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Installation, Parts, and Service

MiRAIL[®] Hard Ring



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1 General Service Information

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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, NEGLIGENCE, 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 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 1. The Bolts in Milnor® Equipment

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

1.2.1 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).

1.2.1.1 Fasteners Made of Carbon Steel

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1.2.1.1.1 Without a Threadlocker

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Table 1. Torque Values for Standard Fasteners with Maximum 5/16-inch Diameters and No Lubricant

Dimension	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
	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 2. Torque Values for Standard 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	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

Table 2 Torque Values for Standard Fasteners Larger Than 5/16-inch Diameters and No Lubricant (cont'd.)

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

Dimension	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
	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 4. 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

Table 4 Torque Values for Plated Fasteners Larger Than 5/16-inch Diameters and No Lubricant (cont'd.)

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
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	–	–

1.2.1.1.2 With a Threadlocker

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Table 5. 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 6. Torque Values if You Apply LocTite 222

Dimension	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
	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 7. Torque Values if You Apply LocTite 242

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
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 8. Torque Values if You Apply LocTite 262

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
3/4 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 9. Torque Values if You Apply LocTite 272 (High-Temperature)

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
1 x 8	350	475	901	1222	1272	1725	1114	1510
1 x 12	383	519	986	1337	1392	1887	–	–
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	–	–

Table 9 Torque Values if You Apply LocTite 272 (High-Temperature) (cont'd.)

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
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 10. Torque Values if You Apply LocTite 277

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
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	–	–

1.2.1.2 Stainless Steel Fasteners

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Table 11. Torque Values for Stainless Steel Fasteners 5/16-inch and Smaller

Dimension	316 Stainless		18-8 Stainless		18-8 Stainless with Loctite 767	
	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 12. 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

Table 12 Torque Values for Stainless Steel Fasteners Larger Than 5/16-inch (cont'd.)

Dimension	316 Stainless		18-8 Stainless		18-8 Stainless with Loctite 767	
	Pound-Feet	N-m	Pound-Feet	N-m	Pound-Feet	N-m
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

1.2.2 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.

1.2.3 How to Apply a Threadlocker

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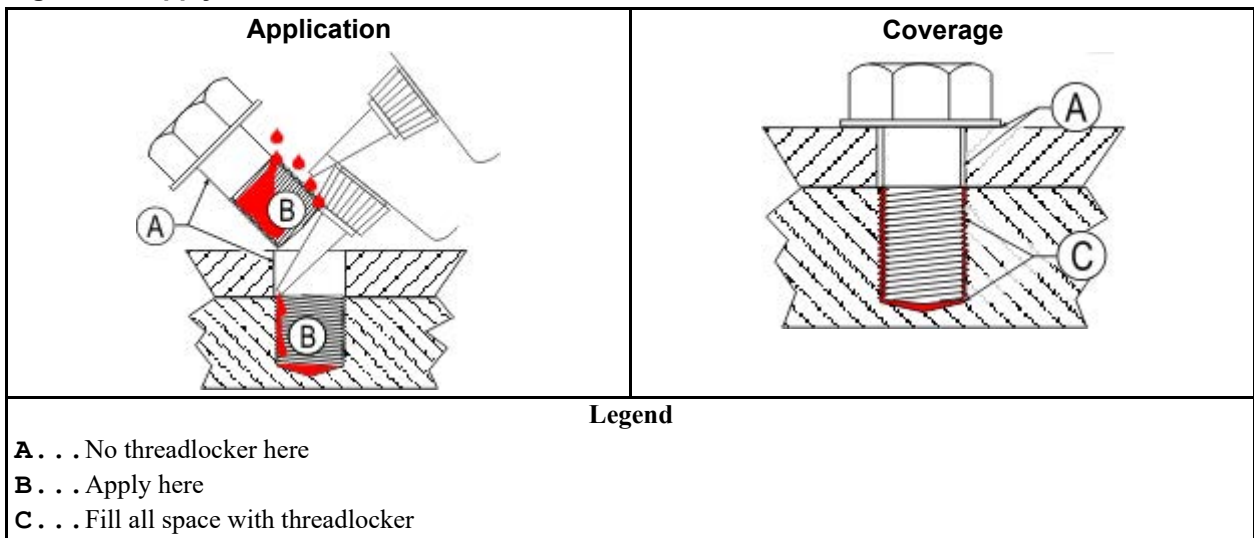


CAUTION: Malfunction Hazard — Heat, vibration, or mechanical shocks can let the fasteners loosen if you do not apply the threadlocker correctly. Loose fasteners can cause malfunctions of the equipment.

- ▶ 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 2. Apply Threadlocker in a Blind Hole



1.2.3.1 Blind Holes

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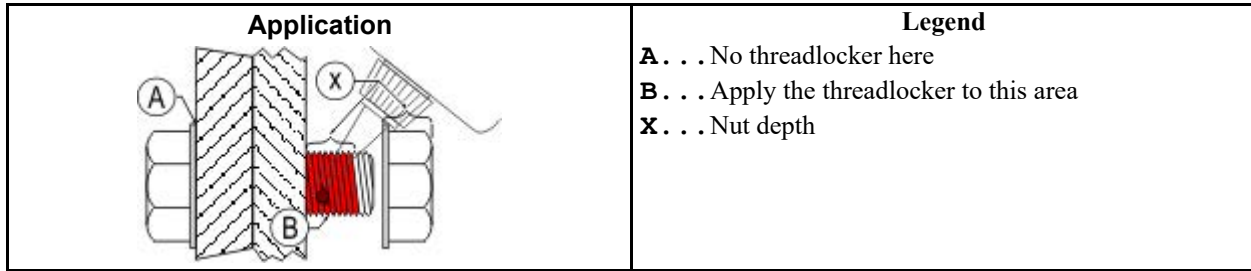
1. Apply the threadlocker down the threads to the bottom of the hole.
2. Apply the threadlocker to the bolt.
3. Tighten the bolt to the value shown in the correct table ([Table 5: Threadlocker by the Diameter of the Bolt \(see below Note\), page 9](#) to [Table 11: Torque Values for Stainless Steel Fasteners 5/16-inch and Smaller, page 11](#)).

1.2.3.2 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 5: Threadlocker by the Diameter of the Bolt \(see below Note\), page 9](#) to [Table 11: Torque Values for Stainless Steel Fasteners 5/16-inch and Smaller, page 11](#)).

Figure 3. Apply Threadlocker in a Through Hole



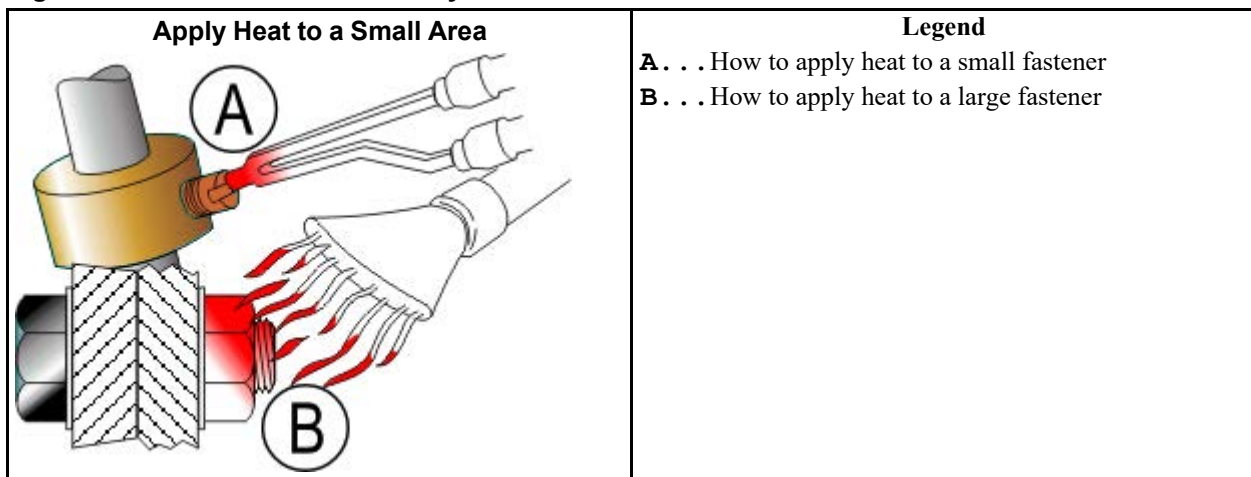
1.2.3.3 Disassembly

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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.

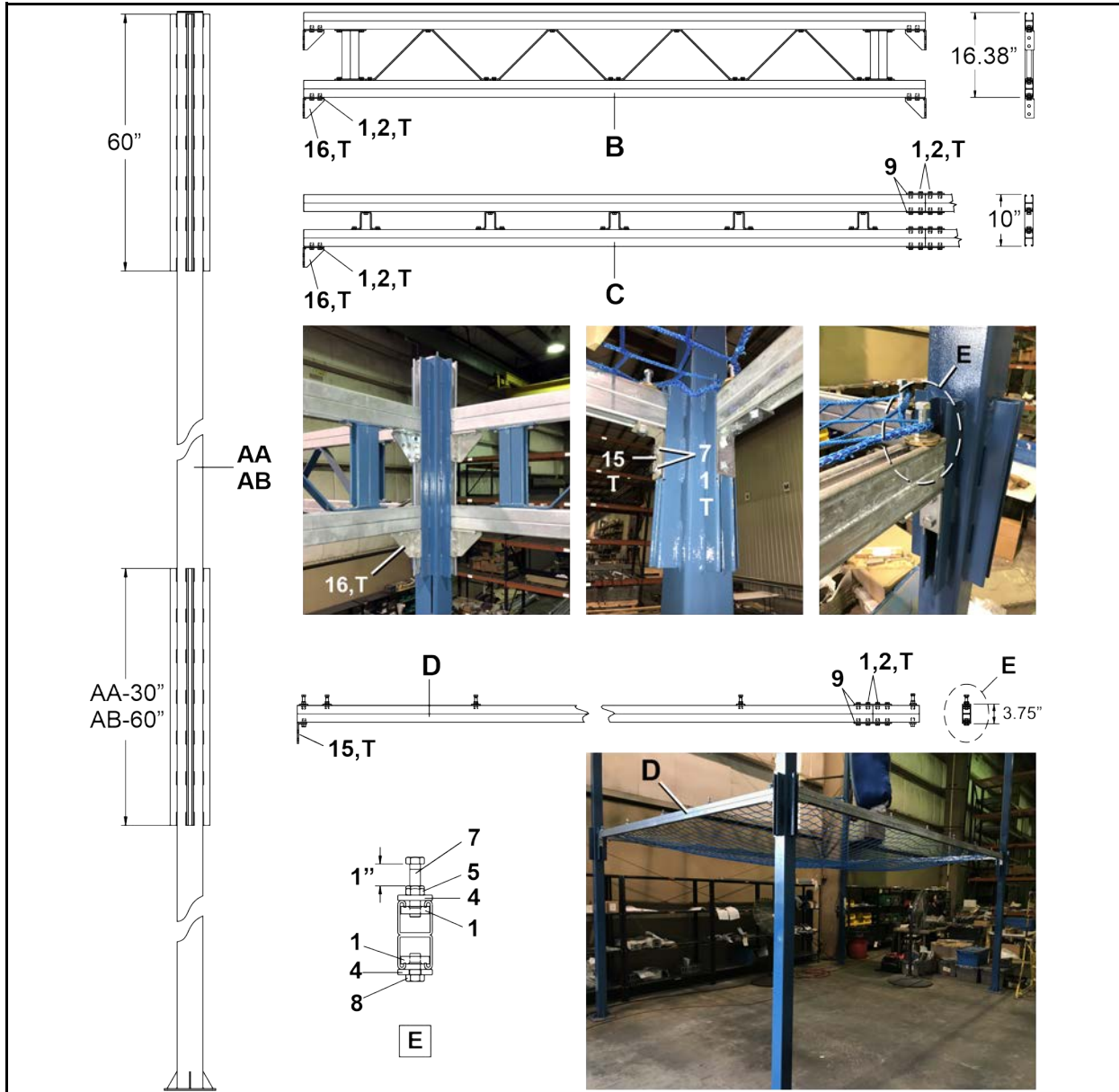
Figure 4. Use heat for disassembly of fasteners with threadlocker.



2 Rail & Netting Installation

Stanchion and Beam Connections

Figure 5. Lattice Beams, Short Beams, and Net Support Beam Connections



Legend

- AA . . Stanchion made of 4" square tubing
- AB . . Stanchion made of 6" square tubing
- B . . . Lattice Beam
- C . . . Short Beam
- D . . . Net Support Beam
- E . . . Net Support Beam Hardware, typical
- T . . . Typical

Stanchion and Beam Connections

Figure 6. Stanchions to Floor

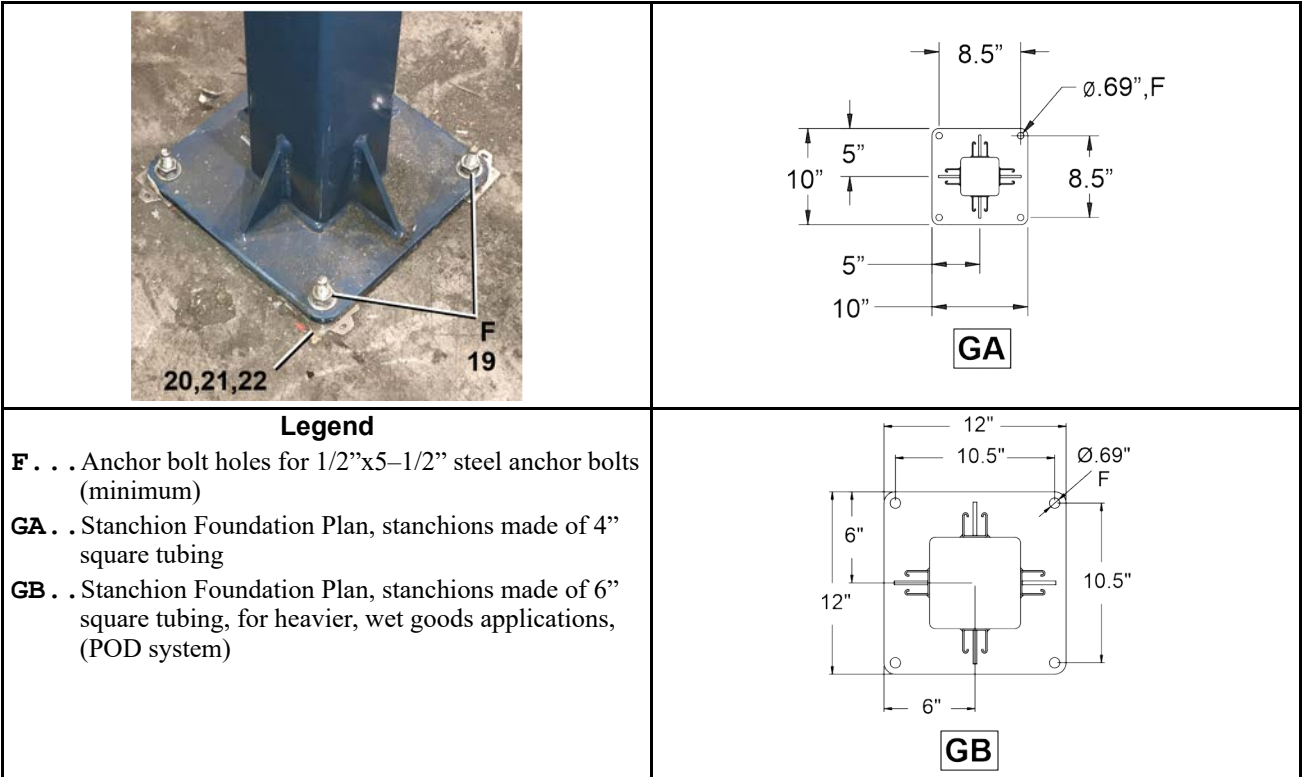
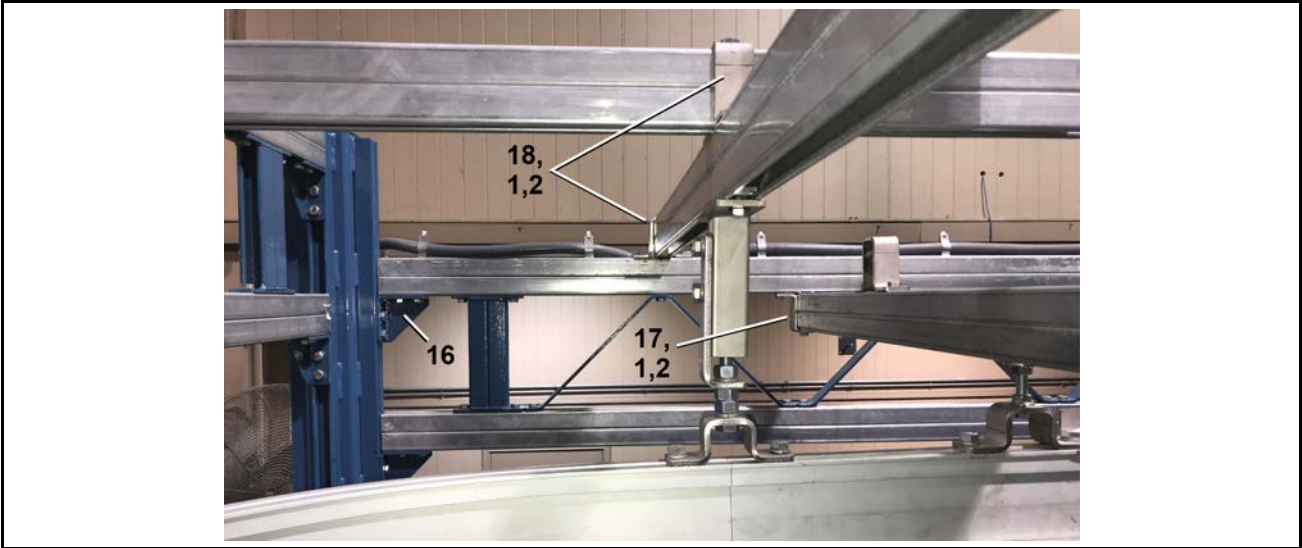


