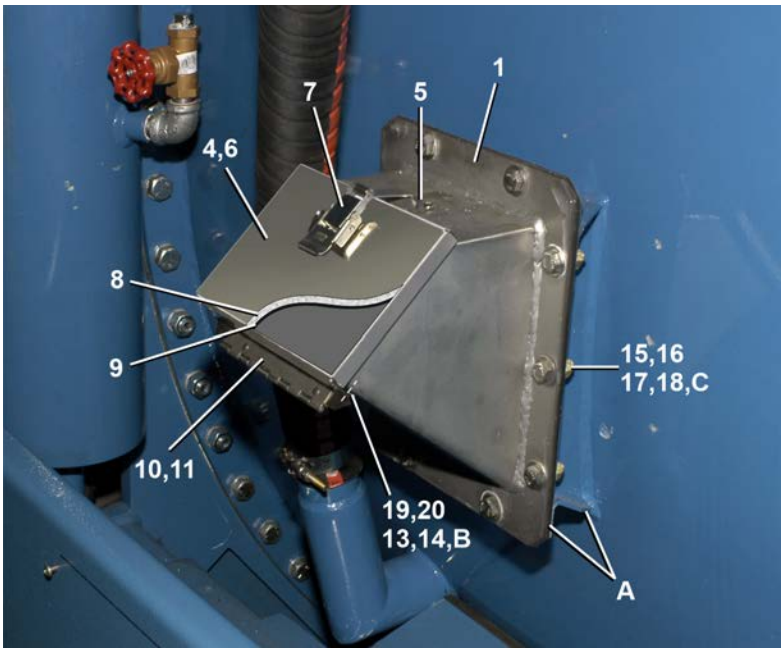
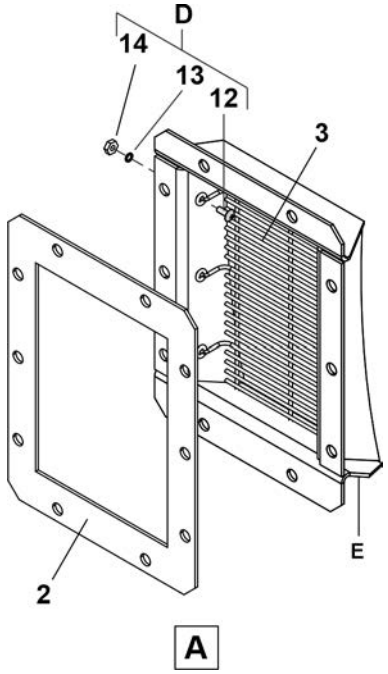
Soap Chute

2 Sheets

72044SR2



Gasket and Guard



Legend

A . . . See detail A
B . . . 4 instances
C . . . 10 instances
D . . . 6 instances
E . . . Shell weldment

Table 49. Parts List—Soap Chute

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
			Reference Assemblies	
	A	G29 05500B	INST=SOAP CHUTE 60/72SG	
			Components	
all	1	W2 18884	WLMT=SOAP CHUTE	
all	2	02 18887	SOAP CHUTE GASKET	
all	3	02 15982	GUARD=42WE SOAP CHUTE	
all	4	SA 15 102	*LID ASSY=SOAPCHUTE-GASKETED	
all	5	02 18640	HOOK=SOAPCHUTE LATCH	
all	6	02 15817	LID=SOAP CHUTE (BEND@PRINT)	
all	7	27A009B	CATCH SPECIAL 2-HOLE BASE	

Soap Chute

2 Sheets

72044SR2

Table 49 Parts List—Soap Chute (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
all	8	02 15838	GASKET-SPONGRUBBER=SOAPCHUTE	
all	9	02 15839	GASKET-SHEETRUBBER=SOAPCHUTE	
all	10	02 02706	HINGE=SOAP CHUTE	
all	11	02 15835	02 18481SOAP CHUTE HINGE	
all	12	15N130	RDMACSCR 10-24UNC2A X 1/2 SS18	
all	13	24G018N	ROLLED WASH.194ID NYLTITE 10W	
all	14	15G121	HXCAPNUT 10-24UNC2 #3266BR NKL	
all	15	15K096	HEXCAPSCR 3/8-16UNC2X1SS18-8	
all	16	15U245	FLTWASH 3/8 STD COMM 18-8 SS	
all	17	15U260	LOCKWASHER MEDIUM 3/8 SS18-8	
all	18	15G206B	HEXNUT 3/8-16UNC2 BRASS	
all	19	15N141	RDMACSCR 10-24NCX3/4 SLOTTED S	

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Five Compartment Supply

5 Sheets

72044SP2, 72044SR2, 7244WP2, 7244WR2

Figure 66. Installed view

Legend

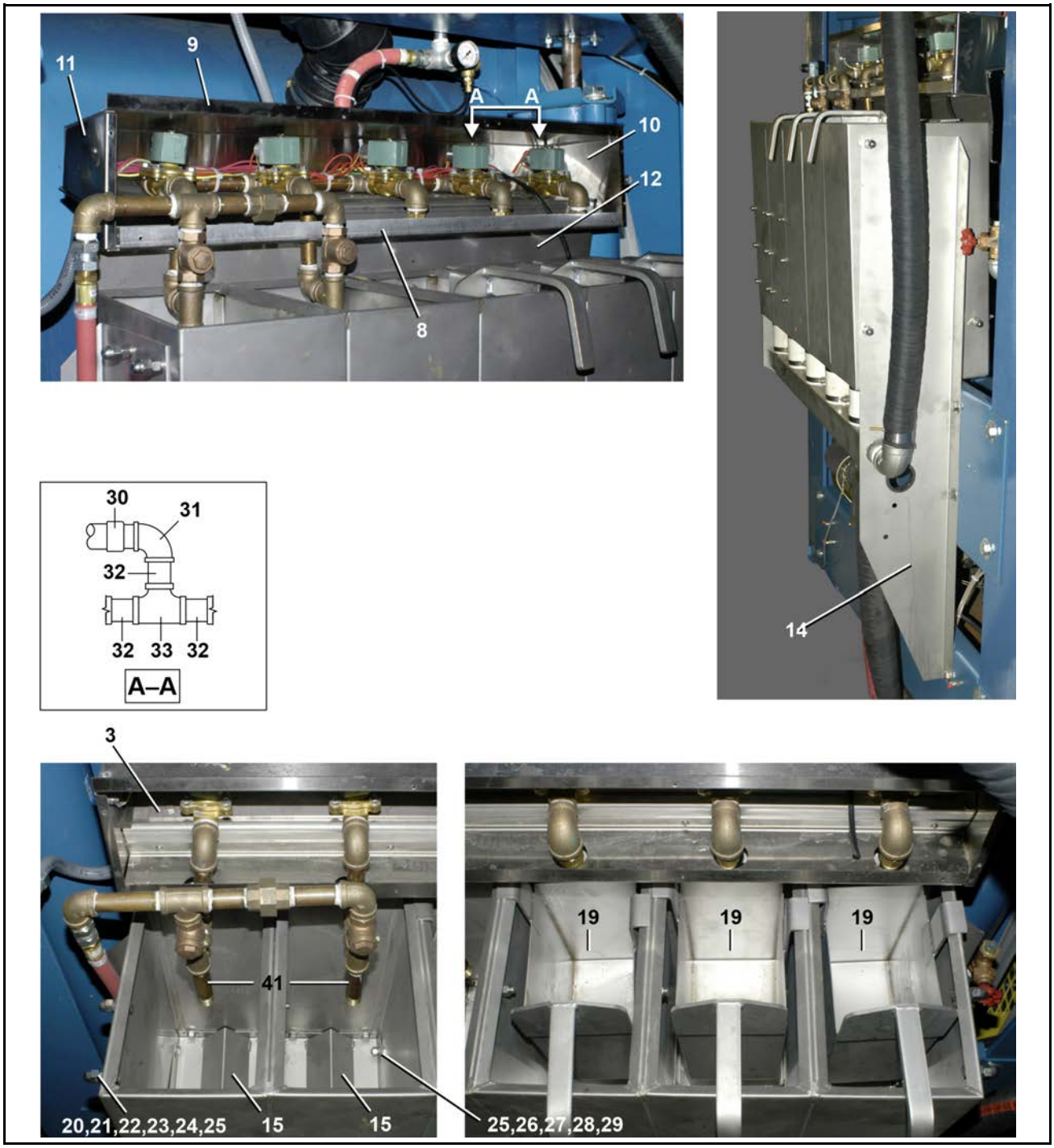
B . . . Hand actuated flush switch
C . . . Shown disconnected

