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RW 1200

ROCK WINDROWER

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INTRODUCTION

We are pleased to welcome you as an owner of a product of **Rite Way Mfg.** This product is the result of years of agricultural and engineering experience, and is built to give you many years of successful operating service.

For the most in efficiency and operation of your rock windrower, we have provided this owner's manual. Its preparation is the result of years of experience gained in field testing and normal usage of this, and similar implements. We urge a careful study of this manual to provide you with a thorough understanding of your new rock windrower before operation. We also urge you're care of this manual so that it will be available for future reference when needed. If your manual should become lost or destroyed, a new copy can be obtained from your **Rite Way Mfg.** Dealer. We will also be happy to answer any questions you might have concerning the use or care of this product.

SPECIFICATIONS

- Working Width 144" (3660mm)
- Height 32" (812mm)
- Transport Height 42" (1066mm)
- Weight 1720 lbs. (782Kg.)
- Drive Hydraulic – 10 to 15 GPM @ 1200 to 1500 PSI
- Drum Speed 125 to 150 RPM
- Replaceable Drum Teeth
- Shipping Dimensions 150" x 68" x 22"
(Length x Width x Height) = (3800mm x 1730mm x 560mm)

SAFETY SUGGESTIONS

1. Read manual thoroughly before operating machine.
2. Study all warning decals on implement.
3. Most accidents occur because of *neglect* or *carelessness*.
4. Only the operator should be on the tractor during operation.
5. Connect the hitch to the tractor before operating hydraulics. Be cautious of the hydraulic oil leaks.
6. Always throttle the tractor down and use caution in attaching the machine to the tractor. Never stand between the implement and the tractor.
7. Be very cautious when unhooking the tractor and hitch. The ***parking jack must be securely lowered on firm level ground (on blocking with tires chocked)*** or the hitch will raise abruptly causing serious injury and other damage.
8. Proceed carefully when performing maintenance on the machine. The drum should be on the ground; however, if the nature of the work requires that the implement be in transport position, being sure to use the cylinder lock up.
9. The hydraulic cylinder should be locked up during transport
10. **Limit towing to a maximum of 25 M.P.H.**
11. Exercise caution when working on hillsides or near ditches.

MAINTENANCE INSTRUCTIONS

NEW

- Repack wheel hubs after first 500 acres, yearly thereafter.
- Visually inspect wheel bolts for tightness. Torque to 110 ft/lbs. after first few hours of operation and frequently thereafter.

DAILY

- Grease bushing mount and axle bearings

50 HOURS OF OPERATIONS

- Check that all bolts and nuts are tight.

ANNUALLY

- Grease wheel bearings and inspect for looseness.
- Check wheel bolts for tightness.
- Check tire pressure. Recommended pressure is 35 psi.
- Visually inspect all bolts for tightness and check for loose and worn components.

ANNUAL STORAGE

- Coat exposed cylinder shaft with thick oil or grease.
- **Ensure that the parking jack is on firm level ground (on blocking with tires chocked).**
Failure to do so may cause the hitch to rise sharply as the jack pads sink into the ground.
- Lock all applicable safety pins in place.

ASSEMBLY INSTRUCTIONS

- Study the general layout on pages 9 through 25.
- Assemble in a large open area free of obstacles.
- References to “Left”, “Right”, “Forward”, and “Rear” are always determined from the rear of the machine facing the direction of forward travel.
- Grease all points either during assembly or immediately after.
- Double check wheel bolts and all other bolts after assembly.
- Use thread sealant on all hydraulic connections that are not flared fittings.

MAIN FRAME ASSEMBLY

1. Block up the main frame (#1, Page 12) approximately 20”.
2. Attach the perfect hitch tongue to the perfect hitch body (#1 & 2, Page 9) using a 1/2 x 4-1/2 Capscrew & 1/2” Stover lock nut (#3 & 4, Page 9). Attach the perfect hitch body to the main frame using two 5/8 x 5 capscrews and two 5/8” stover locknuts (#17 & 22, Page 12).
3. Attach parking jack (#4, Page 12)
4. Attach the tip & chain holder (#33, Page 12) to the main frame using two 1/2 x 1-1/4 capscrews & two 1/2” stover locknuts (#14 & 21, Page 12).
5. Attach the 24” shepherd hook hose standoff (#2, Page 12) to the main frame using a 1/2 x 1-1/2 capscrew, 1/2” washer & 1/2” stover locknut (#15, 29 & 21, Page 12).
6. Attach the storage tube (#8, Page 12) to the main frame using a 3/8 x 1-1/4 capscrew & 3/8” flat washer on the inside of the tube & a 3/8” stover locknut on the outside (#12, 28 & 20, Page 12).
7. Attach the slow moving sign spade (#6, Page 12) to the main frame using two 5/16 x 3/4 capscrews & two 5/16” flange hex nuts (#11 & 27, Page 12). Attach the slow moving sign to the slow moving sign spade using two 1/4 x 3/4 capscrews & two 1/4” flange hex nuts (#10 & 26, Page 12).
8. Attach the safety chain (#3, Page 12) using a 1” x 2” capscrew and stover locknut (#18 & 23, Page 12).
9. Attach the 3” hose clamps and back plates (#31 & 32, Page 12) using the 3/8” x 1-1/2” capscrews, 3/8” hex nut and flat washer as required (#13, 19, 24 & 28 Page 12).

MAIN FRAME AXLE ASSEMBLY

1. Attach the axle bearing weldment (#7, Page 14) to the left side of main frame using four 5/8 x 1-3/4 capscrews, four 5/8" spring lock washers and four 5/8" hex nuts (#18, 20 & 24, Page 14), leave loose at this time.
2. Attach the bushing mount weldment (#11, Page 14) to the right side of the main frame using two 1/2 x 3-1/2 x 3-1/4 U-bolts, four 1/2" spring lock washers and four 1/2" hex nuts (#19, 22 & 23, Page 14), leave loose at this time.
3. Insert the long axle weldment (#4, Page 14) and tighten up the bushing mount and left axle bearing weldment (#11, Page 14). Measure the distance from the axle to main frame cross member at each end and keep equal distance from left to right to make sure the axle is straight with the main frame weldment.
4. Attach the hydraulic cylinder (#2, Page 14) to the cylinder lug on the main frame and to the long axle using 1 x 3-1/2 cylinder pins c/w cotter pins (#26 & 28, Page 14). Ensure that the cylinder is in extended position and locked with cylinder lock up (#10, 17 & 27, Page 14). Connect hoses to cylinder, making sure they are connected properly.
5. Attach the axle bearing weldment (#7, Page 14) to the right side of the main frame using four 5/8 x 1-3/4 capscrews, four 5/8" spring lock washers, and four 5/8" hex nuts (18, 20 & 24, Page 14).
6. Insert the short axle weldment less hub (#5, Page 14) into the right axle bearing and secure it using the axle washer & 1/4 x 3 cotter pin (#25, 29, Page 14). Attach the axle link adjuster bar threaded clevis end using a 1 x 3-1/2 cylinder pin c/w cotter pin (#26, 28, Page 14).
7. Attach the axle link adjuster bar base assembly (#9, Page 14) to the right side of the long axle using a 1 x 3-1/2 cylinder pin c/w cotter pin (#26, 28, Page 14).

DRUM CARRIAGE AND DRUM ASSEMBLY

1. Align the assembled main frame with the drum carriage (# 3, 4, Page 16) and attach using 5/8" x 2-1/4" capscrew, 5/8" spring lock washers and 5/8" hex nuts (# 21, 26 & 32, Page 16).
2. Align the assembled main frame and drum carriage with the drum weldment (#1, 3, Page 16). Ensure that the drum assembly is secure and will not move. Place the 4-bolt flange bearings on to the drum shafts. Lower the assembly so that the drum is in position to be attached.
3. Mount the 4-bolt flange bearings to the drum carriage (#13, Page 16) using 5/8" x 2-1/4" capscrews, 5/8" stover locknuts (#21, 24, Page 16). Make sure to have equal spacing on each end of the drum between the carriage plates and drum ends. Ensure that the grease zerks are facing in the opposite direction of travel. If there is an Eccentric lock collar, then it should be locked in place to match the direction of forward rotation. If there are two set screws then tighten both.

