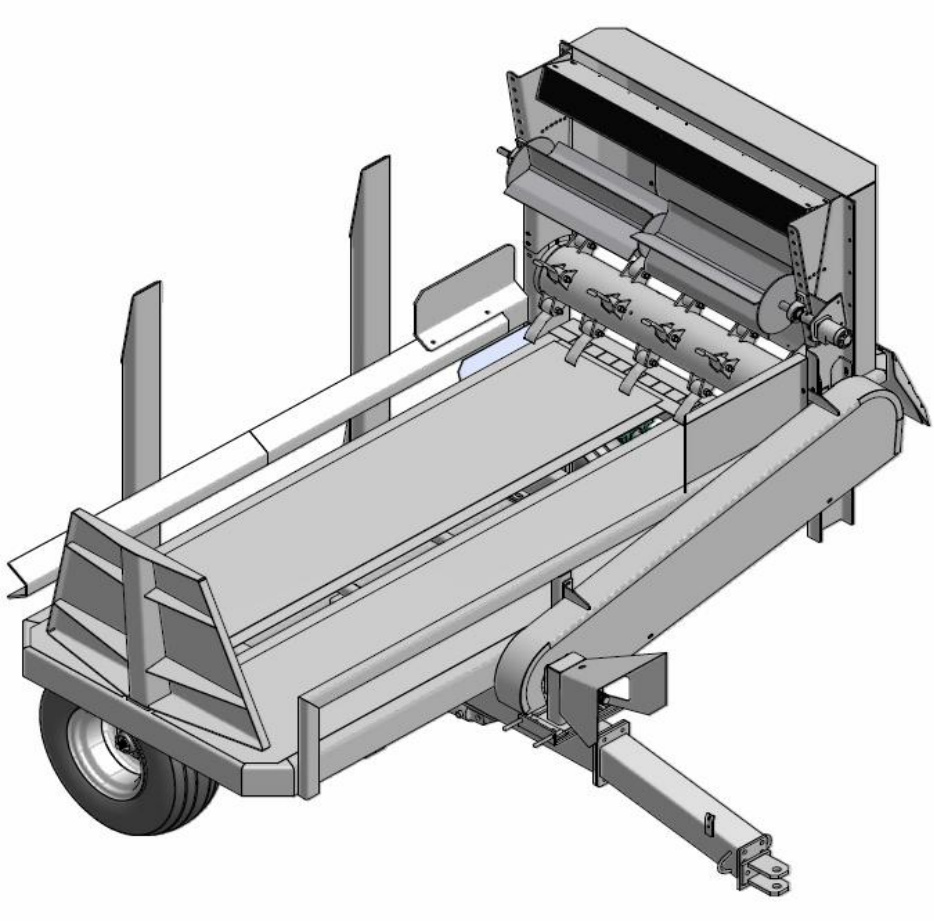
Tube-Line Bale Processor

Boss II

Operator's Manual



TUBE•LINE™ MANUFACTURING LTD

28686 (13/08/13)

BOSS TWO SQUARE BALE PROCESSOR

INTRODUTION

Your **BOSS TWO SQUARE BALE PROCESSOR** is designed to load and shred all types of forage in large square bales up to 2800 pounds (1270 kg). Maximum length of bales is 102” (274cm) or 8 ½' and the width of bales may vary from 24” (61cm) to 58” (147cm).

The **BOSS TWO SQUARE BALE PROCESSOR** has multiple uses:

1. Laying windrows in open fields.
2. Filling feed bunks – fence line, circular, etc.
3. Spreading forage for livestock bedding.
4. Spreading mulch over perennial plants such as strawberries and mushrooms.
5. Retractable knife section for commodity chopping.

The purpose of this owner's manual is to explain the maintenance requirements and routine adjustments for the most efficient operation of your “ BOSS” . There is also a troubleshooting section which may help in case of any problems in the field. Any information not covered in this manual may be obtained from your dealer or by contacting the factory at:

6455 Reidwoods Dr, RR#4, Elmira ON, N3B 2Z3
Toll Free : 888-856-6613 Phone : 519-669-9488 Fax : 519-669-5808
E-mail: sales@tubeline.ca

Sold and Serviced by

BOSS TWO SQUARE BALE PROCESSOR

Warranty

For one year from delivery date TUBE-LINE MANUFACTURING LTD. will replace or repair for the original purchaser, free of charge, any part or parts found upon examination at our factory in Elmira, Ontario, to be defective in material or workmanship under normal use and maintenance.

This warranty does not apply to tires, bearings, flails, knives or any other trade accessories not manufactured by TUBE-LINE MANUFACTURING. The buyer must rely solely on the existing warranty, if any, of those respective manufacturers.

Limited warranty on commercial use.

This warranty shall become void if the processor has been subject to misuse, negligence, alterations, accident or lack of required maintenance.

This warranty does not cover personal injury or any damage done to the processor or anything else if cause by foreign material put through the processor.

Wheel nuts must be tightened at 150 km and periodically thereafter.
Flail bolts must be tightened before use and periodically thereafter.

The 'Warranty Registration' form must be filled out and signed to validate warranty.

Replacement parts are available only through your Boss II Bale Processor dealer.

To obtain the fastest service, please remember to:

1) Order by part number
2) Give the model year
3) Include the serial number

Purchaser_____

Date of Purchase_____

Serial Number_____

Always use your Serial Number when referring to parts or problems.

SPECIFICATIONS

Tractor horsepower required . . . . . 60 – 180 H.P
(*Higher Horse Power May Be Used With Caution)*

Capacity . . Two (2) Large square bales 2800 lb (1270 kg)

Chamber Size . . 52” (132 cm) high to 60” (152 cm) wide
102” (259 cm) maximum length

Tire Size . . . . . 12.5L15 Tire

Length . . . . . 132” (335 cm)

Width . . . . . 140” (356 cm)

Height . . . . . 93” (236 cm)

P.T.O . . . . . 1000 R.P.M. (540 Optional)

Dual Hydraulics . . . . . 2500 PSI

Safety

Learn Machine Safety

Carefully read this manual. Learn how to operate this machine and learn how to use the controls properly.

Do not let anyone operate this machine without proper instruction.

Unauthorized modifications to the machine may impair the function and/ or safety and affect machine life.

Understand Signal Words

A signal word – DANGER, WARNING or CAUTION is used with the safety alert symbol. Danger identifies the most serious hazards.

