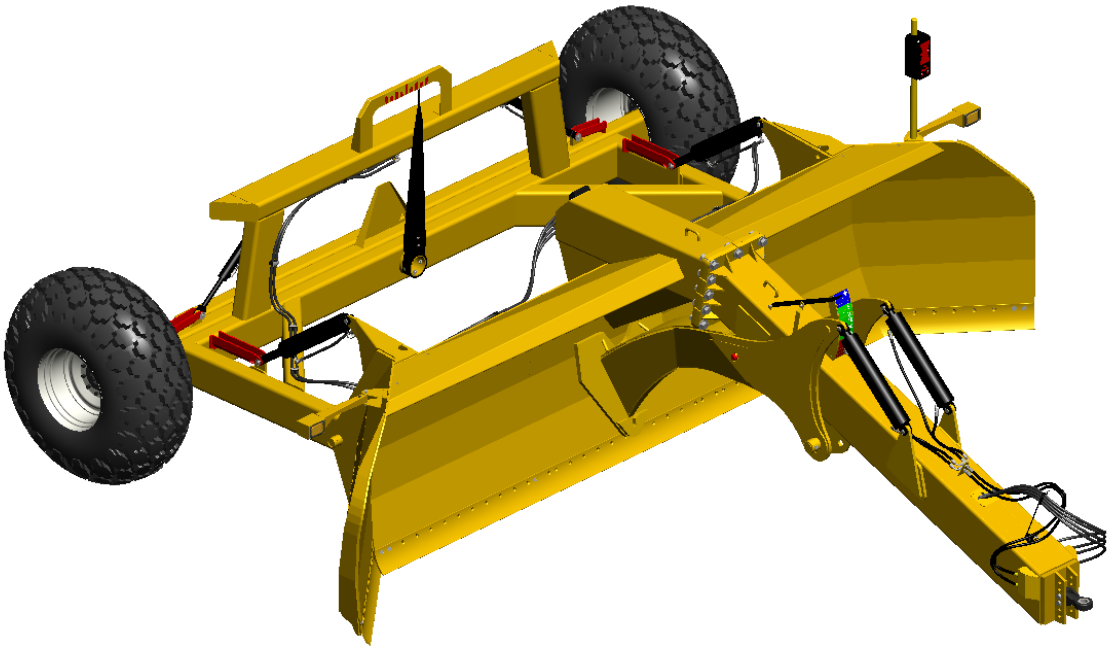
BRIDGEVIEW MFG. INC.



PULLDOZER
1800/1800XL/2400/2400XL

Assembly and Parts Manual

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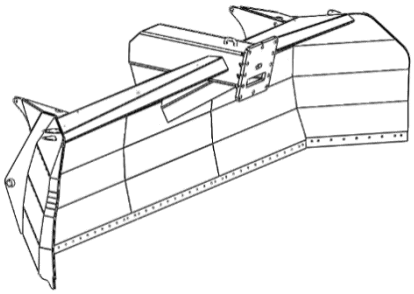
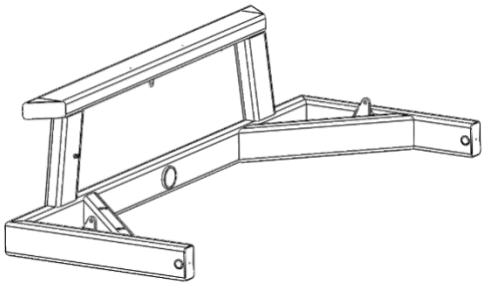
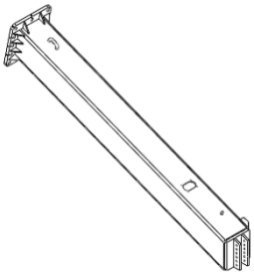
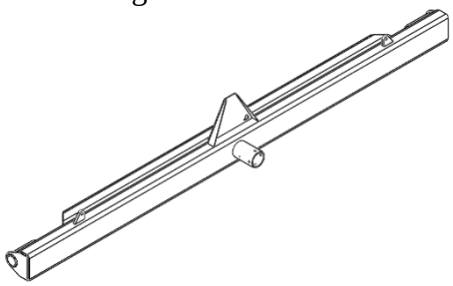
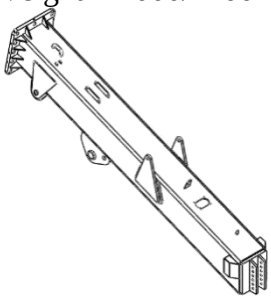
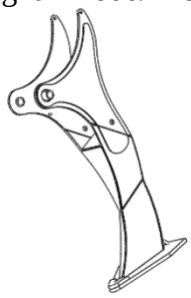
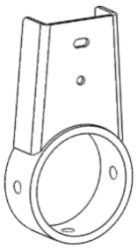
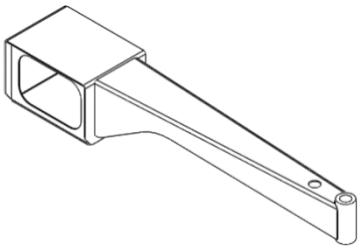
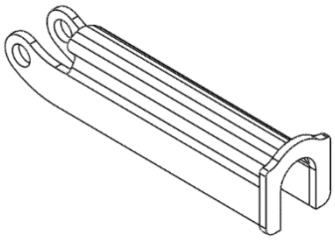
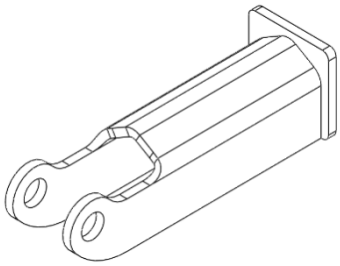
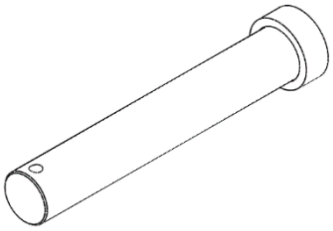
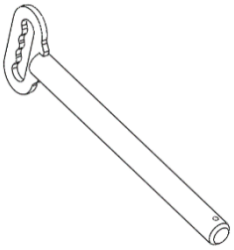
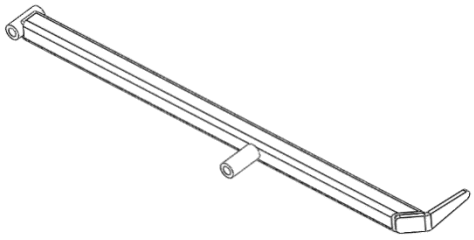
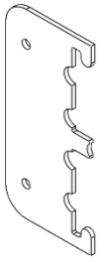
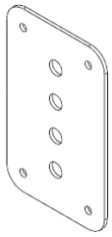
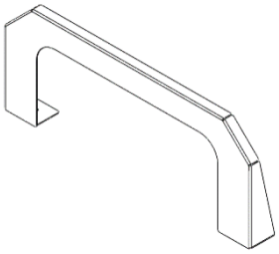
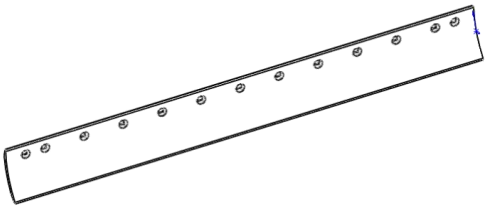
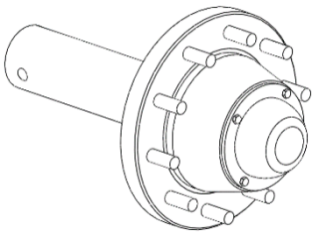
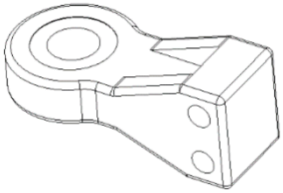
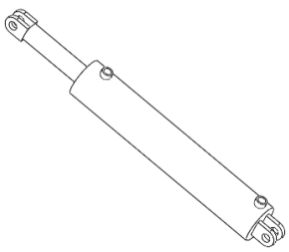
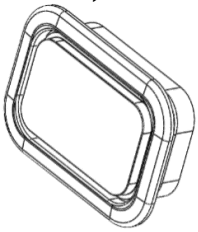
1. Component Information (2400/1800)

NOTE: ID Numbers and weights shown as 2400/1800, where different.

Blade Weldment **20743/20421** Weight = 10600/7200 lb 	**Main Frame Weldment** **20744/20419** Weight = 3800/3000 lb 
Hitch Weldment **20742/20422** Weight = 1700/1800 lb 	**Axle Weldment** **20745/20420** Weight = 5600/3000 lb 
Trencher Hitch Weldment **22107/22176** Weight = 2000/2100 lb 	**Trencher** **22013/22204** Weight = 1600/1100 lb 
Axle Collar Weldment **21550** 	**Flasher Light Weldment** **23339** 

Lift Cylinder Safety Lock Weldment **20630** 	**Tilt Cylinder Safety Lock Weldment** **21228** 
Blade Pin Weldment **23338** 	**Trencher Safety Pin** **22136** 
Trencher Depth Indicator Bracket **27200** 	**Trencher Depth Indicator Arm** **22137** 
Trencher Depth Indicator Linkage **23341** 	**Blade Pin Collar** **23342** 
Hitch Bulkhead Plate 1 **22343** 	**Hitch Bulkhead Plate 2** **23344** 

Rear Bulkhead Plate **23346** 	**Angle Indicator Arm** **21562/21553** 
Readout Bracket **21570** 	**Blade Cutting Edge** **20428 (4ft) / 20430 (6ft)** 
Tires & Rims **See Section 2.8** 	**Hub & Spindles** **See Section 2.7** 
Hitch **20453 (Class 4) / 21375 (Class 4.5)** 	**Spring Hose Holder** **17967** 
Hydraulic Cylinder **20431 (5"x24") / 20488 (3"x20")** 	**Lights** **21419 (Red) / 21420 (Amber)** **21421 (Grommet) / 21422 (Pigtail)** 

2. Body Assembly

NOTE: Refer to component list at end for ID Numbers (in brackets).

1. Place the blade subassembly upright on a stable level surface. Make sure the blade is blocked appropriately for stability.

2. Using 1-1/2" bolts (20653), and hex nuts (20654) attach the hitch subassembly (or trencher hitch subassembly) to the neck of the blade subassembly. Washers (20434) must be placed one on each side of the blade and hitch plates.

   Note: These bolts must be lubricated and torqued to 1800 ft-lb.

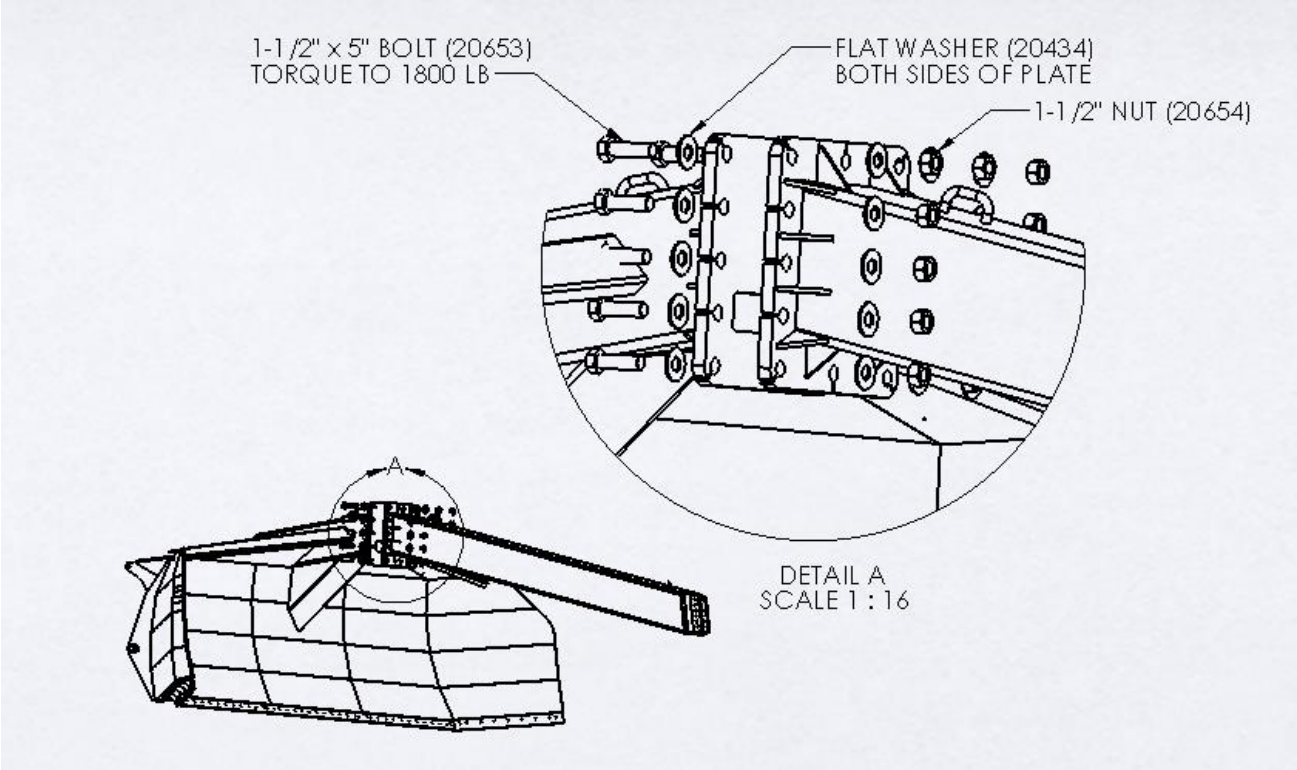


Figure 1 - Blade to hitch Attachment

3. Lift the main frame subassembly keeping it level and line it up with the mounting holes on the blade subassembly.

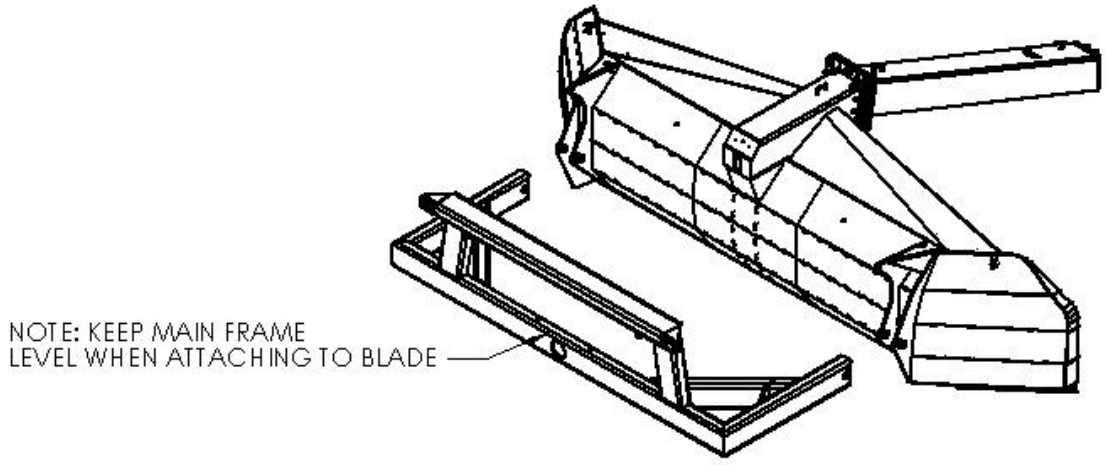


Figure 2 - Main frame to blade alignment

4. Using the blade pins (23338), blade pin collars (23342), 1/2" x 4" bolts (15574) , and 1/2" nylon lock nuts (10241), attach the main frame to the blade.