4. When mounting the motor to the motor mount on the carriage weldment use the four 5/8" jam nuts on the carriage weldment (these will have to be adjusted equally to tighten the chain and keep the motor and sprocket true).
5. The 5/16" x 1-1/4" motor key stock (#9, Page 16) should be ground to match the radius of the keyway on the hydraulic motor shaft. This key stock comes with the motor. It should be removed and modified as required.
6. The motor sprocket should be mounted flush with end of the motor shaft. It will be held in place by a 5/8" x 1" capscrew, 5/8" fender washer and 5/8" spring lock washer (#16, 32 & 33, Page 16).
7. The motor mount when placed on the motor should not move from side to side. If this occurs, the motor mount may have to be replaced.
8. The drum sprocket will have to be aligned with the motor sprocket. Make sure that the 3/8" x 2-1/2" key stock (#10, Page 16) is completely flush with drum shaft (all the way in) into the drum shaft sprocket. Use **Blue Loc-tight** on drum shaft sprocket set screws when installing on shaft.
9. Once the Sprockets are aligned you can then install the #80 chain, connector and half link (#8, 11 & 12, Page 16).
10. Refer to page 23 for chain installation tightening. Once you are satisfied with the tension of the chain, tighten the 5/8" hex nuts and 5/8" spring lock washers (# 26 & 32, Page 16).
11. Once the drum (#1, Page 16) has been attached, assemble the 611 hubs as shown on page 19. Attach the two wheel rims (#13 & 14, Page 14) using six 9/16 x 1-1/4 wheel bolts (#21, Page 14) per hub.
12. When mounting the chain guard (# 2, Page 16) on the drum carriage, using two 3/8" x 1" capscrews, 3/8" flat washers & 3/8" spring lock washers (# 17, 29 & 31, Page 16) and two 1/2" x 1-3/4" capscrews, 1/2" flat washers & 1/2" stover locknuts (# 19, 23 & 30).
13. Tighten all grease zerks and grease as required.
14. Assemble hydraulic lines to the main frame (Refer to Page 17), fill with hydraulic fluid.
15. Apply decals; refer to page 21 & 22 as required.
16. Test the operation of the implement to ensure standards of quality are met.

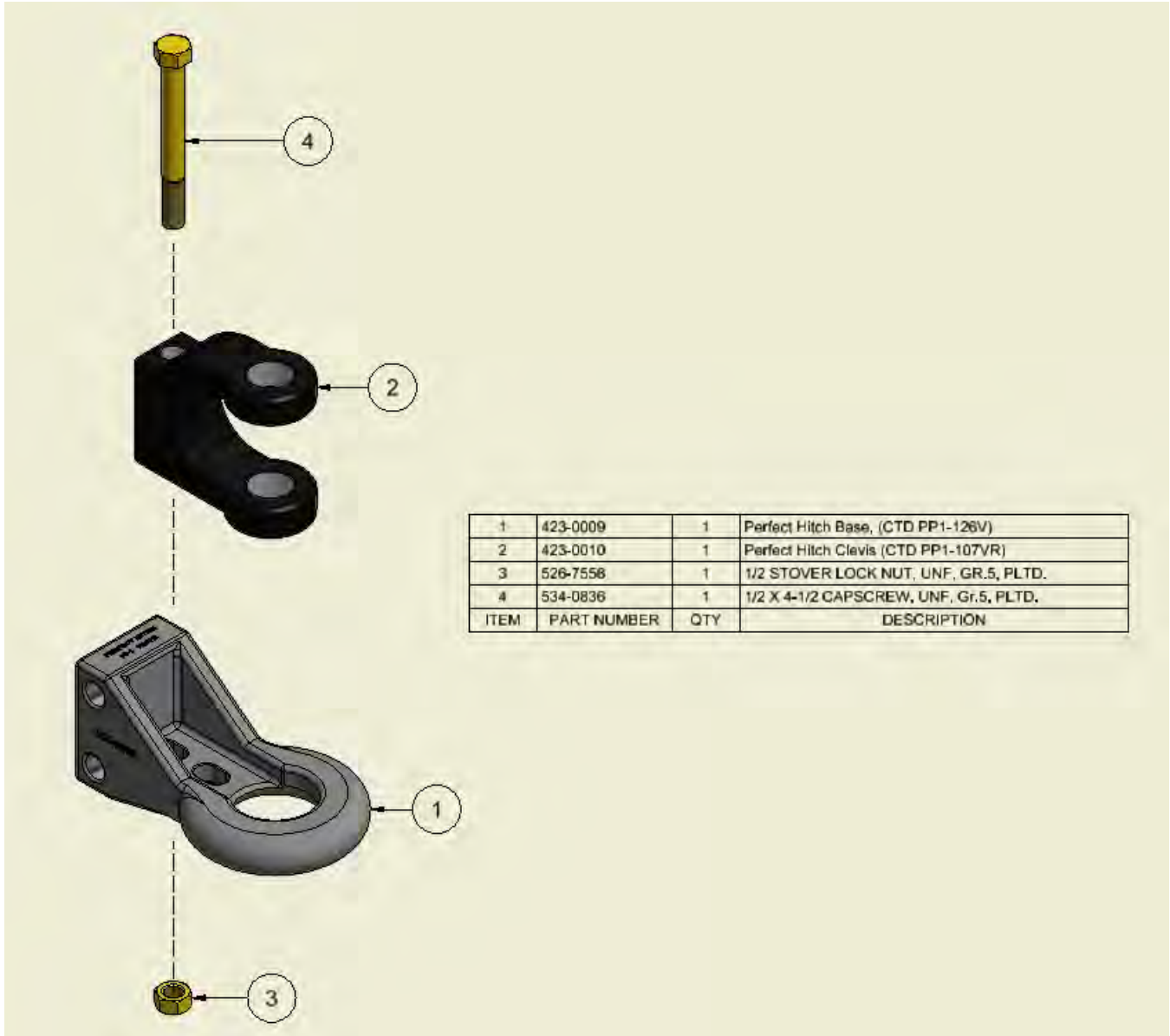
OPERATING INSTRUCTIONS

- Periodically check that all bolts and nuts are tight.
- Grease all fittings daily during use.
- Grease wheel bearings annually
- Your **Rite Way** rock windrower requires a single hydraulic system with a pump capable of delivering 10 to 15 gallons per minute at 1200 to 1500 PSI.
- The proper speed for the windrower drum is 125 to 150 RPM which you can achieve in most cases by throttling faster or slower, or some tractors may have hydraulic flow controls. Check your tractor manual for details on the hydraulic system.
- If the machine is jammed, simply reverse the motor by reversing the hydraulic control lever.
- References to “Left”, “Right”, “Forward” and “Rear” are always determined from the rear of the machine facing the direction of forward travel.