Safety signs with signal word DANGER or WARNING are typically near specific hazards.

General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this operator's manual.

Transport Safely

- Disengage PTO
- Do not tow loads that weigh more than twice the weight of the tractor
- Reduce the tractors speed when ground is rough
- Always keep the tractor in gear when traveling down steep grades
- To assure adequate braking performance and control, tow only with an agricultural tractor. Safe towing speed depends on the weight of the tractor and the towed load. Speed should never exceed 32kmh (20mph)

Safety

Check Before Operating :

- Become familiar with the controls
- Check all hardware, especially if your machine has a knife kit
- Check all hydraulic hoses and connections
- Check the condition of drive belts
- Remove foreign objects from the machine
- Inspect drive-line shield for free rotation
- Be sure all guards are in place

Operate Safely :

- Keep all shields in place
- Avoid operating processor when making sharp turns or in steep banked gullies
- Under no circumstances should a processor equipped for 540 rpm PTO be operated with 1000 rpm PTO. Nor should a 1000 rpm PTO processor be operated by a tractor with 540 rpm PTO
- DO NOT allow riders on processor
- Drive slowly through doors and gates
- Reduce tractor ground speed when turning or traveling on rough terrain. Avoid traveling over loose fill, rocks, ditches, or holes

Park Safely :

Always park the processor on level ground and block the wheels when not in use

Using On Inclines :

When working on inclines or slopes, travel uphill or downhill. Be sure to keep tractor transmission in gear when traveling downhill.

Safety

Service Machine Safely

- Always engage tractor parking brake or place transmission in “PARK”, lower fork to the ground, shut off the engine and remove key before servicing.
- Do not work under raised machine parts unless it is securely blocked or safety props are in position
- Before disconnecting hydraulic hoses, relieve all hydraulic pressure.

Practice Safe Maintenance

- Understand service procedures before doing any work.
- Never lubricate or service machine while it is moving.
- Keep hands, feet, and clothing from power-driven parts.
- Disengage all power and operate controls to relieve pressure.
- Lower fork to the ground
- Securely support any machine elements that must be raised for service work
- Keep all parts in good condition and properly installed.
- Fix damage immediately.
- Replace worn or broken parts.
- Remove any buildup of grease, oil, or debris.

Protect Bystanders

- Never operate the machine near people.
- Do not stand near machine when running
- Keep all shields in place
- DO NOT allow children to operate the tractor
- Operate the machine from the tractor seat only

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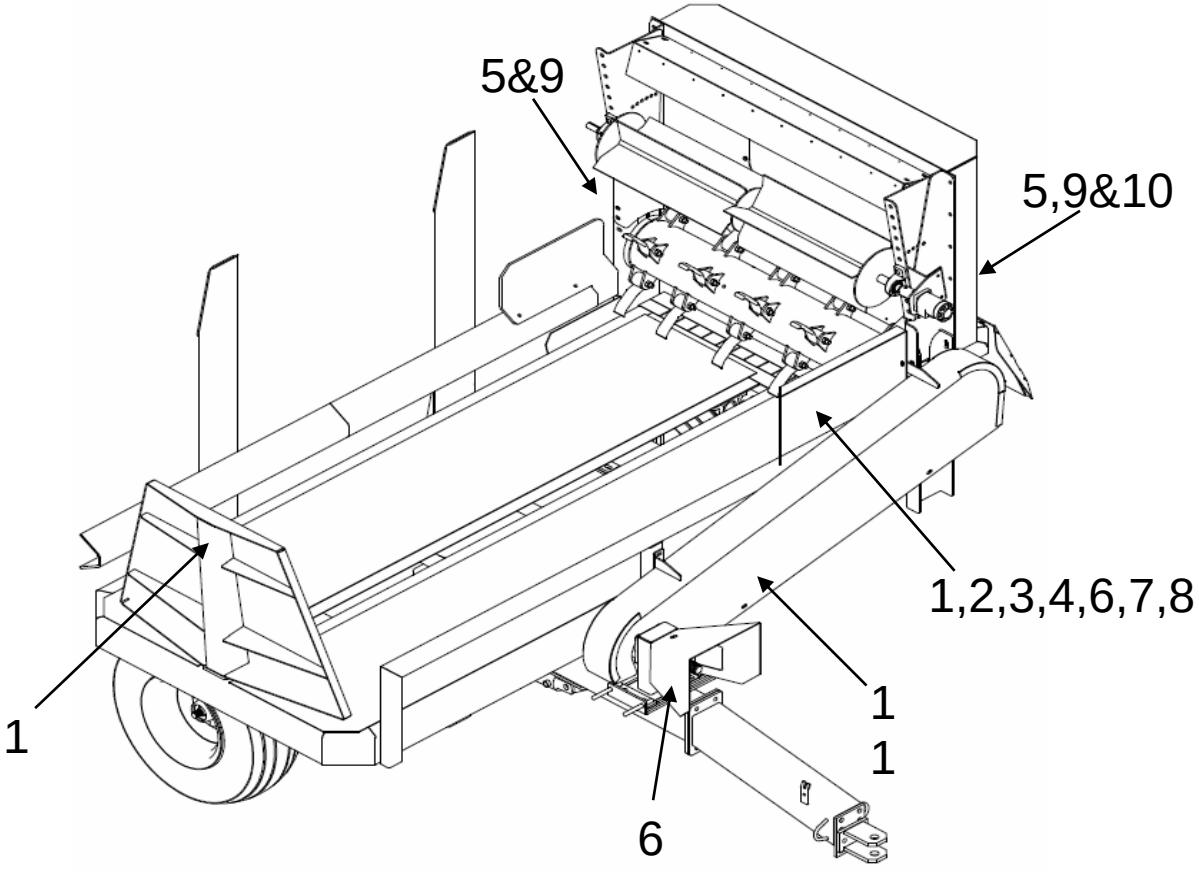
Decals

Item	Part #	Description
1	DE23845	WARNING ! Moving Part Hazard
2	DE23847	WARNING ! High Pressure Fluid Hazard
3	DE23851	DANGER ! Injury or Death From Pinching
4	DE23848	WARNING ! Thrown Object Hazard
5	DE23837	DANGER ! Keep Hands And Feet Away
6	DE23849	DANGER ! Do Not Operate Without…
7	DE23839	WARNING ! To Prevent Serious Injury or Death
8	DE23840	CAUTION ! To Avoid Injury or Machine Damage
9	DE23850	DANGER ! Stop Engine And Remove Key
10	DE23984	WARNING ! Stay Clear While Engine Is Running
11	DE23836	WARNING ! Moving Part Hazard