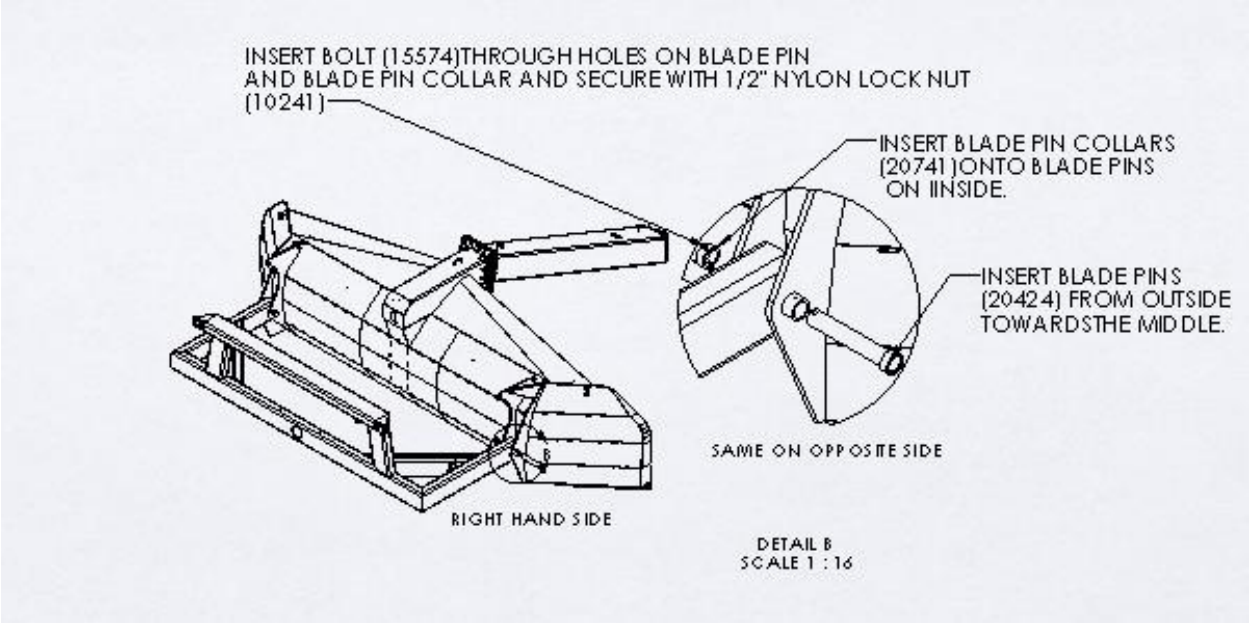


Figure 3 - Main frame attachment

5. Place blocks under main frame in order to maintain its horizontal position.

6. Attach the axle sub assembly to the main frame. Slide the axle into the main frame from the rear of the machine. Place the axle collar weldment onto the axle after sliding through the main frame. Then secure the axle in place with four 3/4" x 2" bolts (21243) and four 3/4" nylon lock nuts (10007).

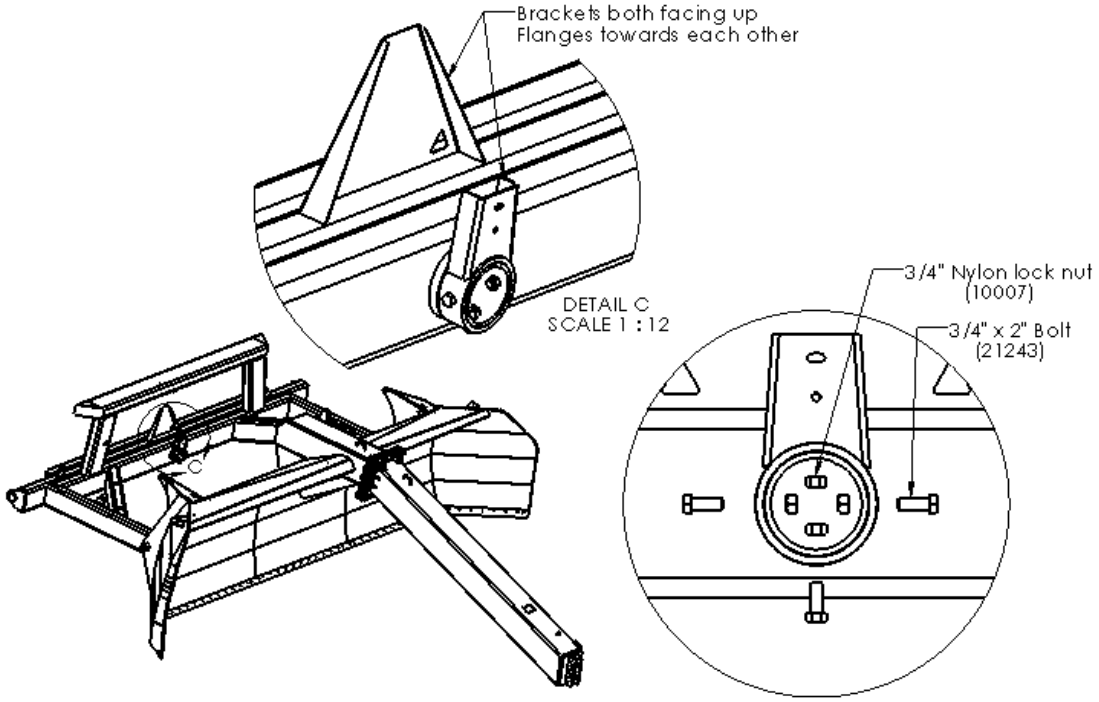


Figure 4 - Axle alignment

7. Assemble the hub and spindle.

a) Insert rear bearing (3) into the hub housing. Install the seal (6) (with rubber lip to the outside (as shown). Lightly tap into place with a rubber mallet.

b) Pack bearings full of grease (Mobil UNIREX EP2 GC-LB). Run grease around the inside of the hub with a spatula to fill the opening.

c) Insert the spindle (2) as shown, with the shoulder up against the rear bearing.

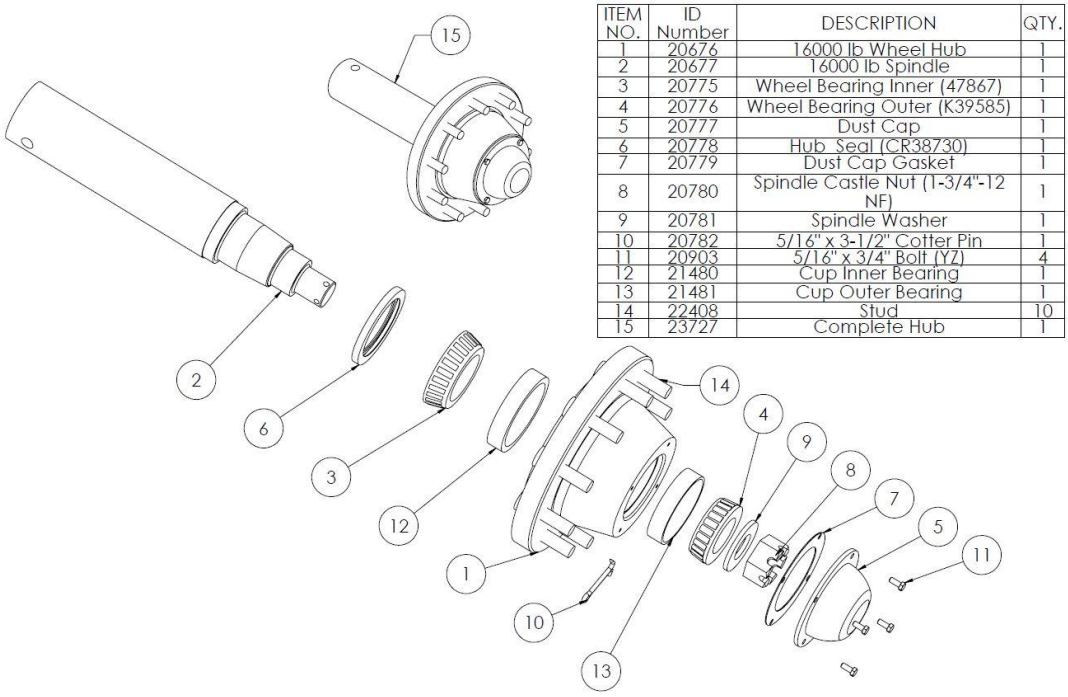
d) Insert front bearing (4), washer (9), and castle nut (8).

e) Rotate the spindle a few times, then repack with grease.

NOTE: Tighten after installed on machine.

f) Tighten the castle nut until the bearings are tight, then back off one notch. Fix in place using the cotter pin (10).

g) Install the dust cap (5), and gasket (7), using four 5/16" x 3/4" bolts (11).



ITEM NO.	ID Number	DESCRIPTION	QTY.
1	20676	16000 lb Wheel Hub	1
2	20677	16000 lb Spindle	1
3	20775	Wheel Bearing Inner (47867)	1
4	20776	Wheel Bearing Outer (K39585)	1
5	20777	Dust Cap	1
6	20778	Hub Seal (CR38730)	1
7	20779	Dust Cap Gasket	1
8	20780	Spindle Castle Nut (1-3/4"-12 NF)	1
9	20781	Spindle Washer	1
10	20782	5/16" x 3-1/2" Cotter Pin	1
11	20903	5/16" x 3/4" Bolt (YZ)	4
12	21480	Cup Inner Bearing	1
13	21481	Cup Outer Bearing	1
14	22408	Stud	10
15	23727	Complete Hub	1

Figure 5 - Hub and spindle assembly

8. Fasten the rim (21437 - 1800) - (21438 - 2400) to the hub using spherical washers (21151) and wheel nuts (20783). The flat side of the spherical washers should contact the surface of the rim with the spherical side against the wheel nuts. **NOTE: Valve stem on outside.**

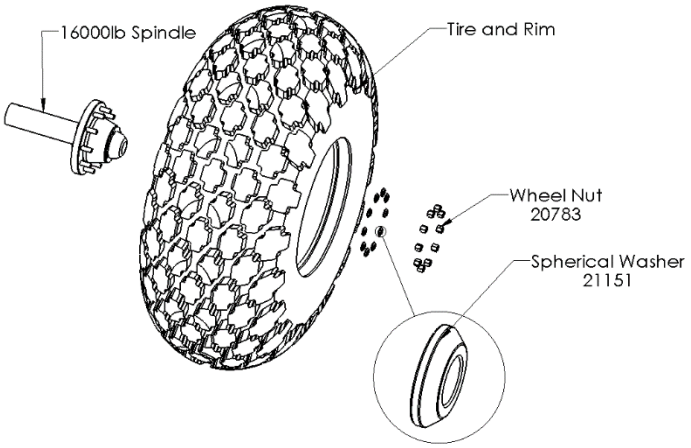


Figure 6 - Hub and wheel assembly

	1800	**2400**
Tire Size	23.1-26, 12 ply	28L-26, 16 ply
Rim Size	DW20A-26	DW25B-26
Tire Pressure	16 psi	24 psi
Wheel Nut Torque	325 ft-lb	325 ft-lb

9. Install the spindle to the axle using 3/4" x 6-1/2" (20787) bolts and nylon lock nuts (10007).

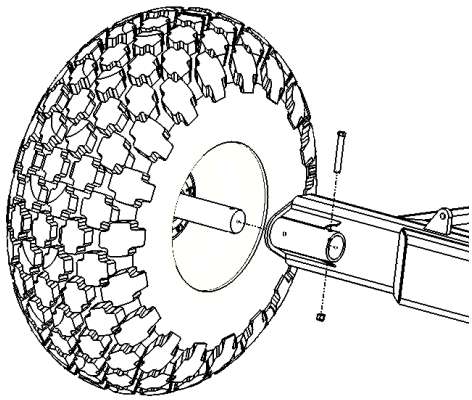


Figure 7 - Spindle to axle assembly

10. Bolt the hitch (Cat. 4 or Cat. 4.5) to the front of the hitch subassembly using two 1" x 7-1/2" Gr.8 NF bolts (21103), and Stover lock nuts (21104). Set to the desired height (usually centered) with the **lettering on the top side**. The Cat.4 hitch has two available pin sizes. Install the desired size by removing the snap ring from the bushing.

Draw Pin Size (inches)	Hitch Required	Part NO
1.50	Flanged Bushing	27373
2.00	Category 4 ***** with 2" bushing installed, 2 Hole Pattern	27371
2.00	Category 4 ***** with 2" bushing installed, 3 Hole Pattern	27372
2.75	Category 5, 2 Hole Pattern	30128

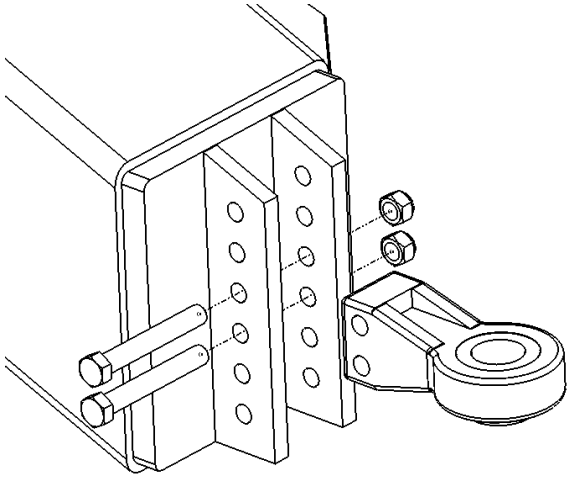


Figure 8 - Hitch installation

3. Hydraulics Assembly

NOTE: Hydraulic cylinders must be attached at the top first then pulled down into position. A hydraulic schematic will be attached at the back of the Hydraulics Assembly Section.

1. Align the 5 x 24” cylinders (20431) with the cylinder attachment holes on the blade subassembly (ports down, ram end to bottom). Insert 1-1/4” x 3-3/8” cylinder pins (20688) into the blade holes. Secure the cylinder pins with 3/16” x 2” cotter pins (11670).