Figure 7. Unistrut Beam Brackets and Hardware



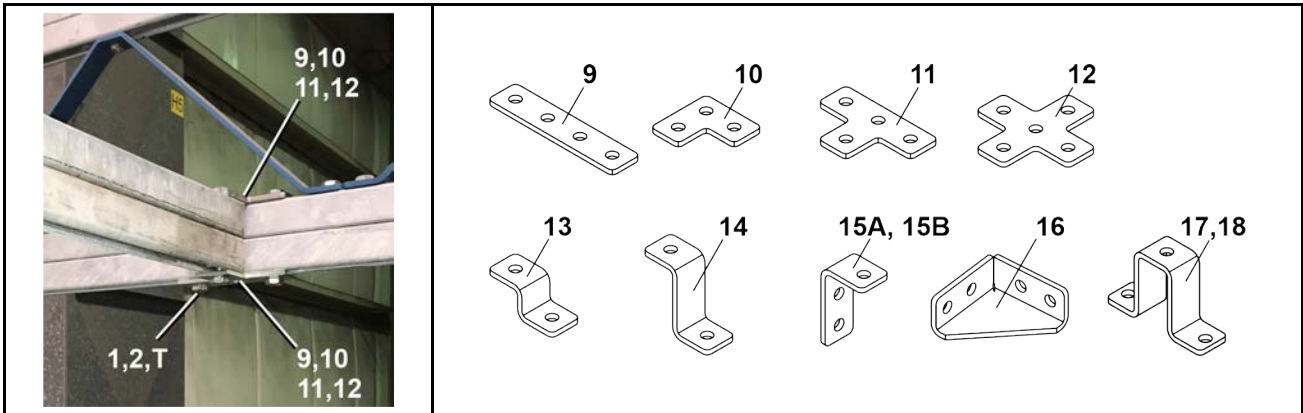
Stanchion and Beam Connections

5 Sheet

Figure 8. Example of Unistrut Cross Bracing



Figure 9. Additional Unistrut Beam Connectors



Stanchion and Beam Connections

Figure 10. Upper Elevator Connected to Unistrut

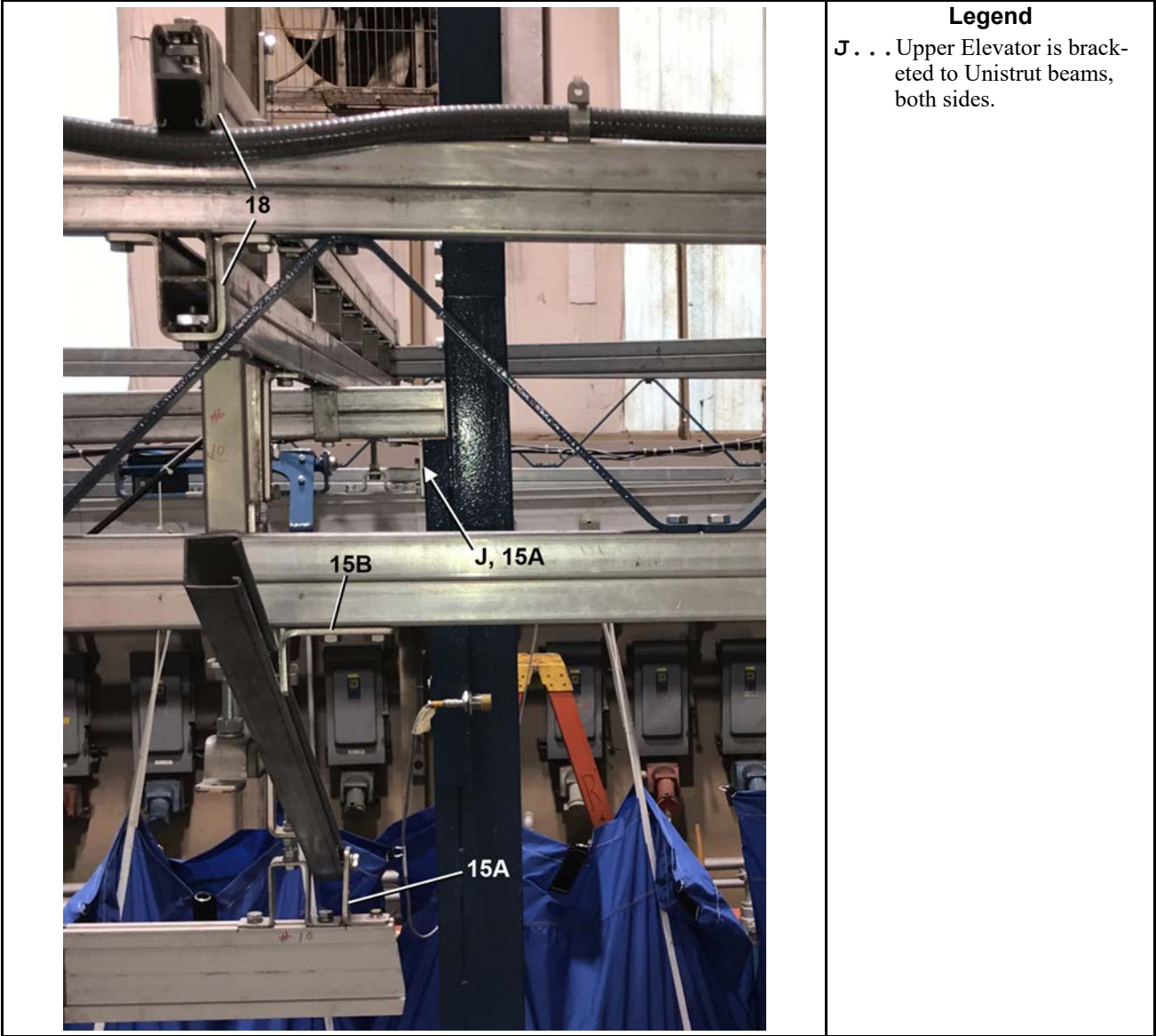


Table 13. Parts List—Stanchion and Bean Connections

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	GUJ37001A	UNISTRUT STRAIGHT JOINT W/HARDWARE	Reference
	B	GUJ37001B	UNISTRUT L-JOINT W/HARDWARE	

Stanchion and Beam Connections

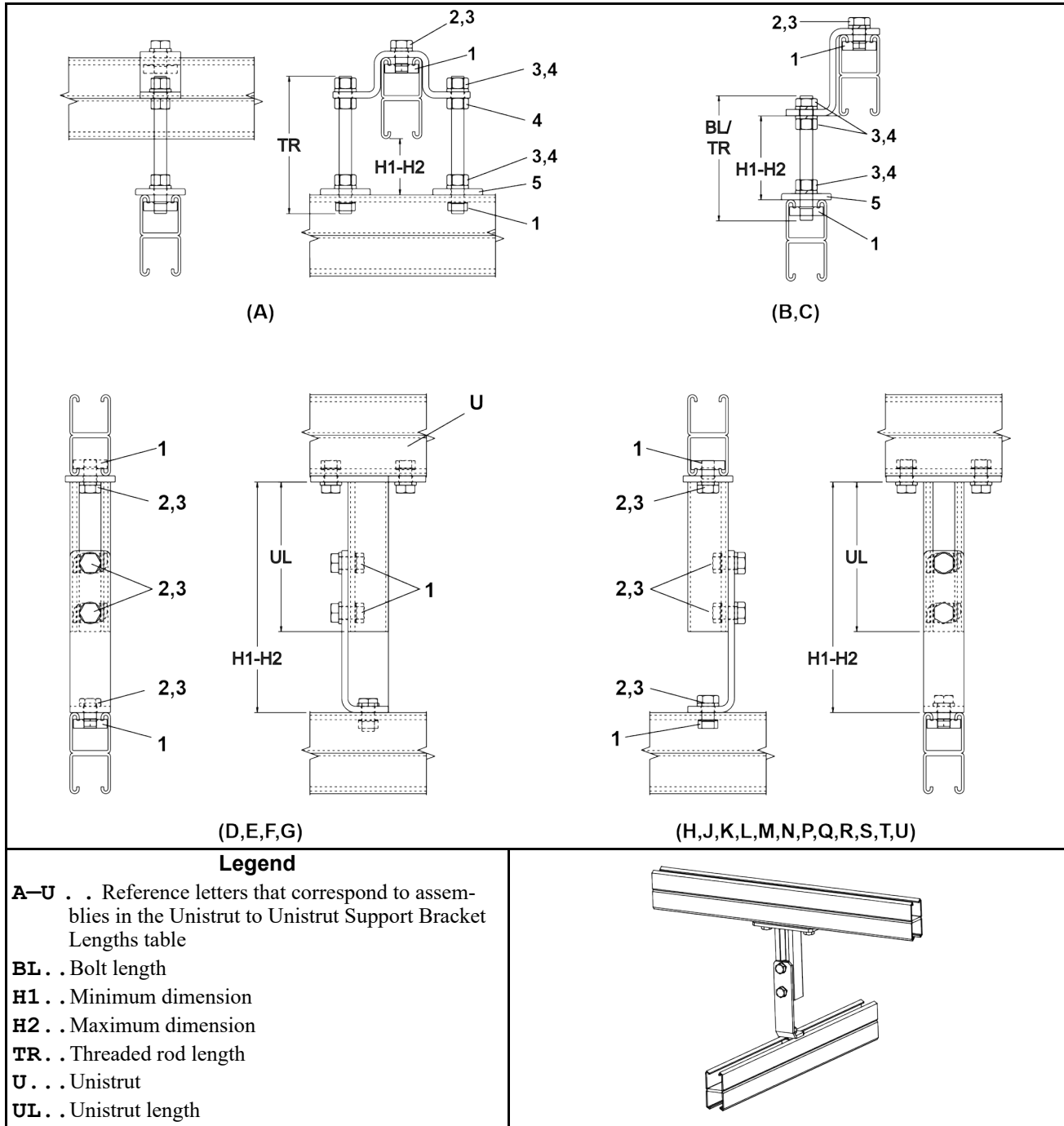
Table 13 Parts List—Stanchion and Bean Connections (cont'd.)

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	GUJ37001C	UNISTRUT T-JOINT W/HARDWARE	
	D	GUJ37001D	UNISTRUT CROSS-JOINT W/HARDWARE	
	E	GUJ37003	UNISTRUT GUSSET W/HARDWARE	
	F	GUJ37004	UNISTRUT DOUBLE CHANNEL TOP HAT W/HARDWARE	
	G	GUJ37004A	UNISTRUT TOP HAT W/HARDWARE	
	H	GUJ37005	UNISTRUT L BRACKET W/HARDWARE	
	J	GUJ37005A	UNISTRUT SHORT L BRACKET W/HARDWARE	
	K	GUJ37006	UNISTRUT LONG Z-BRACKET W/HARDWARE	
	L	GUJ37006A	UNISTRUT SHORT Z-BRACKET W/HARDWARE	
Components				
all	1	27A0625NUV	CLAMPNUT 1/2-13	
all	2	15K151B	HXCAPSCR 1/2-13UNC2X1.25 GR5 ZINC PRECOTE 30 THRD7-11	
all	4	15U286	FLATWASHER 2"0DX17/32"IDX1/4"	
all	5	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	6	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	7	15K190A	HEXTAPSCR 1/2-13X2.5 ZINC GR5F	
all	8	15K149	HXCAPSCR 1/2-13UNC2X1+1/8 GR5 ZINC	
A	9	27A06001	UNISTRUT FLAT PLATE STRAIGHT	
B	10	27A06002	UNISTRUT FLAT PLATE L	
C	11	27A06003	UNISTRUT FLAT PLATE T	
D	12	27A06004	UNISTRUT FLAT PLATE CROSS	
L	13	27A06005	UNISTRUT Z BRACKET	
K	14	27A06005A	UNISTRUT Z BRACKET LONG	
H	15	27A06006	UNISTRUT L BRACKET	
J	15	27A06006A	UNISTRUT SHORT L BRACKET	
E	16	27A06010	UNISTRUT GUSSET 4X4X90DEG WLD	
all	17	04 30575A	RAIL SUPPORT TOP HAT	
all	18	04 30575C	DOUBLE CHANNEL TOP HAT	
all	19	15B193	WEDGE ANCHOR BOLT 1/2X5-1/2 STEEL	
all	20	04 30598	SHIM 24GA 2" X 2" SS 5/8" SLOT	
all	21	04 30598A	SHIM 18GA. 2" X 2" SS 5/8" SLOT	
all	22	04 30598B	SHIM 11GA. 2" X 2" SS 5/8" SLOT	

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Unistrut Support Brackets

Figure 11. Bracket Assemblies by Height and Direction



Unistrut Support Brackets

2 Sheet

Figure 12. Unistrut to Unistrut Support Bracket Lengths

Reference	Assembly	BL/TR/UL *	H1 (Minimum)	H2 (Maximum)	IL/P **
A	AUS37001	5.5" TR	0.0"	2.25"	IL/P
B	ARS37001	3.5" BL	0.0"	1.50"	IL/P
C	ARS37003	5" TR	1.13"	3.38"	IL/P
C	ARS37003	8" TR	3.39	7.18	IL/P
D	AUI37009	6" UL	7.19"	9.50"	IL
E	AUI37010	8" UL	9.19"	11.50"	IL
F	AUI37015	18" UL	19.19"	21.50"	IL
G	AUI37019	26" UL	27.19"	29.50"	IL
H	AUS37009	6" UL	6.81"	9.50"	P
J	AUS37010	8" UL	8.81"	11.50"	P
K	AUS37011	10" UL	10.81"	13.50"	P
L	AUS37012	12" UL	12.81"	15.50"	P
M	AUS37014	16" UL	16.81"	19.50"	P
N	AUS37016	20" UL	20.81"	23.50"	P
P	AUS37018	24" UL	24.81"	27.50"	P
Q	AUS37020	28" UL	28.81"	31.50"	P
R	AUS37022	32" UL	32.81"	35.50"	P
S	AUS37023	34" UL	34.81"	37.50"	P
T	AUS37024	36" UL	36.81"	39.50"	P
U	AUS37025	38" UL	38.81"	41.50"	P

* — BL (Bolt length)/TR(Threaded rod)/UL(Unistrut of bracket length)**—IL(Direction in-line)/P(Perpendicular)

Table 14. Parts List—Unistrut Support Brackets Hardware

Components				
all	1	27A0625NUV	CLAMPNUT 1/2-13	TYPICAL
all	2	15K147	HXCAPSCR 1/2-13UNC2X1 GR5 ZINC	TYPICAL
all	3	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	TYPICAL
all	4	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	TYPICAL
all	5	15U286	FLATWASHER 2"ODX17/32"IDX1/4"	TYPICAL