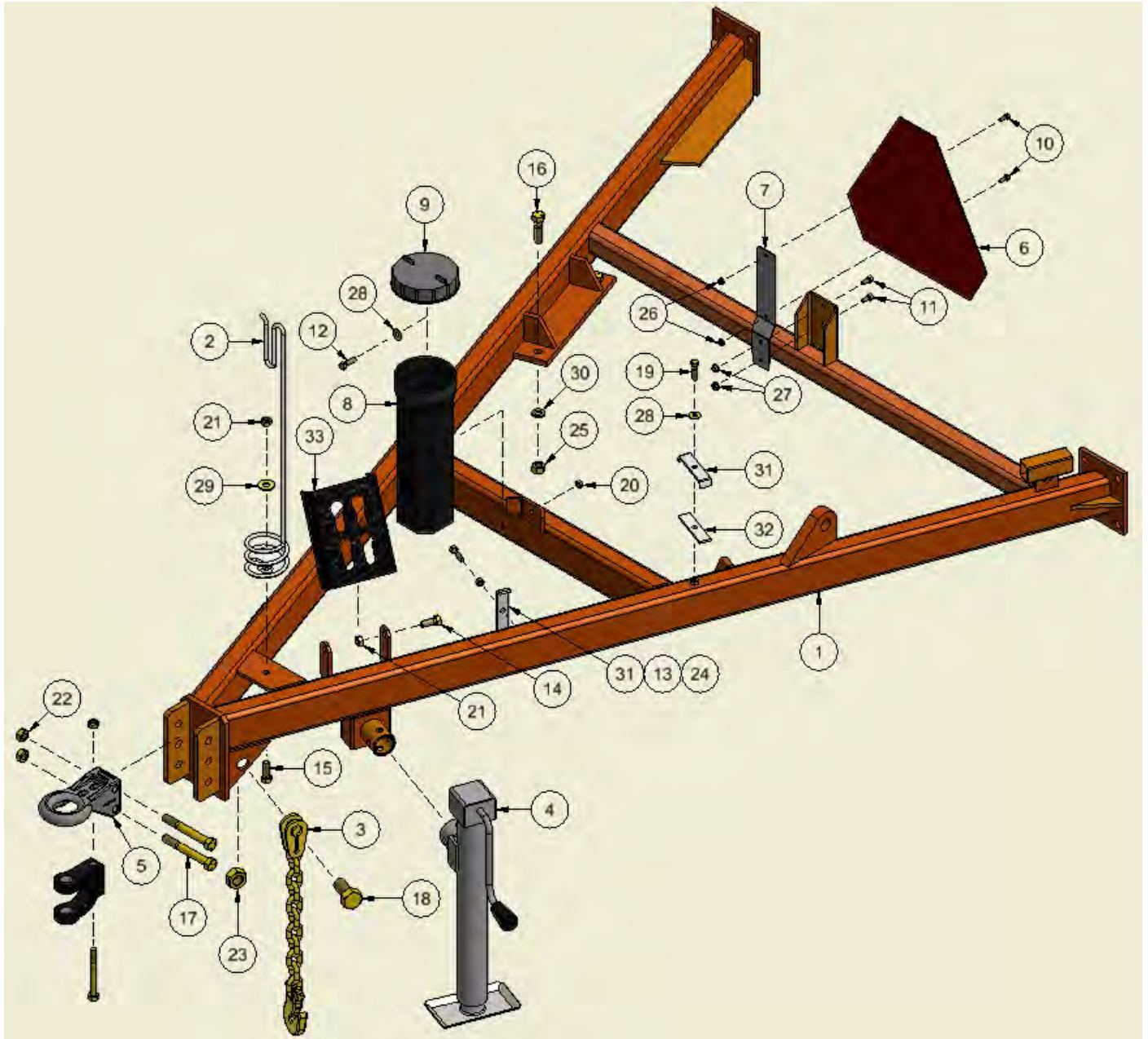
PERFECT HITCH ASSEMBLY PARTS LIST

If using a clevis, bolt onto the bottom of the base hitch using a grade 5 or 8 bolt and stover lock nut, to ensure the vertical loads are taken by the base hitch. If **no clevis** is used the perfect hitch base should be used with the clevis slot facing up on the base hitch.



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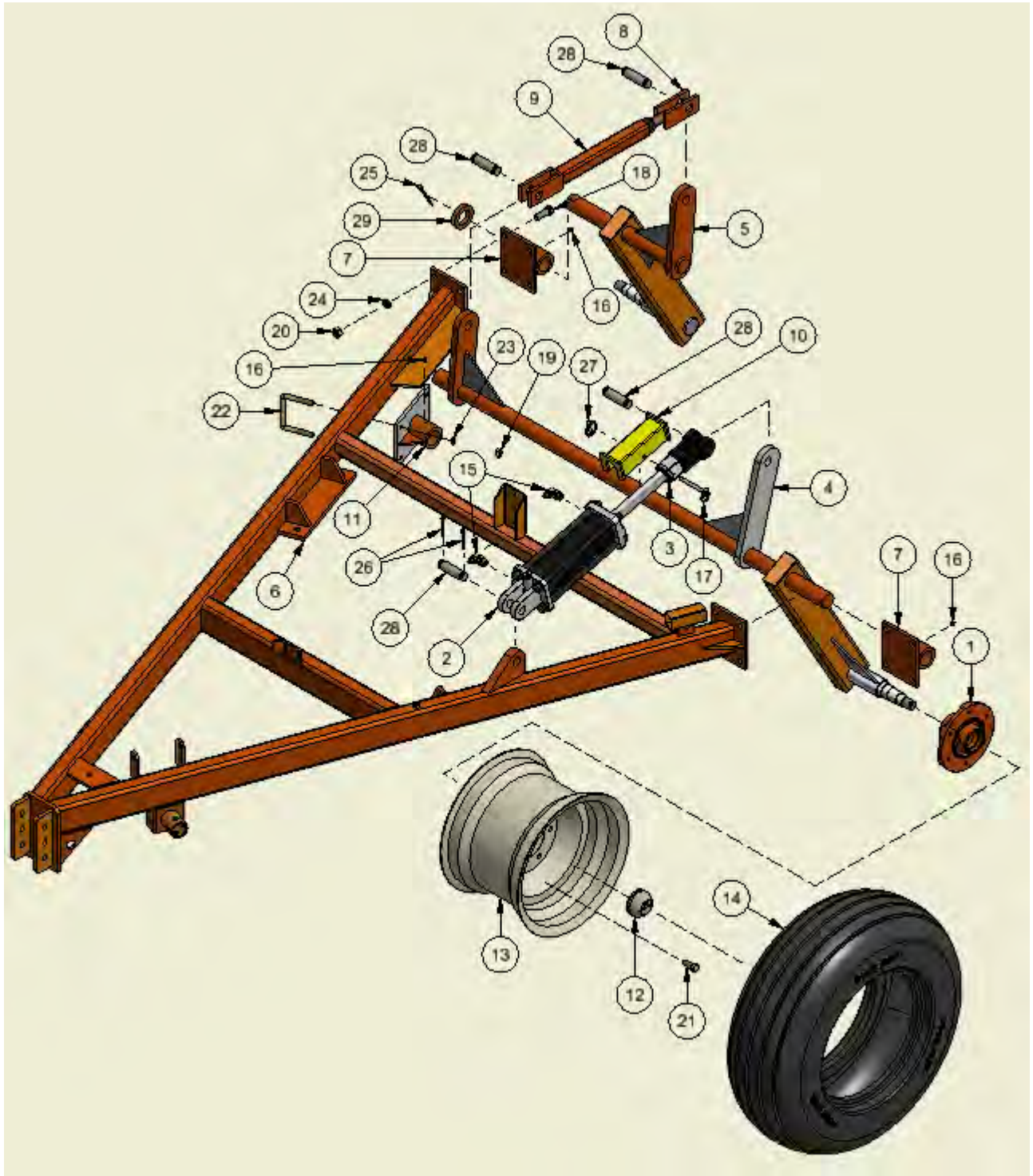
MAIN FRAME PARTS LIST



MAIN FRAME PARTS LIST

<u>ITEM</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	110-1221r5	Main Frame Weldment
2	407-0003	24" Shepherd Hook Hose Standoff
3	409-9050	20,000 lbs. Safety Chain Assembly
4	420-0132	10" 3,000 lbs. Side Winder Jack Assembly
5	423-0011	Perfect Hitch Assembly c/w Clevis Option, (Refer to Page 15)
6	424-0001	Slow Moving Sign
7	424-0002	Slow Moving Sign Spade
8	426-0001	Storage Tube
9	426-0002	Storage Tube Cap
	426-0003	Storage Tube Assembly c/w Tube and Cap
10	526-0406	1/4" x 3/4" Capscrew, NC, Gr.5, Pltd.
11	526-0506	5/16" x 3/4" Capscrew, NC, Gr.5, Pltd.
12	526-0610	3/8" x 1-1/4" Capscrew, NC, Gr.5, Pltd.
13	526-0613	3/8" x 1-1/2" Capscrew, NC, Gr.5, Pltd. (Full Thread)
14	526-0810	1/2" x 1-1/4" Capscrew, NC, Gr.5, Pltd.
15	526-0812	1/2" x 1-1/2" Capscrew, NC, Gr.5, Pltd.
16	526-1018	5/8" x 2-1/4" Capscrew, NC, Gr.5, Pltd.
17	526-1040	5/8" x 5" Capscrew, MC, Gr.5, Pltd.
18	526-1616	1" x 2" Capscrew, NC, Gr.5, Pltd.
19	526-2026	3/8" x 1-1/2" Capscrew, NC, Gr.5, Pltd. (Full Thread) (Scotch Grip)
20	526-6103	3/8" Stover Lock Nut, NC, Gr.5, Pltd.
21	526-6105	1/2" Stover Lock Nut, NC, Gr.5, Pltd.
22	526-6106	5/8" Stover Lock Nut, NC, Gr.5, Pltd.
23	526-6109	1" Stover Lock Nut, NC, Gr.5, Pltd.
24	526-6206	3/8" Hex Nut, NC, Gr.5, Pltd.
25	526-6210	5/8" Hex Nut, NC, Gr.5, Pltd.
26	526-7104	1/4" Flange Lock Nut, NC, Gr.5, Pltd.
27	526-7105	5/16" Flange Lock Nut, NC, Gr.5, Pltd.
28	550-5206	3/8" Flat Washer, Pltd.
29	550-5208	1/2" Flat Washer, Pltd.
30	551-5010	5/8" Spring Lock Washer, Pltd.
31	811-1003	3" Steel Hose Clamp, Pltd. (3/16" x 1" Flat - 4-1/2")
32	811-1017	3" Steel Backing Plate, Pltd. (3/16" x 1" Flat - 4")
33	835-1011	Tip And Chain Holder, Painted