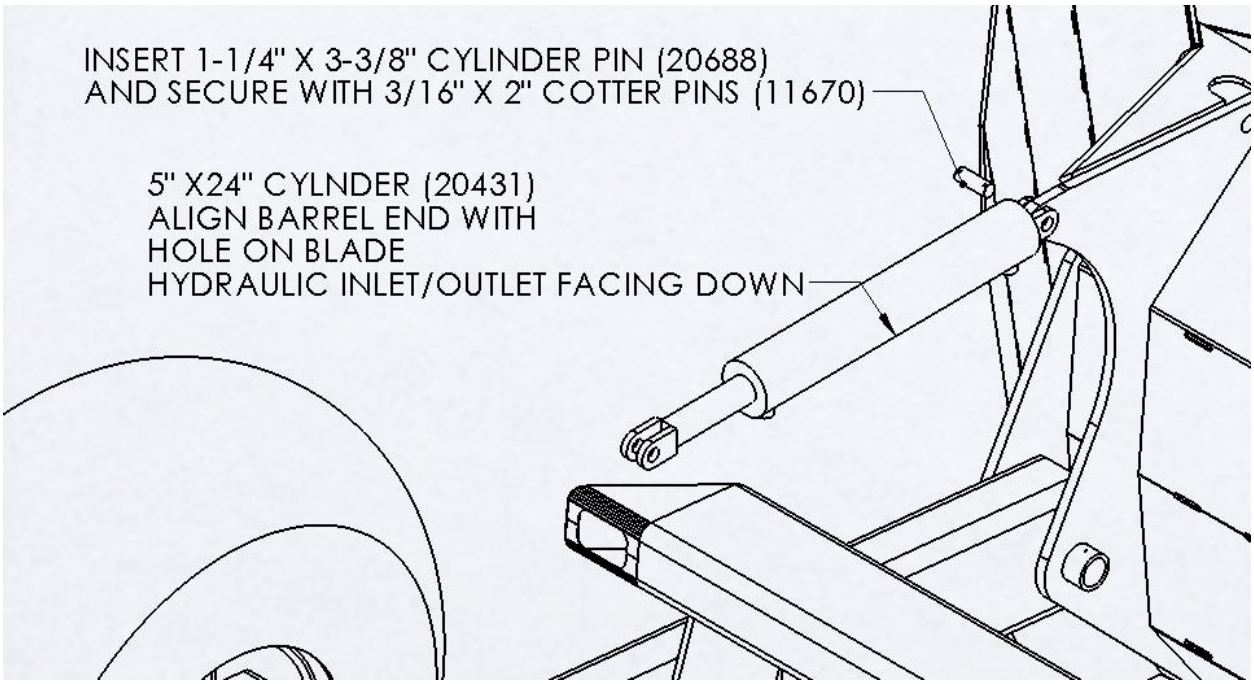


Figure 9 - 5x24" cylinder attachment (top)

2. Pull the piston ends of the cylinders down and align the clevis holes with the cylinder attachment holes on the Pulldozer's main frame. Align the lift cylinder locks (20630) with the clevis holes. Insert cylinder pins (20665) through the holes on the lift cylinder lock, cylinder clevis and main frame. Secure with 1 ¼” washers (16650) on outside of lift cylinder lock and 3/16” x 2” cotter pins (11670).

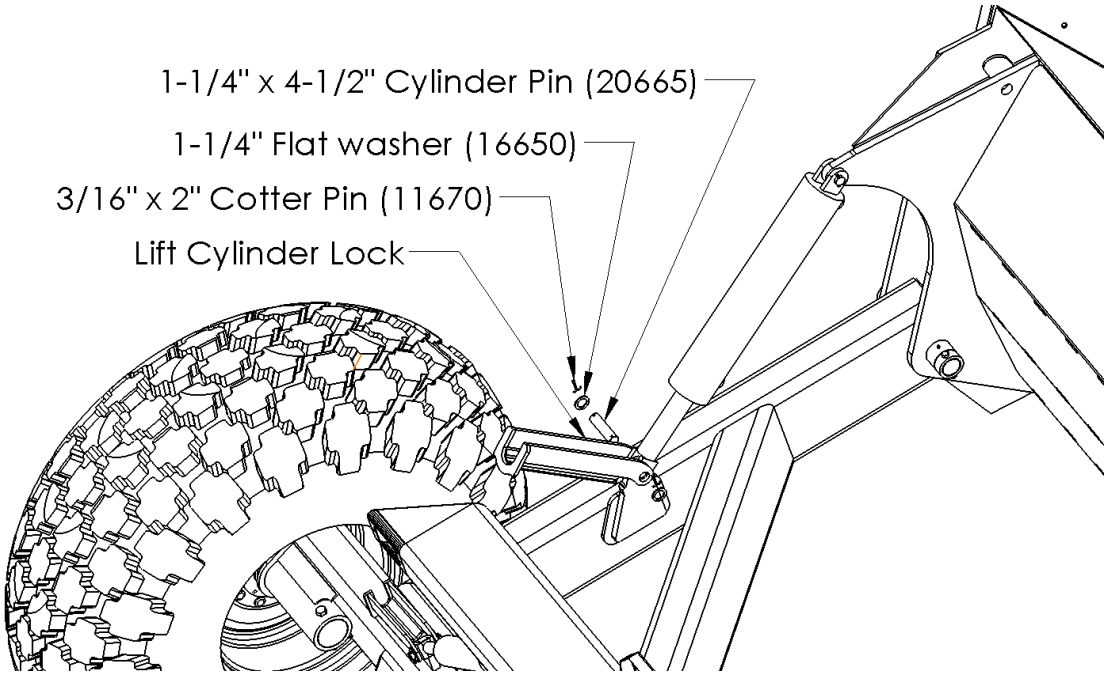


Figure 10 - 5x24" cylinder attachment (bottom)

3. Using a 3” x 20” hydraulic cylinder (20488), align the clevis on the barrel end of the cylinder with the cylinder attachment hole on the top bar of the main frame (ports down). Insert cylinder pin (10339) 1” x 2-7/8” through the clevis and cylinder attachment hole. Secure with 3/16” x 2” cotter pins (11670).

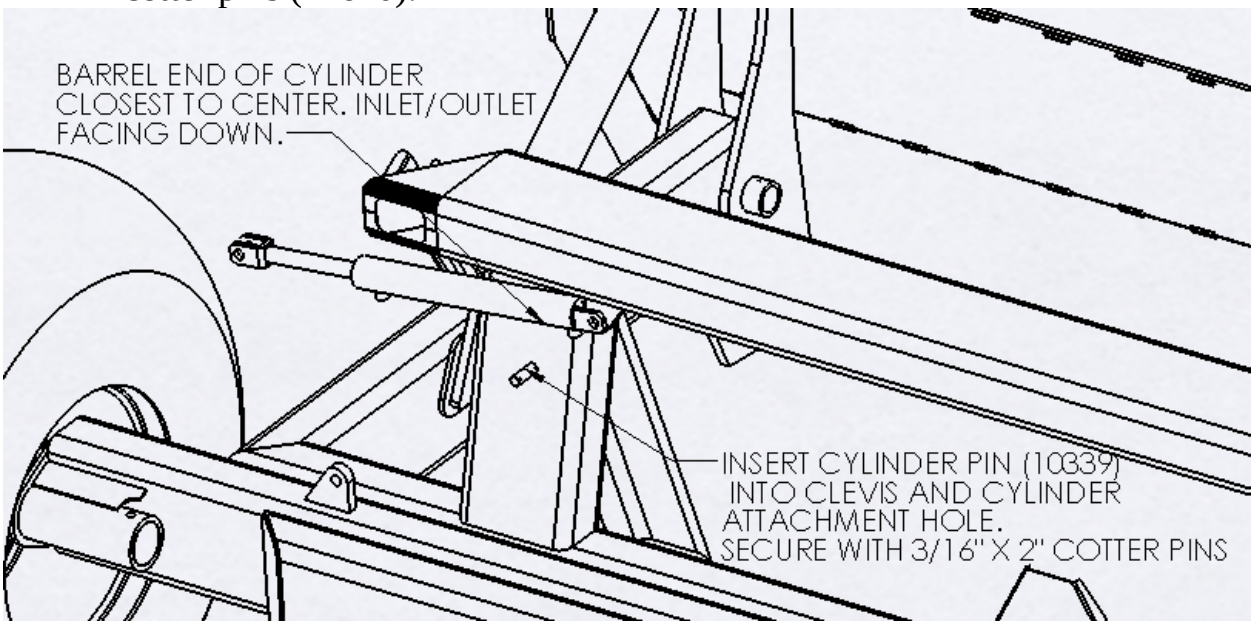


Figure 11 - 3x20" cylinder attachment (top)

4. Pull the piston end of the cylinder down and align the clevis with the cylinder attachment hole on the Pulldozer's axle. Align the tilt cylinder lock (21228) with the clevis hole. Insert cylinder pin (20788) through the holes on the tilt cylinder lock, clevis, and axle. Secure with 1” flat washers (14472) on outside of cylinder locks and 3/16” x 2” cotter pins (11670).

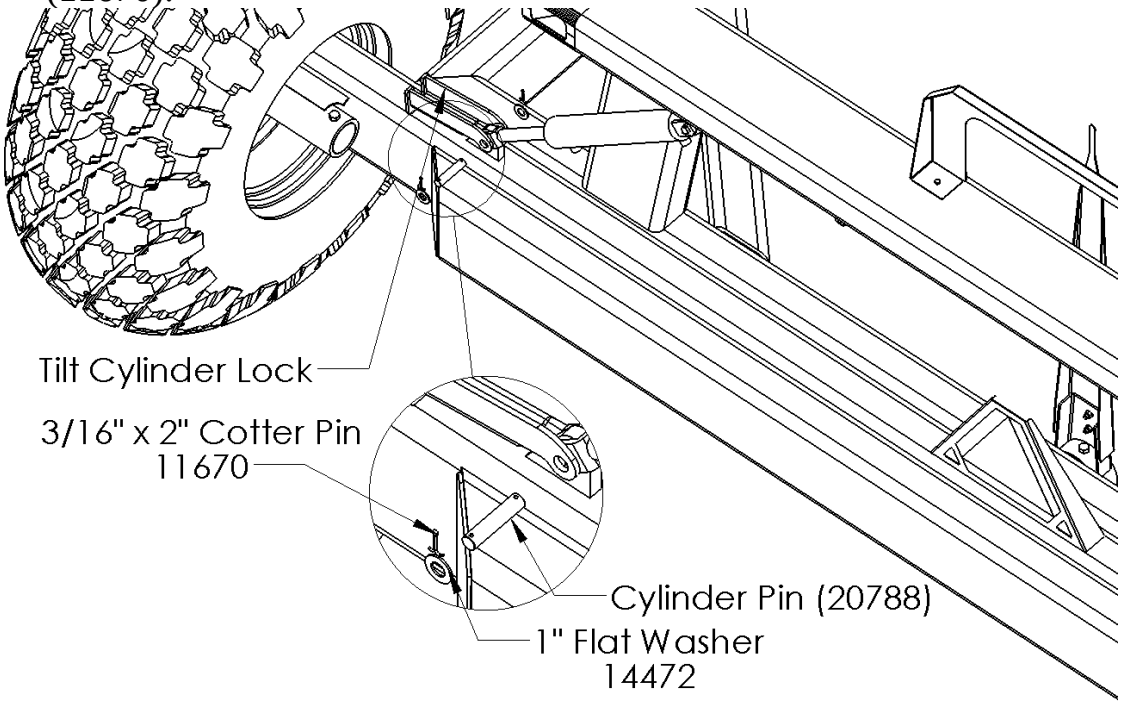


Figure 12 - 3x20" cylinder attachment (bottom)

5. Install cylinder port fittings:
   - Install 12MB-8MJ90 fittings to each port of the 5" cylinders
   - Install 6MB-6MJ90 fittings to each port of the 3" cylinders
   - Leave the fittings loose until the hoses are connected, then rotate to the position that works best for hose routing.

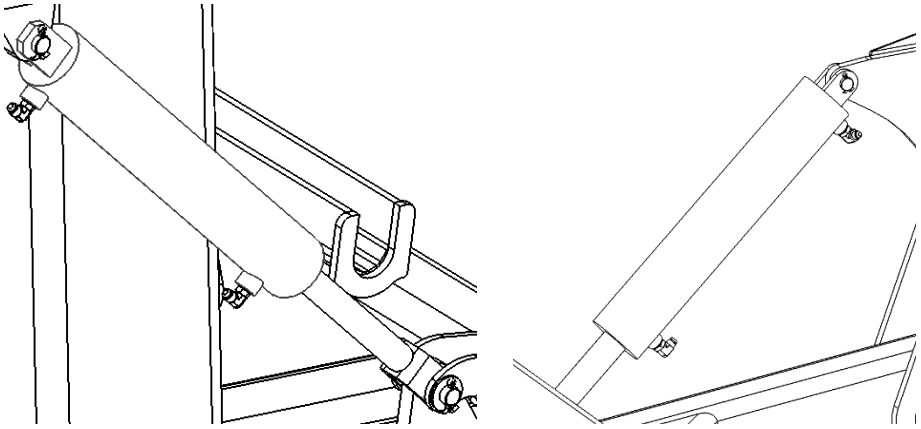


Figure 13 - Cylinder port fittings

6. Run hoses from cylinders to back of blade (see schematic at end of section). Install fittings on bulkheads as shown. NOTE: Do not install rear bulkhead plate until electrical wiring is complete.