Rail Support Brackets

Figure 13. Rail Slope for Design and Installation

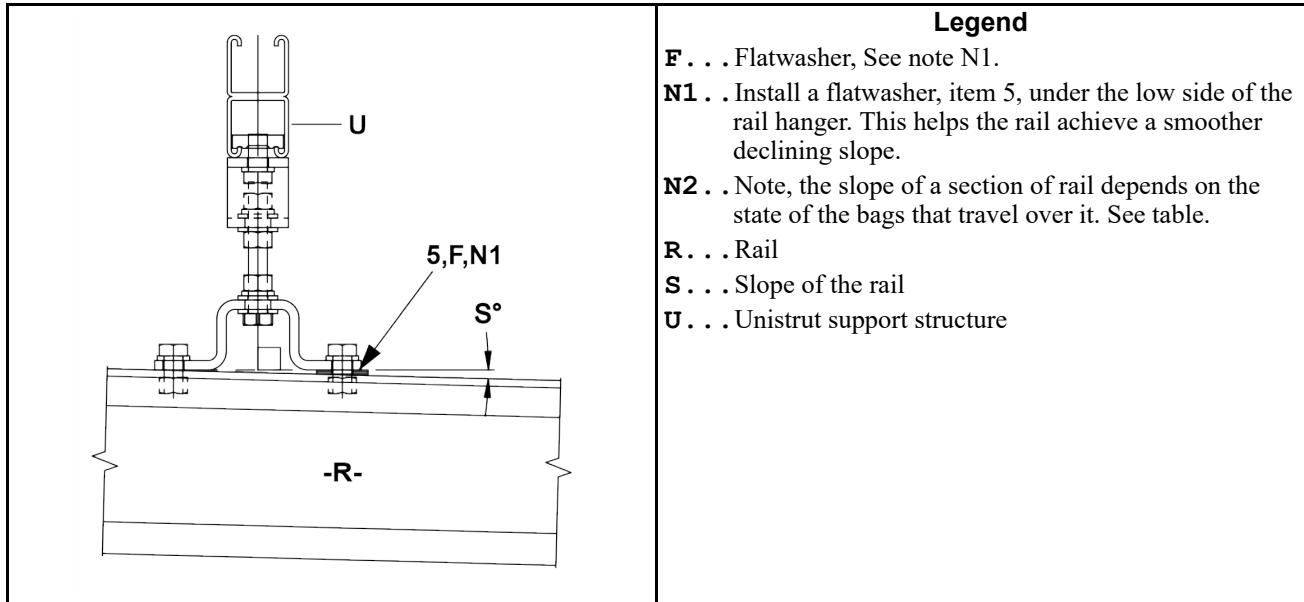
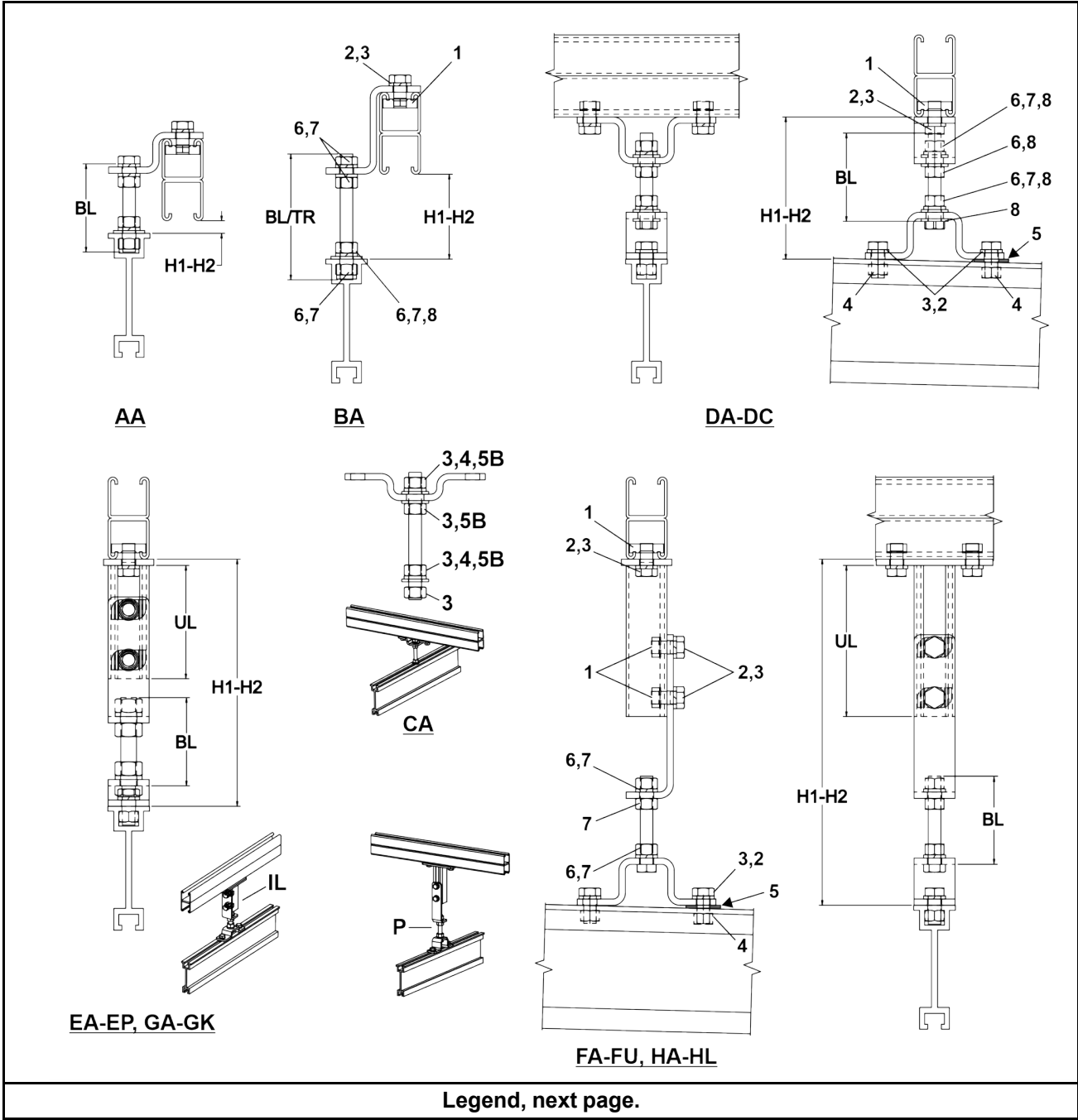


Figure 14. Slope of Rail Sections

Slope of Rail Sections				
Type and State of Bags Traveling Over Rail Sections	Angle in Degrees	Drop Dimension		
		Inches/1Ft.	Inches/4Ft.	Inches/10Ft.
Hard Ring Bags— Full	1.0	0.21	0.85	2.125
Sling Bags —Full	1.25	0.26	1.05	2.625
Bags— Empty	1.5	0.31	1.25	3.125

Rail Support Brackets

Figure 15. Bracket Assemblies by Height and Direction



Rail Support Brackets

Legend	
AA — . .	HL Reference letters that correspond to assemblies in the Unistrut to Rail Support Brackets table.
BL . .	Bolt length
TR . .	Threaded rod length
UL . .	Unistrut bracket weldment length
H1 . .	Minimum dimension
H2 . .	Maximum dimension
IL . .	In-line
P . . .	Perpendicular

Figure 16. Unistrut to Rail Support Brackets

Reference	Assembly	BL/TR *	UL **	H1(Minimum)	H2(Maximum)	IL/ P***
AA	ARS37001	5" TR	—	0	1.50"	P
BA	ARS37003	5" TR	—	1.13"	3.38"	P
CA	ARS37004	5" TR	—	2.88"	4.25"	P
DA	ARS37005	4.5" BL	—	3.75"	5.19"	P
DB	ARS37006	3.5" BL	—	5.18"	5.81"	P
DC	ARS37007	5.5" BL	—	5.57"	7.81"	P
EA	ARI37007	3" BL	4" UL	7.56"	8.31"	IL
FA	ARS37008	3.5" BL	4.5" UL	7.69"	9.81"	P
EB	ARI37008	3.5" BL	4.5" UL	8.06"	9.81"	IL
FB	ARS37008A	3.5" BL	4.5" UL	8.50"	10.63"	P
EC	ARI37008A	3.5" BL	4.5" UL	8.88"	10.63"	IL
FC	ARS37009	4" BL	6" UL	10"	14"	P
ED	ARI37009	4" BL	6" UL	10.38"	14"	IL
FD	ARS37009A	5.5" BL	6" UL	11.75"	14.75"	P
FE	ARS37009B	7.5" BL	6" UL	13.75"	16.75"	P
FF	ARS37010	4" BL	8" UL	12"	16"	P
EE	ARI37010	4" BL	8" UL	12"	16"	IL
FG	ARS37010A	5.5" BL	8" UL	17.75"	20.75"	P
FH	ARS37010B	7.5" BL	8" UL	19.75"	22.75"	P
FJ	ARS37011	4" BL	10" UL	14"	18"	P
EF	ARI37011	4" BL	10" UL	14"	18"	IL
FK	ARS37011A	5.5" BL	10" UL	23.75"	26.75"	P
FL	ARS37011B	7.5" BL	10" UL	25.75"	28.75"	P
FM	ARS37012	4" BL	12" UL	16"	20"	P
EG	ARI37012	4" BL	12" UL	16"	20"	IL

*- BL(Bolt length)/TR(Threaded rod), **-UL(Unistrut of bracket length), ***-IL(In-line) or P(Perpendicular)

Rail Support Brackets

5 Sheet

Figure 17. Unistrut to Rail Support Brackets, Continued

Reference	Assembly	BL/TR *	UL **	H1(Minimum)	H2(Maximum)	IL/ P***
FN	ARS370013	4" BL	14" UL	18"	22"	P
EH	ARI37013	4" BL	14" UL	18"	22"	IL
FP	ARS37014	4" BL	16" UL	20"	24"	P
EJ	ARI37014	4" BL	16" UL	20"	24"	IL
FQ	ARS37015	4" BL	18" UL	22"	26"	P
EK	ARI37015	4" BL	18" UL	22"	26"	IL
FR	ARS37016	4" BL	20" UL	24"	28"	P
EL	ARI37016	4" BL	20" UL	24"	28"	IL
FS	ARS37017	4" BL	22" UL	26"	30"	P
EM	ARI37017	4" BL	22" UL	26"	30"	IL
FT	ARS37018	4" BL	24" UL	28"	32"	P
EN	ARI37018	4" BL	24" UL	28"	32"	IL
FU	ARS37019	4" BL	26" UL	30"	34"	P
EP	ARI37019	4" BL	26" UL	30"	34"	IL
HA	ARS37020	4" BL	28" UL	32"	36"	P
GA	ARI37020	4" BL	28" UL	32"	36"	IL
HB	ARS37021	4" BL	30" UL	34"	38"	P
GB	ARI37021	4" BL	30" UL	34"	38"	IL
HC	ARS37022	4" BL	32" UL	36"	40"	P
GC	ARI37022	4" BL	32" UL	36"	40"	IL
HD	ARS37023	4" BL	34" UL	38"	42"	P
GD	ARI37023	4" BL	34" UL	38"	42"	IL
HE	ARS37024	4" BL	36" UL	40"	44"	P
GE	ARI37024	4" BL	36" UL	40"	44"	IL
HF	ARS37025	4" BL	38" UL	42"	46"	P
GF	ARI37025	4" BL	38" UL	42"	46"	IL
HG	ARS37026	4" BL	40" UL	44"	48"	P
GG	ARI37026	4" BL	40" UL	44"	48"	IL
HH	ARS37027	4" BL	42" UL	46"	50"	P
GH	ARI37027	4" BL	42" UL	46"	50"	IL
HJ	ARS37028	4" BL	44" UL	48"	52"	P
GJ	ARI37028	4" BL	44" UL	48"	52"	IL
HK	ARS37029	4" BL	46" UL	50"	54"	P
GK	ARI37029	4" BL	46" UL	50"	54"	IL
HL	ARS37030	4" BL	48" UL	52"	56"	P

*- BL(Bolt length)/TR(Threaded rod), **-UL(Unistrut of bracket length), ***-IL(In-line) or P(Perpendicular)

Rail Support Brackets

5 Sheet

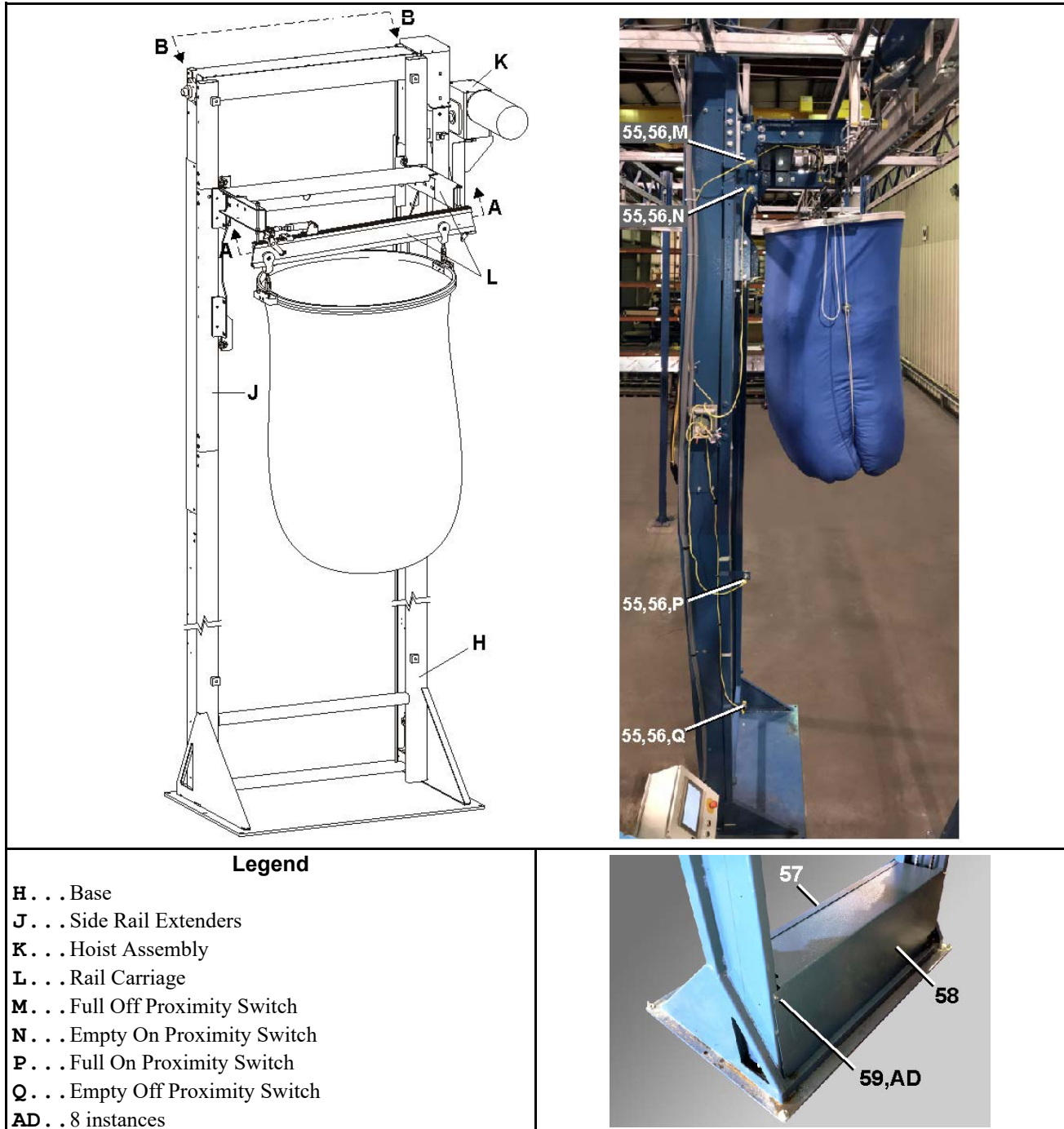
Table 15. Parts List—Rail Support Brackets

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	27A0625NUV	CLAMPNUT 1/2-13	
all	2	15K151	HXCAPSCR 1/2-13UNC2AX1.25 GR5	
all	3	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	4	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	5	15U280	FL+WASHER(USS STD)1/2 ZNC PL+D	
all	6	15G238	HXNUT 5/8-11UNC2B SAE ZINC GR2	
all	7	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	8	15U318S	FLATWASH 1.12ODX.656IDX.09T 30	