Decals

Item # : 1
Part # : DE23845

Item # : 2
Part # : DE23847

Item # : 3
Part # : DE23851

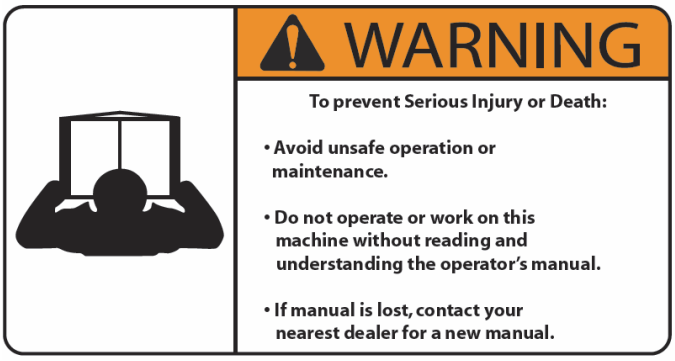
Item # : 4
Part # : DE23848

Item # : 5
Part # : DE23837

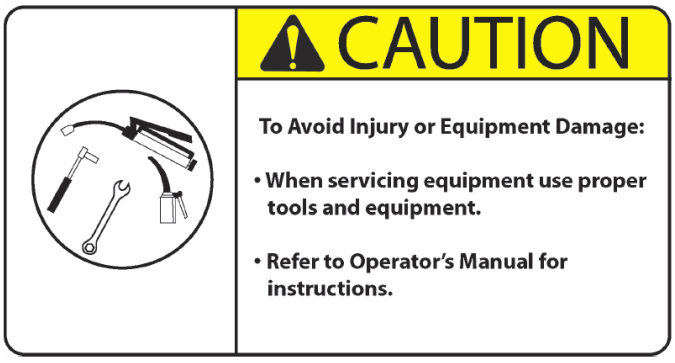
Item # : 6
Part # : DE23849

Decals

Item # : 7
Part # : DE23839



Item # : 8
Part # : DE23847



Item # : 9
Part # : DE23850

Item # : 10
Part # : DE23984

Item # : 11
Part # : DE23836

Before Operating

Keep chains and belts at proper tension

- Machine is assembled complete from the factory less hitch mountings
- Adjust the height of the machine so it is parallel to the ground
- Improper hitch adjustments may cause separation from the PTO drive-line when operating on uneven terrain.
- The machines hydraulic system requires dual outlets on the tractor

PTO Drive-line

PTO drive-line maintenance instructions must be read before attaching and operating. The maintenance instructions are attached to the chain supplied on the drive-line.

Failure to do so may result in damage to the drive-line and machine may void warranty.

When lubricating drive-line telescoping shafts, it is imperative that yokes remain phased. In order to maintain phasing, the flat profile of the inner tube must be engaged with the flat profile of the outer tube. Failure to do so will result in damage across and bearings and premature shearing of the shear bolt.

Shear bolt replacement must be done only with shear bolts of the same grade and diameter supplied on the drive-line.

Proper and adequate length of the drive-line must be maintained in order to have maximum one third engagement of telescoping tubing.

Too short of a drive-line will result in premature failing of the drive-line.
Too long of a drive-line will result in damage to drive-line, tractor PTO and implement.

PTO shaft drive-line must not be opened without all safety shields in place.
PTO shaft drive-line must be attached securely before operating.

At no time should any persons be in the immediate area of the PTO shaft drive-line and machine while the PTO shaft drive-line is being operated.

Caution :

Tractor PTO must be disengaged and tractor shut off before approaching or contacting the PTO shaft drive-line.

Maintenance and Adjustments

Caution

The flail tube in this machine is a fully balanced assembly. If for any reason the flails must be removed, they MUST BE RETURNED to the SAME POSITION they were taken from. If this is not done a balance problem will result causing machine vibration. Number flails and inserts and their positions before you do any work.

Before performing any maintenance or adjustments make sure machine is not running. If for any reason arc welding is to be done, always ground the cylinder to the frame of the machine prevent arcing in the bearings.

1. Check for loose and badly worn parts.

2. Conveyor chain should be adjusted to allow chain slack 1” (2.54 cm) to 1 1/2” (3.8 cm).

3. Follow the Lubrication Chart.

4. Inspect rotor and all rotating parts for twine or wire build-up.

5. Inspect and tighten Allen screws on bearings after the first 10 hours of operation.

6. Check air pressure in tires – 35lb. (15.9 kg)

7. Discharge deflector has adjustments to allow forage to be spread to any desired width.

8. Check for broken flails. Replace with new BOSS flails to keep the machine in balance.

Starting Machine

Warning

- Make sure that bales are free from foreign objects foreign objects in bale may cause damage to the machine or cause injury or death to livestock, bystanders, or operator.

- Make sure any bystanders are away from the machine and discharge before engaging PTO flying objects can cause serious injury or even death.

This machine is set-up to operate on a 1000 rpm PTO (540 rpm is optional).

The machine's hydraulic system performs two functions. One function tilts the fork for loading bales o top of the machine. The second function powers the bale pusher by means of a hydraulic motor. Desired speed of the pusher is controlled by a flow control valve located on the front of the machine. Decrease the speed of the pusher allows flail knives to chop forage finer, increasing the speed leaves forage coarser when the knives are in the upward position.

The table knives may be lowered for coarse chopping, spreading forage over perennial plants or livestock bedding.

Operating the tractor at maximum PTO rpm allows the machine to do a better job of chopping forage.