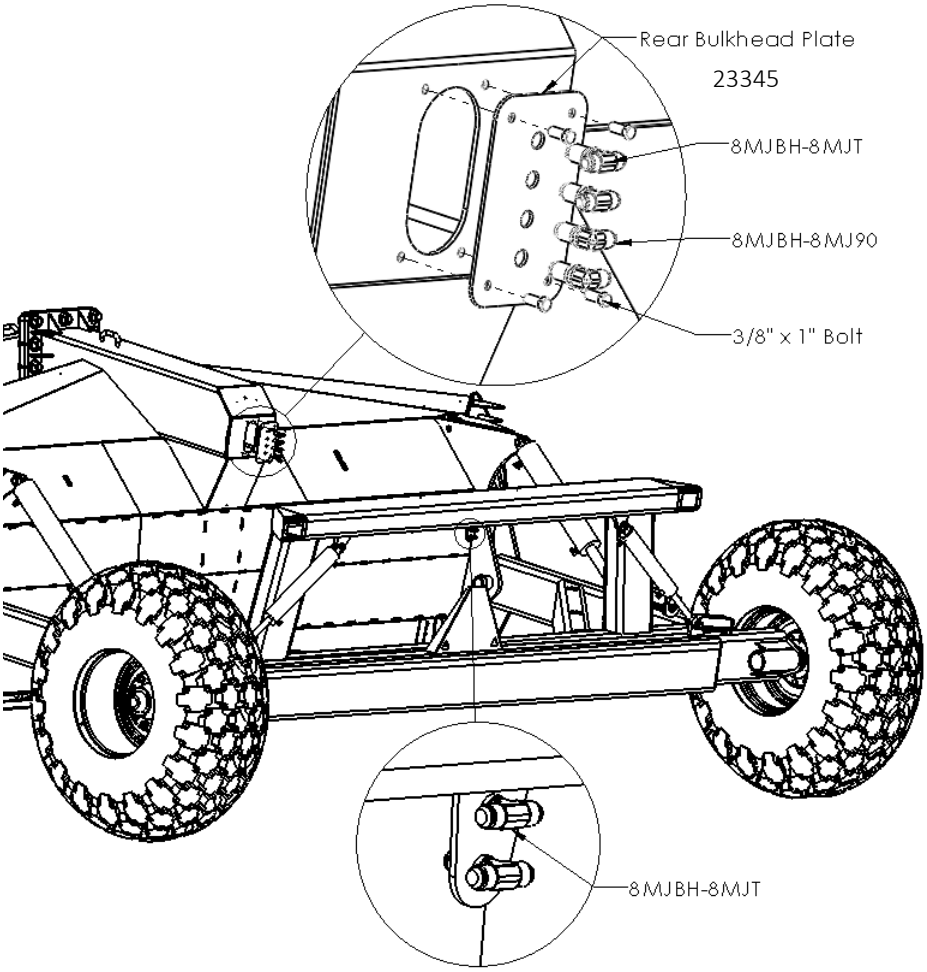


Figure 14 - Rear bulkhead fittings

7. Attach hoses to frame and blade using hose clamps.
   - 2400:
      - 1/2" clamps and cable clamps on blade (x3), along bottom of main frame (x2), and on the upright of the main frame (x1).
      - 1/2" clamps without cable clamps on front of main frame upper cross member (x1)
      - 3/8" clamps without cable clamps of rear of main frame upper cross member (x2)
   - 1800:
      - 1/2" clamps with cable clamps on blade (x3), along bottom of main frame (x2), and on the upright of the main frame (x1)

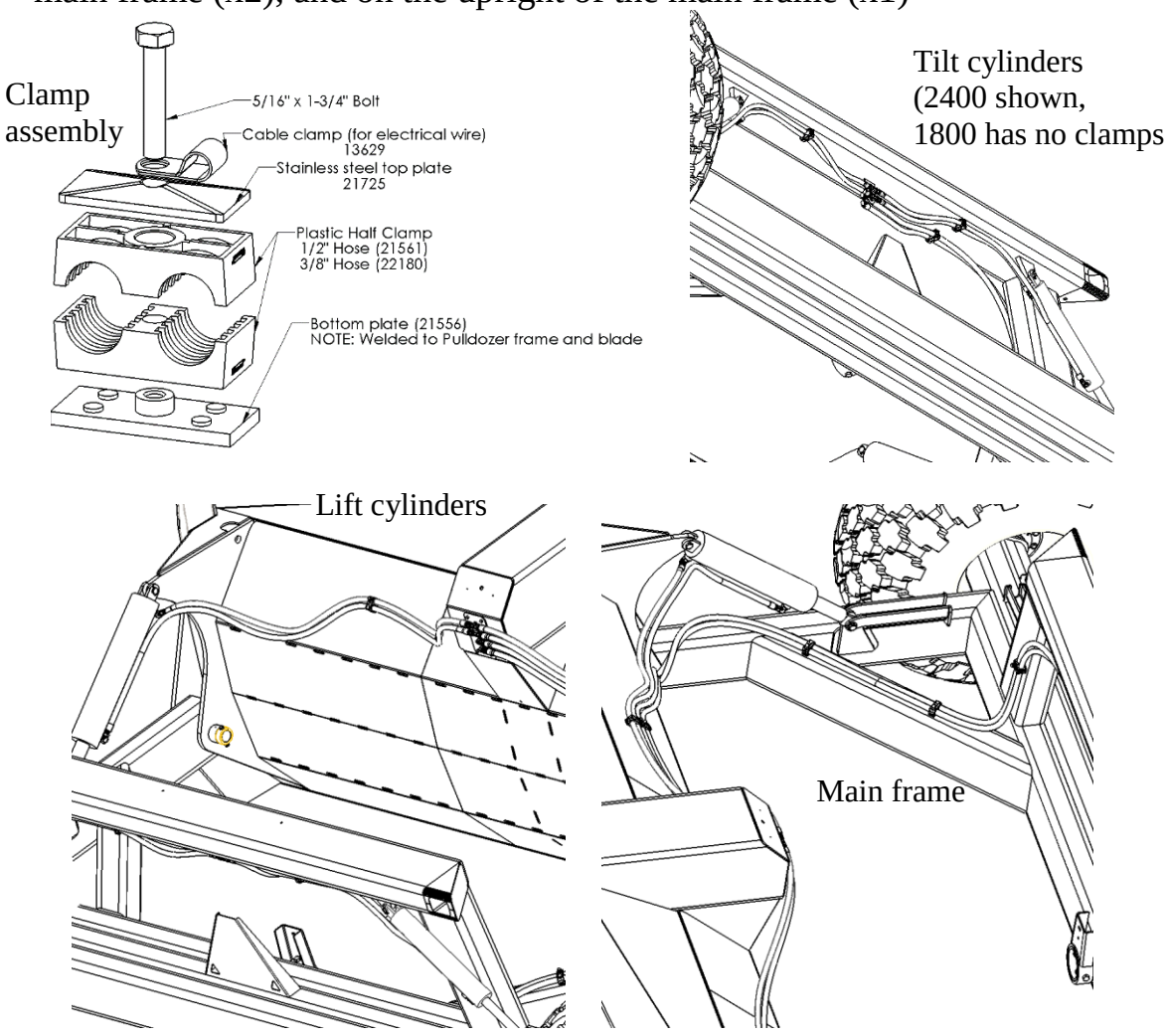


Figure 15 - Rear hose routing

   - Tie any loose hoses together using zip ties or hose straps to complete the rear hose routing.

8. Run tractor hoses:

a) Attach hose fittings as shown below, tighten hoses to the bulkhead fitting, leave nut loose between the bulkhead and the hitch hose.

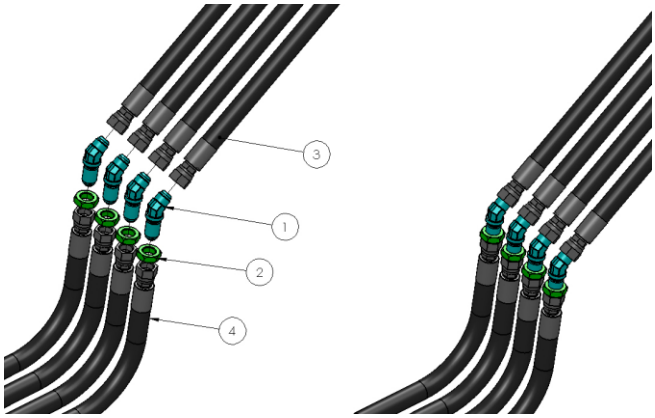


Figure 16 - Hitch to tractor hose connection

ITEM NO.	DESCRIPTION	QTY.
1	8MJBH-8MJ45	4
2	Bulkhead Nut	4
3	Tractor Hose	4
4	Hitch Hose	4

b) Insert hoses into the hole in the hitch, and run back to the rear bulkhead plate. Connect to the fittings, then bolt the rear bulkhead plate on. **NOTE:** Keep track of which hose is which.

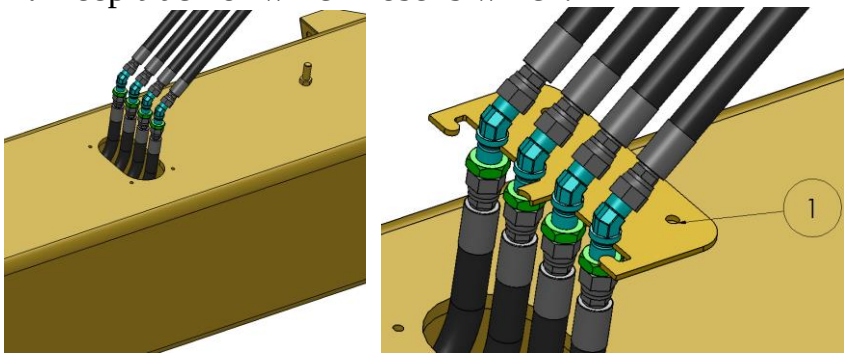
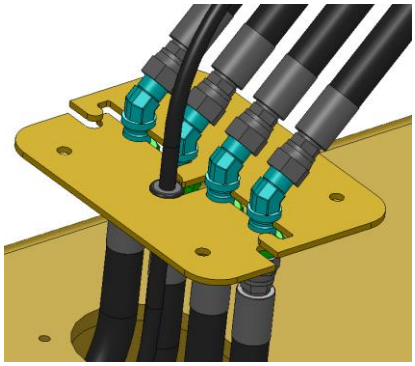


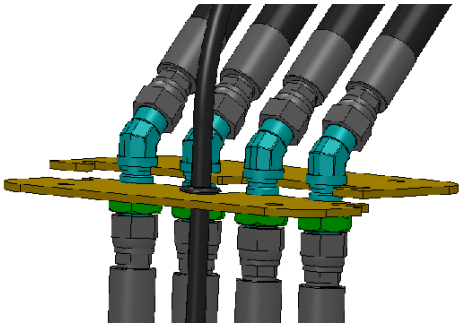
Figure 17 - Front bulkhead assembly

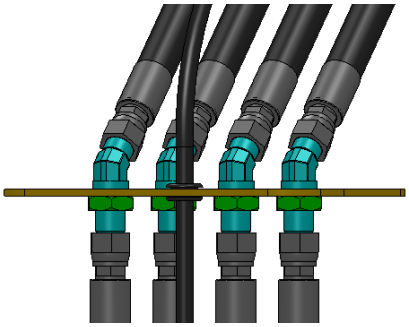
c) Loosely place the hoses in the grooves in 23344 (1). The plate should go between the bulkhead flange and the nut.

d) Place 23343 under 23344 in between the bulkhead flange and the nut so the bulkhead fitting is clamped between the semi-circles on the two plates.

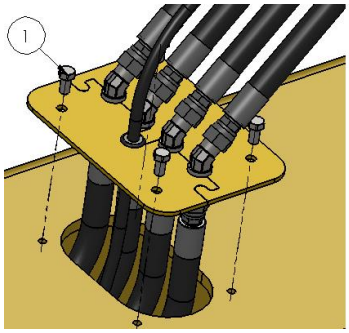


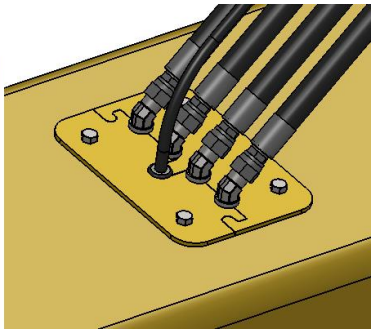
Slide the lower plate up until flush with the other plate. Tighten the nuts on the lower side.





e) Bolt the assembled bulkhead plate to the hitch using 3/8" x 1" (13806) bolts. NOTE: Do not do this step until the electrical wiring is run.

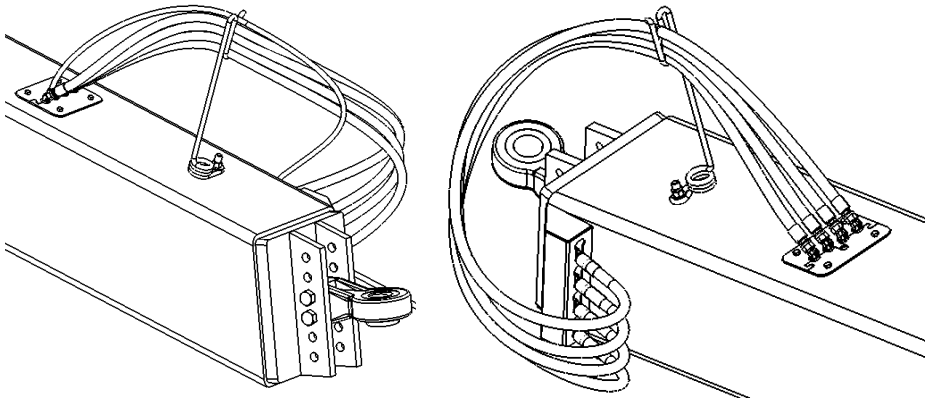




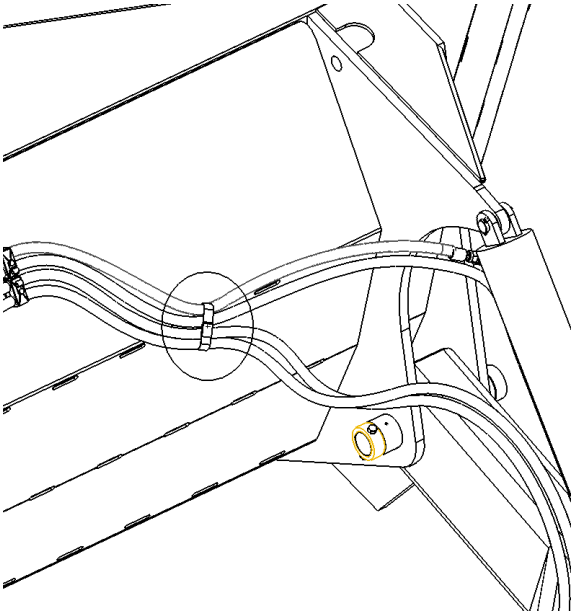
f) Install pioneer fittings (17379) to the end of each hose and mark with heat shrink.