3 Bag Handling

Elevator

Figure 18. Elevator Components, Soft Sling & Hard Ring

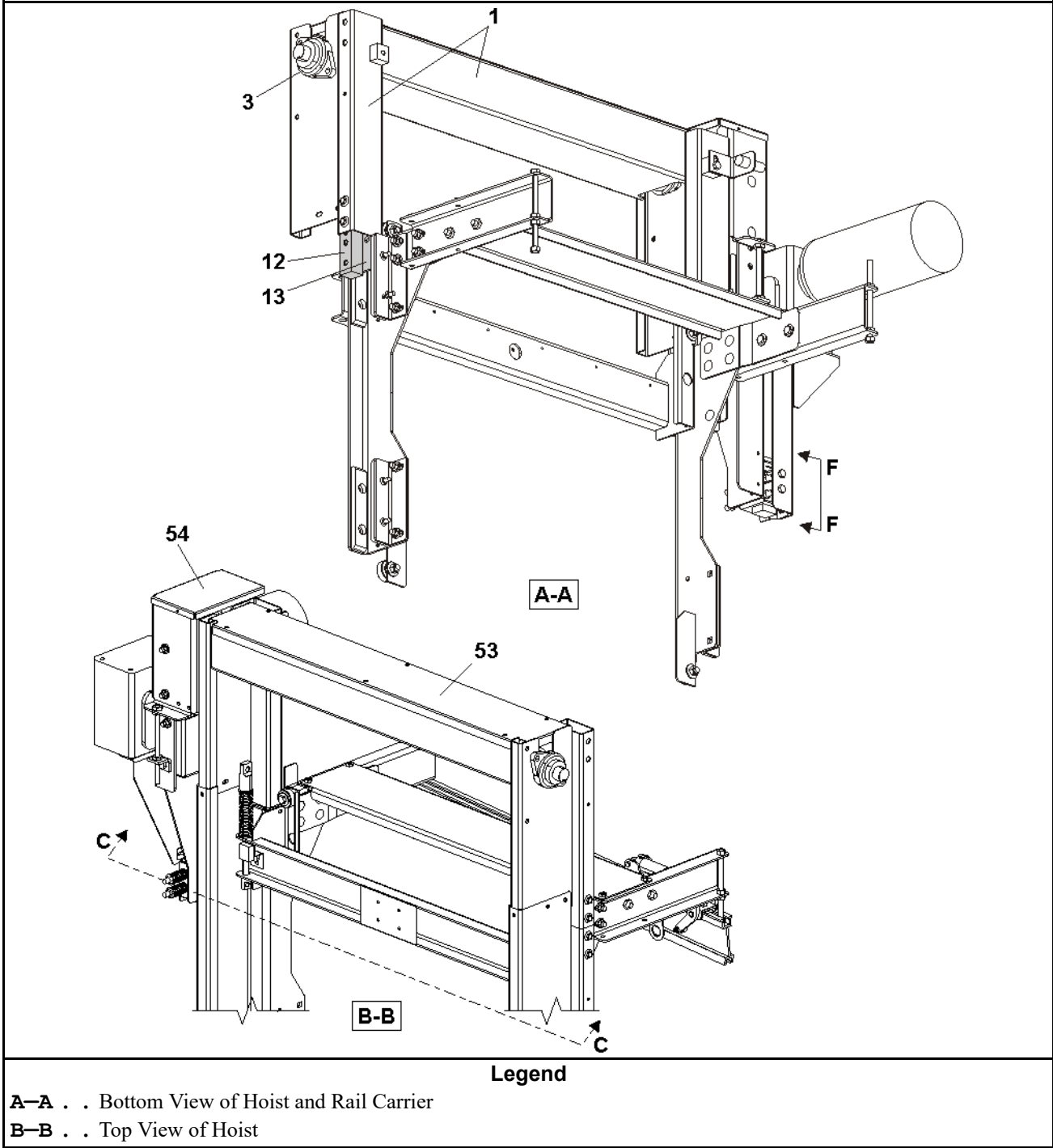


Legend

- H . . . Base
- J . . . Side Rail Extenders
- K . . . Hoist Assembly
- L . . . Rail Carriage
- M . . . Full Off Proximity Switch
- N . . . Empty On Proximity Switch
- P . . . Full On Proximity Switch
- Q . . . Empty Off Proximity Switch
- AD . . 8 instances

Elevator

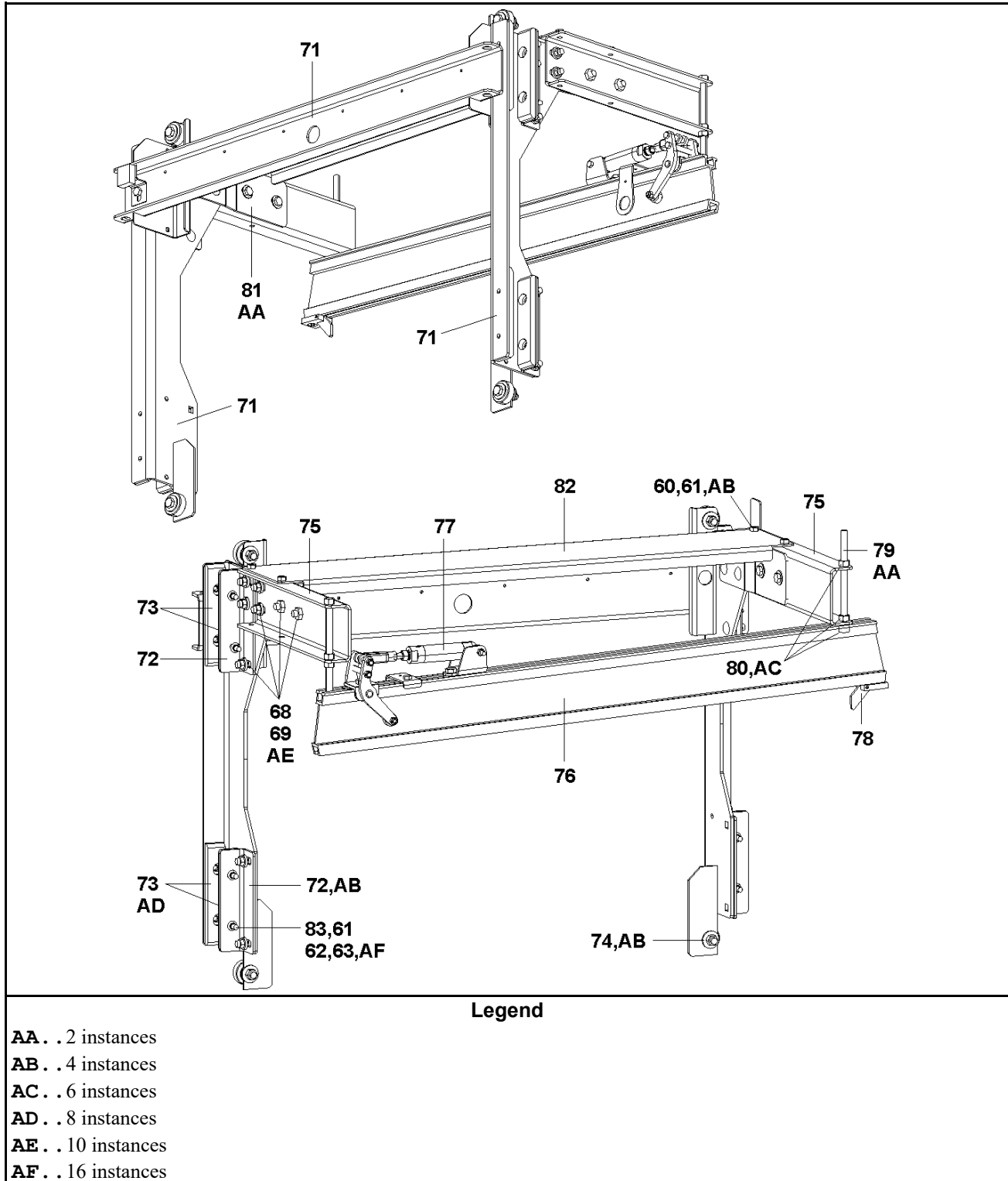
Figure 19. Hoist, Frame, & Covers



A-A . . Bottom View of Hoist and Rail Carrier
B-B . . Top View of Hoist

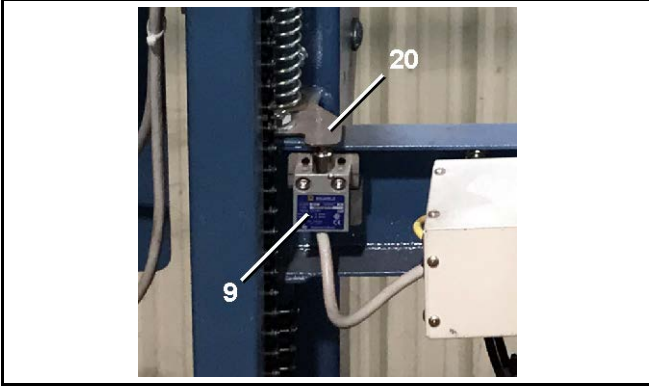
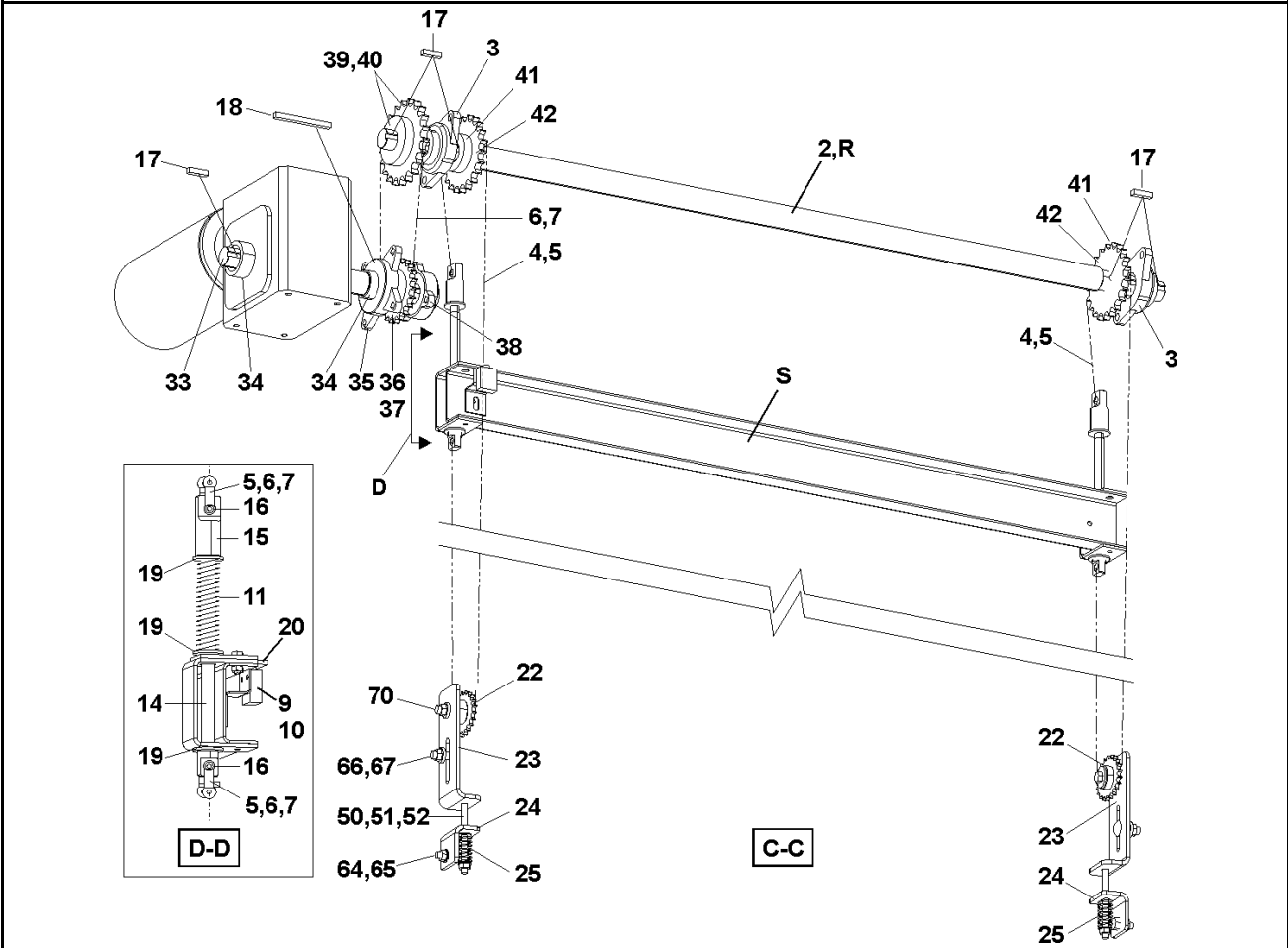
Elevator

Figure 20. Rail Carrier



Elevator

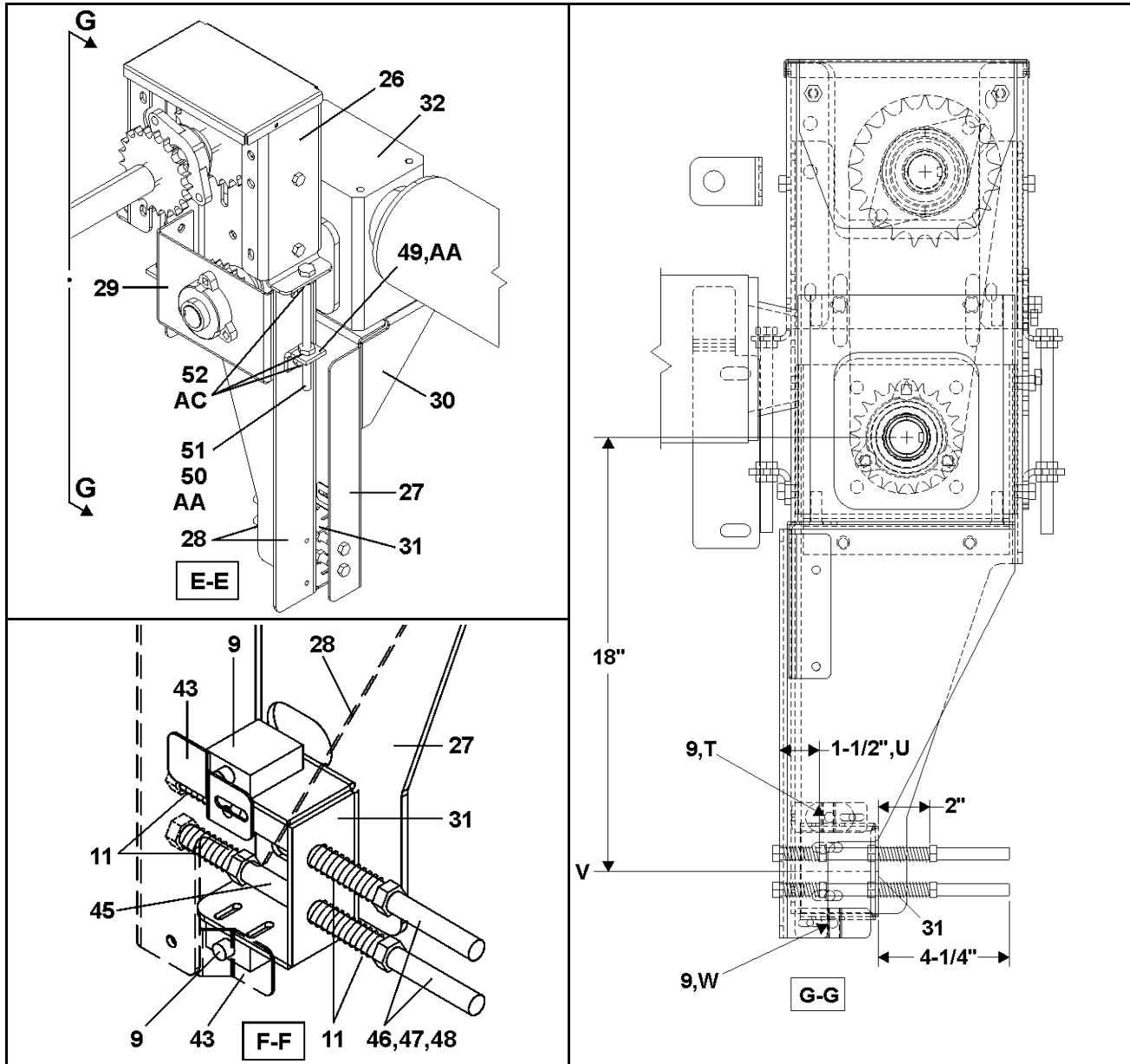
Figure 21. Double Chain Hoist Drive



Legend
 D-D . . Shaft Chain Connection, 2 instances
 R . . Lifting Shaft
 S . . Lifting Bar

Elevator

Figure 22. Hoist Switch Settings



Legend

- E-E . . Jackshaft Drive Housing
- F-F . . Switch Mounting
- G-G . . Cross Section View of Switch Settings
- T . . . Overload Safety Switch
- U . . . Overload Protection Setting
- V . . . Centerline of Mounting Bracket

Elevator

Hoist Switch Settings (cont'd.)