Five Compartment Supply

5 Sheets

72044SP2, 72044SR2, 7244WP2, 7244WR2

Figure 67. Supply box components



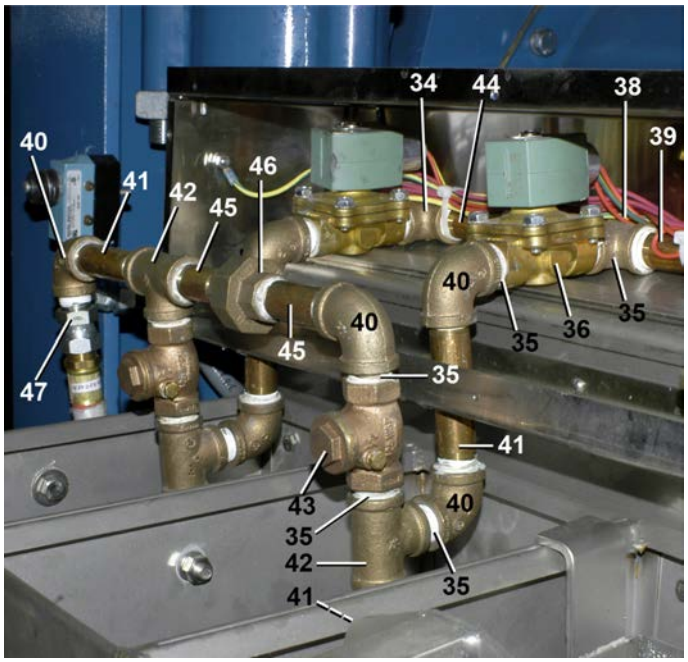
Five Compartment Supply

5 Sheets

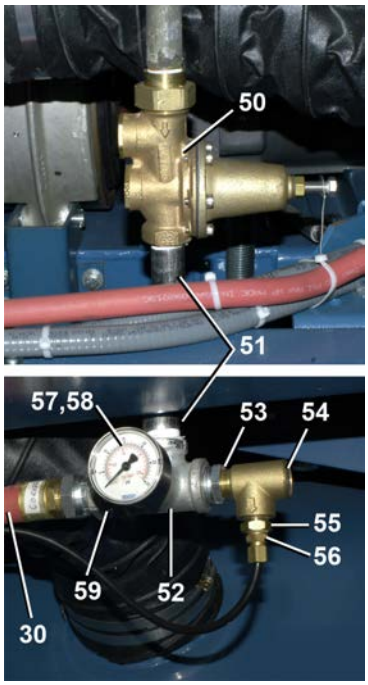
72044SP2, 72044SR2, 7244WP2, 7244WR2

Figure 68. Water inlet and manifold piping

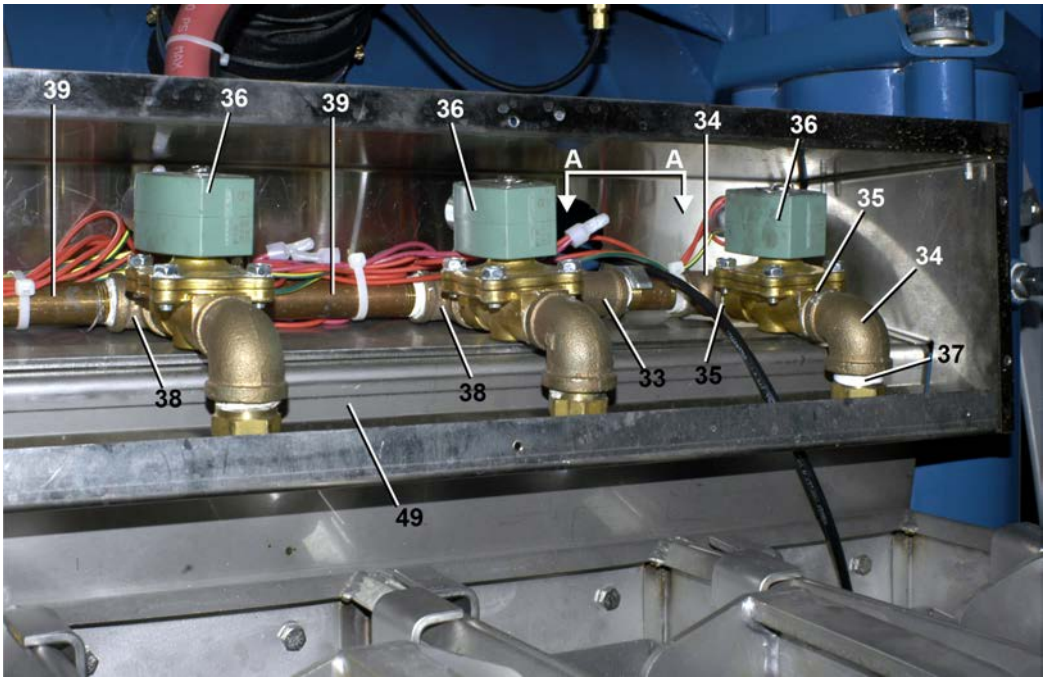
Supply Manifold



Water Inlet



Supply Manifold



Five Compartment Supply

5 Sheets

72044SP2, 72044SR2, 7244WP2, 7244WR2

Table 50. Parts List—Five Compartment Supply

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
			Reference Assemblies	
	A	AD 36 032A	* SUPPLY INJECTOR ASSY	7244SP2, SR2
	B	AD 36 031A	7244WP2/3 ADD FLUSH SUPPLY IN	7244WP2, WR2
	C	SA 36 037	*INLET-WATER SUP INJ 72WEV	ALL
	D	A36 04900D	ASSY=5FLUSH SUP-7244SG	7244SP2, SR2
	E	A36 04900B	* ASSY,5FLUSH SUPINJ=72DIVCYL	7244WP2, Wr2
	F	SA 36 017A	* PIPING ASSY=7244 SUPINJ	ALL
			Components	
all	1	09R012STDG	* 09R012 +MOUNTING HDWRE+INST	
all	2	02 15096	BRACKET=DRINTLOKSW-CAD	
all	3	03 06263	SUPPLY INJ PIPE MNT	
A	4	60E301A19A	HOSE= *2.5"ID PE X19"	
B	4	60E301A24A	HOSE= *2.5"ID PE X 24"	
A	5	W2 15831A	*TRAP-WELDED=SUPINJ INLET SG	
B	5	W3 06292	*ELBOW=SUPPINJ INLET=7244	
A	6	60E301A27A	HOSE= *2.5"ID PE X27"	
B	6	60E301A33A	HOSE= *2.5"ID PE X33"	
all	7	27A075	T-BOLT HOSECLAMP 2.78-3.09"	
all	8	03 06382	COVER=SUPPLY VALVE FRONT SG2	
all	9	03 06360	COVER=SUPPLY VALVE TOP	
all	10	03 06286A	END=SUPPLY VALVE COVER	
all	11	03 06286B	END=SUPPLY VALVE COVER-FRONT	
all	12	03 06253	SUPPORT=SUPPLY INJ PIPING	
D	13	03 06323A	SUPPLY MNT FRONT=7244SG	
E	13	03 06323	MTANGLE, FRONT=FLUSHSUP 72WEU	
DI	14	03 06324A	SUPPLY MNT REAR=7244 SG	
E	14	03 06324	MTG=SUP INJ REAR WES BND@PRT	
all	15	03 06373	BAFFLE=SUPPLY TANK	
all	16	02 15773	PINCHVALVE TUBE-HYPALON	
all	17	27A074	HOSECLAMP 2+1/16-3"CADSC#62040	
all	18	W3 06254	*MANIFOLD=72"SUP.INJ.W/OBRACK	
all	19	W3 06325	* BUCKET=SUPPLY TANK=72WEDU	
all	20	15K096	HEXCAPSCR 3/8-16UNC2X1SS18-8	
all	21	24G030N	ROLLED WASH.379ID NYLTITE 37W	

Five Compartment Supply

5 Sheets

72044SP2, 72044SR2, 7244WP2, 7244WR2

Table 50 Parts List—Five Compartment Supply (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
all	22	15G206	HEXNUT 3/8-16 UNC2 SS 18-8	
all	23	15U260	LOCKWASHER MEDIUM 3/8 SS18-8	
all	24	15U245	FLTWASH 3/8 STD COMM 18-8 SS	
all	25	20C040	SUPERFLEX SILICONE ADH 85GR	
all	26	15N174	HXCAPSCR 1/4-20UNC X5/8SS18-8	
all	27	24G020N	ROLLED WASH.252ID NYLTITE 25W	
all	28	15U181	LOCKWASHER MEDIUM 1/4 SS18-8	
all	29	15G170	HEXNUT 1/4-20UNC2 SS18-8	
all	30	60E086C16K	* HOSE ASSY=3/4"X 16+1/2"LG	
all	31	5SL0PBEA	NPTELB 90DEG 3/4 BRASS 125#	
all	32	5N0P02AB42	NPT NIPPLE 3/4X2 TBE BRASS STD	
all	33	5S0PBEA	NPT TEE 3/4" BRASS 125#	
all	34	5SL0PBEA0K	NPTELB 90DEG 3/4X1/2 BRASS150#	
all	35	5N0KCLSBE2	NPT NIP 1/2XCLS TBE BRASS STD	
all	36	96TDC2AA37	1/2"N/C2WY120V50/60C VLV(DRYVC)	
all	37	27A004	NOZZLE SPRACO	
all	38	5S0PBEA0K	NPT TEE 3/4X3/4X1/2 BRASS 125#	
all	39	5N0P05KBE2	NPT NIP 3/4X5.5 TBE BRASS STD	
all	40	5SL0KBEA	NPTELB 90DEG 1/2 BRASS 125#	
all	41	5N0K04ABE2	NPT NIP 1/2X4 TBE BRASS STD	
all	42	5S0KBEA	NPT TEE 1/2" BRASS 125#	
all	43	96D047	1/2" SWING CHECK VALVE=SMITH COOPER	
all	44	5N0P06ABE2	NPT NIP 3/4X6 TBE BRASS STD	
all	45	5N0K02KB42	NPT NIP 1/2X2.5 TBE BRASS STD	
all	46	5SU0KBE	NPT UNION 1/2" BRASS 125#	
all	47	51X017	UNIONSTRADT 1/2"#1404-8-8	
all	48	60E085C26K	HOSE ASSY=1/2"X26 1/2LG+ENDS	
all	49	03 06261	BOTTOM=SUPVAL COVER BND@PRT	
all	50	96J031D	3/4"PRESSREG SET 28# FEMXUN=WATTS	
all	51	5N0P20AG42	NPT NIP 3/4X20 TBE GALSTL SK40	
all	52	5S0PNFB	NPT SIDEOUT TEE 3/4" GALMAL	
all	53	5SB0P0KNFO	NPTHEXBUSH 3/4X1/2 GALMAL 150#	
all	54	96M001	1/2X3/8" RELIEF VALVE SET31#	
all	55	5SB0G0EDEO	NPTHEXBUSH 3/8X1/4 GALCI 125#	