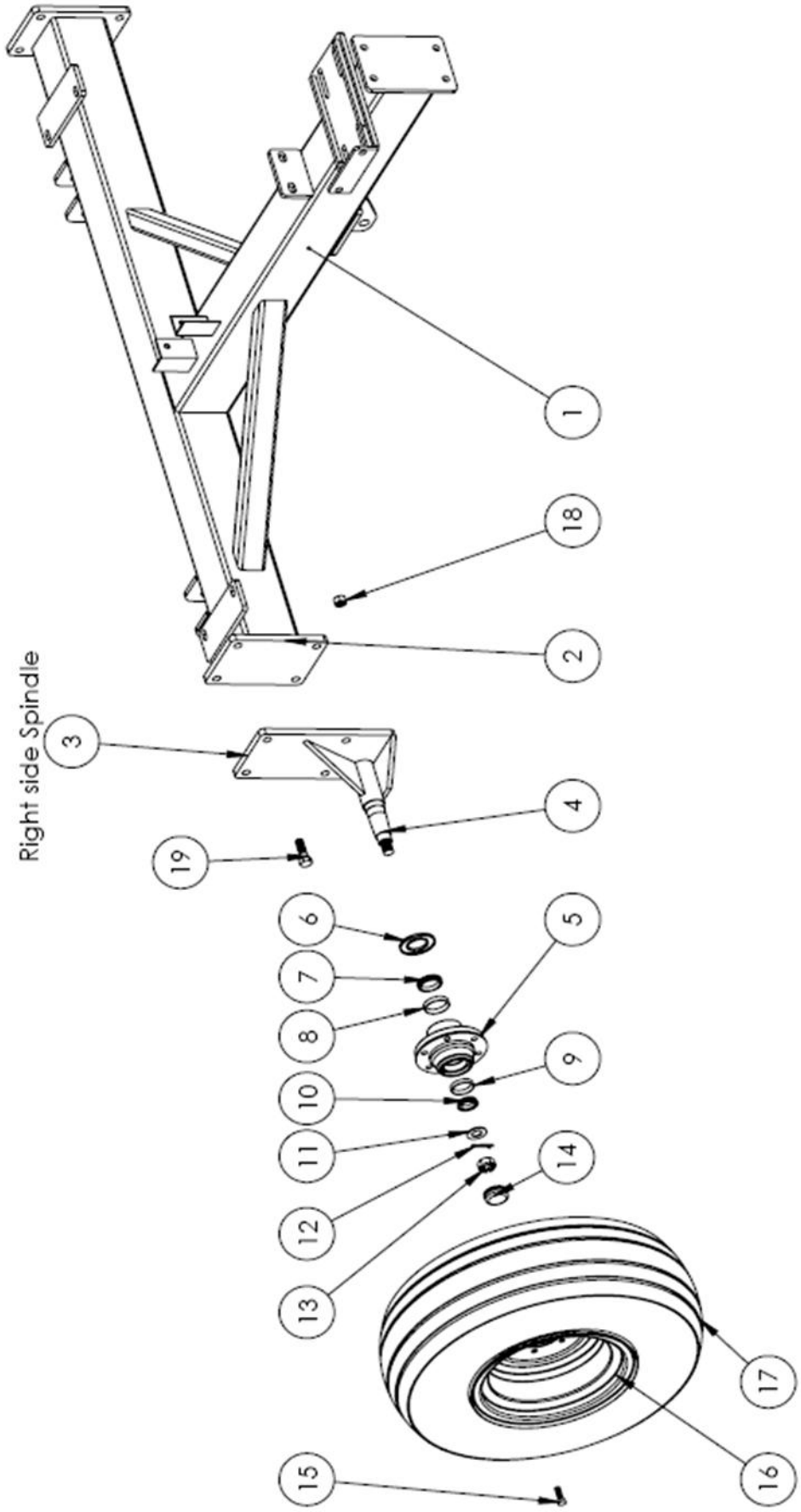
Twine build-up should be kept to a minimum to reduce fire hazard and keep the machine in balance.

Always load one bale at a time. A second bale may be carried on the forks. If bales are frozen, put the frozen side down to the table for better operation.

Center the bale on the forks before loading on to the table. Slide the forks lightly on ground when loading bales on the forks. Store bales on level ground so that the bale can be loaded with ease. Bales should be stored on a clean surface free from rocks and other foreign objects.

Check for cylinder wear and broken flails and flail bracket wear.