<p>W . . . Loose Chain Safety Switch AA . . 2 instances AC . . 6 instances</p>

Table 16. Parts List—Elevator

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	AVB37001	VERTICAL ELEVATOR BASE ASSEMBLY	REFERENCE
	B	ASR37053E	VERTICAL ELEVATOR SIDERAIL EXTEND 53.25"	REFERENCE
	C	AVR37001	VERTICAL ELEVATOR RAIL CARRIAGE - 1 BAG	REFERENCE
	D	AVH37001	VERTICAL ELEVATOR HOIST ASSEMBLY	REFERENCE
Components				
all	1	W4 30537	VERTICAL ELEVATOR TOP BEAM WLMT	
all	2	X4 30538	VERTICAL ELEVATOR CHAIN HOIST SHAFT	
all	3	56F1H2CS	FLGBRG REXNORD BS228336 1+7/16" (2 BOLT)	
all	4	54G050C	ROLCHN ANSI 50-1R 5/8"P EA=1FT	
all	5	54G050A	CONN LINK ANSI #CL2050 EXT PITCH INCLUDES DOUBLE LENGTH MASTERLINK	
all	6	54G080C	ROLLCHAIN ANSI 80-1R 1"P (50FT REELS ONLY)	
all	7	54G080	CONN LINK ANSI 80 SPRING CLIP	
all	9	09RM01212G	CAPSW 12FT 180DEG ROLLER GOLD	
all	10	04 22184	KICKPLATE SW MTG BRKT	
all	11	03 06211A	SPRING=.154"WIREX4.56LG	
all	12	X4 23342	TUBE CONNECTING BAR	
all	13	04 23331	VERT TUBE ALIGN BAR	
all	14	X4 22341	BED LIFTING SHAFT-DBLCHAIN	
all	15	X4 22342	LIFTING SHAFT CHAIN CONN	
all	16	X4 24526	DRILLBUSHING FOR #50 CHAIN	
all	17	15E225	SQMACHKEY 3/8X1+1/2 NOTAPER-NO	
all	18	15E229	MACHINE KEY .375X.375X7.00LG	
all	19	15U316	FLTWASH 5/8 HARD ASTM F436	
all	20	04 22740	SLACKCHAIN TARGET-DBLCHN HOIST	
all	22	54N050B15B	SPRKT, IDLER 51E15 #102054	
all	23	W4 22738A	SPRING TENSION IDLER SPROCKET MTG WLMT	
all	24	04 22738B	SPRING TENSION MTG BRKT	
all	25	02 18187S	SPRING=DOOR STAINLESS STEEL	
all	26	04 22327	HOIST DRV SPROCKET HOUSING	

Elevator

Table 16 Parts List—Elevator (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	27	04 22336	DBLCHAIN HOIST TORQARM	
all	28	04 22334	CHAIN TENSIONING CHANNEL	
all	29	04 22335	JACK SHAFT BRNG SUPPORT	
all	30	04 22336B	DBLCHAIN TORQARM GUSSET	
all	31	04 22337	TORQARM OVERLOAD SW MTG	
all	32	54STB33225	REDUCER 25:1 SF732-25T-B7-G	
all	33	X4 22339	CHAIN HOIST JACK SHAFT	
all	34	54JH11437C	SHAFTCOLLAR 1.4375 CFG #23S	
all	35	54AF1687	FLBRG 1.6875 NTN#UCF209-111T	
all	36	54N080B13	SPRKT 80BTB13H-1615 #100596	
all	37	56Q1HTB1	1+7/16"TAPRLOCKBUSH1615#119055	
all	38	54AF1437	FLGEBRG.HUBCITY 3-BOLT FB150URX1-7/16	
all	39	56Q1HTB2	1+7/16"TAPRLOCKBUSH2012#119256	
all	40	54N080B18	SPRKT 80BTB18H-2012 #100601	
all	41	54N050B17	SPROCKET 17T MARTIN#D50ATB17H (1610)	
all	42	56Q1HTB	1+7/16"TAPRLOCKBUSH1610#119226	
all	43	04 22338	TORQUE LIMIT SW TARGET	
all	45	27B32024SS	SPACER ROLL .5IDX1.5LX.062T SS	
all	46	15D122C	HEXTAPSCR 1/2-13UNCK 8.5 FLTHD	
all	47	15U280	FL+WASHER(USS STD)1/2 ZNC PL+D	
all	48	15G231	HXFJNUT 1/2-13UNC2B ZINC G	
all	49	02 19288	BRACKET=ADJUSTING-1.5X1.75	
all	50	15B110	HXTAPBOLT 3/8-16UNC2X5 FULTHD	
all	51	15U240	FLATWASHER(USS STD) 3/8" ZNC P	
all	52	15G201	HXLKKNUT 3/8-16 NYL/SS TYPE NE	
all	53	04 30539	VERTICAL ELEVATOR TOP BEAM COVER	
all	54	04 22736	SPROCKET HOUSING COVER	
all	55	09RPS30ADW	PROX SW QK CONN 30M NO-DC UNSHLD	
all	56	09RPSDC010	CONN.STR FEMALE DC 3A 300V 10M RK4T-10 -	
all	57	04 30615	VERTICAL ELEVATOR FR LOWER COVER	
all	58	04 30614	VERTICAL ELEVATOR RR LOWER COVER	
all	59	15P175	TRDCUT-F HXHD 1/4-20UNC2AX1/2	
all	60	15K085	HEXCAPSCR 3/8-16UNC2AX3/4 GR5	
all	61	15G198	HXFLGNUT 3/8-16 ZINC	

Elevator

8 Sheet

Table 16 Parts List—Elevator (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	62	15K095	HXCPSCR 3/8-16UNC2AX1 GR5 ZINC	
all	63	15U200	FLATWASHER(USS STD) 5/16"ZNC P	
all	64	15A011	CARBOLT 3/8-16UNC2X1 ZINC GR2	
all	65	15G218	HXLOKNUT NYL 3/8-16 STL/ZNC	
all	66	15A058SZ	CARBOLT 1/2-13X1.25 ZINCGR2	
all	67	15G234N	HXLOCKNUT NYL 1/2-13UNC2 STL/Z	
all	68	15A063	CARBOLT 1/2-13UNC2X1.50 ZINC G	
all	69	15G222B	HEXFLGNUT 1/2-13 ZINC SERRATED	
all	70	15K182	HEXTAPSCR 1/2-13X2ZINC GR5 FUL	
all	71	W4 30543	VERTICAL ELEVATOR CARRIAGE WELDMENT	
all	72	04 22243	MAIN SLIDER ADJ ANGLE	
all	73	X4 23391	TRACK SLIDER UHMW BAR	
all	74	ALC50155	BED LIFT GUIDE WHEEL ASSY	
all	75	04 30542	VERTICAL ELEVATOR CARRIAGE ARM	
all	76	X4 RA054A2H	HARD ANODIZED RAIL TRACK 54.00" L CHMF BTH SIDE	
all	77	APS37001B	STOP ASSEMBLY W/O RAIL	
all	78	ANR37001	RAIL NO RETURN ASSEMBLY	
all	79	17R022A08A	THRD ROD 1/2-13UNCX8" LG ZN PL	
all	80	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	81	04 30547	CARRIAGE ARM DOUBLER	
all	82	04 30548	CARRIAGE ARMS CROSS BRACE	
all	83	27B25002SZ	SPCROLL.39ID.125L.048T STLZNC	

Hard Ring Bag

1 Sheet



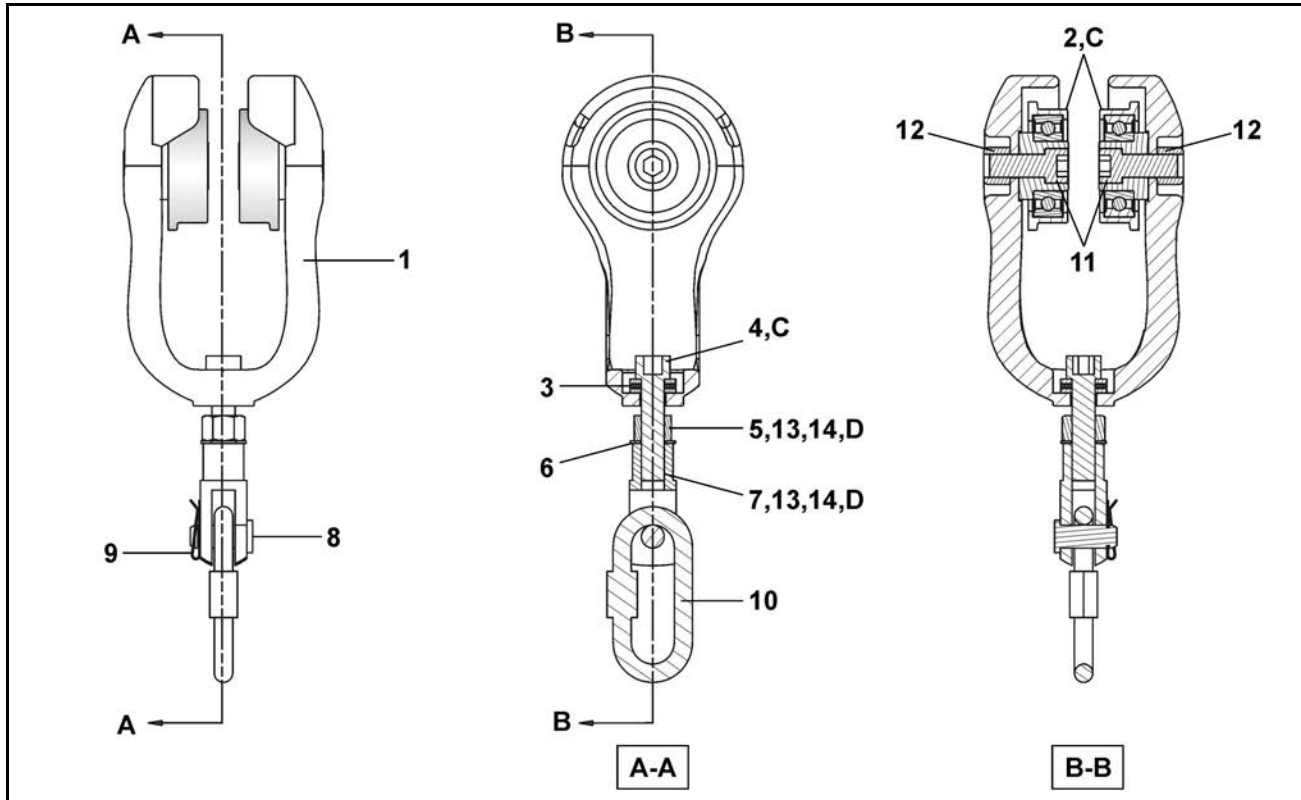
Table 17. Parts List—Hard Ring Bag

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				
none				
Components				
all	1	SKU000070	BAG ASSEMBLY 68KG AUTO-LOADED SOUTHERN LINEN	

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Trolley with Link

Figure 23. Cross Section Views



Legend

A-A . . View A-A

B-B . . View B-B

C . . . This item must spin freely.

D . . . Bolt must have primer (item 14) and adhesive (item 13) under the locknut and clevis.

Table 18. Parts List—Trolley with Link

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	ATA37001	SINGLE TROLLEY ASSY W/LINK	ASSEMBLY
Components				
all	1	C4 30300	TROLLEY CASTING 304 SS	
all	2	09WRA0005	LL4002B FLANGED BEARING	
all	3	09WRA0026	F8-19M AF2 THRUST BEARING	
all	4	09WRA0009	M8 X 40 HEX BOLT BZP	
all	5	09WRA0010	M8 LOCKNUT	

Trolley with Link

2 Sheet

Table 18 Parts List—Trolley with Link (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	6	09WRA0011	M8 SHAKEPROOF WASHER	
all	7	09WRA0006	M8 X 1.25 CLEVIS	
all	8	09WRA0007	M8 CLEVIS PIN	
all	9	09WRA0008	M8 CLEVIS PIN SAFETY CLIP	
all	10	09WRA0004	6MM QUICKLINK	
all	11	15K050C	SKCAPSCR 5/16-24X5/8 1936 SERIES PLAIN ALLOY	
all	12	15G194	HEXLOKNUT 5/16-24 NYL ZINC	
all	13	20C007G	THDLOCKSEAL LCT24231 RMUBL50CC	
all	14	20C006P	PRIMER-N #7649 LCT#21348-4	