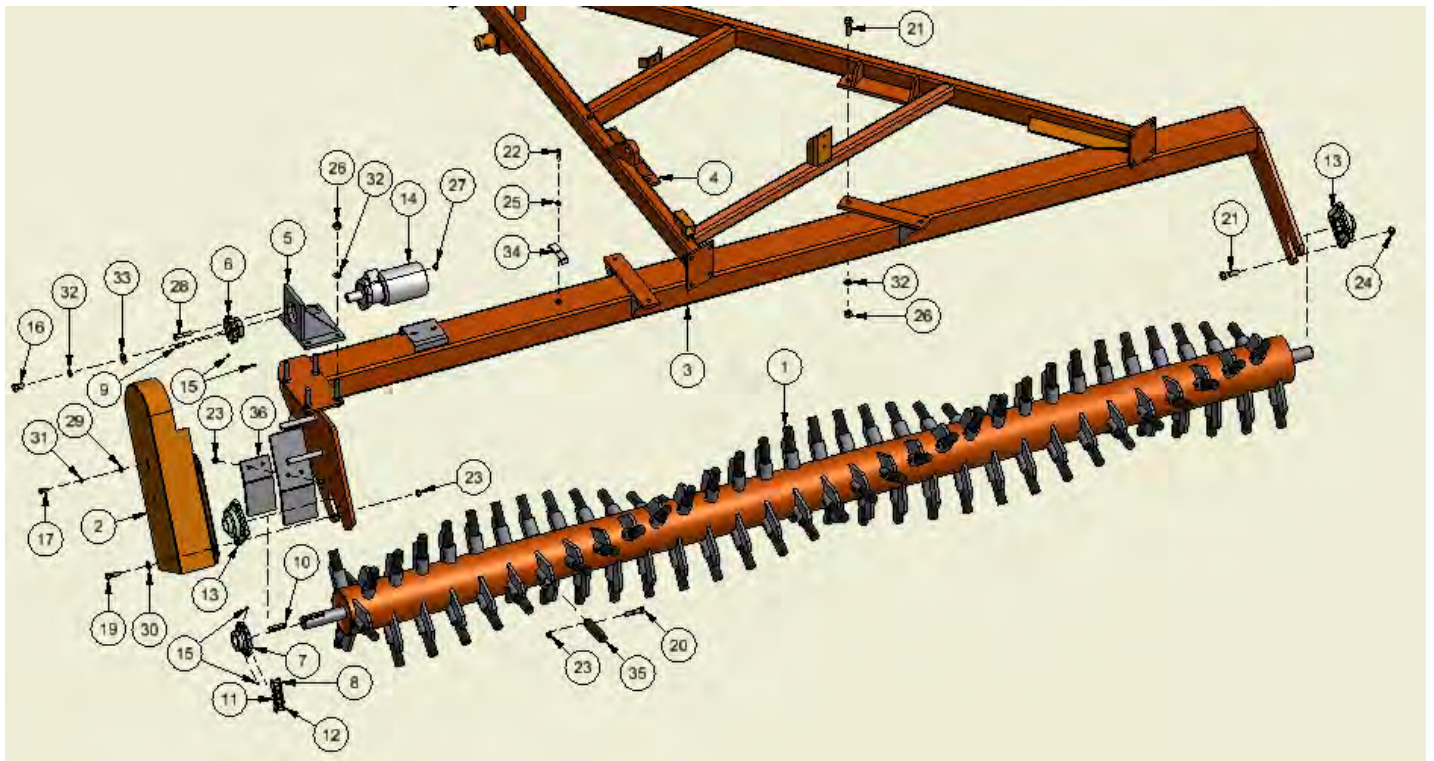
AXLE PARTS LIST



AXLE PARTS LIST

<u>ITEM</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	020-5590	611-9 Hub Assembly
2	030-5980	3-1/2 x 8 – 1-1/4 Monarch Hydraulic Cylinder
3	030-5980-DC	Depth Control (Monarch # 638656)
4	110-1204r3	Long Axle Weldment
5	110-1205r2	Short Axle Weldment
6	110-1221r5	Main Frame Weldment
7	112-1201	Axle Bearing Weldment
8	112-1202	Threaded Axle Link Weldment
9	112-1203	Axle Adjustment Bar Weldment - Base
10	112-1206	Cylinder Lock Up (for Ø1-1/2" x 7-1/4" long shaft)
11	113-0081	Bushing Mount Weldment
12	202-6010	DC – 13 Dust Cap, CTD
13	204-5565	Wheel Rim, 15 x 8 – 6 Bolt, (Offset 1-1/8")
14	205-9580	9.5L x 15 – 8 Ply Tubeless Tire
	020-0097	Tire and Wheel Rim Assembly
15	319-5710	1/2" ORB M x 3/8" JIC M – 90° Elbow
16	419-0004	1/4" UNF Grease Zerk, Straight, Pltd.
17	422-0007	3/8" x 3" Hitch Pin, Pltd.
18	526-1014	5/8" x 1-3/4" Capscrew, NC, Gr.5, Pltd.
19	526-6208	1/2" Hex Nut, NC, Gr.5, Pltd.
20	526-6210	5/8" Hex Nut, NC, Gr.5, Pltd.
21	543-5562	9/16" x 1-1/4" UNF Wheel Bolt, Pltd.
22	546-5149	1/2" x 3-1/2" x 3-1/4" IL, U-Bolt, NC, Gr.5, Pltd.
23	551-5008	1/2" Spring Lock Washer, Pltd.
24	551-5010	5/8" Spring Lock Washer, Pltd.
25	556-0824	1/4" x 3" Cotter Pin, Pltd.
26	556-0906	3/16" x 1-3/4" Cotter Pin, Pltd.
27	559-1000	1/4" x 1-3/4" Lynch Pin, Pltd.
28	560-1614	1" x 3-1/2" Cylinder Pin, Pltd.
29	805-7005	Axle Washer, Painted