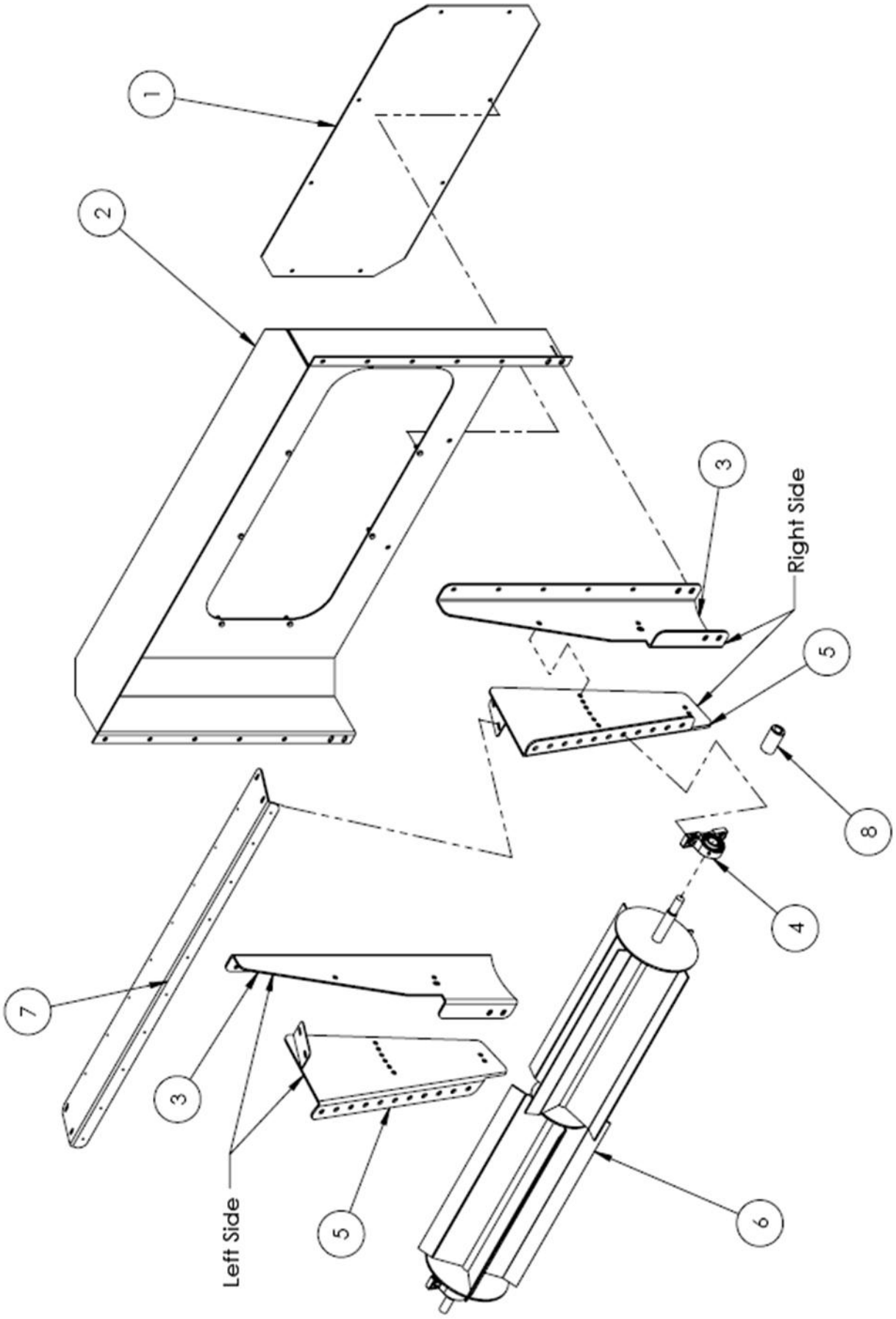
Tire & Axle Assembly



Tire & Axle Assembly

Item	Qty	Part #	Description
1	1	200092A	Main Hitch Axle Tube
2	2	200095A	Bolt-on Spindle Plate
3	1	208120	Right Spindle Weld Assembly
	1	208121	Left Spindle Weld Assembly
4		208122	Straight Spindle (2 1/4 x 12 3/4)
5		208126	Hub (W-6000)
5A	2	208127	Hub c/w Parts (W-6000) (Ref # 6-15)
6		208123	Seal
7	2	208124	Inner Bearing
8	2	208125	Inner Cup
9	2	208128	Outer Cup
10	2	208129	Outer Bearing
11	2	208130	1” Washer
12	2	208131	Cotter Pin
13	2	208132	1” Slotted Hex Nut (1-14)
14	2	208133	Dust Cap
15	12	208134	Wheel Bolt (9/16 x 1 3/4)
16	2	208135	15 x 8 x 6 Rim
17	2	208136	12.5L – 15 x 6 Ply Tire
18	8	LN 3/4	Locknut
19	8	HB 3/4 x 2 1/2	Hex Bolt

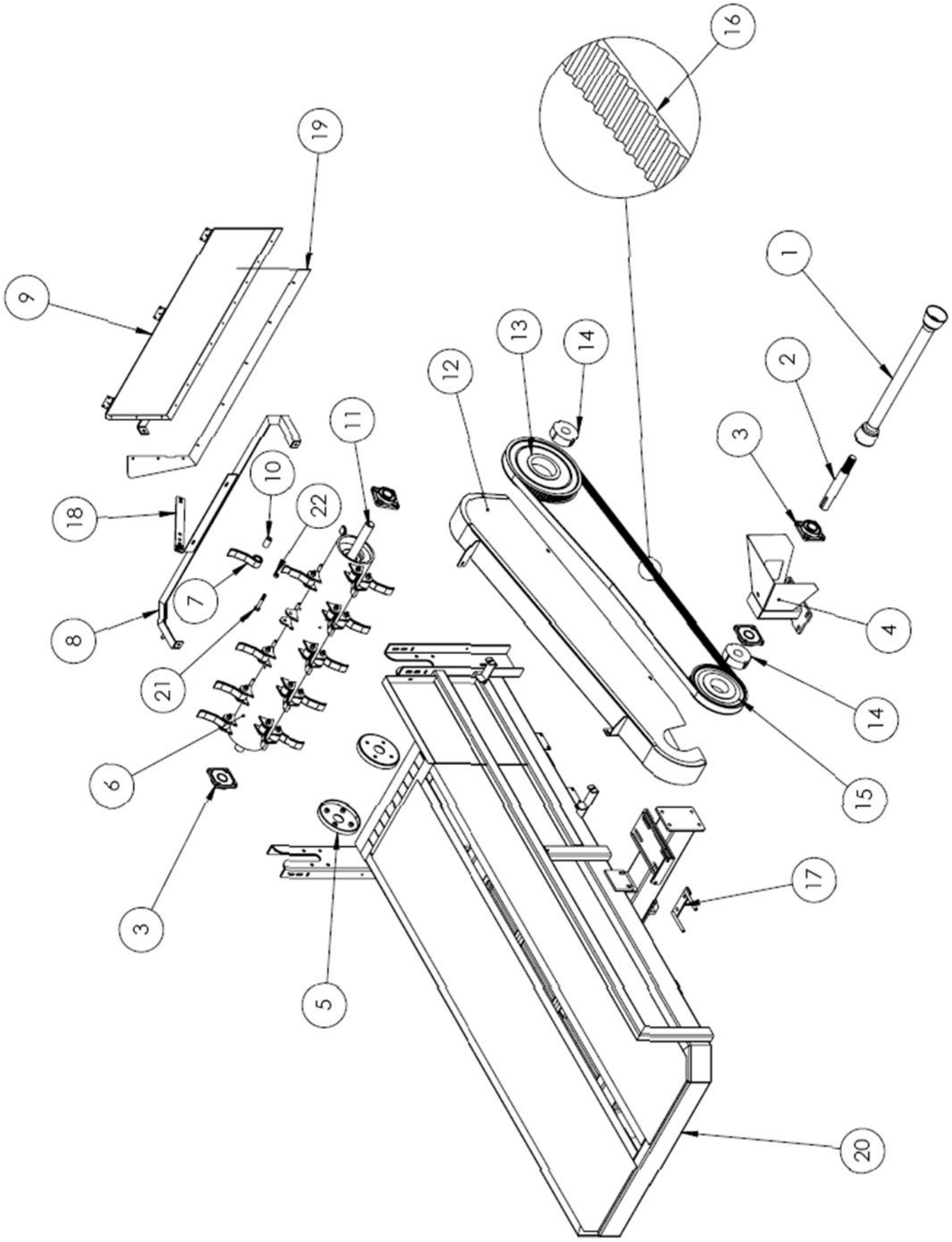
Upper Beater Assembly



Upper Beater Assembly

Item	Qty	Part #	Description
1	1	200174B	Upper Lid Front Plate
2	1	200170D	Front Shield
3	2	200172C	Outer Side Plate, Right & Left
4	2	208137	1 1/4 Pillow Block Bearing
5	2	208138	Inner Side Plate, Left & Right
6	1	208139	Upper Beater
7	1	200175B	Top Plate Roof Cover
8	1	208115A	Top Beater Motor Coupler