Five Compartment Supply

5 Sheets

72044SP2, 72044SR2, 7244WP2, 7244WR2

Table 50 Parts List—Five Compartment Supply (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
all	56	53A008B	BODYMALECON.25X.25COMP#B68A-4B	
all	57	5SB0P0CNFA	NPTHEXBUSH 3/4X1/8GALV150#CORD	
all	58	30N100	PRESSGAUGE 1/8"BACKCN.0-30PSI	
all	59	51X019	UNIONSTRADT 3/4"#0107-12-12	

8 Water & Steam

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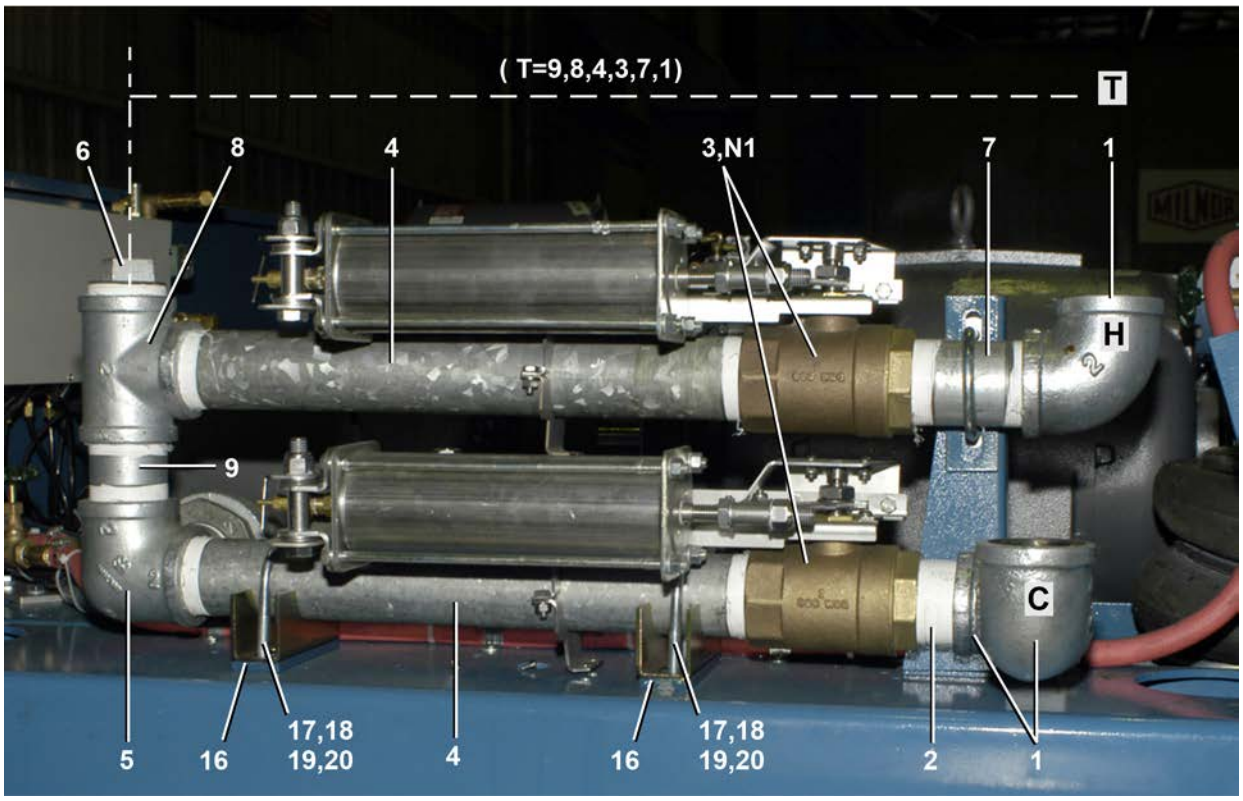
Water Inlets

3 Sheets

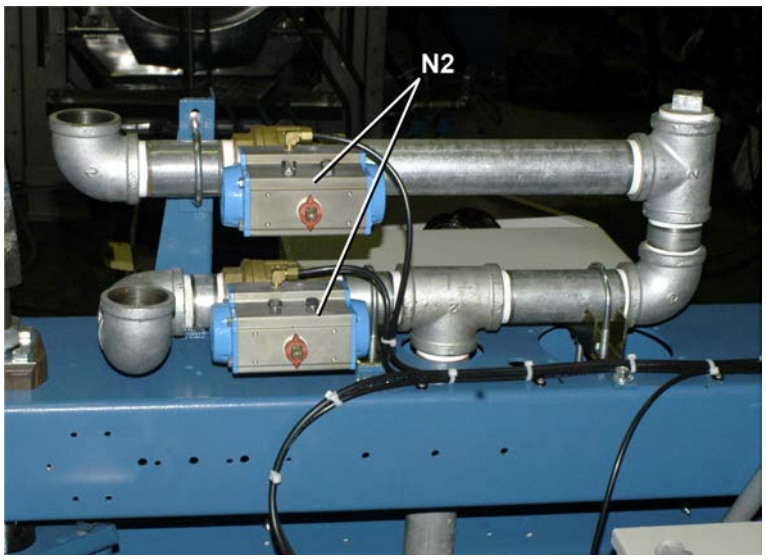
72044SR2

Figure 69. Hot, Cold, and Third Water Inlets

72044SR2 Water Piping before 9/2014



Water valves used since 9/2014 (60044SR2 shown)



Legend

C . . . Cold water inlet

H . . . Hot water inlet

T . . . Third water inlet (location shown dashed)

N1 . . The 72044SR2 photos shows watts water valves not used since 2014. See the parts list for the current valve part number.

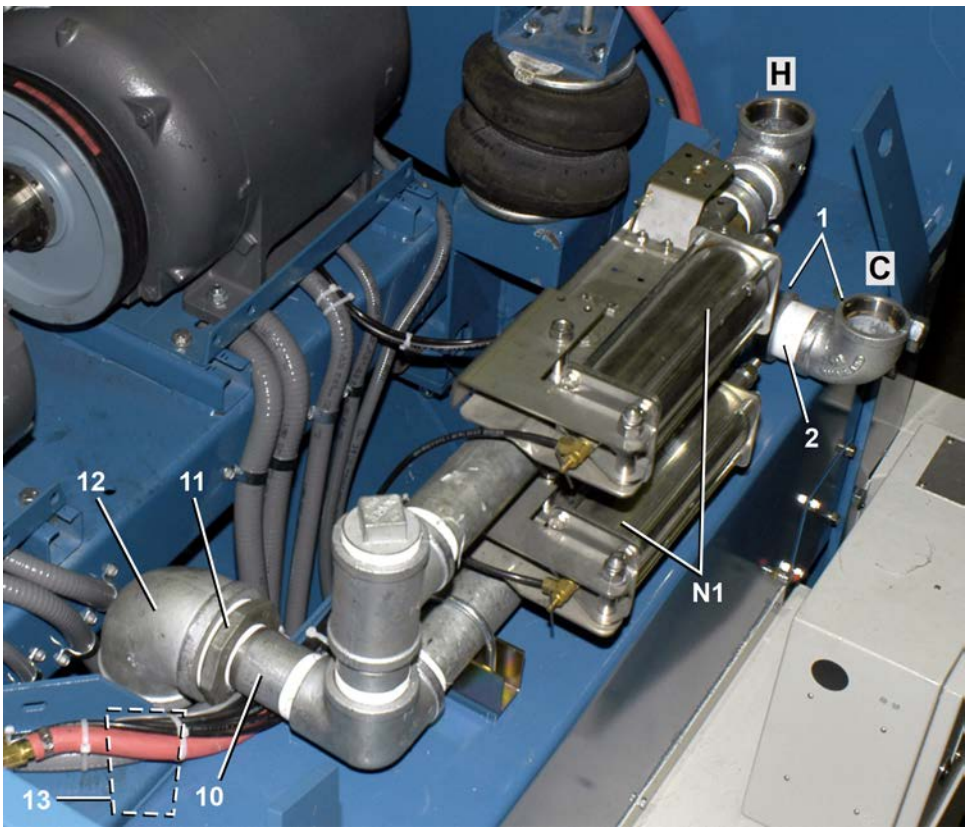
N2 . . This 60044SR2 photo shows the current valve style.