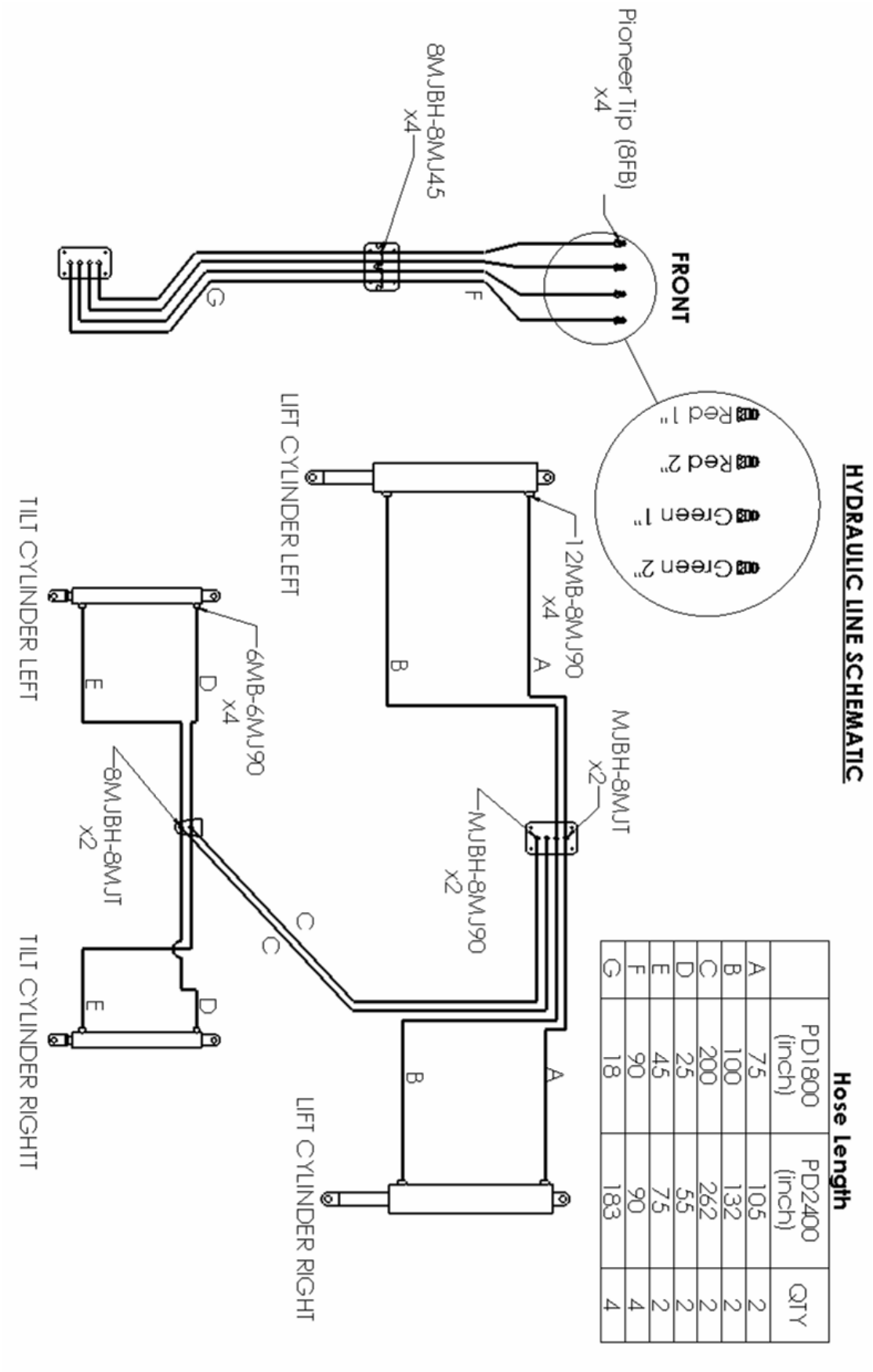
- Green 1" runs to right tilt cylinder base/left tilt cylinder ram
- Green 2" runs to right tilt cylinder ram/left tilt cylinder base
- Red 1" runs to lift cylinder bases
- Red 2" runs to lift cylinder rams

9. Bolt the spring hose holder (17967) to the front of the hitch as shown, using a 5/8" flat washer (13975) and nylon lock nut (10364). Loop hoses around to front of hitch and place in hose bracket.



10. Install a Velcro hose strap (17962) to the hoses where it splits from 4 to 2 on the back of the blade.



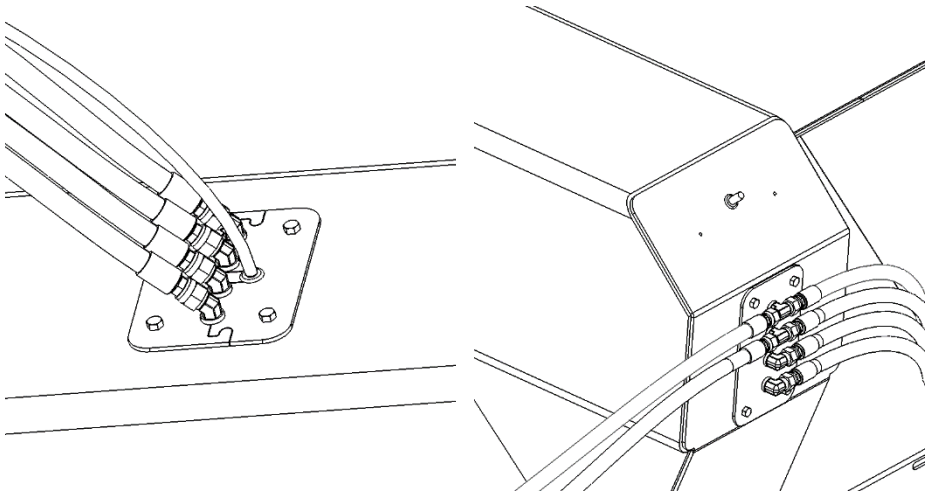


Hose Length

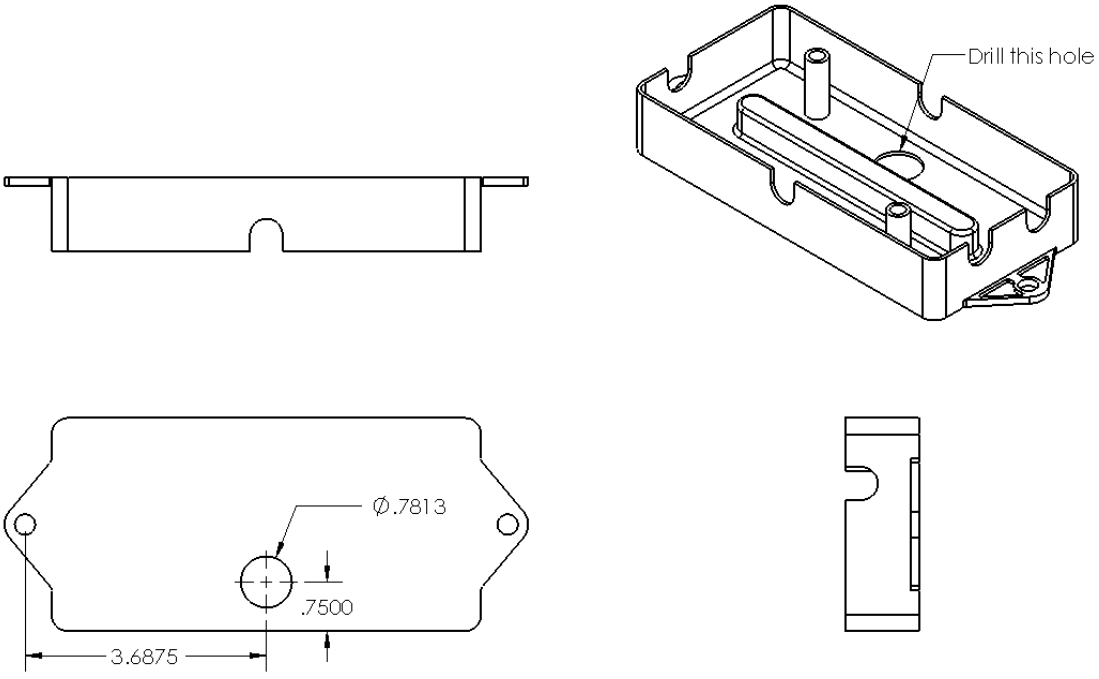
	PD1800 (inch)	PD2400 (inch)	QTY
A	75	105	2
B	100	132	2
C	200	262	2
D	25	55	2
E	45	75	2
F	90	90	4
G	18	183	4

4. Electrical Assembly

1. Run main electrical cable (4-wire) through the hitch (see wiring diagram at end of section). It will run alongside the hydraulic lines, through the front bulkhead cover (using a grommet: 21428). Leave enough wire at the back for ease of making connections. Both bulkhead covers can then be installed.



2. Install 7-pin junction box (13668) to back of blade. First, a hole needs to be drilled in the junction box (see drawing) and then insert a grommet (21439) into it.

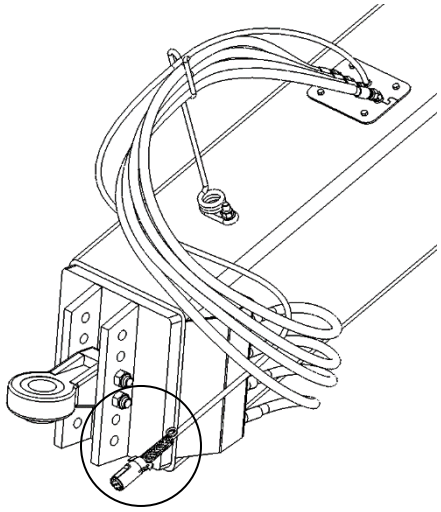


Run cable through the hole, and bolt the junction box to the back of the blade using a 1/4" x 1" bolt.

Split the end of the cable and separate the four wires. Attach a blue ring connector (21455) to the end of each wire, and connect them to the posts (see wiring diagram).

Pull back any slack in the cable towards the front of the machine.

3. Connect the 7-pin trailer plug (12177) to the front of the machine as per the wiring diagram.



4. Attach each flasher light assembly to the blade using a 3/4" x 4-1/2" bolt (21460) and nylon lock nut (10007).

Install cable clamps along the top of the blade on each side, and attach using 3/8" x 1" bolts (13806) and serrated flange nuts (10271).

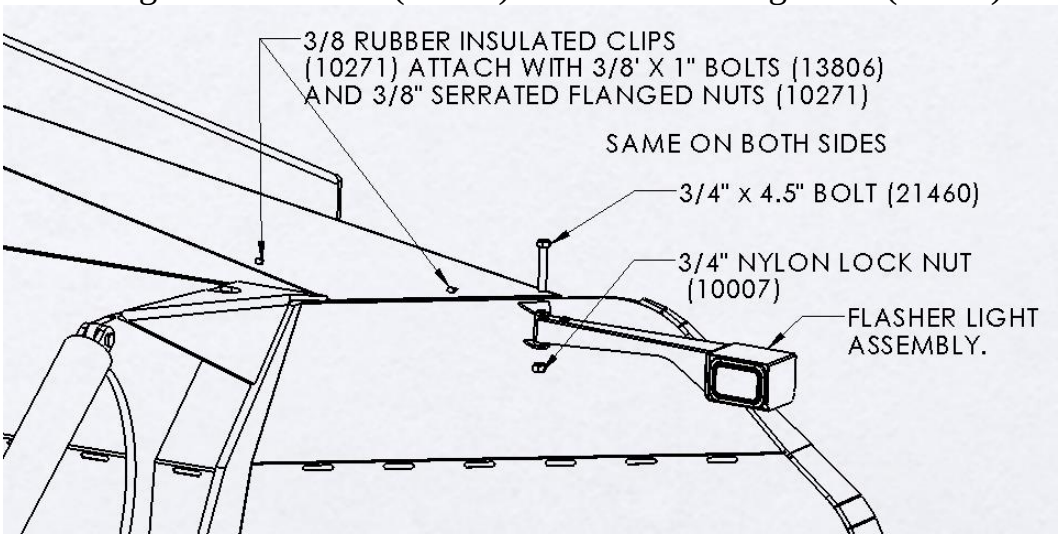
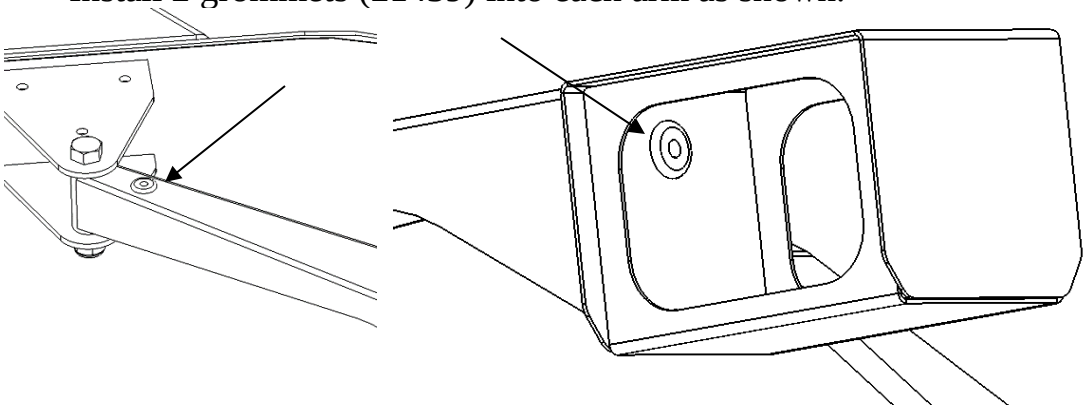


Figure 18 - Flasher light assembly

Install 2 grommets (21439) into each arm as shown.



5. Route the flasher electrical lines to the box and wire them in as per schematic.

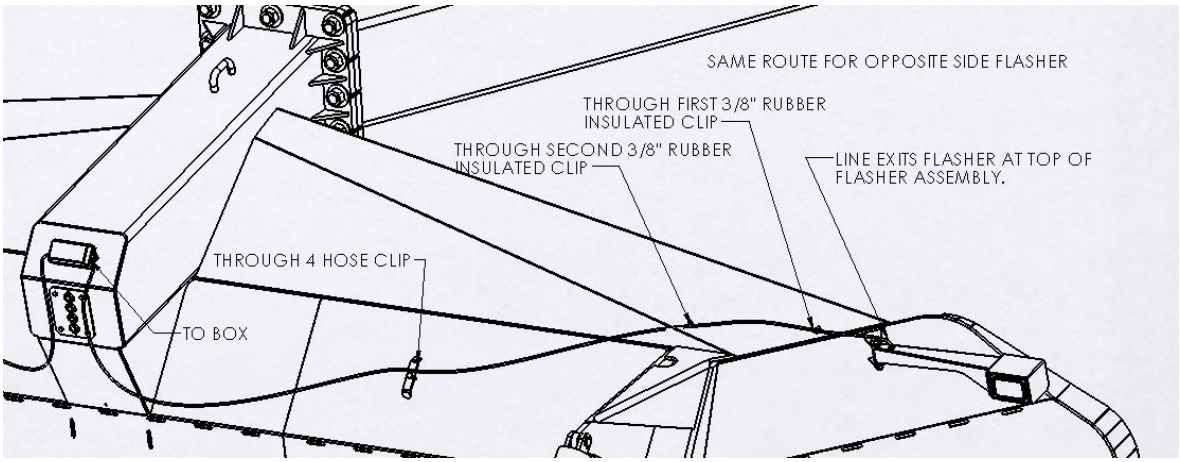
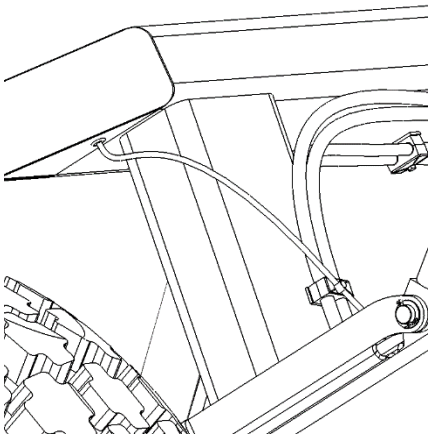


Figure 17: Flasher electrical lines route

6. Route the tail lights electrical line and wire it in to the box as per schematic. Install a grommet (21439) to the bottom of the right tail light bracket. The wire runs alongside the hydraulic lines on the main frame. Run a second wire between the tail lights through the main frame top tube. Install cap on junction box.