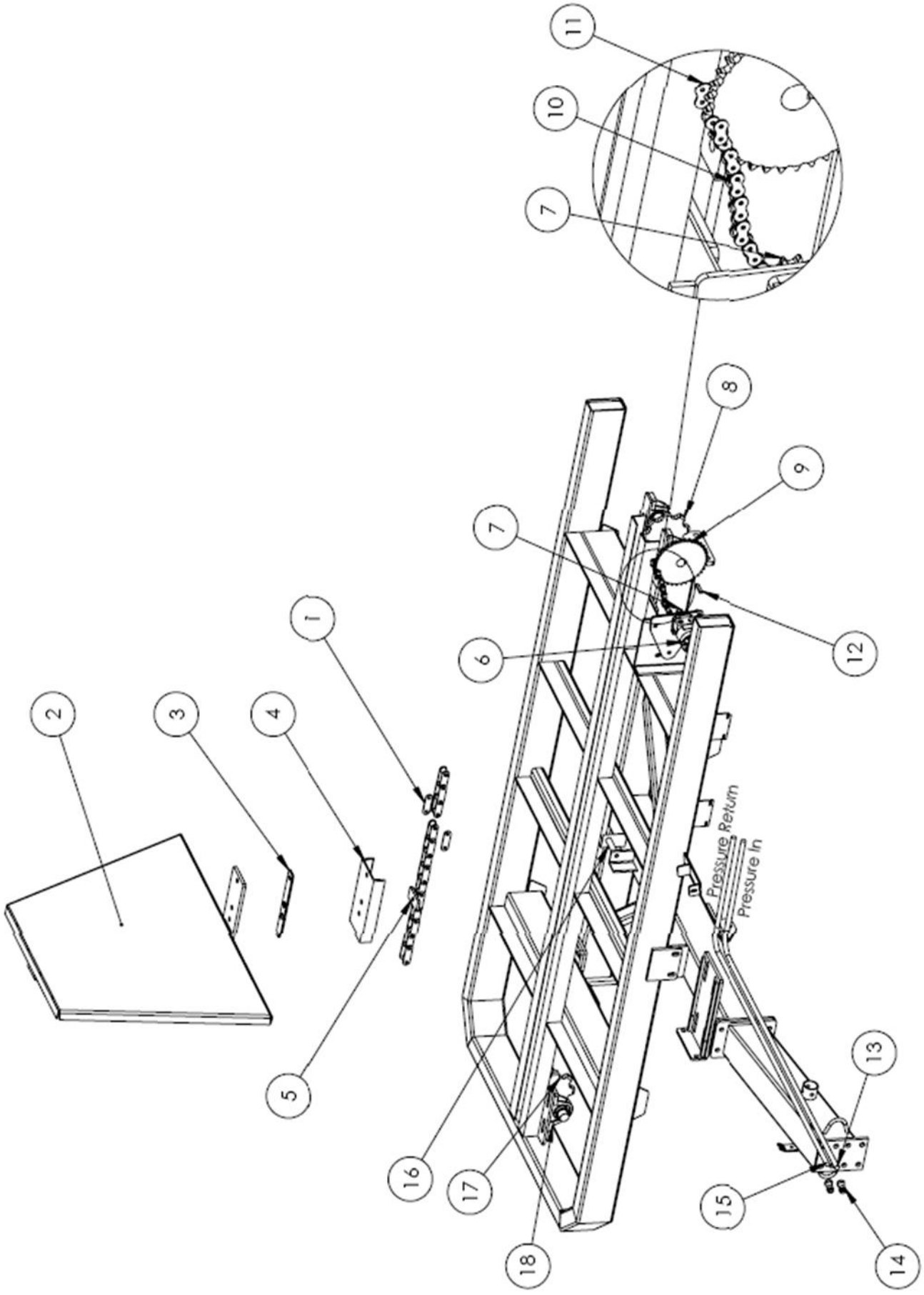
Bottom Beater Assembly



Bottom Beater Assembly

Item	Qty	Part #	Description
1	1	208140	PTO Complete
2	1	200163A	PTO Stub Shaft
3	4	199399A	Square Bearing, 2” Bore c/w zerk
4	1	200150A	PTO Shield
5	2	208141	Bearing Protector
6	1	208142	Bottom Beater
7	20	20060A	Flail
8	1	200177B	Outer Lid Support Angle
9	1	208143	Front Bottom Beater Lid
10	20	200059A	Flail Bushing
11	1	200069A	2” Shaft, Flail Tube
12	1	208144	Belt Shield
13	1	208102	Pulley Sprocket 80T
14	2	208103	Taper Lock Hub c/w setscrews
15	1	208104	Pulley Sprocket 60T
16	1	200165A	Drive Belt
17	1	200106A	Pulley Adjusting Bracket
18	1	208105	Side Discharge Adjuster
19	1	208106	Side Discharge Deflector
20	1	200100A	Deck Main Frame
21	20	208150	5/8-18 NFT x 4 Gr.8 Bolt
22	20	208151	5/8-18 NFT Steel Locknut