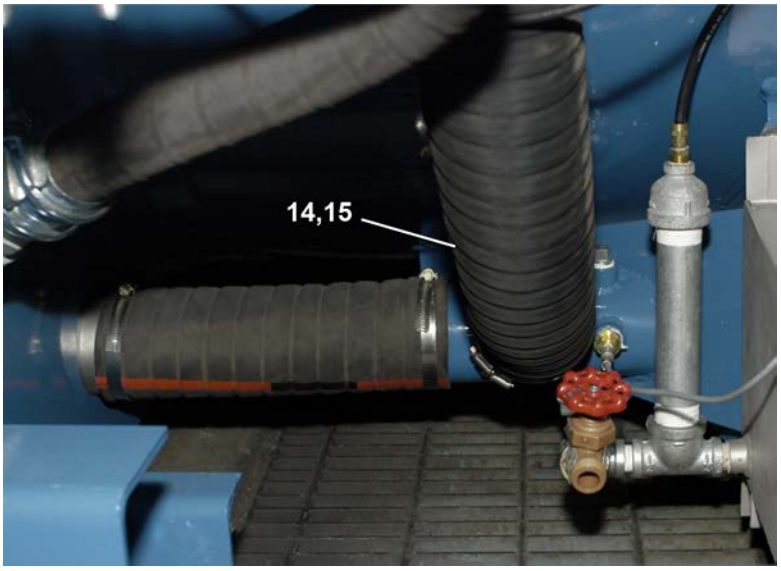
Water Inlets

3 Sheets

72044SR2

Figure 70. Piping to Drain Sump





Legend

C . . . Cold water inlet

H . . . Hot water inlet

T . . . Third water inlet (location shown dashed)

N1 . . The 72044SR2 photos shows watts water valves not used since 2014. See the parts list for the current valve part number.

Water Inlets

3 Sheets

72044SR2

Table 51. Parts List—Water Inlets

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
			Reference Assemblies	
	A	GVW36001	H2O INLTS=MTG HDWE NO SB72SG	REFERENCE
	B	AVW36003	*H2O INLT=COLD ONLY , 72SG	
	C	AVW36004	*H2O INLT=+HOT VALVE, 72SG	
	D	AVW36005	*H2O INLT=+1 FRESH VALVE 72SG	
	E	AVW36002	*H2O INLT=INLT PIPING,72SG	
			Components	
all	1	5SL2ANFA	NPT ELBOW 90DEG 2" GALMAL 150#	
all	2	5N2ACLSG42	NPT NIP 2XCLS TBE GALSTL SK40	
all	3	96D088BCSR	2.00WAT BVAL+ACT/BR/NC/ST/RH	
all	4	5N2A18AG42	NPT NIP 2X18 TBE GALSTL SK40	
all	5	5SL2ANFB	NPTELB 90D SIDEOUT 2"GALML150#	
all	6	51P060	PLUG PIPE SQ 2"GALCORED CI 125	
all	7	5N2A03AG42	NPT NIPPLE 2X3 TBE GALSTL SK40	
all	8	5S2ANFA	NPT TEE 2" GALMAL 150#	
all	9	5N2A04AG42	NPT NIP 2X4 TBE GALSTL SK40	
all	10	5N2A04KG42	NPT NIP 2X4.5 TBE GALSTL SK40	
all	11	5SB3A2ADEO	NPTHEXBUSH 3X2 GALCI 125#	
all	12	5SL3ANFA	NPT ELBOW 90DEG 3" GALMAL 150#	
all	13	5N3A03AG41	NPT NIP 3X4 TOE GALSTL	
all	14	60E303C	HOSE 3"ID#7216ETRANS/EQUALIZER	
all	15	27A075A	T-BOLT HOSECLAMP 3.03-3.34"	
all	16	27A032M	UBOLT 2"PIPE 3/8-16 ZNC3.5" LG	
all	17	15P200	TRDCUT-F HXWASHD 3/8-16X3/4NIK	
all	18	15U245	FLTWASH 3/8 STD COMM 18-8 SS	
all	19	15U260	LOCKWASHER MEDIUM 3/8 SS18-8	
all	20	15G206	HEXNUT 3/8-16 UNC2 SS 18-8	

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Steam Components

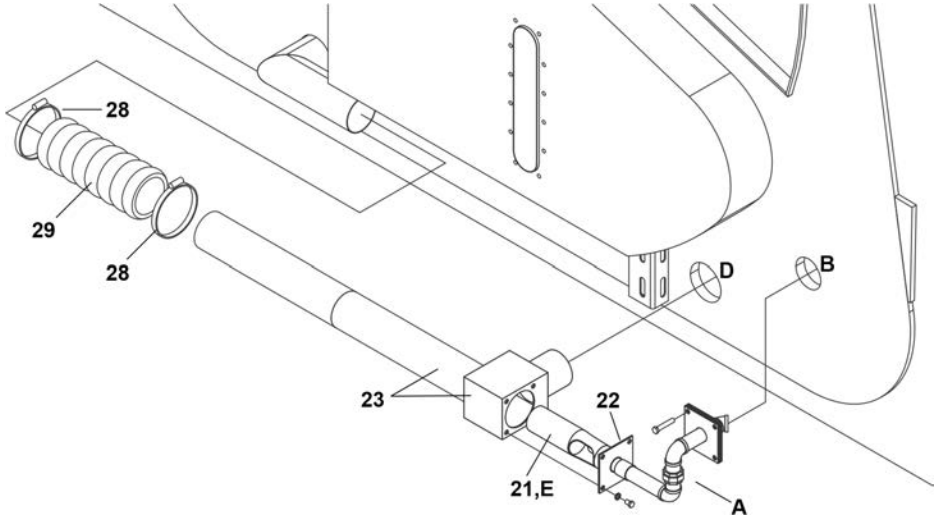
3 Sheets

72044SR2

Steam Inlet

Hoses

Steam Mixing- Clean Side



Legend

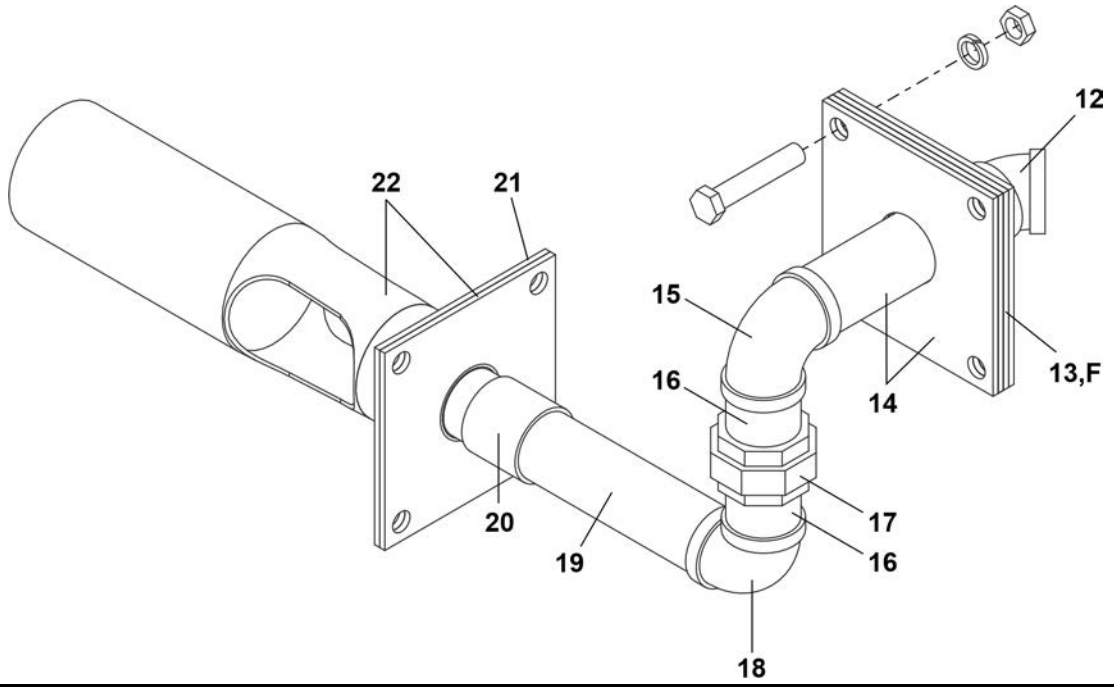
A . . . See Detail A
B . . . Steam
C . . . Mixing water
D . . . Water
E . . . Sparger