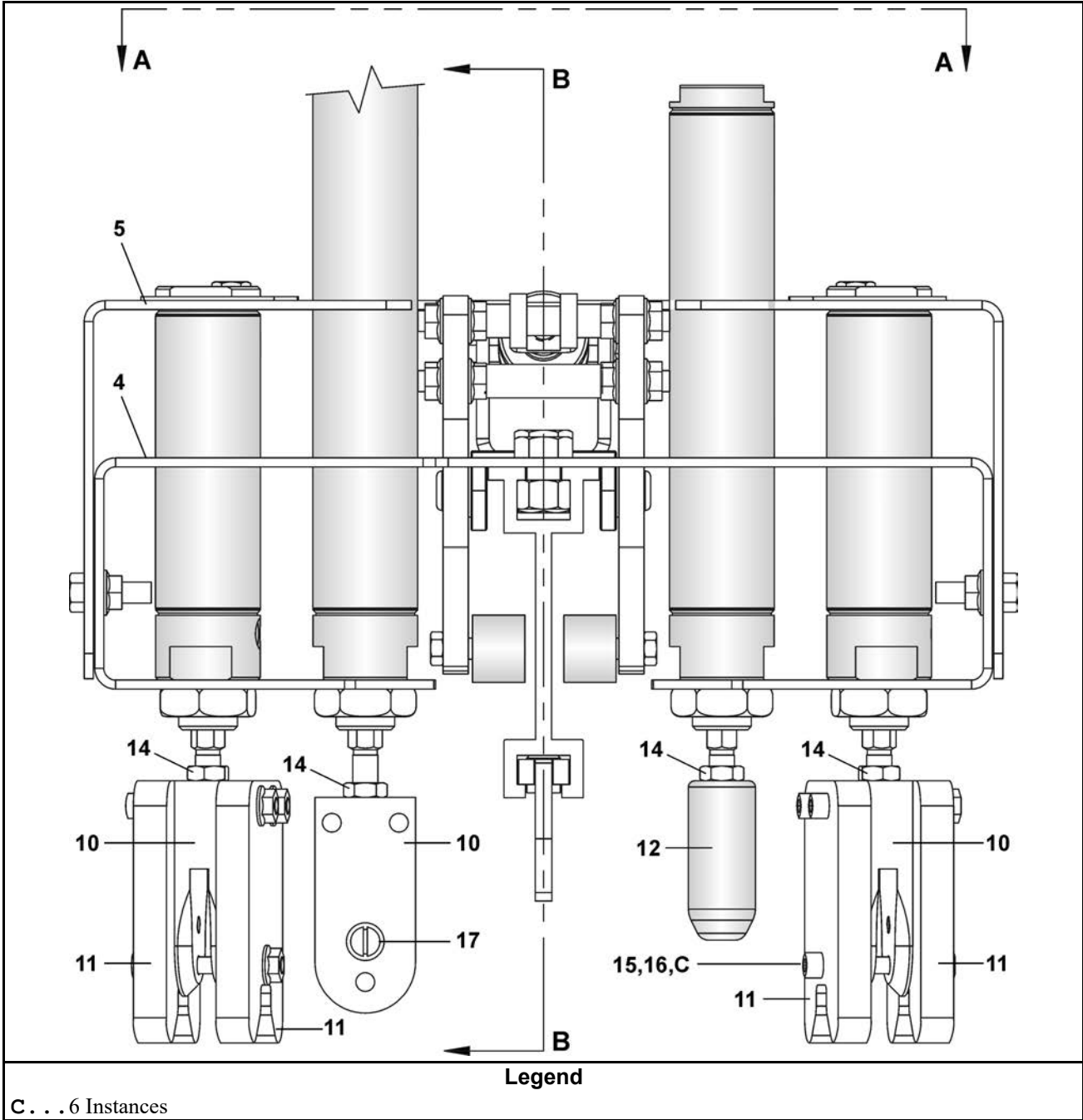
Discharger and Closer

Figure 24. General Views



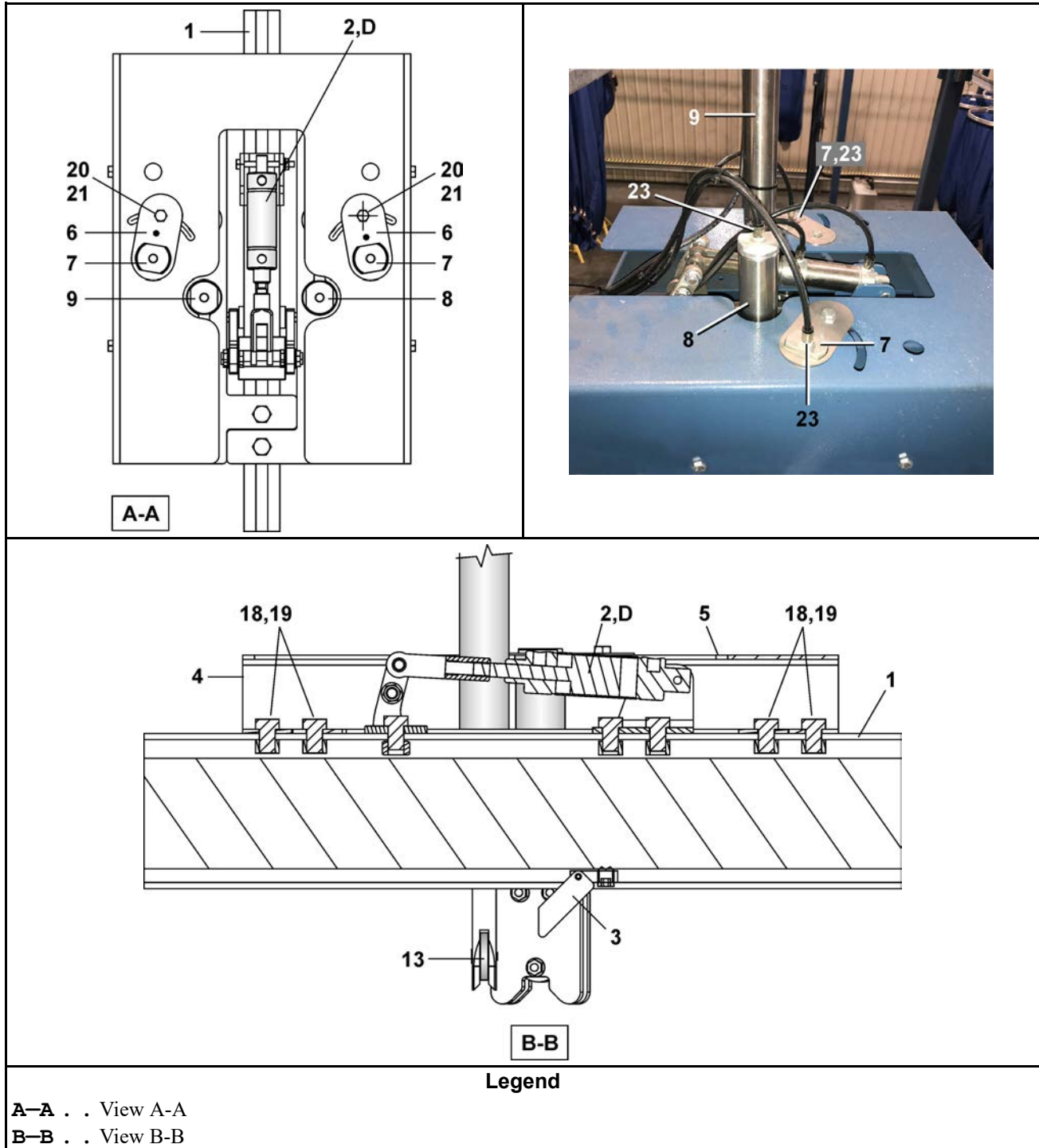
Bag Discharger & Closer

Figure 25. Enlarged Rear View



Bag Discharger & Closer

Figure 26. Detailed Views



Bag Discharger & Closer

4 Sheet

Detailed Views (cont'd.)

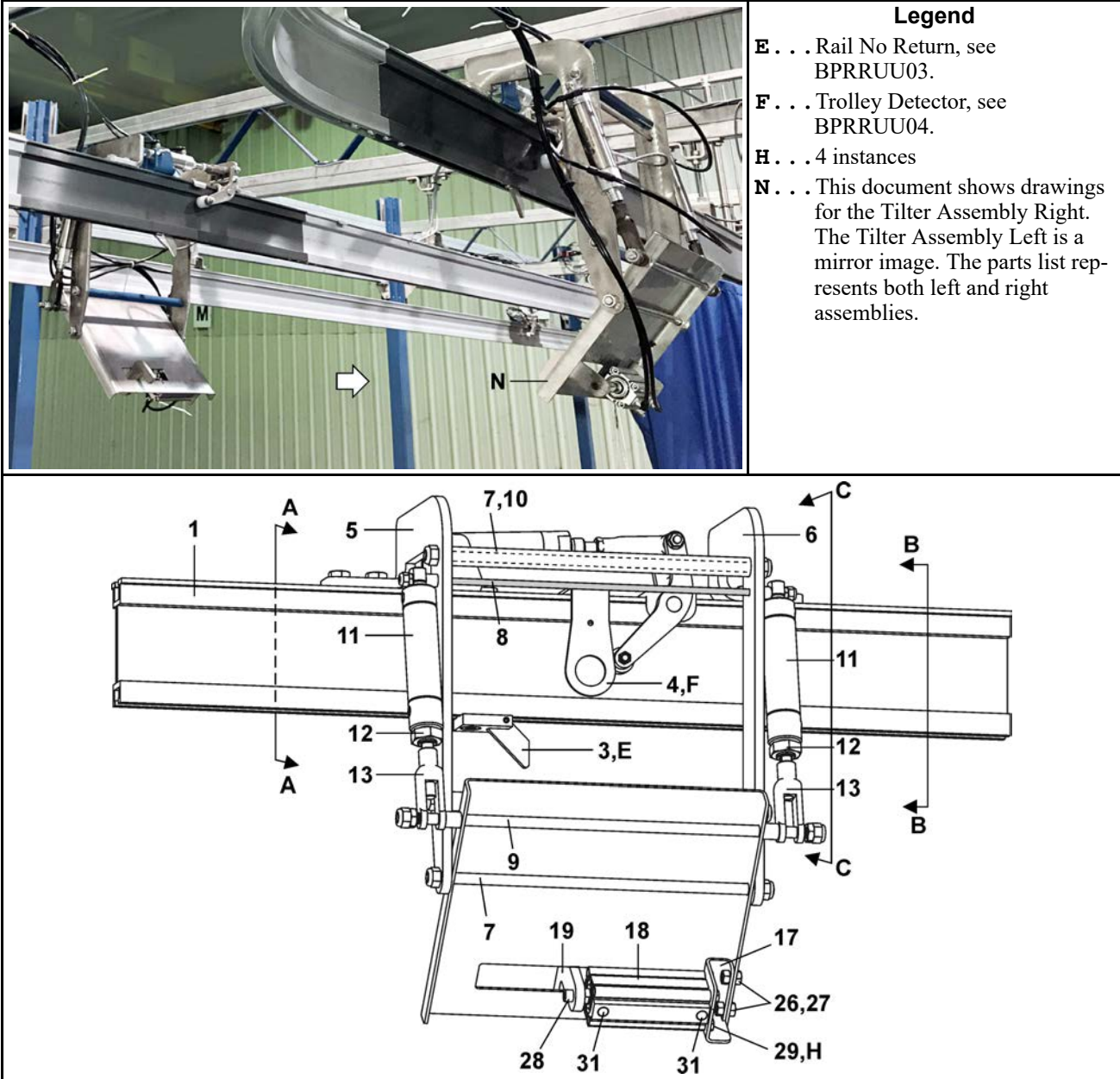
D . . . Stop Assembly, see BPRRU02.

Table 19. Parts List—Bag Discharger & Closer

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	ABD37001	BAG DISCHARGER AND CLOSER	
Components				
all	1	04 RA024AH	RAIL TRACK 24.00" LONG HARD ANODIZED	
all	2	APS37001B	STOP ASSEMBLY W/O RAIL	
all	3	ANR37001	RAIL NO RETURN ASSEMBLY	
all	4	04 30568	BAG DISCHARGER INNER BRACKET	
all	5	04 30569	BAG DISCHARGER OUTER BRACKET	
all	6	04 30574	BAG GRABBER ADJUSTMENT PLATE	
all	7	27C213A	AIR CYL 1.5"BORE X 3.00"STROKE DBL NON-ROT	
all	8	27C213B	AIR CYL 1.5"BORE X 6"STROKE DBL NON-ROT	
all	9	27C213C	AIR CYL 1.5"BORE X 24"STROKE DBL NON-ROT	
all	10	X4 30570	BAG DISCHARGER CYLINDER END	
all	11	X4 30571	BAG GRABBER CLAW	
all	12	X4 30573	BAG OPENER CYLINDER END	
all	13	X4 30572	BAG CLOSER ROLLER	
all	14	15G215	HXFJAMNUT 3/8-24UNF2B ZINC G	
all	15	15K045D	SKCPSCR 1/4-20 UNCX2" ZN	
all	16	15G178	1/4"-20 HEXFLANGE NUT ZINC	
all	17	15N176	FLATMACSCR 1/4-20NCX3/4SS18-8	
all	18	15K145	HXCAPSCR 1/2-13UNC2AX3/4 GR5 P	
all	19	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	20	15G196	HXFLGNUT 5/16-18 ZINC	
all	21	15K065	HEXCAPSCR 5/16-18UNC2AX1 GR5 Z	
all	22	96PVQC18249	QUICK CONNECT FITTING 1/8" NPT X 1/4" TUBING 90	
all	23	96PVQC1824	QUICK CONNECT FITTING 1/8" NPT X 1/4" TUBING STRAIGHT	

Bag Tilter

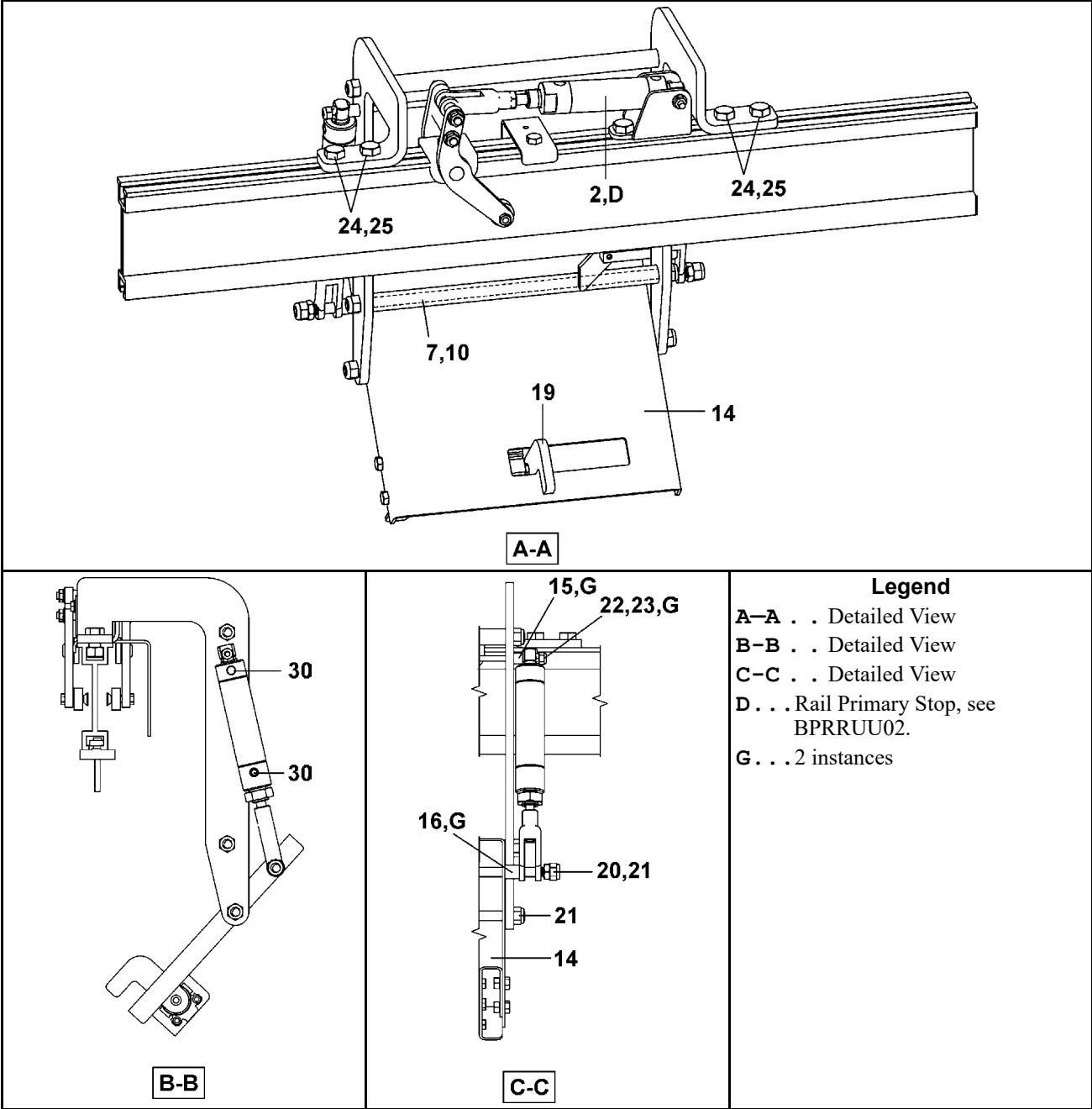
Figure 27. Tilter Assembly



Bag Tilter

3 Sheets

Figure 28. Tilter Detailed Views



Bag Tilter

Table 20. Parts List—Bag Tilter

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	ABT37001	BAG TILTER RIGHT	REFERENCE
	B	ABT37001A	BAG TILTER LEFT	REFERENCE
Components				
all	1	04 RA036AH	RAIL TRACK 36.00" LONG HARD ANODIZED	
all	2	APS37001B	STOP ASSEMBLY W/O RAIL	
all	3	ANR37001	RAIL NO RETURN ASSEMBLY	
all	4	ATD37001	TROLLEY DETECTOR ASSEMBLY	
all	5	04 30563	BAG TILTER MOUNT ARM LEFT	
all	6	04 30563A	BAG TILTER MOUNT ARM RIGHT	
all	7	15T110	DBL END STUD 14" BODY X 7/16-14X 3/4" THRD SS	
all	8	15T104	DBL END STUD 16" BODY X 1/4-20 X 5/8" THRD SS	
all	9	15T111	DBL END STUD 17+1/4" BODY X 7/16-14X 1+1/8" THRD SS	
all	10	X4 30565	BAG TILTER ARM SPACER	
all	11	27C212C	AIRCYL 1+1/4"BORE X 2+1/2" STK DBL	
all	12	15G222A	HXFINJAMNUT 7/16-20UNF2B SS	
all	13	17A018A	7/16-20 ADJ YOKE END DROPFORGE ZINC	
A	14	04 30562	BAG RING LIFTER RIGHT	
B	14	04 30562A	BAG RING LIFTER LEFT	
all	15	X4 30566	BAG TILTER SHORT SPACER	
all	16	X4 30567	BAG TILTER LONG SPACER	
all	17	04 30578	BAG TILTER CYLINDER MOUNT	
all	18	27C212D	AIRCYL 32MM BORE X 80MM STK DBL	
all	19	04 30564	BAG TILTER PUSH PLATE	
all	20	15G222	HXFINJAMNUT 7/16-14UNC2B ZINC	
all	21	15G222D	HEXLOCKNUT 7/16-14UNC ZINC	
all	22	15G165	HXNUT 1/4-20UNC2BSAE ZC GR2	
all	23	15G166A	HXLOKNUT NYL1/4-20 UNC2A STL/Z	
all	24	15K147	HXCAPSCR 1/2-13UNC2X1 GR5 ZINC	
all	25	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	26	15K050	HXCAPSCR 5/16-18UNC2AX1/2 GR5 ZN	
all	27	15G185	HXNUT 5/16-18UNC2B SAE ZINC GR	
all	28	15K050C	SKCAPSCR 5/16-24X5/8 1936 SERIES PLAIN ALLOY	

Bag Tilter

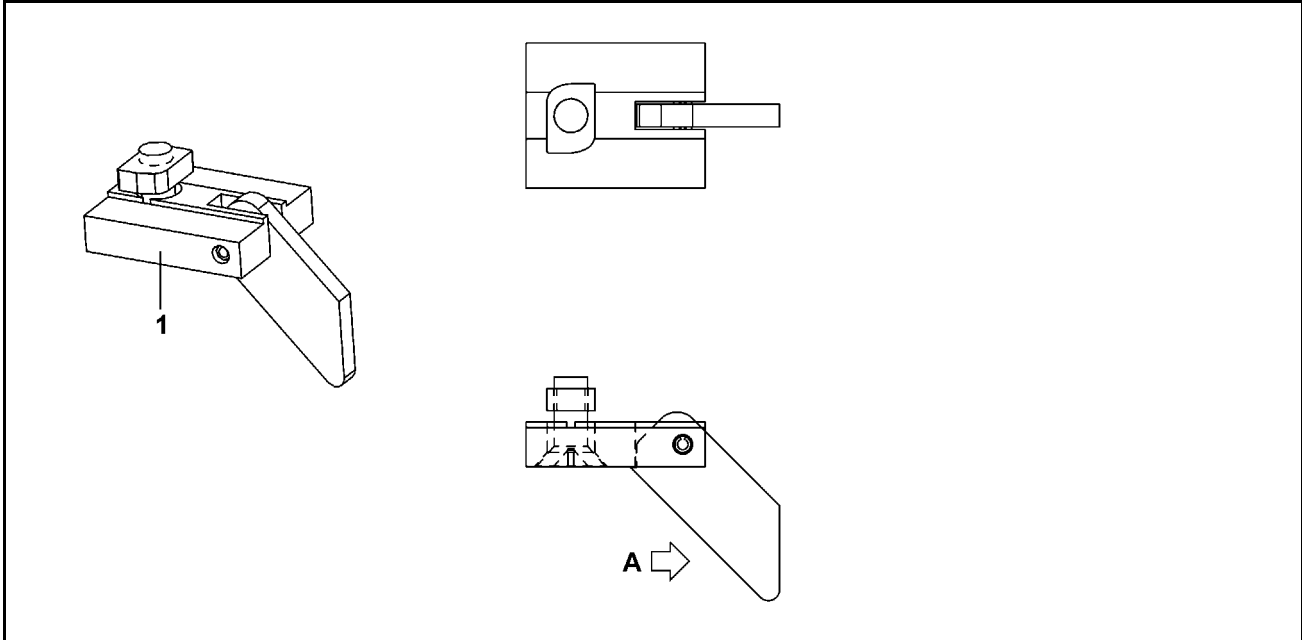
3 Sheets

Table 20 Parts List—Bag Tilter (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	15K037	HEXCAPSCR 1/4-20UNC2AX5/8 GR5	
all	30	96PVQC18249	QUICK CONNECT FITTING 1/8" NPT X 1/4" TUBING 90	
all	31	96PVQC1824	QUICK CONNECT FITTING 1/8" NPT X 1/4" TUBING STRAIGHT	

4 Stops & Switches

Rail No Return



Legend

A . . . Flow of Goods, Orient as shown.