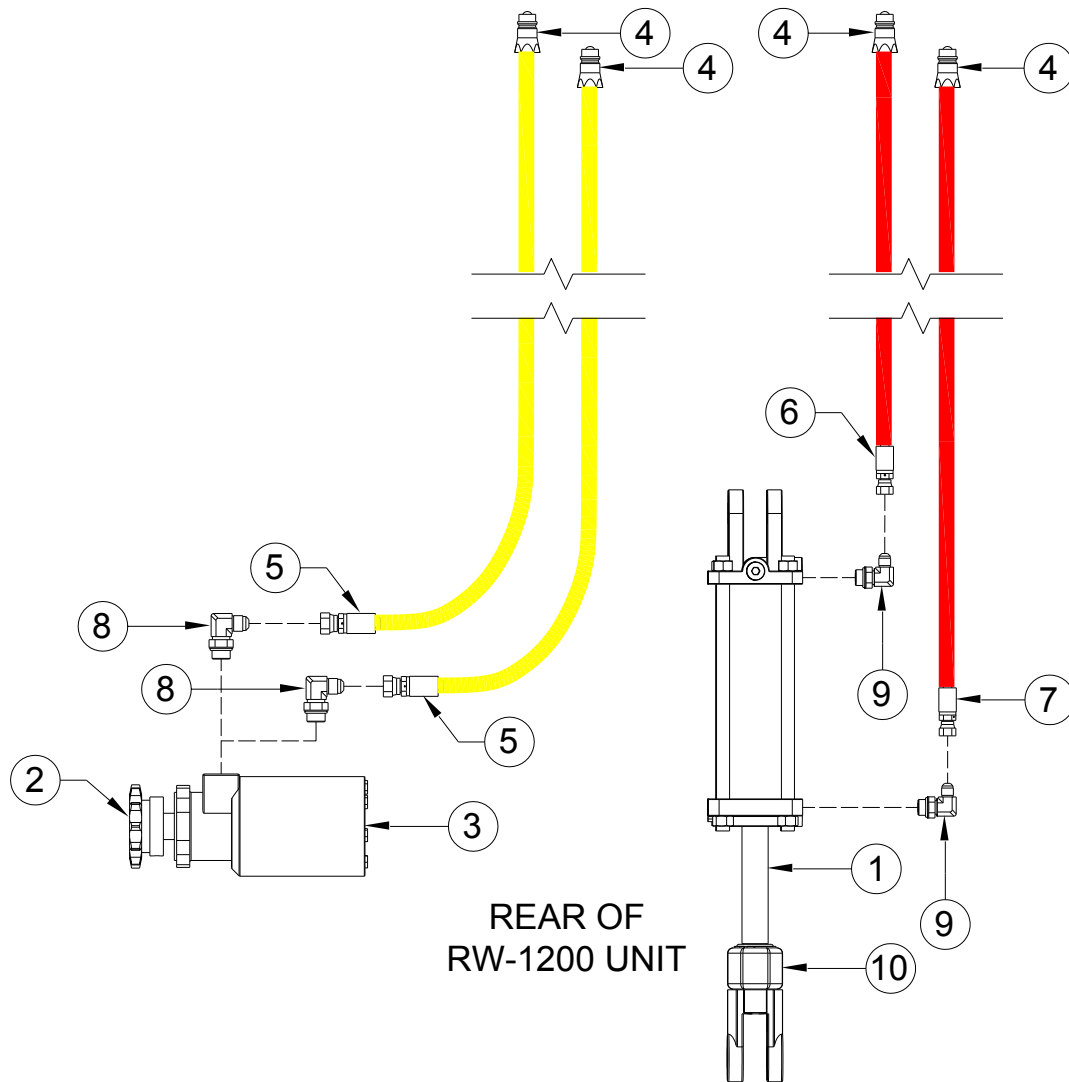
DRUM & DRUM CARRIAGE PARTS LIST



DRUM & DRUM CARRIAGE PARTS LIST

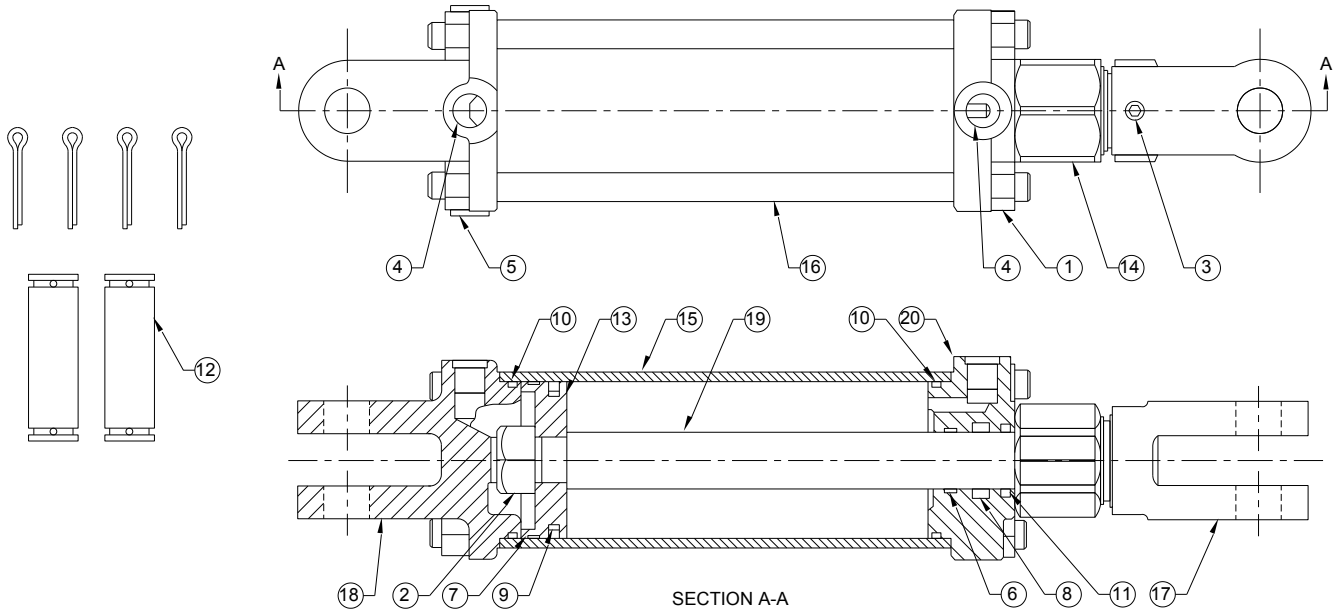
<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1	105-0224	RW-1200 Drum Weldment
	160-0085	RW-1200 Drum Assembly, c/w Replaceable Teeth, Capscrews & Stover's
2	105-0443	Chain Guard Weldment
3	110-1202r5	Drum Carriage Weldment
4	110-1221r5	Main Frame Weldment
5	113-0113	Motor Mount Weldment
6	252-1180	80 B14 Sprocket, Ø1-1/4" Hole, 5/16" Key
7	252-1480	Sprocket, 14 tooth 80B14, Ø1-3/4" Bore, 3/8" Key
8	262-8051	#80 Chain, 24 Double Links
9	263-0520	5/16" x 1-1/4" Square Key
10	263-0640	3/8" x 2-1/2" Square Key
11	264-8001	#80 Chain Connector Link
12	264-8002	#80 Chain Half Connector Link
13	292-4015	Ø1-3/4" ID 4-Bolt Flange Bearing
14	307-1003	Parker Hydraulic Motor c/w Built In Reliefs
15	510-4553	Set Screw, 5/16" x 5/16"
16	525-1008	5/8" x 1" Capscrew, UNF, Gr.5, Black
17	526-0608	3/8" x 1" Capscrew, NC, Gr.5, Pltd.
18	526-0812	1/2" x 1-1/2" Capscrew, NC, Gr.5, Pltd.
19	526-0814	1/2" x 1-3/4" Capscrew, NC, Gr.5, Pltd.
20	526-0820	1/2" x 2-1/2" Capscrew, NC, Gr.5, Pltd.
21	526-1018	5/8" x 2-1/4" Capscrew, NC, Gr.5, Pltd.
22	526-2026	3/8" x 1-1/2" Capscrew, NC, Gr.5, Pltd., (Full Thread, Scotch Grip)
23	526-6105	1/2" Stover Lock Nut, NC, Gr.5, Pltd
24	526-6106	5/8" Stover Lock Nut, NC, Gr.5, Pltd.
25	526-6206	3/8" Hex Nut, NC, Gr.5, Pltd
26	526-6210	5/8" Hex Nut, NC, Gr.5, Pltd.
27	526-7558	1/2" Stover Lock Nut, UNF, Gr.5, Pltd.
28	534-0805	1/2" x 2-1/4" Capscrew, UNF, Gr.5, Pltd.
29	550-5206	3/8" Flat Washer, Pltd.
30	550-5208	1/2" Flat Washer, Pltd.
31	551-5006	3/8" Spring Lock Washer, Pltd.
32	551-5010	5/8" Spring Lock Washer, Pltd.
33	554-5510	5/8" ID Fender Washer (Parker Motor)
34	811-1003	4" Hose Clamp, Plat. 3/16" x 1" Flat – 4-1/2"
35	827-0031	Drum Tooth, (Ø1-1/4 x 5 Sucker Rod)
36	839-0188	Stone Guard Wear Plate, Painted, (3/8" HR Plate – 8" x 4-1/4")