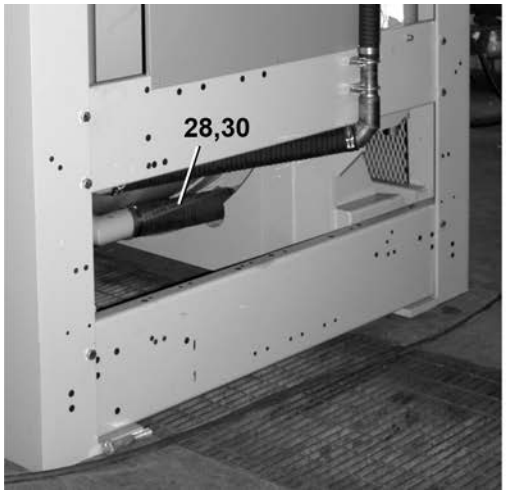
Steam Components

3 Sheets

72044SR2

Detail A: Inlet Piping Through Shell Back to Sparger





Legend

F . . . Uses 3

Steam Components

3 Sheets

72044SR2

Table 52. Parts List—Steam Components

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
			Reference Assemblies	
	A	GVS36001	INSTAL=1.25STEAM 72SGU	REFERENCE
	B	AVS04001A	1.25 BURKERT STEAM=72 SG2+3	
	C	SA 36 027	*STEAM INLET FLANGE ASSY=72SG	
	D	ASS52001D	*72TILT/DYE/DAN ST.SPAR 3/40R	
			Components	
all	1	51T060	Y-STRAINER 1+1/4" CAST IRON	
all	2	5SP0PHFSS	NPT PLUG 3/4 SQ SOLID STL/ZINC	
all	3	5N1E05AG42	NPT NIP 1.25X5 TBE GALSTL SK40	
all	4	96D0011E	1.25"NPTBRZ N/C STEAMVALANGBD	
all	5	96H018	ANGLE NEEDLE VLV 1/4"T X 1/8MP	
all	6	5SB0E0CBEO	NPTHEXBUSH 1/4X1/8 BRASS 125#	
all	7	5N1E03AF42	NPT NIP 1.25X3 TBE BLKSTL SK40	
all	8	5SL1EMFA	NPTELB 90DEG 1.25 BLKMAL 150#	
all	9	5N1ECLSF42	NPT NIP 1.25XCLS TBE BLKSTLS40	
all	10	5SU1EMH	NPT UNION 1.25" BLKMAL 150#	
all	11	60E096C35A	STEAMH*OSE=1.25"X35"+2ENDS=(NO	
all	12	5SL1ENFK	NPT ELB 45DEG 1.25 GALMAL 150#	
all	13	03 06081	GASKET=STEAM FLANGE 1/60+72	
all	14	W3 06080	* TUBE-STEAM INLET	
all	15	5SL1ENFA	NPT ELB 90DEG 1.25 GALMAL 150#	
all	16	5N1ECLSG42	NPT NIP 1.25XCLS TBE GALSTLS40	
all	17	5SU1ENF	NPT UNION 1.25" GALMAL 150#	
all	18	5SL1ESFA	NPT ELB 90DEG 1.25 304SS 150#	
all	19	5N1E07AG42	NPT NIP 1.25X7 TBE GALSTL SK40	
all	20	5SCC1ENF	NPT COUP 1.25 GALMAL 150#	
all	21	W3 64566B	*WLM=STM SPARGER .75 ORF-12"L	
all	22	02 14647E	GASKET=DRNTRGH TO RECIRC BOX	
all	23	W5 20042	* STEAM+WATER IN=7244 TILTS	
all	24	03 06287	COVER=STEAM PIPING 72SG	
all	25	03 06381	COVER=BOOT+STEAM PIPE=72"SG	
all	26	03 06288	PLATE=STEAM PIPE COVER 72SG	
all	27	60E306A11K	HOSE= *3.5"ID PE X11.5"	
all	28	27A084	HOSECLAMP 3+9/16-4.5CADSC#HS64	

Steam Components

3 Sheets

72044SR2

Table 52 Parts List—Steam Components (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
all	29	60E306A29A	HOSE= *3.5"ID PE X29"	
all	30	60E306A24A	HOSE *3.5"ID GATES PE X24"	

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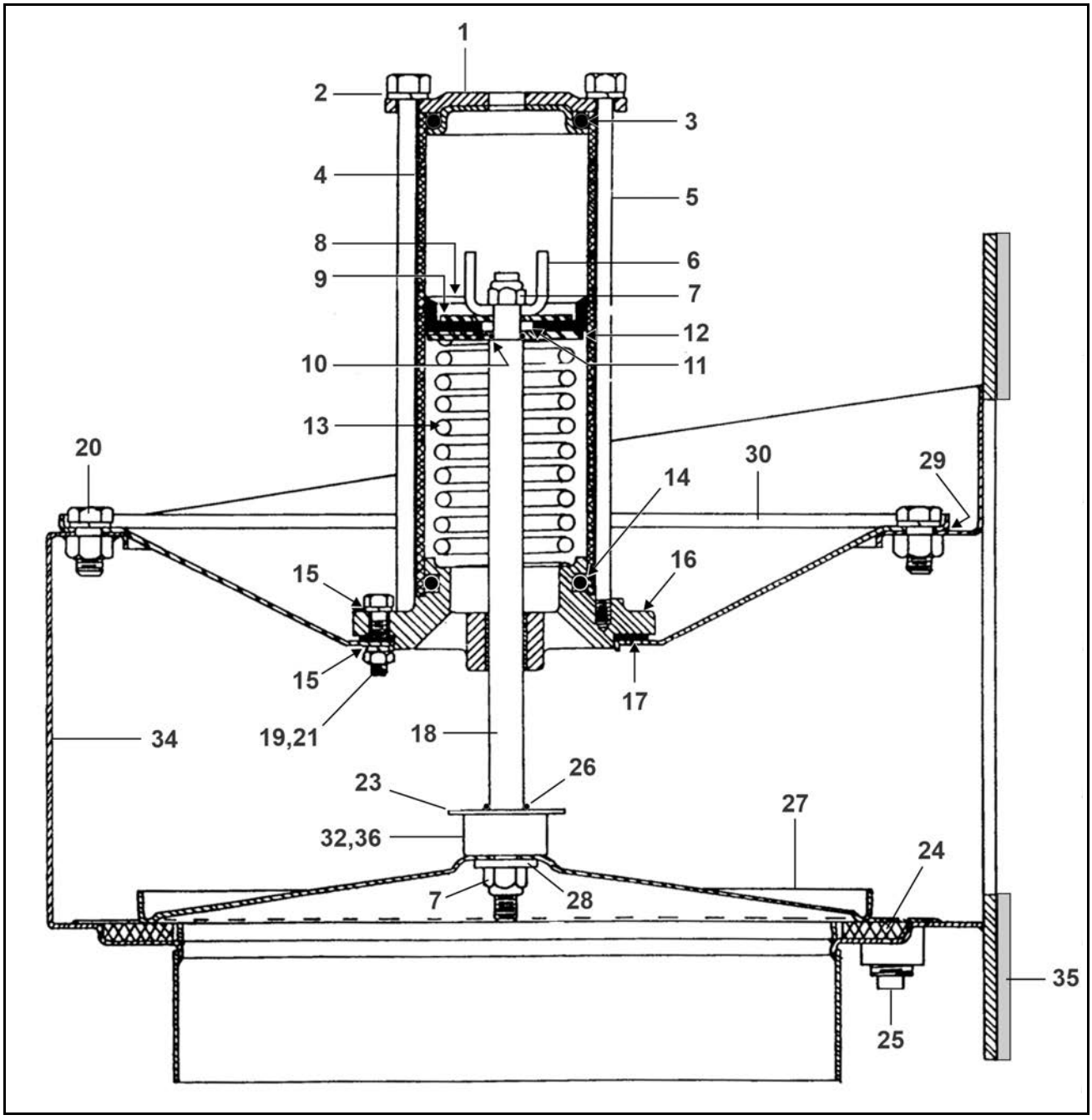
Stainless Dump Valve