7. Install and wire all 6 lights (2 red - 21419, 4 amber - 21420). A 3 wire, 90 degree pigtail (21422) should be plugged into the back of each light. A rubber grommet (21421) must also be placed around each light.

Wire each pigtail to the cables as per the schematic. Solder and apply heat shrink to each joint to ensure a good connection.

Shove each light into the holes until the grommet is properly seated. It should be a tight fit.

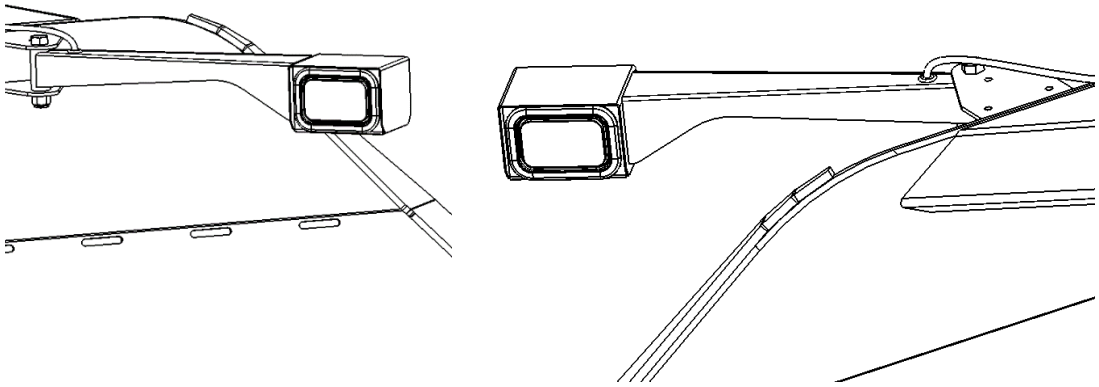


Figure 19 - Amber light locations

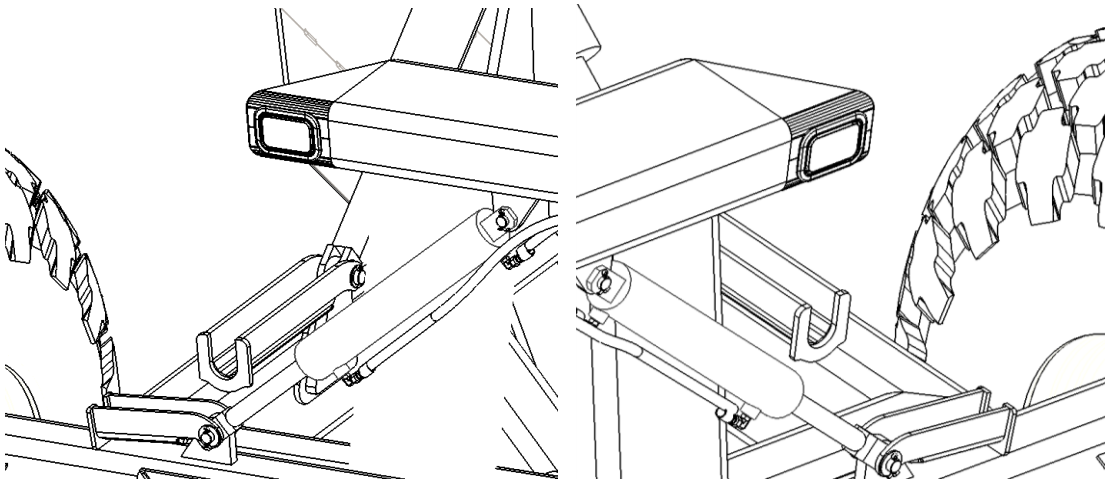
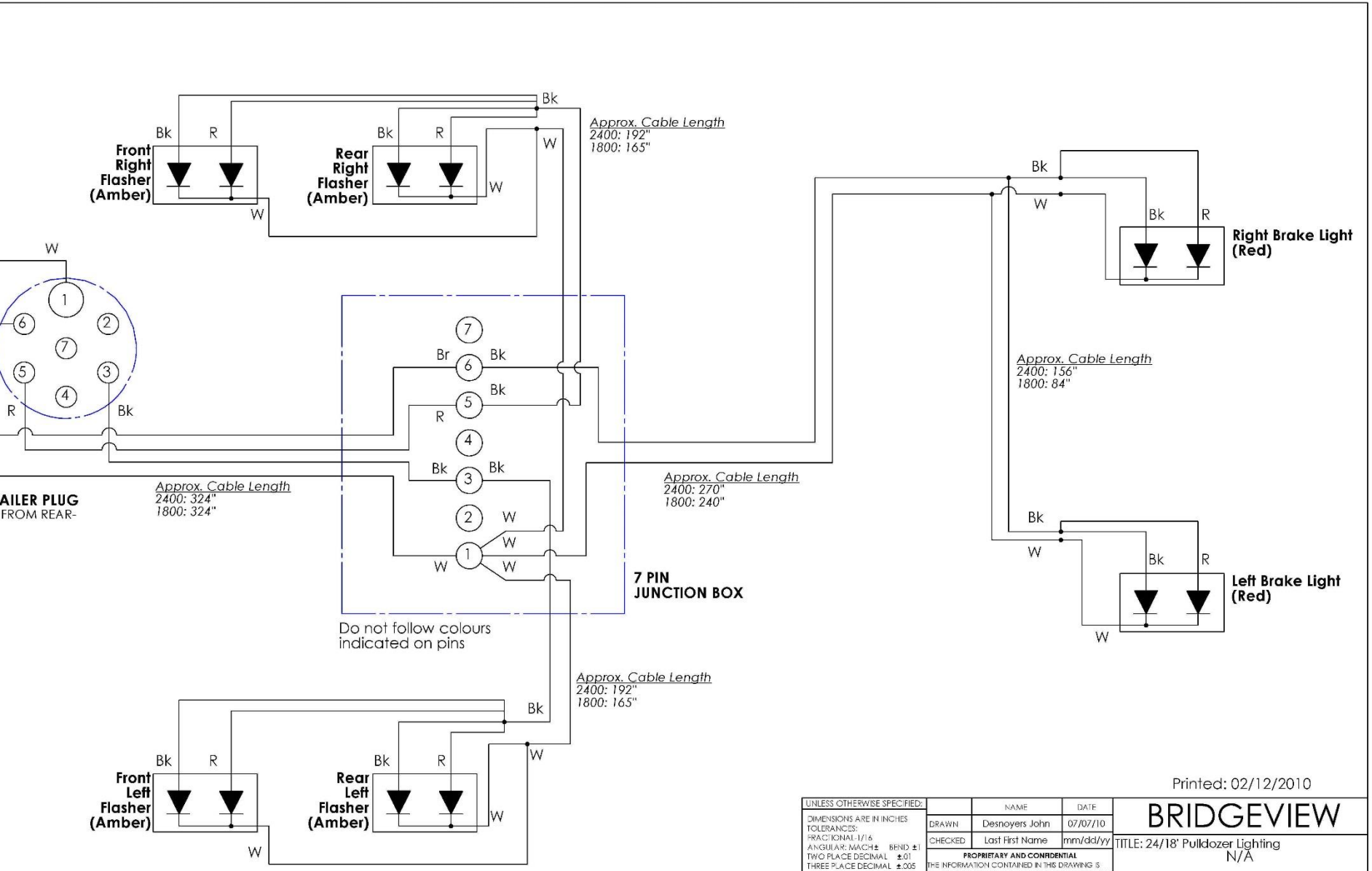


Figure 20 - Red light locations



Printed: 02/12/2010

UNLESS OTHERWISE SPECIFIED:		NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ± BEND ±1 TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.005	DRAWN	Desnoyers John	07/07/10
	CHECKED	Last First Name	mm/dd/yy
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MATERIAL TYPE N/A	Comments:		
MATERIAL N/A			
DO NOT SCALE DRAWING			

BRIDGEVIEW

TITLE: 24/18' Pulldozer Lighting
N/A

SIZE **A** | ID# : N/A
Dwg : Wiring Diagram

SCALE: NTS | WT: N/A | Page 1

5. Miscellaneous

1. There are 10 grease zerks installed on the Pulldozer that require grease before operation. There are 3 located where the main frame attaches to the blade (on each side), 2 where the axle attaches to the main frame, and two on the articulating hitch. Make sure all joints have sufficient grease.

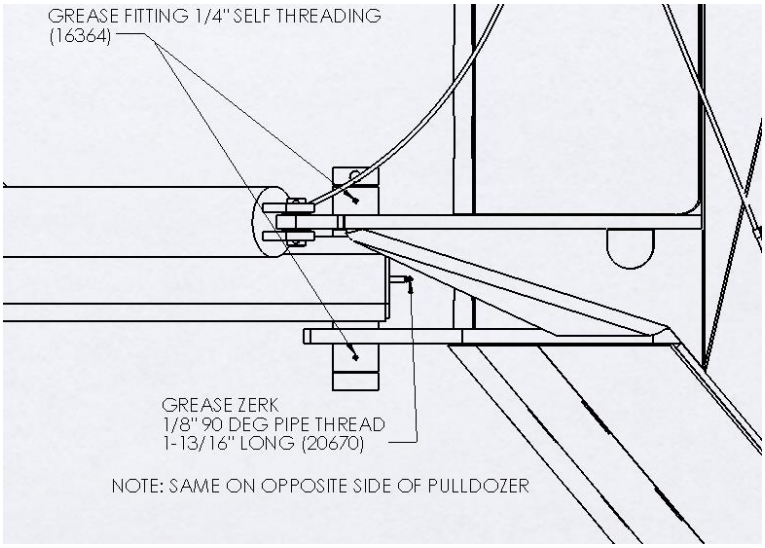


Figure 21 - Blade pin grease zerks

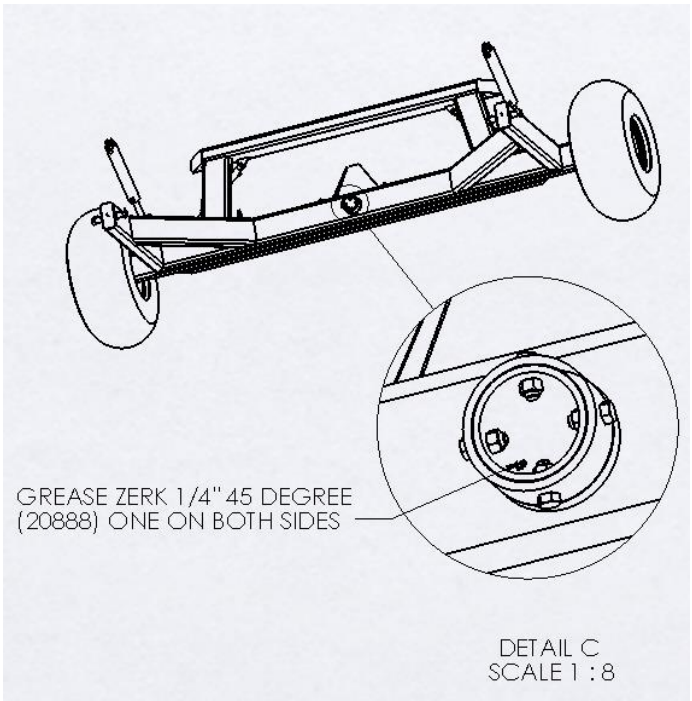


Figure 22 - Axle pivot grease zerks

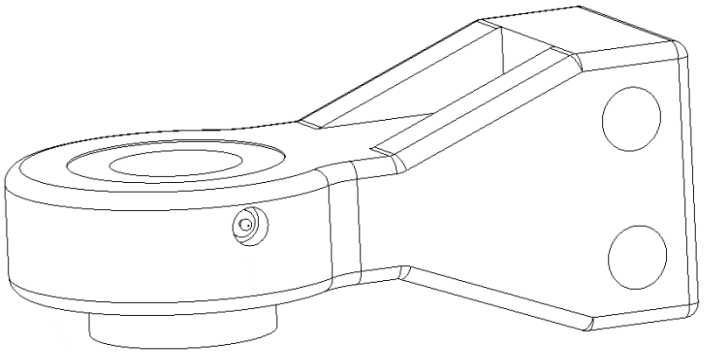


Figure 23 - Articulating hitch grease zerks (x2)

2. After hooking up the Pulldozer to the tractor. Lift the blade off the ground and lock it in place. Then attach two (1800) or three (2400) 6’ cutting edges (20430) and two 4’ cutting edges (20428) using the scraper blade bolts (1800 x 45 – 2400 x 57) (20448) and ¾” nuts (1800 x 45 – 2400 x 57) (20606). Attach the 4’ sections to the wings first, then the 6’ sections to the center.