Table 21. Parts List—Rail No Return

Used In	Item	Part Number	Description/Nomenclature	Comments
Reference Assemblies				
all	1	ANR37001	RAIL NO RETURN ASSEMBLY	

Rail Primary Stops

Figure 29. Primary Stop without Rail

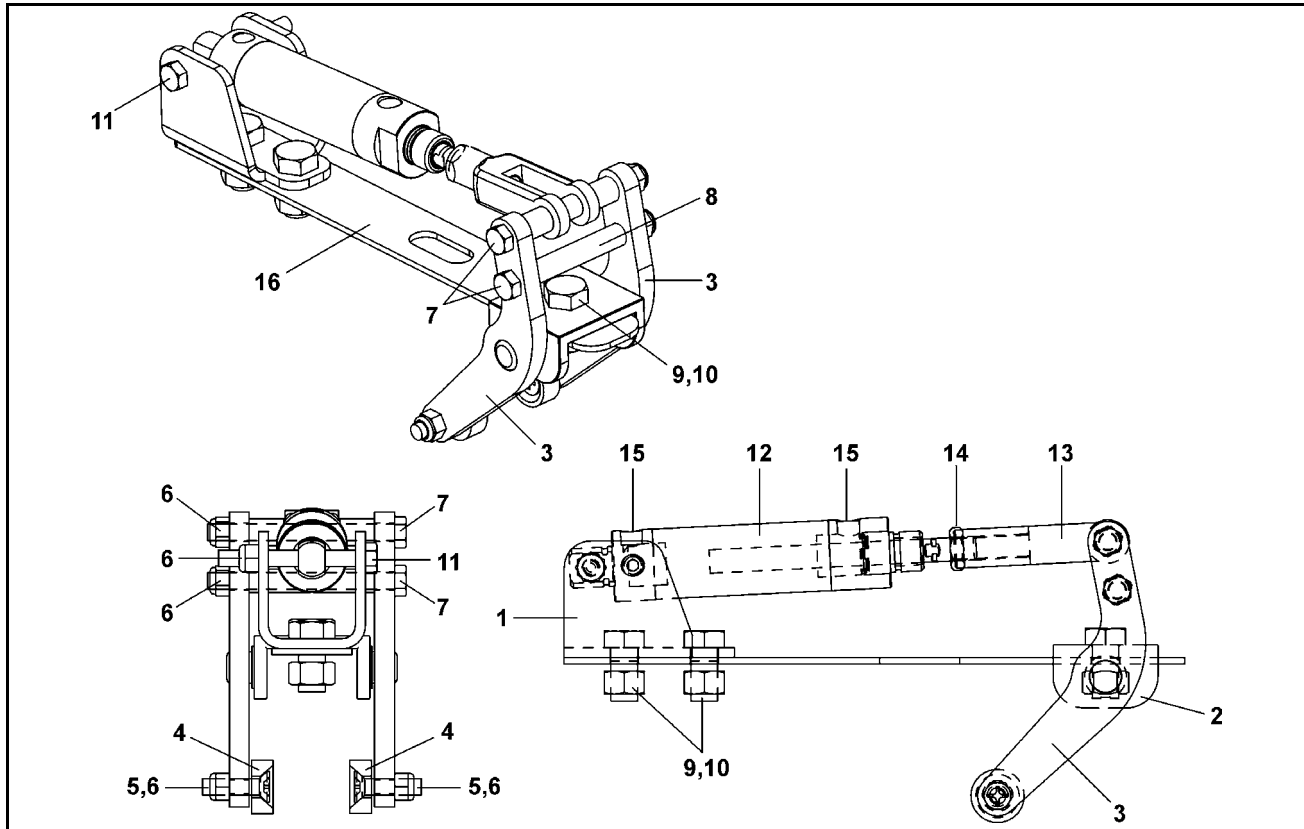
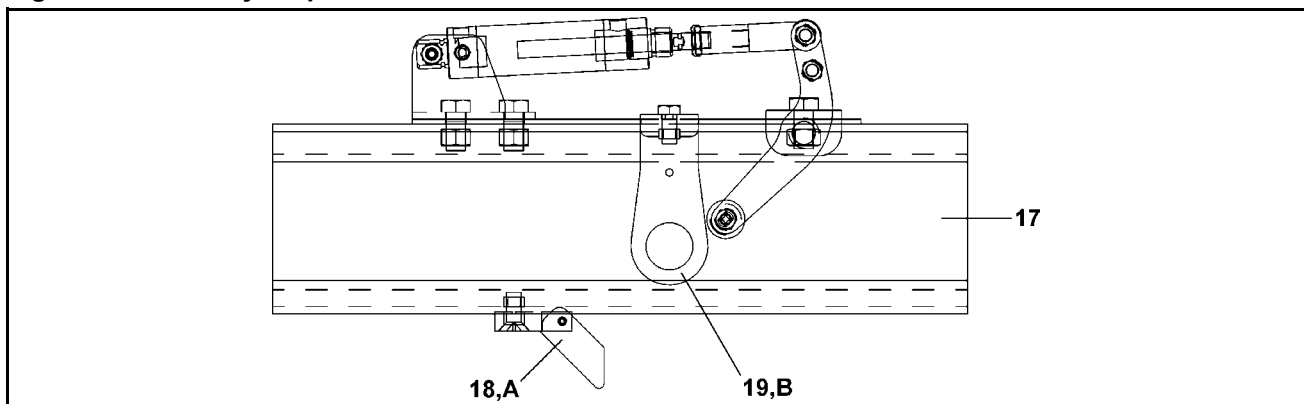


Figure 30. Primary Stop with Rail



Legend

- A . . . Rail No Return , see BPRRU03.
- B . . . Trolley Detector Assembly, see BPRRU04.

Rail Primary Stops

2 Sheet

Table 22. Parts List—Rail Primary Stops

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	APS37001B	STOP ASSEMBLY W/O RAIL	ASSEMBLY CONTAINS (1–16)
	B	APS37001	RAIL PRIMARY STOP WITH RAIL	ASSEMBLY CONTAINS (1–19)
Components				
all	1	04 30314	RAIL PNEUMATIC STOP CYL CLEVIS	
all	3	04 30315	RAIL PNEUMATIC STOP LEVER ARM	
all	4	04 30316	RAIL PNEUMATIC STOP ROLLER	
all	5	15N203A	FLATMACSCR 5/16-18X1+1/4 ZN PHILLIPS	
all	6	15G193	HEXLOKNUT 5/16-18UNC2A NYL STL	
all	7	15K081D	HEXCAPSCR 5/16-18X3.5 GR.5 ZINC	
all	8	04 30317A	RAIL STOP LEVER ARM SPACER LONG	
all	9	15K147	HXCAPSCR 1/2-13UNC2X1 GR5 ZINC	
all	10	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	11	15K081	HXTAPSCR 5/16-18NCX3TFL GR5 ZC	
all	12	27C212E	AIRCYL 1+1/4"BORE X1"STK DBL + SPR RTRN	
all	13	APS37000	STOP CLEVIS AND SPACERS SUBASSY	
all	14	15G222A	HXFINJAMNUT 7/16-20UNF2B SS	
all	15	96PVQC1824	QUICK CONNECT 1/8" NPT X 1/4" TUBING STRT	
all	16	04 30611	STOP SPACING FIXTURE	
B	17	04 RA018AH	RAIL TRACK 18.00" LONG HARD ANODIZED	
B	18	ANR37001	RAIL NO RETURN ASSEMBLY	
B	19	ATD37001	TROLLEY DETECTOR ASSEMBLY	

Separator Stop

Figure 31. Detail Views

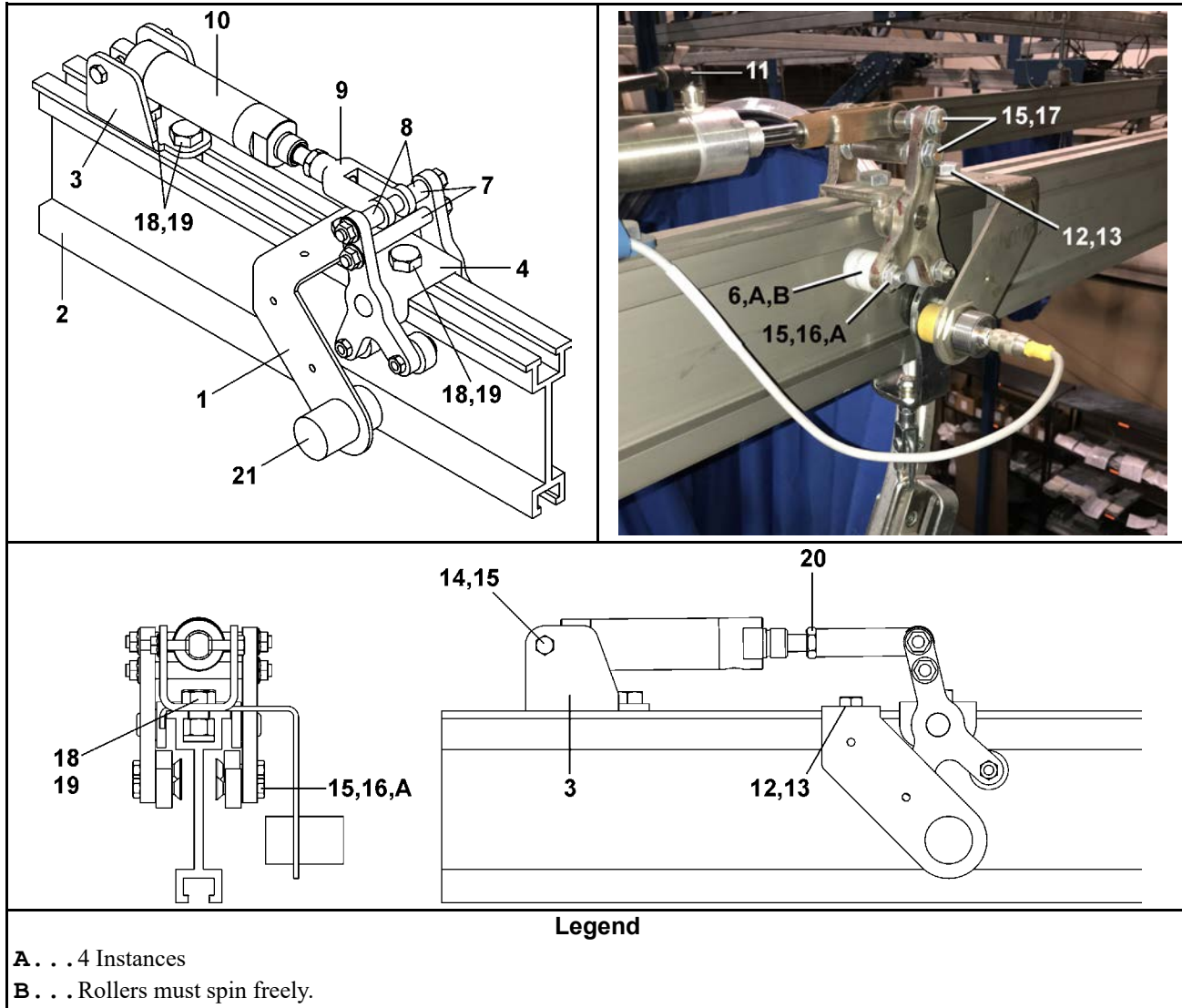


Table 23. Parts List—Separator Stop

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	APS37002	RAIL PNEUMATIC SEPARATOR STOP ASSEMBLY LT	LEFT ASSEMBLY
	B	APS37002A	RAIL PNEUMATIC SEPARATOR STOP ASSEMBLY RT	RIGHT ASSEMBLY
	C	APS37000	STOP CLEVIS AND SPACERS SUBASSY	ASSEMBLY CONTAINS ITEMS 7,8,9

Separator Stop

2 Sheet

Table 23 Parts List—Separator Stop (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
Components				
A	1	04 30320A	RAIL TROLLEY PROXIMITY OFFSET BRKT LF	
B	1	04 30320D	RAIL TROLLEY PROXIMITY OFFSET BRKT RT	
all	2	04 RA018AH	RAIL TRACK 18.00" LONG HARD ANODIZED	
all	3	04 30314	RAIL PNEUMATIC STOP CYL CLEVIS	
all	4	C4 30303	PNEUMATIC STOP CASTING	
all	5	04 30315A	RAIL PNEUMATIC STOP SEPARATOR ARM	
all	6	04 30316	RAIL PNEUMATIC STOP ROLLER	
C	7	04 30317A	RAIL STOP LEVER ARM SPACER LONG	
C	8	27C212E	AIRCYL 1+1/4"BORE X1"STK DBL + SPR RTRN	
C	9	17A018	7/16-20 ADJ YOKE END DROPFORGE	
all	10	04 30317	RAIL STOP LEVER ARM SPACER SHORT	
all	11	96PVQC1824	QUICK CONNECT FITTING 1/8" NPT X 1/4" TUBING STRAIGHT	
all	12	15K085	HEXCAPSCR 3/8-16UNC2AX3/4 GR5	
all	13	04 30585	RAIL 3/8" INSERT NUT	
all	14	15K080A	HEXCAPSCREW 5/16 -18 X 2+3/4 ZN GRADE 8	
all	15	15N203A	FLATMACSCR 5/16-18X1+1/4 ZN PHILLIPS	
all	16	15G193	HEXLOKNUT 5/16-18UNC2A NYL STL	
all	17	15K081D	HEXCAPSCREW 5/16 -18 X 3+1/2 ZN GRADE 8	
all	18	15K147	HXCAPSCR 1/2-13UNC2X1 GR5 ZINC	
all	19	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	20	15G222A	HXFINJAMNUT 7/16-20UNF2B SS	
all	21	09RPS30ADW	PROX SW QK CONN 30M NO-DC UNSHLD	