3 Sheets

42044WR2/WR3/SR2/SR3; 60044WR2/WR3/SR2/SR3; 72044WR2/WR3/SR2/SR3



8”X10” Stainless Dump Valve

3 Sheets

42044WR2/WR3/SR2/SR3; 60044WR2/WR3/SR2/SR3; 72044WR2/WR3/SR2/SR3

Table 53. Parts List—8”X10” Stainless Dump Valve

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
			Reference Assemblies	
	A	SA 28 124	*8"SGL.DUMPVALVE 4244+52+60	42044WR2/WR3 42044SR2/SR3; 60044WR2/WR3; 60044SR2/SR3
	B	SA 36 015	10"SGL.DUMP VALVE 72WE+SG+WT	72044WR2/WR3; 72044SR2/SR3
	C	SA 28 158	* BONNET+AIRCYL=8"SS DUMPVALV	8" DUMP VALVE
	D	SA 36 044	* BONNET+AIRCYL=10"SS DUMPVAL	10" DUMP VALVE
			Components	
CD	1	02 02101	CYLHEAD W/TAPPED HOLE	
CD	2	15U210	LOKWASHER MEDIUM 5/16 ZINCPL	
CD	3	60C132	ORING 2"IDX3/16CS BUNA70 #329	
CD	4	02 02068	AIRCYL-STAINLESS=DUMP VALVE	
CD	5	02 10585D	TIE BOLT=5/16-18X7.875 PLTD	
CD	6	03 01313	STOP=AIR CYL W/2+11/16STROKE	
CD	7	15G220	LTHX THIN LOKNUT 3/8-24 SSNTE	
CD	8	02 02194	PISTON CUP=DUMPVALVE 2+3/8"	
CD	9	02 02085	UP WASHER=2"OD=PISTON CUP	
CD	10	60C106	ORING 5/16ID 1/16CSBUNA70#011	
CD	11	02 02185	WASHER=PISTON CUP COMP LIMIT	
all	12	02 02105B	2.38"ACYL BRASS PISTONCUP WSHR	
CD	13	03 06429	SPRING=2.11ODX6.5FL 64#/"	
CD	14	60C132	ORING 2”IDX/316CS BUNA70 #329	
CD	15	24G020N	ROLLED WASH.252ID NYLTITE 25W	
CD	16	X2 02743	BONNET=2"DUMP VALVE	
CD	17	02 18931F	GASKET=DUMPVALVE-1/60+72WEHU	
CD	18	02 16021I	DUMPVAL STEM-4"+8"316SS	
CD	19	15G168	SQNUT 1/4-20UNC2 SS18-8	
all	20	15K086	HXCAPSCR 3/8-16NCX3/4 SS18-8	
CD	21	15K041S	HEXCAPSCR 1/4-20UNC2AX1 SS18-8	
CD	23	02 16021E	WASHER 3/8IDX1.250D DUMPVAL	
A	24	02 18068	9 SEAT-RESILIENT=8"DUMPVALVE	
B	24	03 06084	SEAT-RESILIENT=10"DUMPVALVE	
A	25	5SP0KGFSS	NPT PLUG 1/2 SOSOLID GALSTL	
CD	26	60C106	ORING 5/16ID 1/6CS BUNA70#011	
AC	27	02 18796	DISC-8" DUMP VALVE S/S	

8”X10” Stainless Dump Valve

3 Sheets

42044WR2/WR3/SR2/SR3; 60044WR2/WR3/SR2/SR3; 72044WR2/WR3/SR2/SR3

Table 53 Parts List—8”X10” Stainless Dump Valve (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
BD	27	03 06083	DISC-10"DUMP VALVE S/S	
all	28	15U245	FLTWASH 3/8 STD COMM 18-8 SS	
A	29	02 18104	GASKET=8"DUMP VALVE BONNET	
B	29	03 06086G	GASKET=10" DUMP VALVE BONNET	
A	30	02 18931E	BONNET-8"DUMP VALVE	8" DUMP VALVE
B	30	03 06086F	BONNET=10"DUMP VALVE	10" DUMP VALVE
CD	32	02 16021C	BUMPER=DUMP VALVE BONNET	
CD	33	02 16021D	DUMP VALVE BUMPER RETAINER	
A	34	W2 18931	* BODY=8"DUMPVALV=4244,60,52	8" DUMP VALVE
B	34	W3 06086	*BODY=10"DUMP VALVE 72WE,SG,T	10" DUMP VALVE
A	35	02 18107	GASKET=8"FLANGED DUMP VALVE	8" DUMP VALVE
B	35	03 06085D	GASKET=10"FLANGEDUMP72D 8050	10" DUMP VALVE

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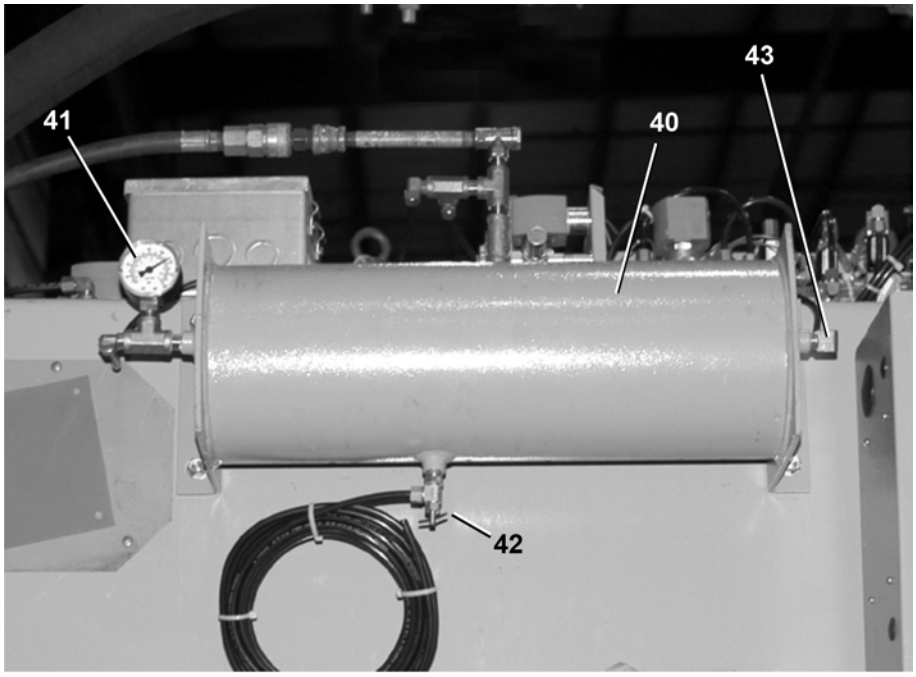
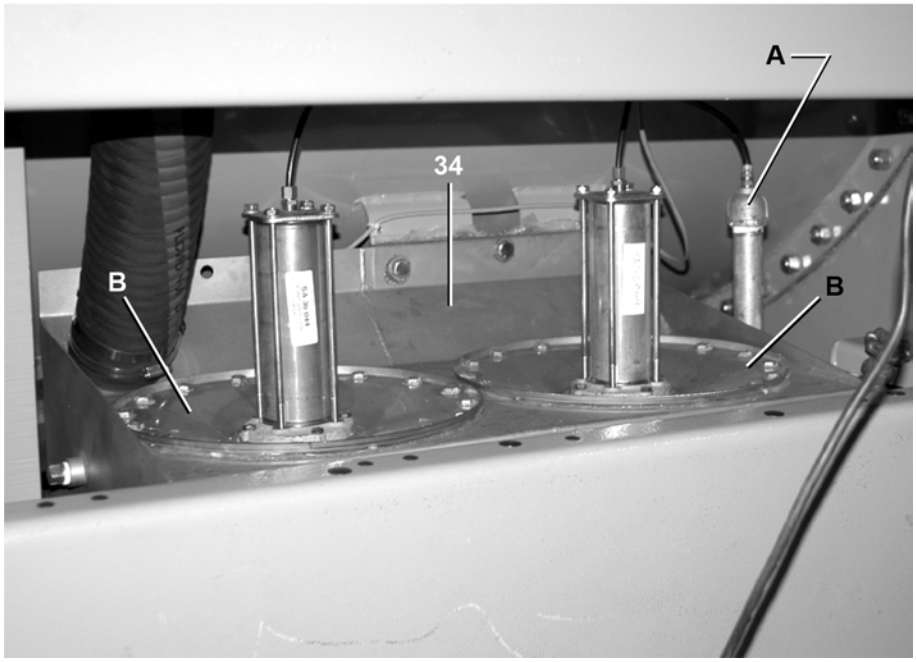
Drain Valve Body with Two Valves