HYDRAULIC ASSEMBLY



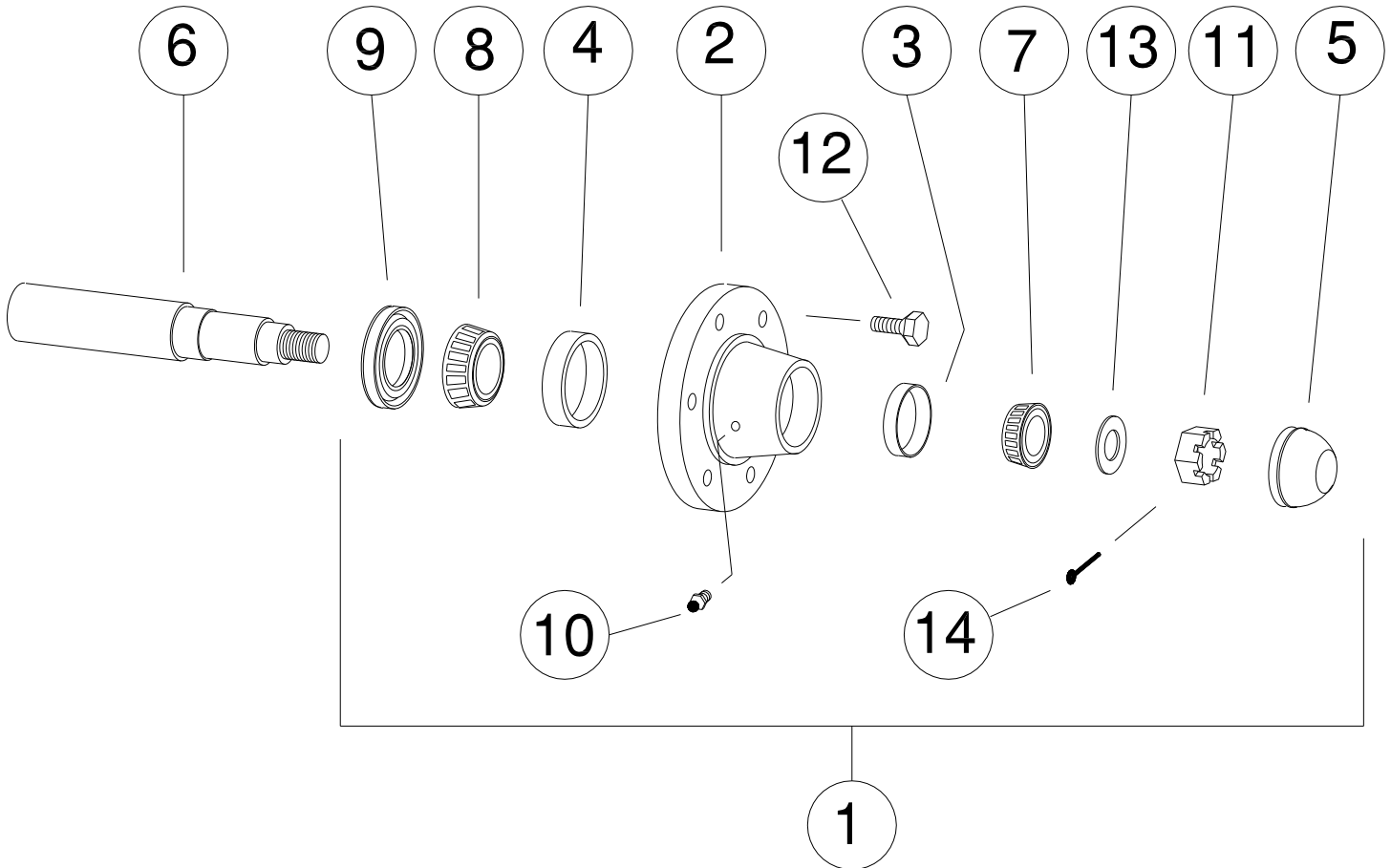
ITEM	PART NUMBER	DESCRIPTION
1	030-5980	3-1/2" x 8 Hydraulic Cylinder c/w Depth Control
2	252-1180	80 q 11 Sprocket, Ø1-1/4" Hole, 5/16" Key
3	307-1003	Parker Hydraulic Motor c/w Built in Reliefs
4	308-0001	1/2" NPT F Pioneer Tip
5	312-1860	1/2" Hose, 1/2" JIC Sw. F z 1/2" NPT M – 160"
6	313-6541	3/8" Hose, 3/8" JIC Sw. F x 1/2" NPT M – 109"
7	313-6543	3/8" Hose, 3/8" JIC Sw. F x 1/2" NPT M – 120"
8	319-5710	1/2" ORB M x 3/8" JIC M – 90° Elbow
9	319-5712	5/8" ORB M x 1/2" JIC M – 90° Elbow
10	292638	STR 1-1/4" Stroke Control Assembly

MONARCH 3-1/2 X 8 (35TH08-125)
RITE WAY PART NUMBER 030-5980 (ORB)
c/w Stroke Control (638656)



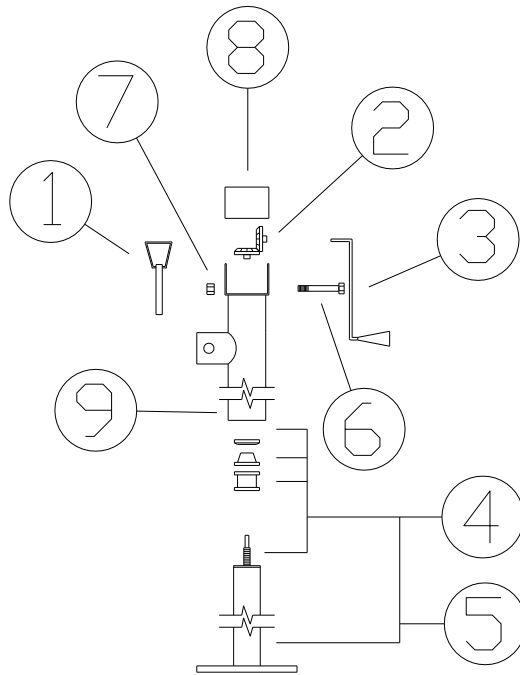
<u>ITEM</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	128271	Hex Nut, Ø5/8-18 UNF, Gr.5
2	130560	Hex Nut, Ø1-1/4 Lock, Gr.B
3	148000	Set Screw Socket 3/8 x 1/2 UNC KNUR
4	174136	Thd Prot 3/4-16 UN ORB Zinc D
5	174164	Trod Prot 3/4 ORB Int Plastic
5	186562	Fitting Plug 3/4-16 ORB Socket
6	190131	Wear Ring 1.37 – 1.25 – 0.250
7	190188	Wear Ring 3.50 – 3.38 – 0.250
8	194016	Seal Zurcon U-Cup RU9 1.25
9	197066	Seal Zurcon Wynseal 3.50 - I
10	199141	Seal Dual 3.50
11	199157	Seal Wiper 1.25 MNUC TSS
12	235005	Pin Kit 1.00 c/w Cotter Pins
13	258827	Piston 3.50 – 1.00 – TSS – ISO - W
14	292638	Stroke Control Assembly Ø1-1/4 Rod
15	491798	Tube Cylinder 3.50 – 8.00
16	492388	Tie Rod Ø5/8 – 8.00
17	492652	Rod Clevis 1.25 – 1.00
18	492676	Clevis Cap 3.50 – 3/4 ORB – 1.00
19	492700	Rod Cylinder 1.25 – 08 – 1.00 – 1.25 - A
20	494286	Rod Cap 3.50 – 1.25 – 3/4 ORB - TS
	649216	Repair Kit, 3.50 x 8 – 1.25

611 HUB BREAKDOWN



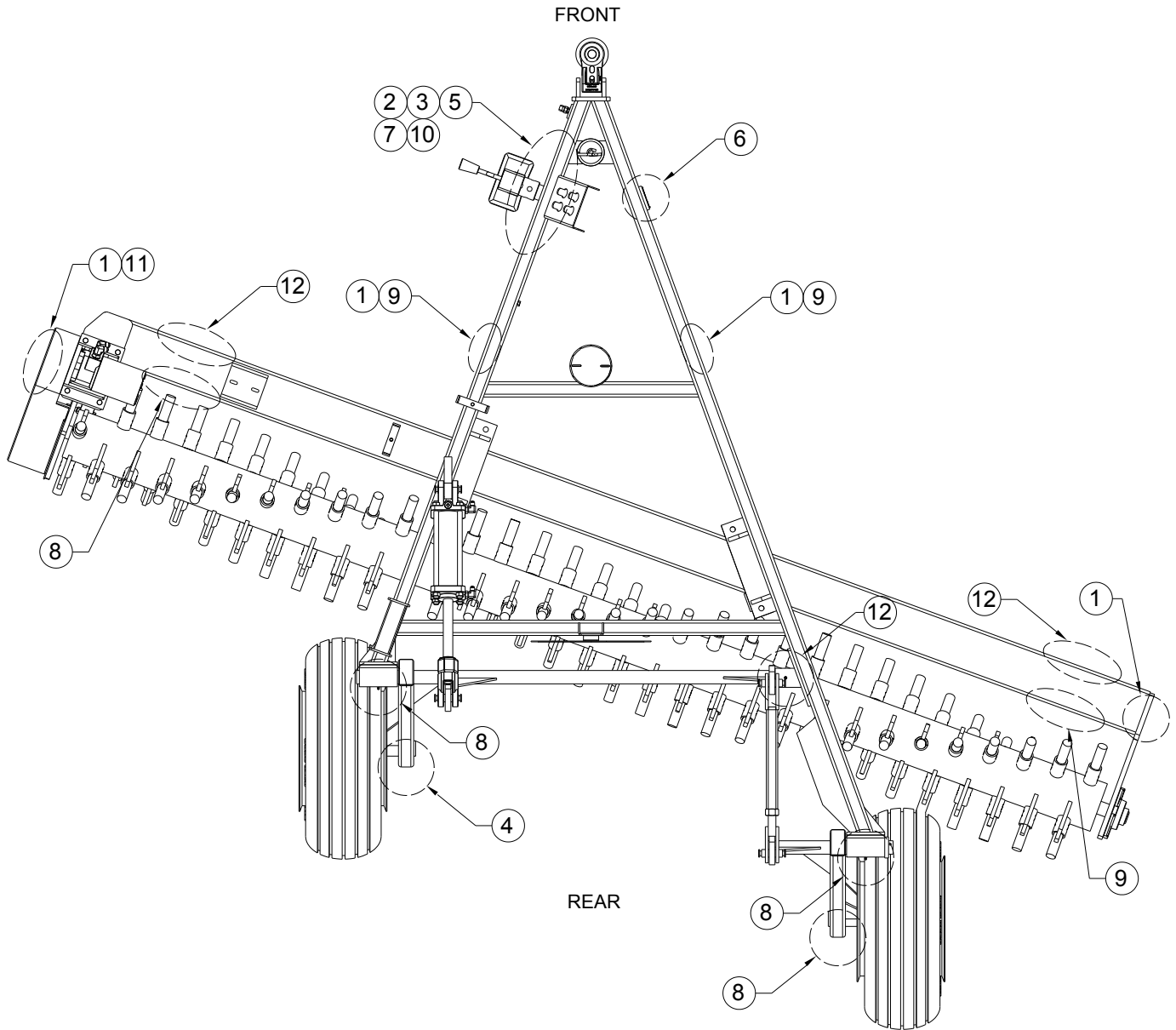
<u>ITEM</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	020-5590	H611 Hub Assembly
2	200-5589	H611-9 Hub c/w Cups Only
3	201-5522	Outer Cup (LM67010)
4	201-5547	Inner Cup (LM29710)
5	202-6010	Dust Cap (DC-13)
6	203-5594	S611 Spindle - 2" x 11"
7	290-5514	Outer Wheel Bearing (LM67048)
8	290-5546	Inner Wheel Bearing (LM29749)
9	295-5518	Seal (SE13)
10	419-0004	1/4" Grease Nipple NF Straight
11	525-7816	1" NF Castle Nut
12	543-5562	9/16" Wheel Stud UNF
13	554-5303	1" Spindle Washer WA-17
14	556-0614	3/16" x 1-3/4" Cotter Pin