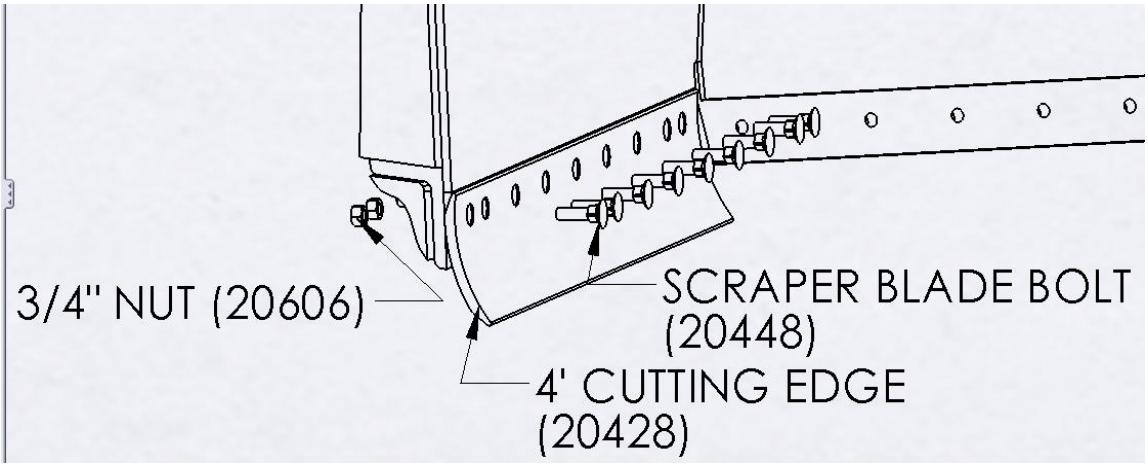


Figure 24 - 4 Foot scraper blade attachment

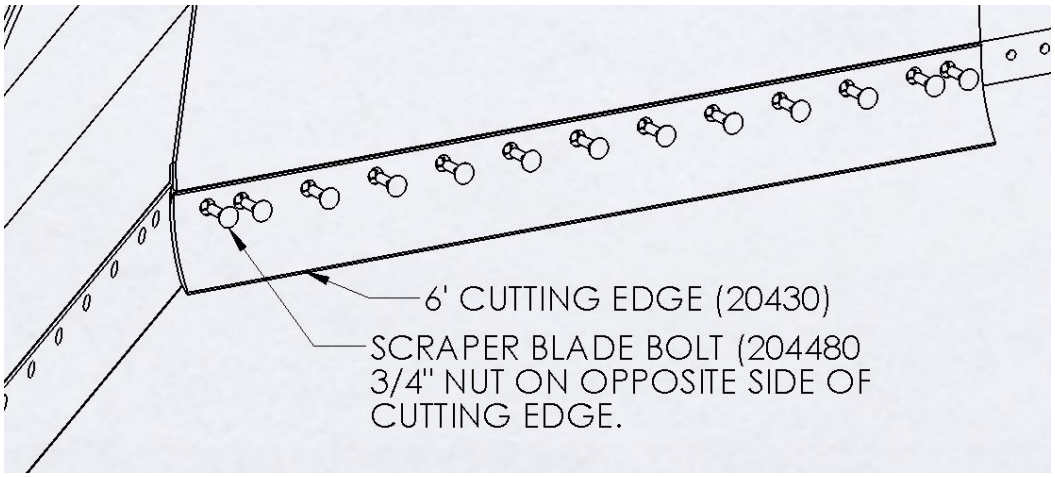


Figure 25 - 6 Foot scraper blade attachment

3. Install the angle indicator arm. For both the 1800 and 2400, a different needle is required. It bolts to the axle collar using two 1/2" x 1-1/4" bolts (10240) and nylon lock nuts (10241) as shown.

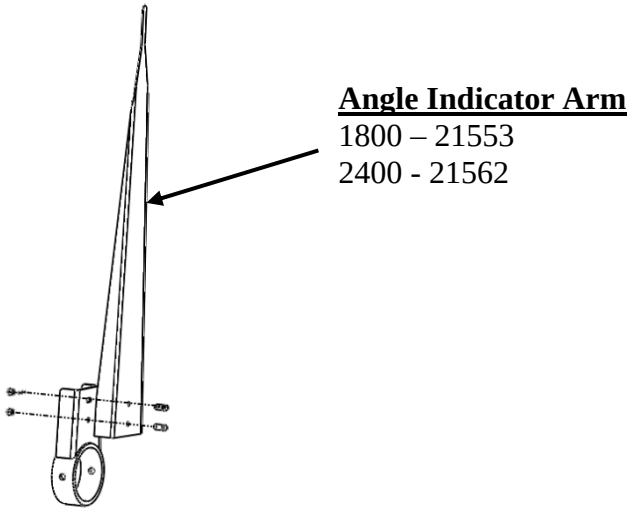


Figure 26 - Angle indicator install

For the 2400 only, install the angle indicator readout bracket with the sticker facing the front, using two 3/8" x 1" (13806) bolts and the tapped holes in the top of the rear main frame tube.

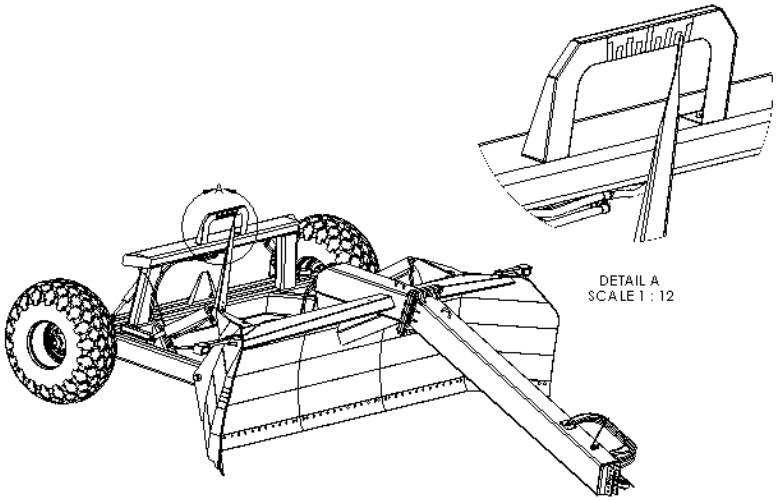


Figure 27 - Angle indicator install - 24ft only

For the 1800 only, install the sticker to the center of the top main frame tube.

Set the angle indicator by leveling the blade side-to-side, then centering the needle on the center of the decal.

6. Trencher Option

NOTE: For machines with the optional trencher, the hitch section is replaced with a special hitch. All other steps remain the same.

All following steps can be done at any time after the hitch is installed.

1. Place the trencher arm underneath of the hitch , then lift it up into place and insert the pin (22099). Lock the pin in place using two 3/4" x 5" bolts (10803) and Stover lock nuts (11823). Lastly, install two 1/4" self-tapping grease zerks (16364) into the holes in the pivot pipe. Fill with grease until pipe is full.

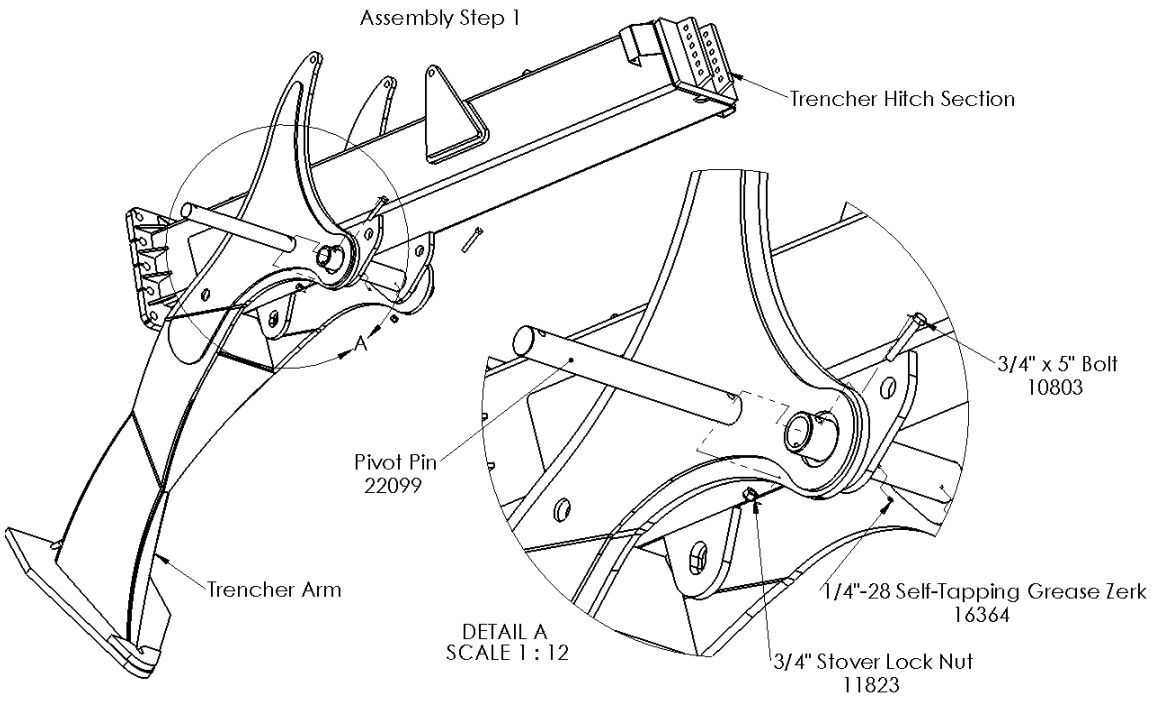
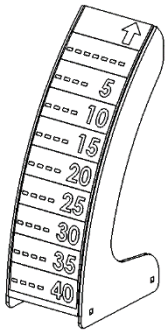


Figure 28 - Trencher install

2. Place the indicator sticker (22209 - 18ft, 22078 - 24ft) onto the depth indicator bracket (27200) with the arrow pointing up. Then install the bracket to the tabs on the top of the hitch using four 3/8" x 1" carriage bolts (15718) and serrated flange nuts (10271).



3. Install the depth indicator arm (22137) to the tabs on the top of the hitch using a 1/2" x 3-1/4" bolt and nylon lock nut. The arm should pivot freely.

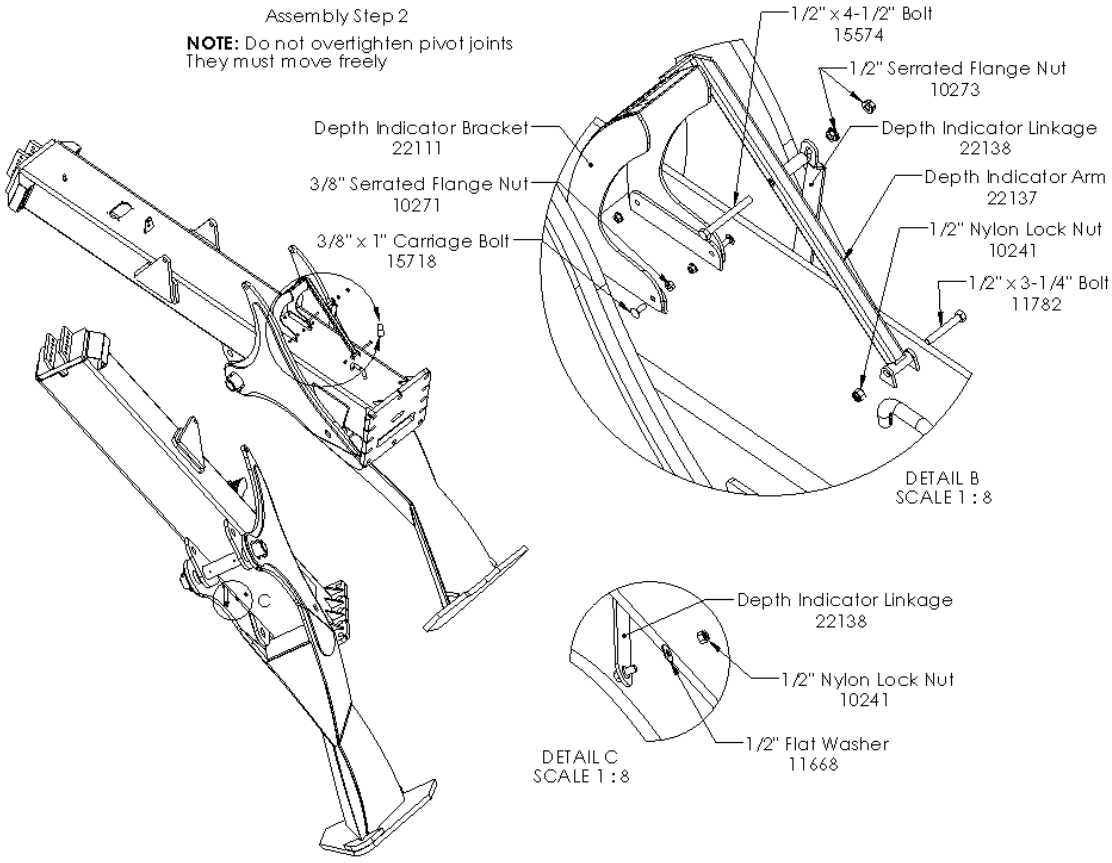
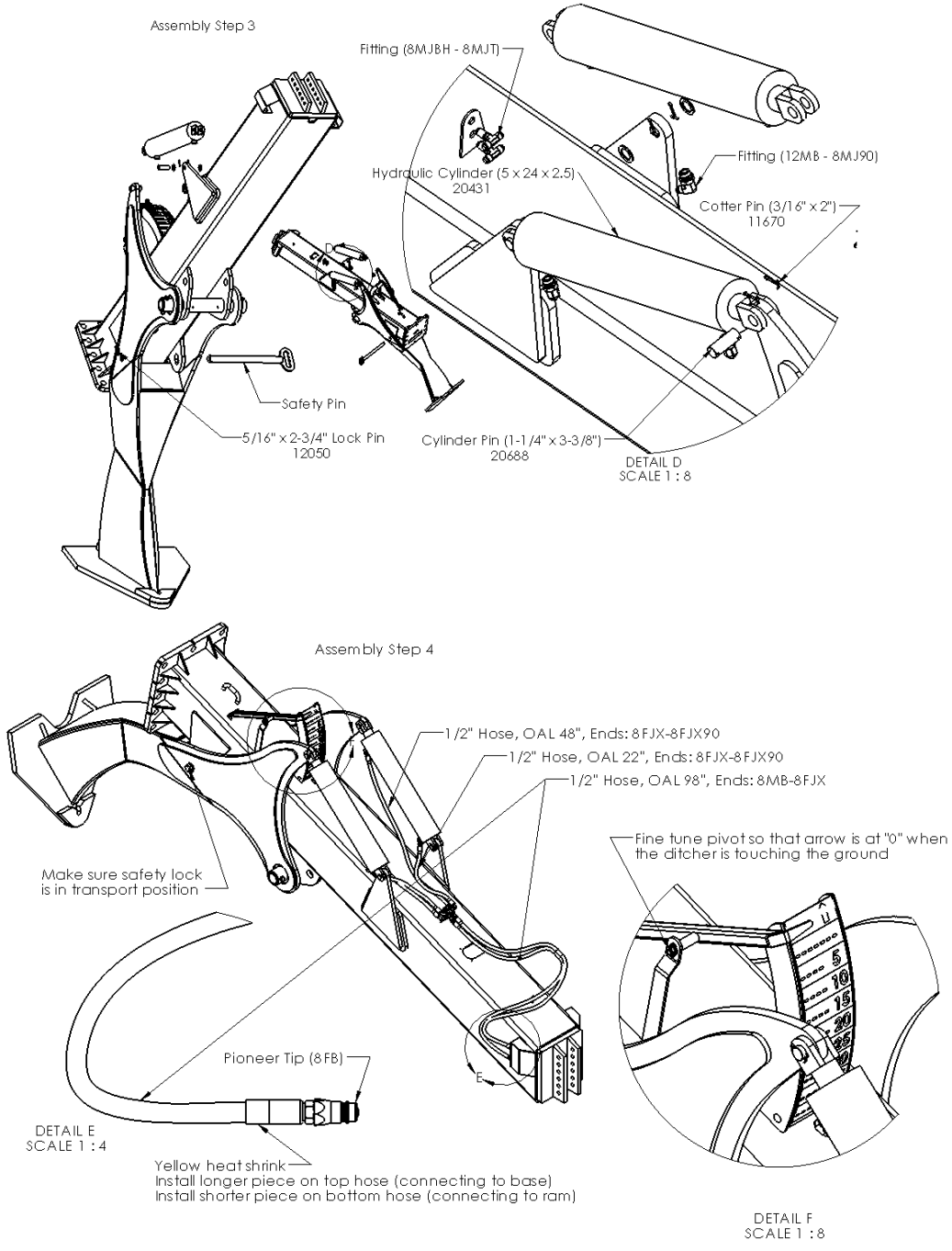


Figure 29 - Depth indicator assembly

4. Install the depth indicator linkage (23341) to the welded on bolt on the ditcher (bushing end) using a 1/2" flat washer (11668) and nylon lock nut (10241). Install the other (slotted) end to the indicator arm using a 1/2" x 4-1/2" bolt (15574) and two serrated flange nuts (10273) to clamp the linkage. Make sure that the arm can still pivot up and down freely. The position within the slot will be set later.