3 Sheets

72044WR2, 72044SR2

Figure 71. Reserve Air Pressure Tank and Dual Drain Valve





Legend

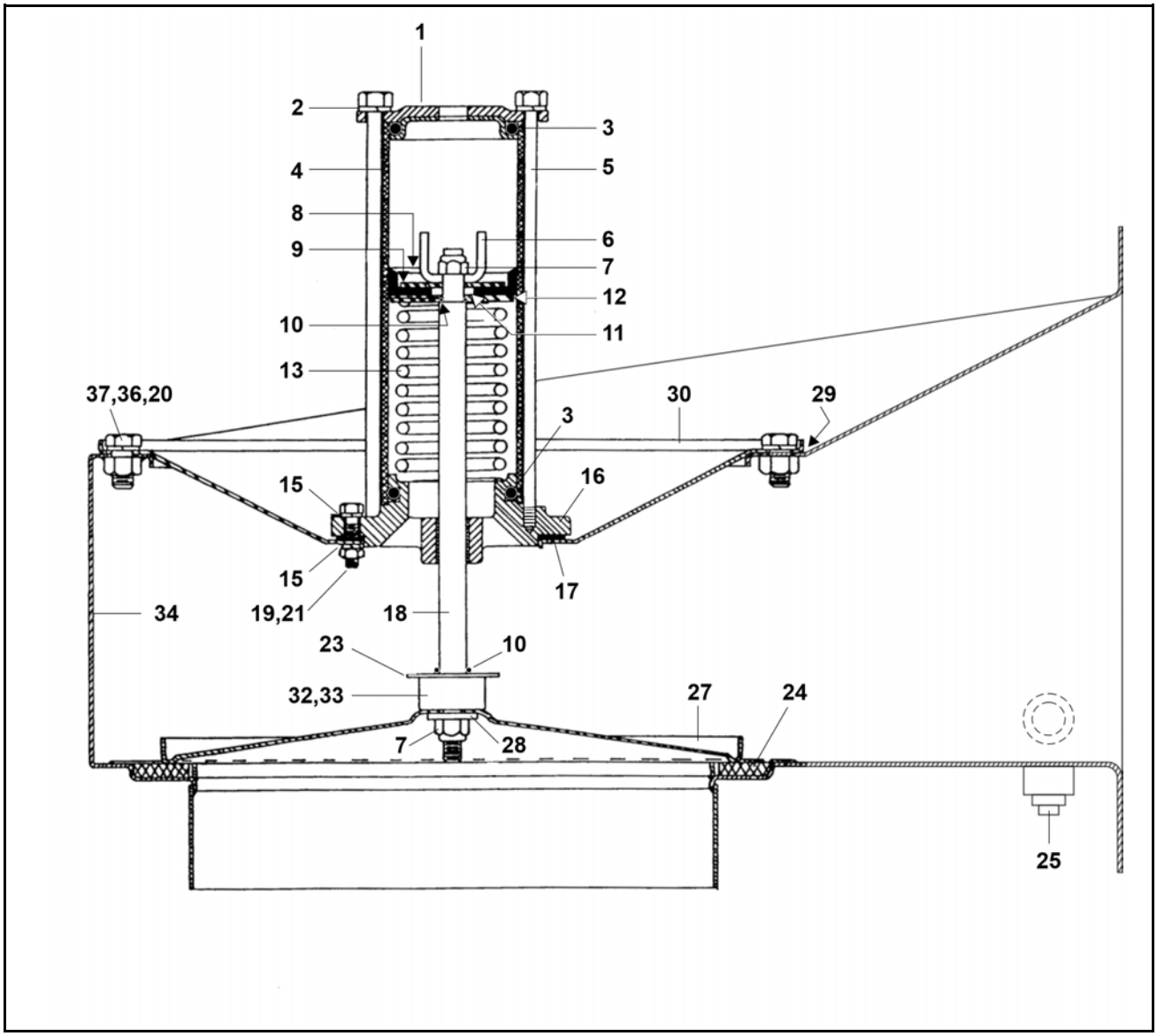
A . . . See BPWVUZ01

Drain Valve Body with Two Valves

3 Sheets

72044WR2, 72044SR2

Figure 72. Cross Section of one valve of the Dual Drain Valves



Drain Valve Body with Two Valves

3 Sheets

72044WR2, 72044SR2

Table 54. Parts List—Drain Valve Body with Two Valves

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
			Reference Assemblies	
	A	SA 36 015A	DUAL 10"DUMPVAL 7244WE2+WE3	
	B	SA 36 044	* BONNET+AIRCYL=10"SS DUMPVAL	
			Components	
all	1	02 02101	CYLHEAD W/TAPPED HOLE	
all	2	15U210	LOKWASHER MEDIUM 5/16 ZINCPL	
all	3	60C132	ORING 2"IDX3/16CS BUNA70 #329	
all	4	02 02068	AIRCYL-STAINLESS=DUMP VALVE	
all	5	02 10585D	TIE BOLT=5/16-18X7.875 PLTD	
all	6	03 01313	STOP=AIR CYL W/2+11/16STROKE	
all	7	15G220	NUTLOK THINHX 3/8-24 SS/NYL	
all	8	02 02194	PISTON CUP=DUMPVALVE 2+3/8"	
all	9	02 02085	UP WASHER=2"OD=PISTON CUP	
all	10	60C106	ORING 5/16ID 1/16CSBUNA70#011	
all	11	02 02185	WASHER=PISTON CUP COMP LIMIT	
all	12	02 02105B	2.38"ACYL BRASS PISTONCUP WSHR	
all	13	03 06429	SPRING=2.11ODX6.5FL 64#/"	
all	15	24G020N	ROLLED WASH.252ID NYLTITE 25W	
all	16	X2 02743	BONNET=2"DUMP VALVE	
all	17	02 18931F	GASKET=DUMPVALVE-1/60+72WEHU	
all	18	02 16021I	DUMPVAL STEM-4"+8"316SS	
all	19	15G168	SQNUT 1/4-20UNC2 SS18-8	
all	20	15K086	HXCAPSCR 3/8-16NCX3/4 SS18-8	
all	21	15K041S	HEXCAPSCR 1/4-20UNC2AX1 SS18-8	
all	23	02 16021E	WASHER 3/8IDX1.250D DUMPVAL	
all	24	03 06084	SEAT-RESILIENT=10"DUMPVALVE	
all	25	5SP0KGFSS	NPT PLUG 1/2 SQSOLID GALSTL	
all	27	02 18796	DISC-8" DUMP VALVE S/S	
all	28	20C018C	NEOPRENE HIGH PERFORMANCE CONTACT ADHESIVE	
all	29	03 06086G	GASKET=10" DUMP VALVE BONNET	
all	30	03 06086F	BONNET=10"DUMP VALVE	
all	32	02 16021C	BUMPER=DUMP VALVE BONNET	
all	33	02 16021D	DUMP VALVE BUMPER RETAINER	

Drain Valve Body with Two Valves

3 Sheets

72044WR2, 72044SR2

Table 54 Parts List—Drain Valve Body with Two Valves (cont'd.)

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
all	34	W3 06086A	*BODY=10"DUAL DUMP 72WE ONLY	
all	36	24G030N	ROLLED WASH.379ID NYLTITE 37W	
all	37	15U200	FLATWASHER(USS STD) 5/16"ZNC P	
all	40	W3 25307D	*TANK=AIR PRESSURE RESERVE	
all	41	30N102	PRESSGAUGE 1/4BOTCON.0-150PSI	
all	42	96H018	ANGLE NEEDLE VLV 1/4"T X 1/8MPE	
all	43	96D047AAK	CHECK VALVE 1/4"DELT#CMMQ20B	

9 Pneumatic

9.1 Servicing Air Cylinders

This is the general procedure for rebuilding an air cylinder using a Milnor® furnished repair kit, once the air cylinder has been removed from the machine. See the specific air cylinder and major assembly parts drawing(s) for component identification and removal/replacement information.

Maintenance procedures require:

- Two threaded rods and nuts, twice the length of the tie bolts.
- The appropriate repair kit.

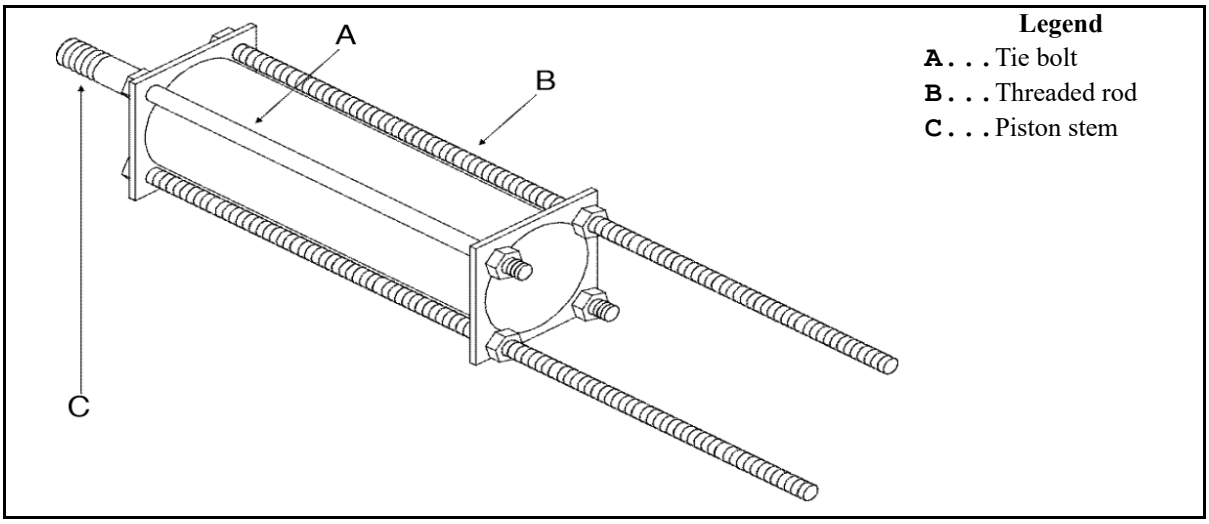
CAUTION: **EXPLOSION HAZARD —** Spring tension can cause air cylinder to burst apart with great force during dissassembly. You can be struck by air cylinder parts.

- ▶ Follow maintenance instructions carefully.
- ▶ Wear eye protection.

NOTE: Use a new locknut when re-assembling air cylinder (see the appropriate parts drawing).