10" x 2000 lb. SIDE WIND PARKING JACK
RITE WAY PART NUMBER 420-0132



<u>ITEM</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	420-0154	Hitch Pin c/w Chain
2	420-0155	Gear Set
3	420-0156	Side Wind Crank Kit
4	N/A	Screw Replacement Kit
5	N/A	Inner Ram Assembly
6	N/A	Capscrew - 1/4" x 3" UNC
7	N/A	Lock Nut - 1/4" UNC
8	N/A	Cover
9	N/A	Body

DECAL INFORMATION



DECAL INFORMATION

ITEM	PART NUMBERS	DESCRIPTIONS
1	060-0009	Amber Reflector (3" x 2")
2	060-0011	Caution: Escaping Fluid Hazard...
3	060-0015	Important: Block Wheels...
4	060-0022	Red Reflector (3" x 2")
5	060-0028	Warning: Lower or Block Elevated...
6	060-0034	Rite Way Serial Number Plate
7	060-0038	Attention: Insure That All Cylinders Are Retracted...
8	060-0046	Grease Every 8 Hrs.
9	060-0048	Rite Way Mfg. Co. Ltd. (9" x 3" Med. Black)
10	060-0067	Warning: Check & Tighten Hub & Wheel Bolts
11	060-0069	Warning: Rotating Parts Hazards...
12	060-0077	RW-1200 (19" x 3", Black)



MODEL NUMBER

YEAR PRODUCED

SERIAL NUMBER

ROLLER CHAIN INFORMATION

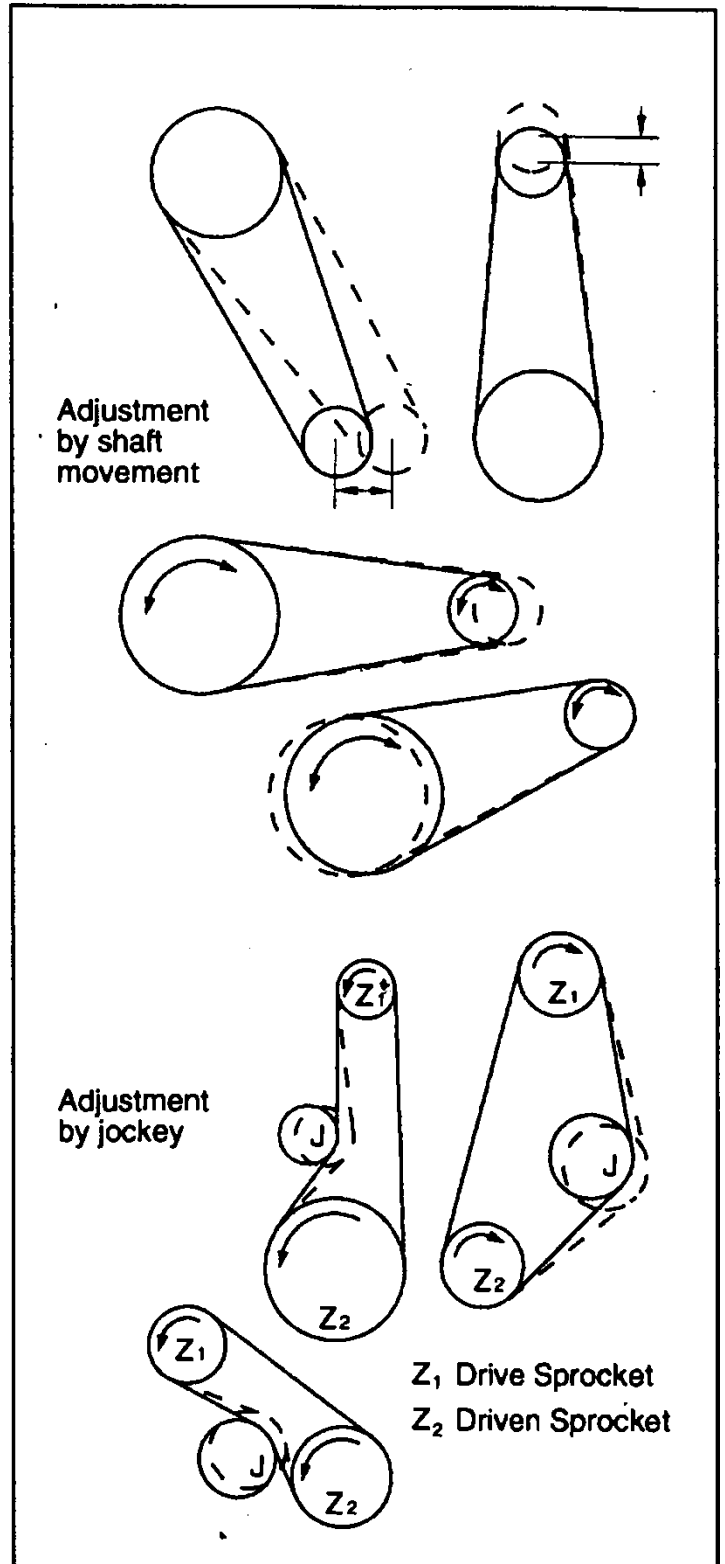
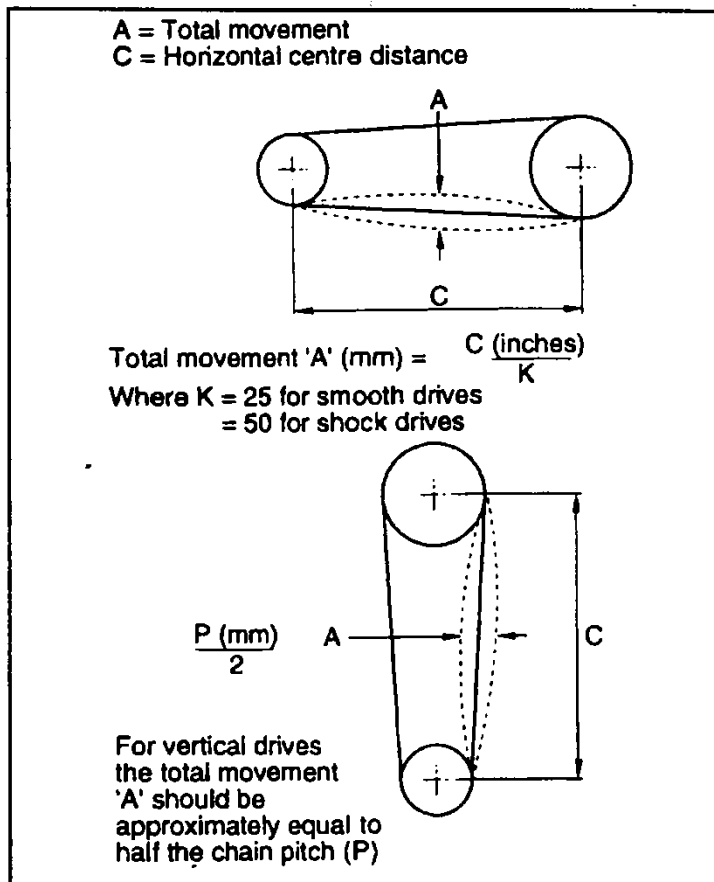
Worldwide Chain Failures

1. Lack of Lubrication
2. Improper chain tensioning
3. Sprocket misalignment

Note: An over tensioned new chain loses around 50% of its running life in the first three hours of running. (See Below)

For a chain of average centre distance (30-50 x chain pitch) correct adjustment is when the mid point of the longest span can be fully moved by hand in accordance with dimension 'A' shown below.