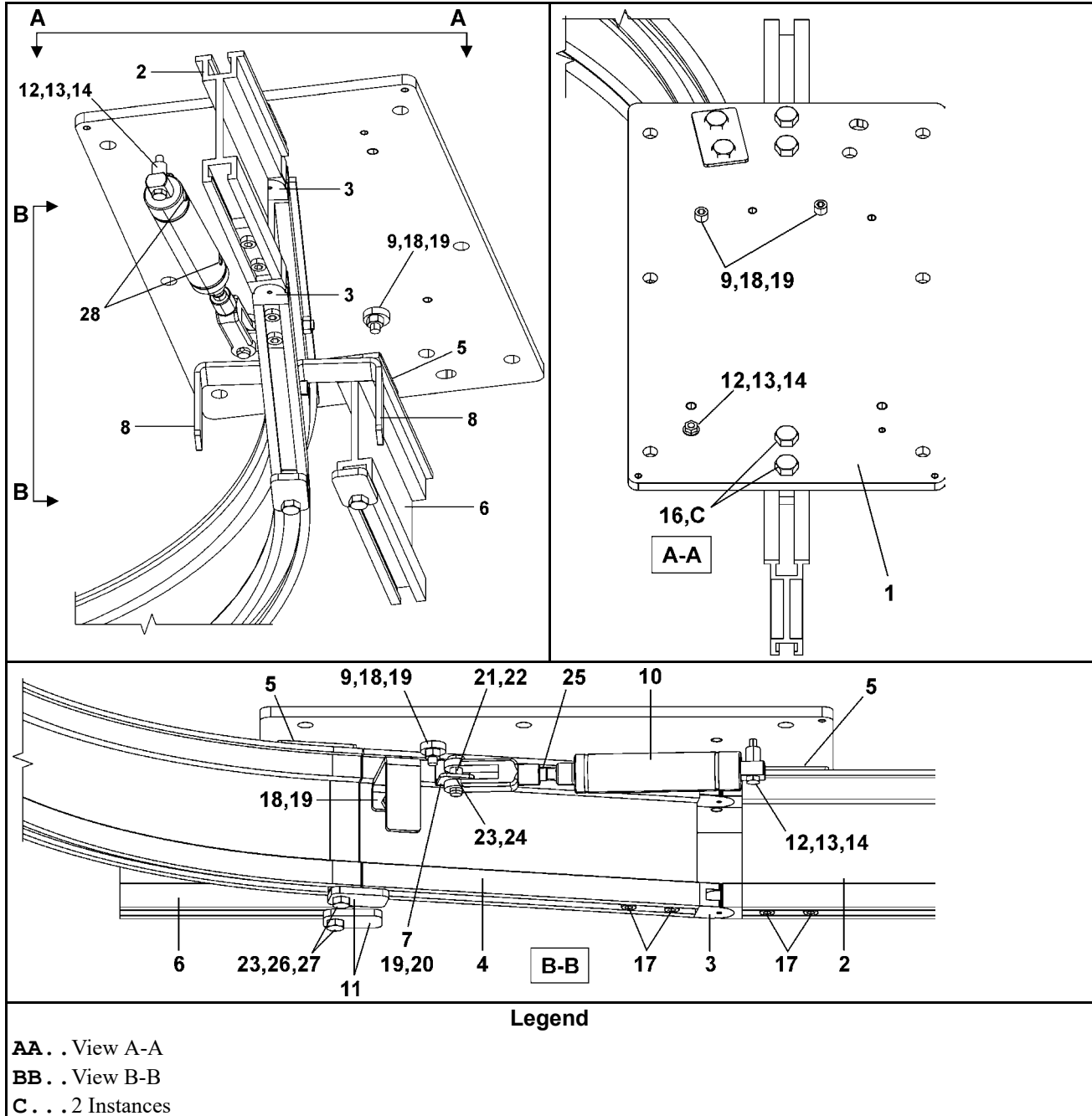
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Switch Left or Right

1 Sheet

MILRAIL



Rail Switch Left or Right

1 Sheet

MILRAIL

Table 24. Parts List—Rail Switch Left or Right

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	ADS2L008	SWITCH POINT LEFT 28" LONG, 1" END CURVE	
Components				
all	1	04 30292	RAIL SWITCH MAIN PLATE	
all	2	04 RA006M	RAIL TRACK 6.63" LONG	
all	3	ADS37001	SWITCH POINT PIVOT ASSEMBLY	
all	4	04 30294	SWITCH PIVOT RAIL	
all	5	04 30293	RAIL SWITCH ELEVATION SPACER	
all	6	04 RA008P	RAIL TRACK 8.75" LONG	
all	7	04 30295	RAIL SWITCH CLEVIS CONNECTION BRKT	
all	8	04 30296	RAIL SWITCH NO RETURN BRKT	
all	9	04 30297	RAIL SWITCH CAM STOP	
all	10	27C212A	AIRCYL 1+1/4"BORE X2"STK DBL	
all	11	04 30586	RAIL SWITCH JOINT PROTECTOR	
all	12	15K046	HXCAPSCR 1/4-20 UNC2A X 2"GR5	
all	13	27B2400K0L	SPACER ROLL.43ID.562L.03T SS	
all	14	15G178	1/4"-20 HEXFLANGE NUT ZINC	
all	15	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	16	15K151	HXCAPSCR 1/2-13UNC2AX1.25 GR5	
all	17	15Q168	SOKSETSCR CUP 1/2-13X5/8 ZN	
all	18	15K055C	SOKCAPSCR 5/16-18X1+1/8 ZN	
all	19	15G185	HXNUT 5/16-18UNC2B SAE ZINC GR	
all	20	15N204B	FLATMACSCR 5/16-18X1+3/4 ZN	
all	21	17A018A	7/16-20 ADJ YOKE END DROPFORGE ZINC	
all	22	17A011	7/16X1+11/32"OAL CLEVISPIN SAE	
all	23	15U240P	FLATWASHER .411IDX.813ODX.020 ZN	
all	24	15H045	STDCOTTERPIN 1/8X1 SS18-8	
all	25	15G222A	HXFINJAMNUT 7/16-20UNF2B SS	
all	26	15G198	HXFLGNUT 3/8-16 ZINC	
all	27	15K086D	HXCAPSCR 3/8-16 UNC2A X 7/8" 1	
all	28	96PVQC18249F	QUICK CONNECT FITTING 1/8" NPT X 1/4" TUBING 90 FLOW CONTROL	

5 Control & Sensing

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Trolley Detector Proximity Switch

1 Sheet

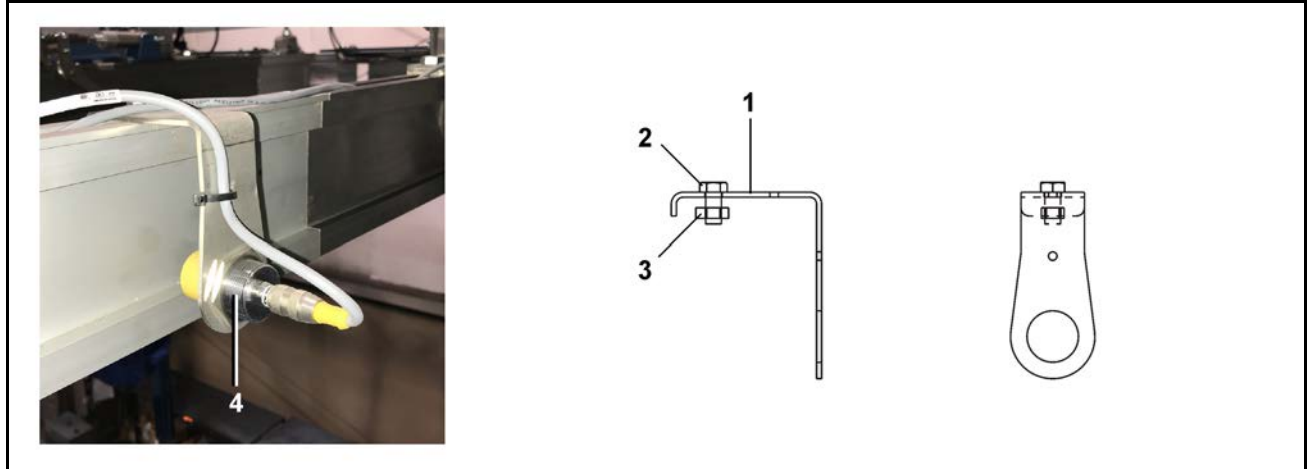


Table 25. Parts List—Trolley Detector Proximity Switch

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	ATD37001	TROLLEY DETECTOR ASSEMBLY	ASSEMBLY CONTAINS (1-4)
Components				
all	1	04 30320B	RAIL TROLLEY PROXIMITY MNT BRKT SMALL HOLE	
all	2	15K085	HEXCAPSCR 3/8-16UNC2AX3/4 GR5	
all	3	04 30585	RAIL 3/8" INSERT NUT	
all	4	09PRS30ADW	PROX SW QK CONN 30M NO-DC UNSHLD	

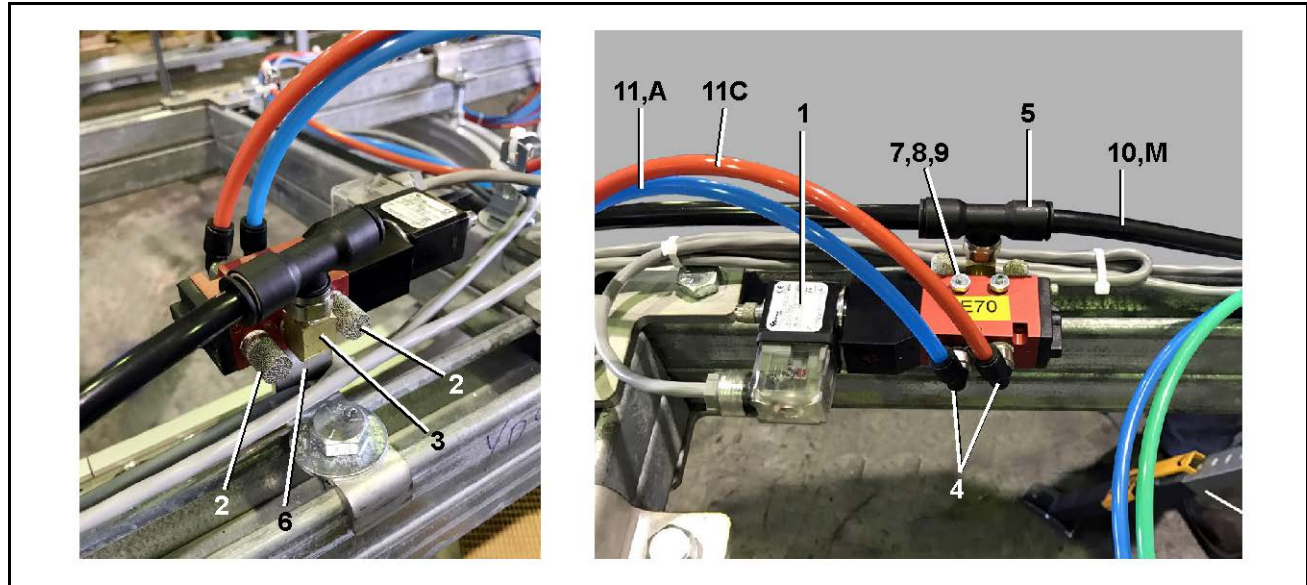
6 Pneumatic Valves

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Solenoid with Spring Return

1 Sheet



Legend

- A . . . Blue Tubing, Actuate
- C . . . Red Tubing, Reset
- M . . . Main Air

Table 26. Parts List—Solenoid with Spring Return

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	AVAMRSSBA01	MILRAIL VALVE ASSY SOLENOID/SPRING RETURN 2 POSITIONS	ASSEMBLY
Components				
all	1	96R305APS24	1/8"NPT PILOT 5 PORT NC 24VDC DIN SOLENOID/SPRING RETURN 2 POSITION	
all	2	96PVQC18S	SILENCER/MUFFLER FOR AIR 1/8" NPT	
all	3	5SL0CBEC	NPTLBR 90DEG STRT 1/8 BRASS125	
all	4	96PVQC1824	QUICK CONNECT FITTING 1/8" NPT X 1/4" TUBING STRAIGHT	
all	5	96PVQC3828T	QUICK CONNECT FITTING 1/8" NPT X 3/8" TUBING TEE	
all	6	04 30579	5 PORT VALVE STRUT MOUNT BRKT	
all	7	15N068	RDMACSCR 6-32UNC2AX1.25 ZINC	
all	8	15G070	HXMACHSCRNUT 6-32UNC2B ZINC GR	
all	9	15U100	LOCKWASHER MEDIUM #6 ZINCPL	
all	10	60E005B	TUBING NYL.3/8"OD X.275"ID	
A	11	60E004BL	1/4"OD X.170"ID NYL(BLUE)TUBING E = FT	

Solenoid with Spring Return

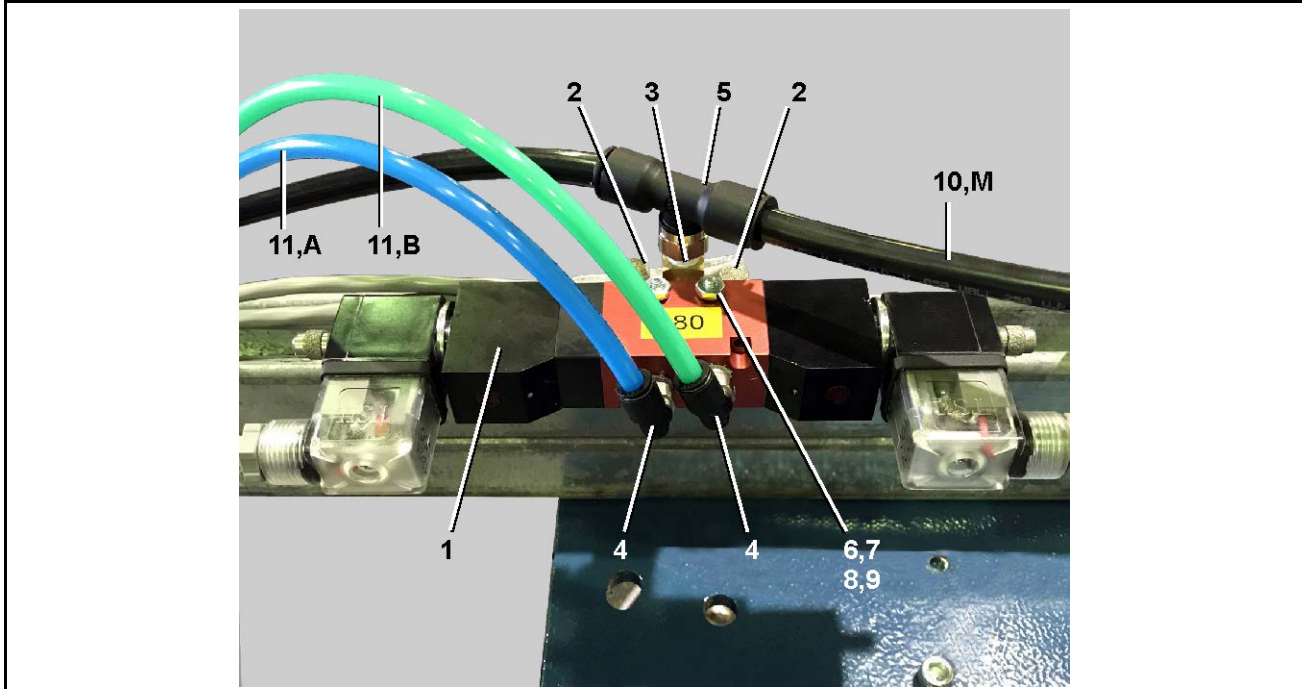
1 Sheet

Table 26 Parts List—Solenoid with Spring Return (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
B	11	60E004GN	1/4"OD X.170"ID NYL(GREEN)TUBING - EA = FT	
C	11	60E004RD	1/4"OD X.170"ID NYL(RED)TUBING - EA = FT	

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Solenoid with Solenoid Return



Legend

- A . . . Blue Tubing, Actuate
- B . . . Green Tubing, Second Actuate
- M . . . Main Air

Table 27. Parts List—Solenoid with Solenoid Return

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	AVAMRSPAA01	MILRAIL VALVE ASSY SOLENOID/SOLENOID 2 POSITION	ASSEMBLY
Components				
all	1	96R305APR24	1/8"NPT PILOT 5 PORT NC 24VDC DIN SOLENOID/SOLENOID 2 POSITION	
all	2	96PVQC18S	SILENCER/MUFFLER FOR AIR 1/8" NPT	
all	3	5SL0CBEC	NPTELB 90DEG STRT 1/8 BRASS125	
all	4	96PVQC18249	QUICK CONNECT FITTING 1/8" NPT X 1/4" TUBING 90	
all	5	96PVQC3828T	QUICK CONNECT FITTING 1/8" NPT X 3/8" TUBING TEE	
all	6	04 30579	5 PORT VALVE STRUT MOUNT BRKT	
all	7	15N068	RDMACSCR 6-32UNC2AX1.25 ZINC	
all	8	15G070	HXMACHSCRNUT 6-32UNC2B ZINC GR	
all	9	15U100	LOCKWASHER MEDIUM #6 ZINCPL	

General Service Information

2 Sheet

Table 27 Parts List—Solenoid with Solenoid Return (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	10	60E005B	TUBING NYL.3/8"OD X.275"ID	
A	11	60E004BL	1/4"OD X.170"ID NYL(BLUE)TUBING E = FT	
B	11	60E004GN	1/4"OD X.170"ID NYL(GREEN)TUBING - EA = FT	
C	11	60E004RD	1/4"OD X.170"ID NYL(RED)TUBING - EA = FT	