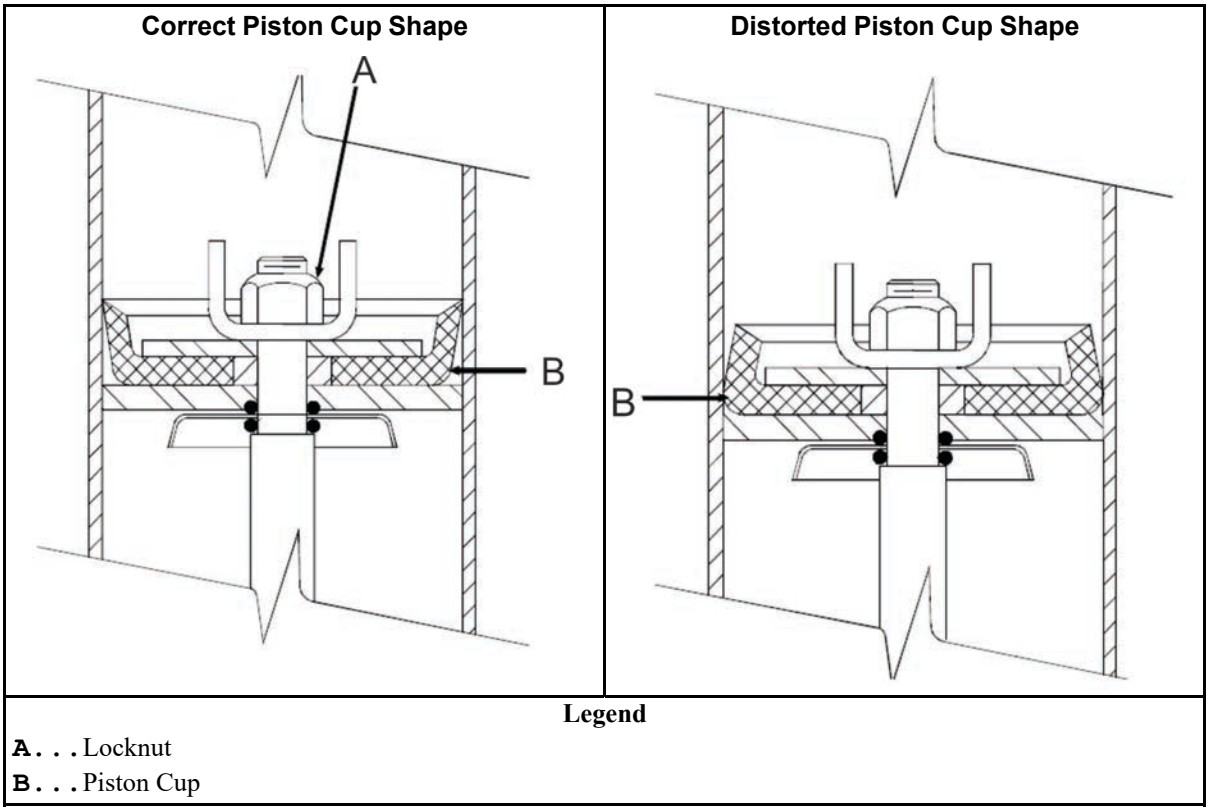
1. Replace two diagonally opposite tie bolts with threaded rods and nuts as shown in Figure 73: Using Threaded Rods, page 182 .
2. Tighten nuts on the threaded rods until they contact the air cylinder.
3. Remove the other two tie bolts and the nuts, washers, clips, and actuators from the external end of piston stem.

Figure 73. Using Threaded Rods



4. Loosen nuts on threaded rods evenly, permitting cylinder heads to separate. Use only a few turns on one nut before moving to the other one. Continue until springs have no tension.

Figure 74. Ensuring Correct Piston Cup Shape



5. Note the position and orientation of the piston cup(s), washers, and springs. Replace the worn parts, then reassemble them in reverse order. Tighten the locknut until it is just barely possible to turn the piston cup and washer assembly on the stem. The correct piston cup shape is shown on the left side of the above figure. **Do not** overtighten the locknut, as this causes the

piston cup to deform to the shape shown on the right side of the figure and may cause the piston to bind in the cylinder.

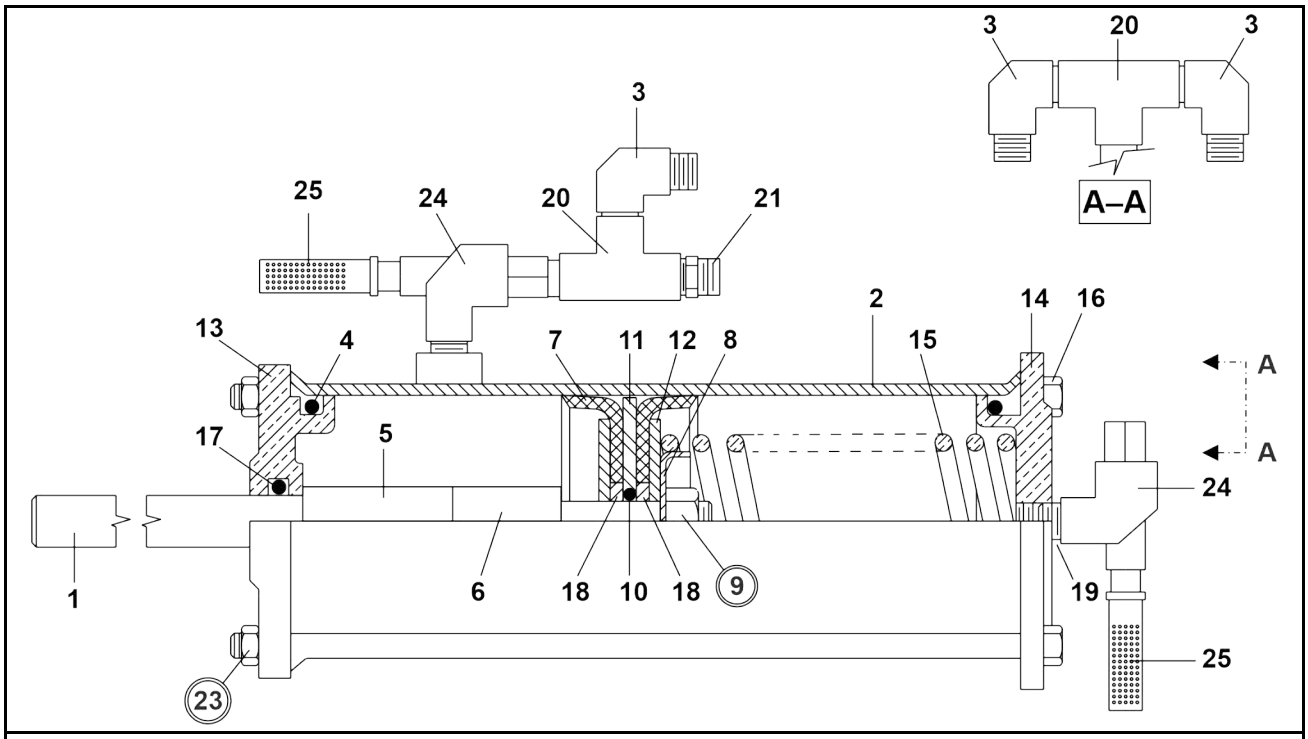
BPWVUP01 / 2020083 BPWVUP01.1 0000276675 D.2 A.4 2/18/20, 9:31 AM Released

Brake Air Cylinder

2 Sheets

CAUTION: **Circled items are under high spring tension —** Air cylinder can burst apart with great force.

- Follow maintenance instructions BNWUUM02 carefully.



Legend

A–A . . Detail view A–A

General Service & Safety-Related Components

2 Sheets

Table 55. Parts List—Brake Air Cylinder

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Reference Assemblies				
	A	AAC65002	AIRCYL BRAKE SINGLE MOTOR	
Components				
all	1	02 18650B	STEM=2WAY AIRCYL BRAKE 7.88L	
all	2	W2 18646	*CYLINDER-AIR=DOUBLEACT BRAKE	
all	3	53A031XB	BODY-EL90MALE.25X25 #269C-4-4B	
all	4	60C132	ORING 2"IDX3/16CS BUNA70 #329	
all	5	27B250	SPCRROLL.5ID1.5L.062T STLZNC	
all	6	27B34010SS	SPACERROLL .51ID.625L.062T SS	
all	7	02 02194	PISTON CUP=DUMPVALVE 2+3/8"	
all	8	02 18651	WASHER=2 WAY BRAKE CYL	
all	9	15G220	NUTLOK THINHX 3/8-24 SS/NYL	
all	10	60C106	ORING 5/16ID 1/16CSBUNA70#011	
all	11	02 02105B	2.38"ACYL BRASS PISTONCUP WSHR	
all	12	02 02085	UP WASHER=2"OD=PISTON CUP	
all	13	06 20702E	FLOW NOT ACTUATOR CYL HEAD	
all	14	02 02101	CYLHEAD W/TAPPED HOLE	
all	15	02 17024	SPRING-SS=DUMP 1.5OD4FL40#/"	
all	16	W6 20702F	*FLOW NOT VLV=AIR-CYL ROD WLD	
all	17	60C110	ORING 1/2IDX3/32CS BUNA70 #112	
all	18	02 02185	WASHER=PISTON CUP COMP LIMIT	
all	19	5N0ECLSBE2	NPT NIP 1/4XCLS TBE BRASS 125#	
all	20	51V015	TEE 1/4 FGDBRASS 101T7-444	
all	21	53A008B	BODYMALECON.25X.25COMP#B68A-4B	
all	22	5SCC0EBE	NPT COUP 1/4 BRASS 125# W/HEX	
all	23	15G185	HXNUT 5/16-18UNC2B SAE ZINC GR	
all	24	96M055	DELTROL QUICK EXHAUST VLV.1/4"	
all	25	27A005	MUFFLER 3/8" BANTAM B38	