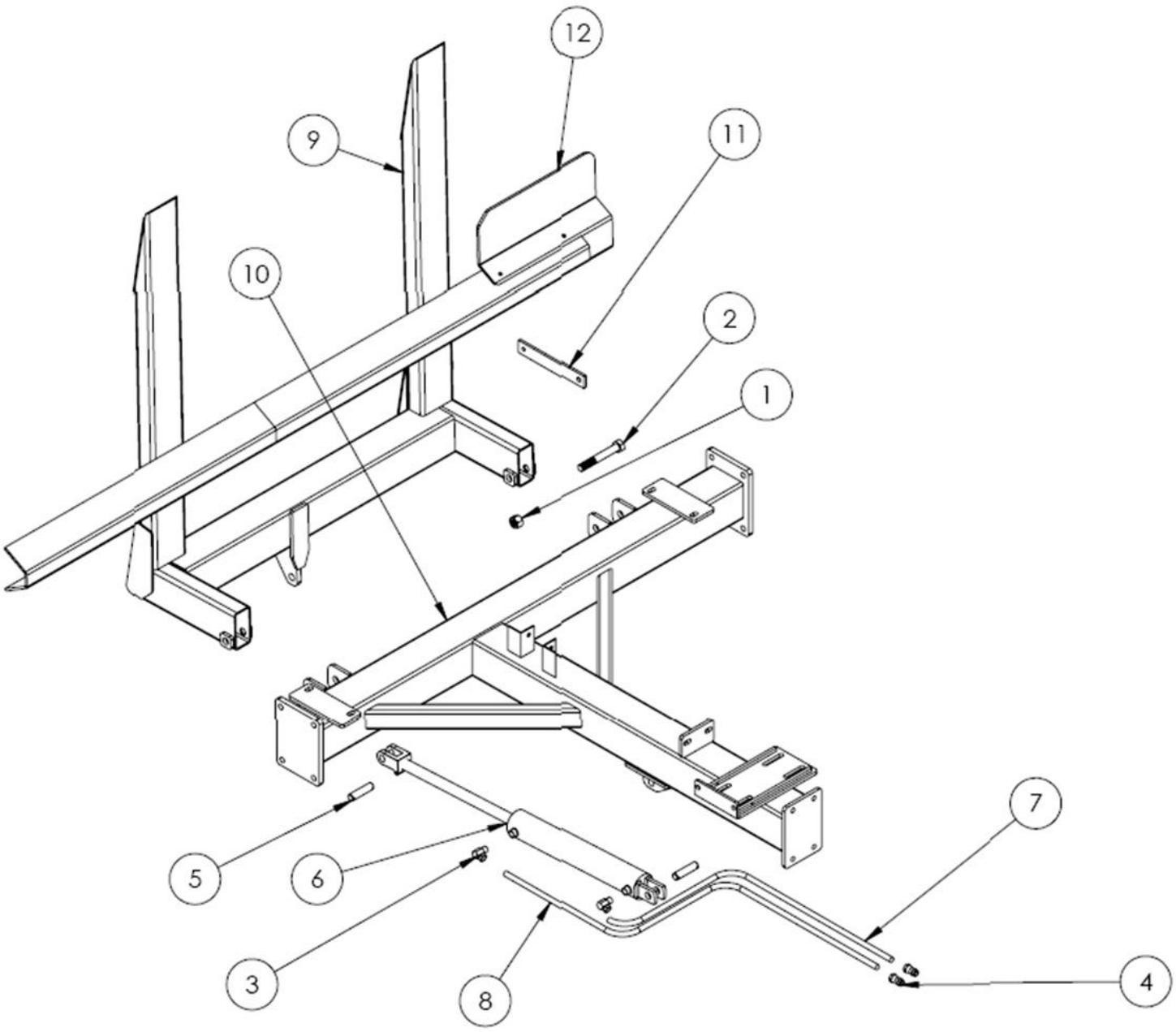
Bale Pusher Assembly



Bale Pusher Assembly

Item	Qty	Part #	Description
1	1	199199A	Connector Link
2	1	200003A	Bale Pusher
3	1	200001A	Bale Pusher Guide Plate
4	1	200000A	Bale Pusher Mount Channel
5	1	200145A	Conveyor Chain
6	1	208107A	1006 Hydraulic Motor
7	1	198998A	Sprocket 60B11
8	1	200141A	Drive Sprocket 8T
9	1	208108A	Sprocket 60B36
10	1	208109A	Roller Chain #60H x 37 3/8
11	1	208110A	Connector Link #60H
12	1	200143A	3/8 x 2 Keystock
13	1	BS-01	Pressure In Hydraulic Hose
14	2	HF-8010-4	Pioneer Ends 1/2 FPT
15	1	BS-04	Pressure Out Hydraulic Hose
16	1	200009A	Conveyor Chain Bushing
17	1	200138A	Idler Sprocket 8T
18	4	199398A	Pillow Block Bearing 1.5 Bore