5. Install 5" x 24" hydraulic cylinders (20431) with the ram on the ditcher side and the ports down. Secure at both ends with an 1-1/4" cylinder pin (20688) and two 3/16" cotter pins (11670).

6. Install 12MB - 8MJ90 fittings to each cylinder port, facing inwards and towards the front of the machine. Install two 8MJBH - 8MJT bulkhead tee fittings to the plate as shown, with the "tee" side towards the cylinders.



7. Run the hydraulic hoses. Two 22" hoses run from the top bulkhead fitting to the base end of the cylinders, and two 48" hoses run from the bottom bulkhead fitting to the ram end of the cylinders. NOTE: The 90 degree ends connect to the bulkhead. Finally, two 98" hoses run to the hitch of the machine. Install pioneer ends (8FB) to each hose, and yellow heat shrink marker (as shown).

8. Connect a tractor and charge the hydraulics. With the blade and the trencher tip both touching the ground, set the depth indicator to read "0". Lift the trencher into transport position and insert the safety lock (22136) and the lock pin (12050).

ASSEMBLY IS NOW COMPLETE

FASTENER TORQUE CHARTS

BOLT CLAMP LOADS

Suggested Assembly Torque Values

DIAMETER & THREADS PER INCH	USS/SAE GRADE 5					USS/SAE GRADE 8				
	TENSILE STRENGTH MIN. PSI	PROOF LOAD LB	CLAMP LOAD LB	TORQUE DRY FT LB	LUBRICATED FT LB	TENSILE STRENGTH MIN. PSI	PROOF LOAD LB	CLAMP LOAD LB	TORQUE DRY FT LB	LUBRICATED FT LB
1/4-20	120,000	2,700	2,020	8	6.3	150,000	3,800	2,850	12	9
28	120,000	3,100	2,320	10	7.2	150,000	4,350	3,250	14	10
5/16-18	120,000	4,450	3,340	17	13	150,000	6,300	4,700	24	18
24	120,000	4,900	3,700	19	14	150,000	6,950	5,200	27	20
3/8-16	120,000	6,600	4,950	30	23	150,000	9,300	6,980	45	35
24	120,000	7,450	5,600	35	25	150,000	10,500	7,900	50	35
7/16-14	120,000	9,050	6,780	50	35	150,000	12,800	9,550	70	50
20	120,000	10,100	7,570	55	40	150,000	14,200	10,650	80	60
1/2-13	120,000	12,100	9,050	75	55	150,000	17,000	12,750	110	80
20	120,000	13,600	10,200	85	65	150,000	19,200	14,400	120	90
9/16-12	120,000	15,500	11,600	110	80	150,000	21,800	16,350	150	110
18	120,000	17,300	12,950	120	90	150,000	24,400	18,250	170	130
5/8-11	120,000	19,200	14,400	150	110	150,000	27,100	20,350	210	160
18	120,000	21,800	16,350	170	130	150,000	30,700	23,000	240	180
3/4-10	120,000	28,400	21,300	260	200	150,000	40,100	30,100	380	280
16	120,000	31,700	23,780	300	220	150,000	44,800	33,500	420	310
7/8-9	120,000	39,300	29,450	430	320	150,000	55,400	41,600	600	450
14	120,000	43,300	32,450	470	350	150,000	61,100	45,800	670	500
1-8	120,000	51,500	38,600	640	480	150,000	72,700	54,500	910	680
14	120,000	57,700	43,300	720	540	150,000	81,500	61,100	1,020	760

When using anti-seize, reduce the lubed chart reading by 20% to properly torque. Always lubricate and use lubed torque values.

NOTES:

The above recommended assembly torques are offered as a guide only. Torque specifications, especially for critical joints, should be determined under actual assembly conditions due to the many variables involved which are difficult to predict and do affect the torque-tension relationship.

The above recommended clamp loads are based on 75% of the minimum specified proof loads for each grade and size.

Torques for Grades 5 and 8 were calculated based on the following relationship:

$T = R D P$

Where: T = Torque (ft lb)

D = Nominal Diameter (in)

P = Clamp Load (lb)

R = Tightening Coefficient

The value of R is assumed to be equal to .20 for dry, unplated conditions and equal to .15 for lubricated, including plated, conditions. Actual values of R can vary between .05 and .35 for commonly encountered conditions.

STRENGTH GRADE	APPLICABLE SIZES	PROOF LOAD STRESS (PSI)	YIELD STRENGTH MIN. STRESS (PSI)	TENSILE STRESS MIN. (PSI)
SAE Gr. 5	1/4 to 1" diameter	85,000	92,000	120,000
	over 1" diameter to 1-1/2 diameter	74,000	81,000	105,000
SAE Gr. 8	1/4 to 1" diameter	120,000	130,000	150,000

Pounds to Inch Pound Conversion

lb x 12 = inch lb

Example: 9 lb x 12 = 108 inch lb

FRACTIONAL MEASUREMENT		
BOLT DIAMETER	CAP SCREW WRENCH SIZE	NUT WRENCH SIZE
1/4	7/16	7/16
5/16	1/2	1/2
3/8	9/16	9/16
7/16	5/8	11/16
1/2	3/4	3/4
9/16	13/16	7/8
5/8	15/16	15/16
3/4	1-1/8	1-1/8
7/8	1-5/16	1-5/16
1"	1-1/2	1-1/2
1-1/8	1-11/16	1-11/16
1-1/4	1-7/8	1-7/8
1-3/8	2-1/16	2-1/16
1-1/2	2-1/4	2-1/4
1-3/4	2-5/8	2-5/8
2"	3"	3"
2-1/4	3-3/8	3-3/8
2-1/2	3-3/4	3-3/4
2-3/4	4-1/8	4-1/8
3"	4-1/2	4-1/2

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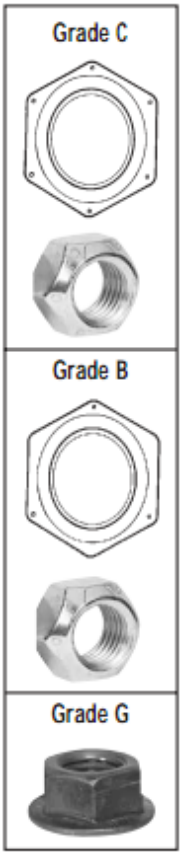
FASTENER TORQUE CHARTS

GUIDE FOR PREVAILING-TORQUE LOCK NUT ASSEMBLY TORQUES (CAD AND WAX, GRADE B, C, AND GRADE G FLANGE NUTS) LOCK NUT STANDARDS FROM IFI-100 REQUIREMENTS

Torque-Tension Requirements

Size Threads Per Inch	Grade B Clamp Load (lb)	Grade B Assembly Torque Max.	Grade B Assembly Torque Min.	Grade C Clamp Load (lb)	Grade C Assembly Torque Max.	Grade C Assembly Torque Min.	Grade G Clamp Load (lb)	Grade G Assembly Torque Max.	Grade G Assembly Torque Min.
1/4–20	2,000	85**	60**	2,850	125**	85**	2,850	150**	100**
1/4–28	2,300	90**	65**	3,250	125**	85**	3,250	160**	105**
5/16–18	3,350	150**	110**	4,700	190**	130**	4,700	240**	155**
5/16–24	3,700	160**	120**	5,200	200**	140**	5,200	230**	155**
3/8–16	4,950	20	14.5	6,950	28	20	6,950	32	21
3/8–24	5,600	22	16	7,900	29	21	7,900	33	22
7/16–14	6,800	32	23	9,600	43	31	9,600	51	34
7/16–20	7,550	34	24	10,700	43	31	10,700	60	40
1/2–13	9,050	50	37	12,800	62.5	45	12,800	85	55
1/2–20	10,200	52.5	37.5	14,440	70	50	14,440	89	59
9/16–12	11,600	70	50	16,400	95	70	16,400	120	80
9/16–18	13,000	77.5	57.5	18,300	95	70	18,300	132	88
5/8–11	14,500	95	70	20,300	122.5	90	20,300	143	95
5/8–18	16,300	97.5	72.5	23,000	125	90	23,000	175	115
3/4–10	21,300	165	125	30,100	210	155	30,100	240	160
3/4–16	23,800	165	120	33,600	210	155	33,600	270	170
7/8–9	29,500	250	185	41,600	312.5	225	41,600	360	260
7/8–14	32,400	270	200	45,800	312.5	225	45,800	402	247
1–8	38,700	375	275	54,600	462.5	360	54,600	530	410
1–12	42,300	395	290	59,750	490	360	59,750	—	—
1–14	43,000	400	300	61,100	500	362.5	61,100	645	398
1-1/8–7	42,100	404	294	69,000	585	454	69,000	—	—
1-1/8–12	47,500	437	327	76,800	622	453	76,800	—	—
1-1/4–7	53,500	513	375	87,000	736	573	87,000	—	—
1-1/4–12	59,700	549	412	96,600	782	570	96,600	—	—
1-3/8–6	63,800	612	445	104,000	880	685	104,000	—	—
1-3/8–12	72,900	670	503	118,000	955	696	118,000	—	—
1-1/2–6	77,600	745	545	127,000	1,075	837	127,000	—	—
1-1/2–12	87,700	807	605	142,000	1,150	837	142,000	—	—



- Clamp loads for the Grade B lock nuts equal 75% of the bolt proof loads specified for SAE J-429 Grade 5, and ASTM A-449 bolts.
  Clamp loads for Grade C lock nuts equal 75% of the bolt proof loads specified for SAE J-429 Grade 8, and ASTM A-354 Grade BD bolts.
- IFI-100 does not govern lock nuts above 1". The values shown in the chart are to be used as a mid-range guideline.

** Torque values for 1/4" and 5/16" sizes are in inch lb. All other torque values are in foot lb.

METRIC TORQUE CHART FOR HEX HEAD CAP SCREWS

Size	Class	Newton Meters Zinc Plated	Newton Meters Unplated	Foot Pounds (approx.) Zinc Plated	Foot Pounds (approx.) Unplated	Class
M4 x .70 Pitch	8.8	3.1	2.2	2.30	1.65	
M5 x .80 Pitch	8.8	6.1	5.5	4.58	4.13	
M6 x 1.00 Pitch	8.8	10.4	9.5	7.80	7.13	
M7 x 1.00 Pitch	8.8	17.0	15.5	12.75	11.63	
M8 x 1.25 Pitch	8.8	25.0	23.0	18.75	17.25	
M8 x 1.00 Pitch	8.8	27.0	24.5	20.25	18.38	
M10 x 1.50 Pitch	8.8	51.0	46.0	38.25	34.50	
M10 x 1.00 Pitch	8.8	57.0	52.0	42.75	39.00	
M10 x 1.25 Pitch	8.8	54.0	49.0	40.50	36.75	
M12 x 1.75 Pitch	8.8	87.0	79.0	65.25	59.25	
M12 x 1.25 Pitch	8.8	96.0	87.0	72.00	65.25	
M12 x 1.50 Pitch	8.8	92.0	83.0	69.00	62.25	
M14 x 2.00 Pitch	8.8	140.0	125.0	105.00	93.75	
M14 x 1.50 Pitch	8.8	150.0	135.0	112.50	101.25	
M16 x 2.00 Pitch	8.8	215.0	195.0	161.25	146.25	
M18 x 2.50 Pitch	8.8	300.0	280.0	225.00	210.00	
M20 x 2.50 Pitch	8.8	430.0	390.0	322.50	292.50	
M22 x 2.50 Pitch	8.8	580.0	530.0	435.00	397.50	
M24 x 3.00 Pitch	8.8	740.0	670.0	555.00	502.50	
M6 x 1.00 Pitch	10.9	15.5	14.0	11.63	10.50	
M8 x 1.25 Pitch	10.9	37.0	34.0	27.75	25.50	
M10 x 1.50 Pitch	10.9	75.0	68.0	56.25	51.00	
M12 x 1.75 Pitch	10.9	160.0	117.0	97.50	87.75	
M14 x 2.00 Pitch	10.9	205.0	185.0	153.75	138.75	
M16 x 2.00 Pitch	10.9	310.0	280.0	232.50	210.00	

TORQUE CHART FOR STAINLESS STEEL CAP SCREWS

Size	316 inch-lb	18/8 inch-lb
6-32	10.1	9.6
6-40	12.7	12.1
8-32	20.7	19.8
8-36	23.0	22.0
10-24	23.8	22.8
10-32	33.1	31.7
1/4-20	78.8	75.2
1/4-28	99.0	94.0
5/16-18	138.0	132.0
5/16-24	147.0	142.0
3/8-16	247.0	236.0
3/8-24	271.0	259.0
7/16-14	393.0	376.0
7/16-20	418.0	400.0
1/2-13	542.0	517.0
1/2-20	565.0	541.0
9/16-12	713.0	682.0
9/16-18	787.0	752.0
5/8-11	1,160.0	1,110.0
5/8-18	1,301.0	1,244.0
3/4-10	1,582.0	1,530.0
3/4-16	1,558.0	1,490.0
7/8-9	2,430.0	2,328.0
7/8-14	2,420.0	2,318.0
1"-8	3,595.0	3,440.0
1"-14	3,250.0	3,110.0