Over-tensioning should be avoided in all cases.



TORQUE & TENSION CHART

Caution: All torque values included in these charts are advisory only, and their use by anyone is entirely voluntary. Reliance on the contents for any purpose by anyone is the sole risk of that person and Fastenal is not responsible for any loss, claim or damages arising therefrom. In developing this information, Fastenal has made a determined effort to present its contents accurately. Extreme caution should always be used when using a formula for torque-tension relationships. Torque is only an indirect indication of tension.

Torque-Tension Relationships for SAE J429 Grade Bolts

Nominal Thread Size	SAE J429 Grade 2			SAE J429 Grade 5			SAE J429 Grade 8		
	Clamp Load (lbs.)	Tightening Torque		Clamp Load (lbs.)	Tightening Torque		Clamp Load (lbs.)	Tightening Torque	
		K = .15	K = .20		K = .15	K = .20		K = .15	K = .20
Unified Coarse Thread Series									
1/4-20	1,300	49 in-lbs	65 in-lbs	2,000	75 in-lbs	100 in-lbs	2,850	107 in-lbs	143 in-lbs
5/16-18	2,150	101	134	3,350	157	210	4,700	220	305
3/8-16	3,200	15 ft-lbs	20 ft-lbs	4,950	23 ft-lbs	31 ft-lbs	6,950	32.5 ft-lbs	44 ft-lbs
7/16-14	4,400	24	30	6,800	37	50	9,600	53	70
1/2-13	5,850	36.5	49	9,050	57	75	12,800	80	107
9/16-12	7,500	53	70	11,600	82	109	16,400	115	154
5/8-11	9,300	73	97	14,500	113	151	20,300	159	211
3/4-10	13,800	129	173	21,300	200	266	30,100	282	376
7/8-9	11,425	125	166	29,435	321	430	41,550	454	606
1-8	15,000	187.5	250	38,600	482.5	640	54,540	680	900
Unified Fine Thread Series									
1/4-28	1,500	55 in-lbs	75 in-lbs	2,300	85 in-lbs	115 in-lbs	3,250	120 in-lbs	163 in-lbs
5/16-24	2,400	112	150	3,700	173	230	5,200	245	325
3/8-24	3,600	17 ft-lbs	22.5 ft-lbs	5,600	26 ft-lbs	35 ft-lbs	7,900	37 ft-lbs	50 ft-lbs
7/16-20	4,900	27	36	7,550	42	55	10,700	59	78
1/2-20	6,600	41	55	10,200	64	85	14,400	90	120
9/16-18	8,400	59	79	13,000	92	122	18,300	129	172
5/8-18	10,800	83	110	16,300	128	170	23,000	180	240
3/4-16	15,400	144	193	23,800	223	298	33,800	315	420
7/8-14	12,610	138	184	32,480	355	473	45,855	500	668

Clamp load estimated as 75% of proof load for specified bolts.

Torque values for 1/4 and 5/16 inch series are in inch-pounds. All other torque values are in foot-pounds.

Torque values calculated from formula $T = KDF$ where: $K = 0.15$ for "lubricated" conditions and $K = 0.20$ for "dry" conditions.

Torque-Tension Relationships for Cadmium Plated Prevailing Torque Lock Nuts

Locknut Size	Steel Hex Locknut			Steel Hex Flange Locknut					
	Clamp Load (lbs.)	Grade C Locknut		Clamp Load (lbs.)	Grade F Locknut		Clamp Load (lbs)	Grade G Locknut	
		Maximum	Minimum		Maximum	Minimum		Maximum	Minimum
Unified Coarse Thread Series									
1/4 - 20	2850	125 in-lbs	85 in-lbs	2000	95 in-lbs	65 in-lbs	2850	150 in-lbs	100 in-lbs
5/16 - 18	4700	19	130	3350	180	120	4700	240	155
3/8 - 16	6950	28 ft-lbs	20 ft-lbs	4950	26 ft-lbs	16 ft-lbs	6950	32 ft-lbs	21 ft-lbs
7/16 - 14	9600	43	31	6800	42	28	9600	51	34
1/2 - 13	12,800	62.5	45	9050	57	38	12,800	85	55
9/16 - 12	16,400	95	70	11,600	85	55	16,400	120	80
5/8 - 11	20,300	122.5	90	14,500	112	75	20,300	143	95
3/4 - 10	30,100	210	155	21,300	195	135	30,100	240	160
7/8 - 9	41,600	312.5	225						
1 - 8	54,600	462.5	360						

Clamp loads for Grades C and G nuts equal 75% of the proof loads specified for SAE J429 Grade 8.











Clamp loads for Grade F nuts equal 75% of the proof load specified for SAE J429 Grade 5.

Torque values for 1/4 and 5/16 inch series are in inch-pounds. All other torque values are in foot-pounds.

GRADE CHART

Mechanical Specifications for Externally Threaded Fasteners with Grade Markings, ASTM A36 Material Specification, SAE J429 Bolt and Nut Compatibility

Mechanical Specifications for Externally Threaded Fasteners with Grade Markings

Specification	Material	Size Range (Inches)	Min. Proof Strength (psi)	Min. Tensile Strength (psi)	Core Hardness Rockwell		Min. Yield Strength (psi)	Grade Identification Marking
					Min.	Max.		
SAE J429-Grade 1	Low or medium carbon steel	1/4-1-1/2	33,000	60,000	B70	B100	36,000	
SAE J429-Grade 2		1/4-3/4	55,000	74,000	B80	B100	57,000	
		7/8-1-1/2	33,000	60,000	B70	B100	36,000	
ASTM A307-Grade A	Low or medium carbon steel	1/4-4		60,000	B69	B100		
ASTM A307-Grade B	Low or medium carbon steel	1/4-4		60,000(min) 100,000(max)	B69	B95		
SAE J429-Grade 5	Medium carbon steel: quenched & tempered	1/4-1	85,000	120,000	C25	C34	92,000	
ASTM A449-Type 1		1-1/8-1-1/2	74,000	105,000	C19	C30	81,000	
ASTM A449-Type 1 <i>See Note 2</i>		1-3/4-3	55,000	90,000			58,000	
ASTM A325-Type 1	Medium carbon steel: quenched & tempered	1/2-1 1-1/8-1-1/2	85,000 74,000	120,000 105,000	C25 C19	C34 C30	92,000 81,000	
ASTM A354 Grade BC	Medium carbon alloy steel: quenched & tempered	1/4-2-1/2 2-1/2-4	105,000 95,000	125,000 115,000	C26 C22	C36 C33	109,000 99,000	
ASTM A354 Grade BD	Medium carbon alloy steel: quenched & tempered	1/4-2-1/2 2-1/2-4	120,000 105,000	150,000 140,000	C33 C31	C39 C39	130,000 115,000	
SAE J429-Grade 8	Medium carbon alloy steel: quenched & tempered	1/4-1-1/2	120,000	150,000	C33	C39	130,000	
SAE J429-Grade 8.2	Low carbon boron steel: quenched & tempered	1/4-1	120,000	150,000	C33	C39	130,000	
ASTM A490-Type 1	Medium carbon alloy steel: quenched & tempered	1/2-1-1/2	120,000	150,000(min) 170,000(max)	C33	C38	130,000	
ASTM A574 Socket Head Cap Screw	Low alloy steel: quenched & tempered	#0-1/2 over 1/2-2	140,000 135,000	180,000 170,000	C39 C37	C45 C45		

Note 1: No minimum hardness is required on bolts and studs 3 times the diameter and longer.

Note 2: Bolts less than 3 times the diameter in length and studs less than 4 times the diameter in length shall have hardness values not less than minimum and not more than maximum.

Note 3: Bolts 3 times the diameter in length and over are not required to meet minimum hardness requirements.

Note 4: ASTM A354-Grade BD with diameters 1/4" through 2-1/2" shall be marked with the grade symbol "BD" and, in addition may be marked with six radial lines.

Note 5: Radial line markings 120 degrees apart are optional.

NOTES