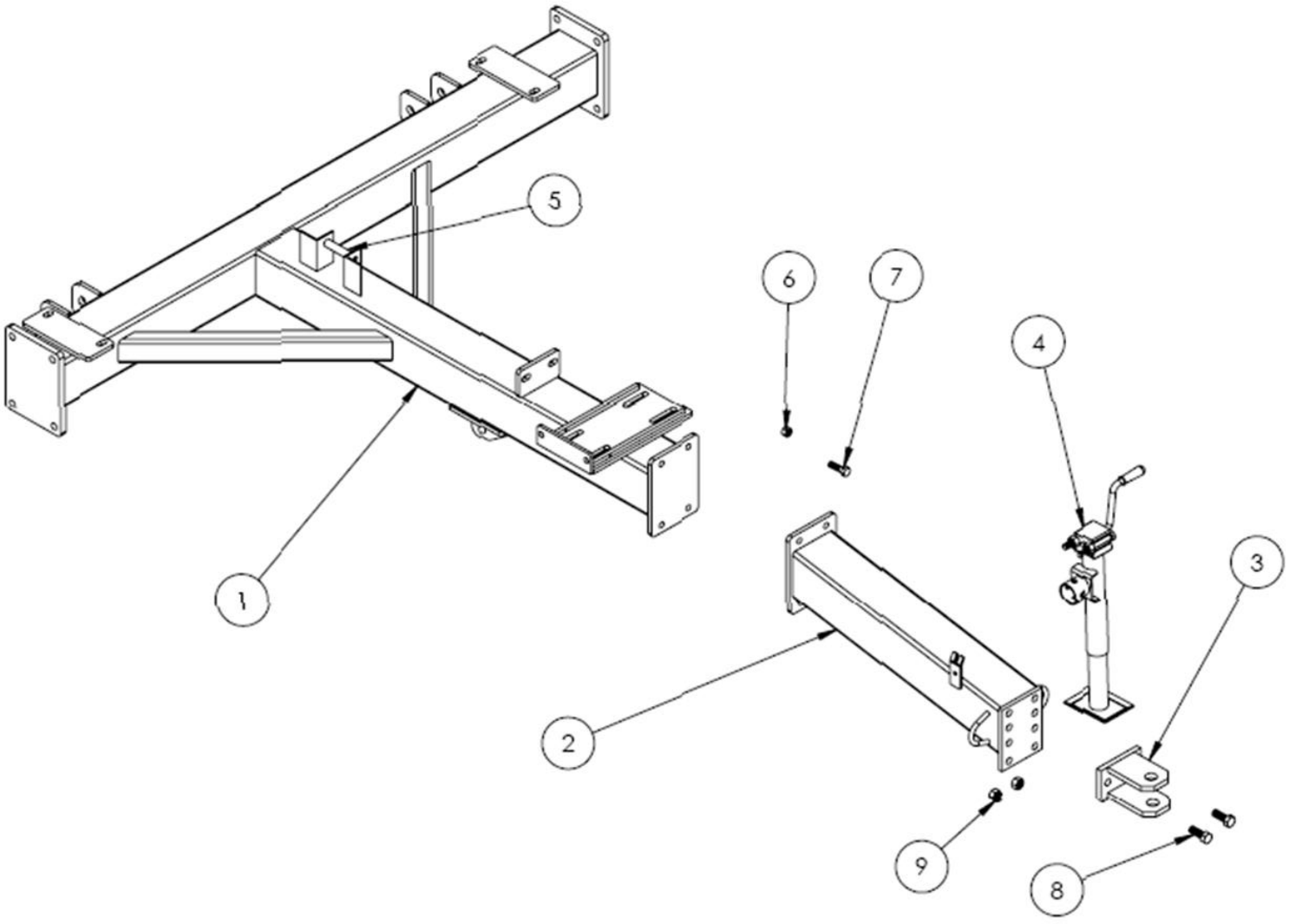
Fork Lift Assembly



Fork Lift Assembly

Item	Qty	Part #	Description
1	2	LN 1	Locknut
2	2	HB 1 X 7	Hex Bolt
3	2	HF 1501-8-8	Elbow Swivel 90* .5 MPT x .5 FPT
4	2	HF 8010-4	Pioneer Ends .5 FPT
5	2	199799A	1” Cylinder Pin
6	1	199899A	Forklift Cylinder
7	1	BS-09	Cylinder Blank End Hydraulic Hose
8	1	BS-10	Cylinder Rod End Hydraulic Hose
9	1	208145	Fork Lift
10	1	200091A	Main Hitch
11	1	208112	Fork Lift Lock Strap
12	1	208146	De-dribbler

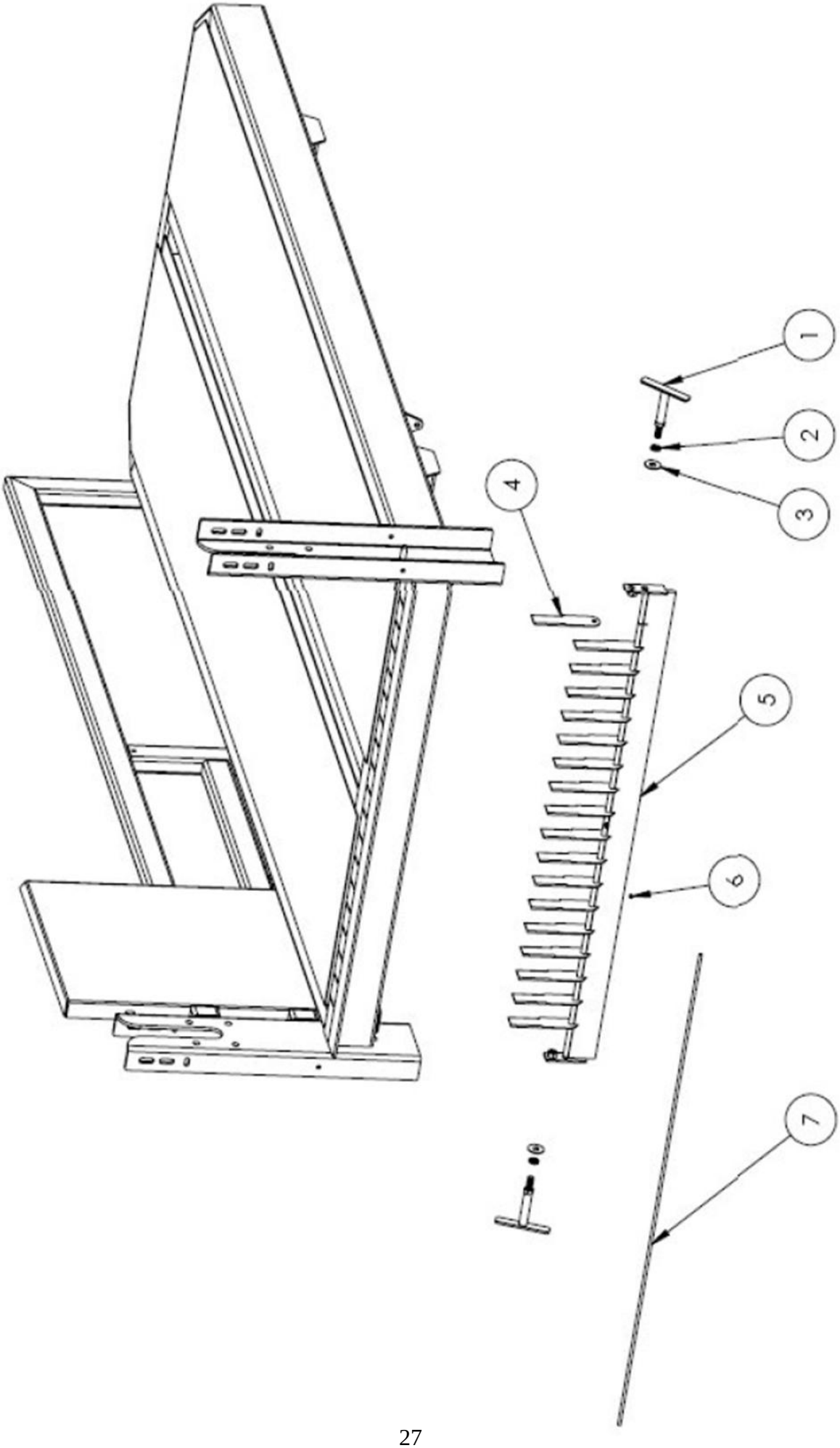
Hitch Assembly



Hitch Assembly

Item	Qty	Part #	Description
1	1	200091A	Main Hitch
2	1	208147	Bolt-on Hitch Tube
3	1	208148	Bolt-on Tongue
4	1	25719	Jack
5	1	200185A	Chain Idler
6	4	LN 5/8	Locknut
7	4	HB 5/8 x 2	Hex Bolt
8	2	HB 3/4 x 2	Hex Bolt
9	2	LN 3/4	Locknut

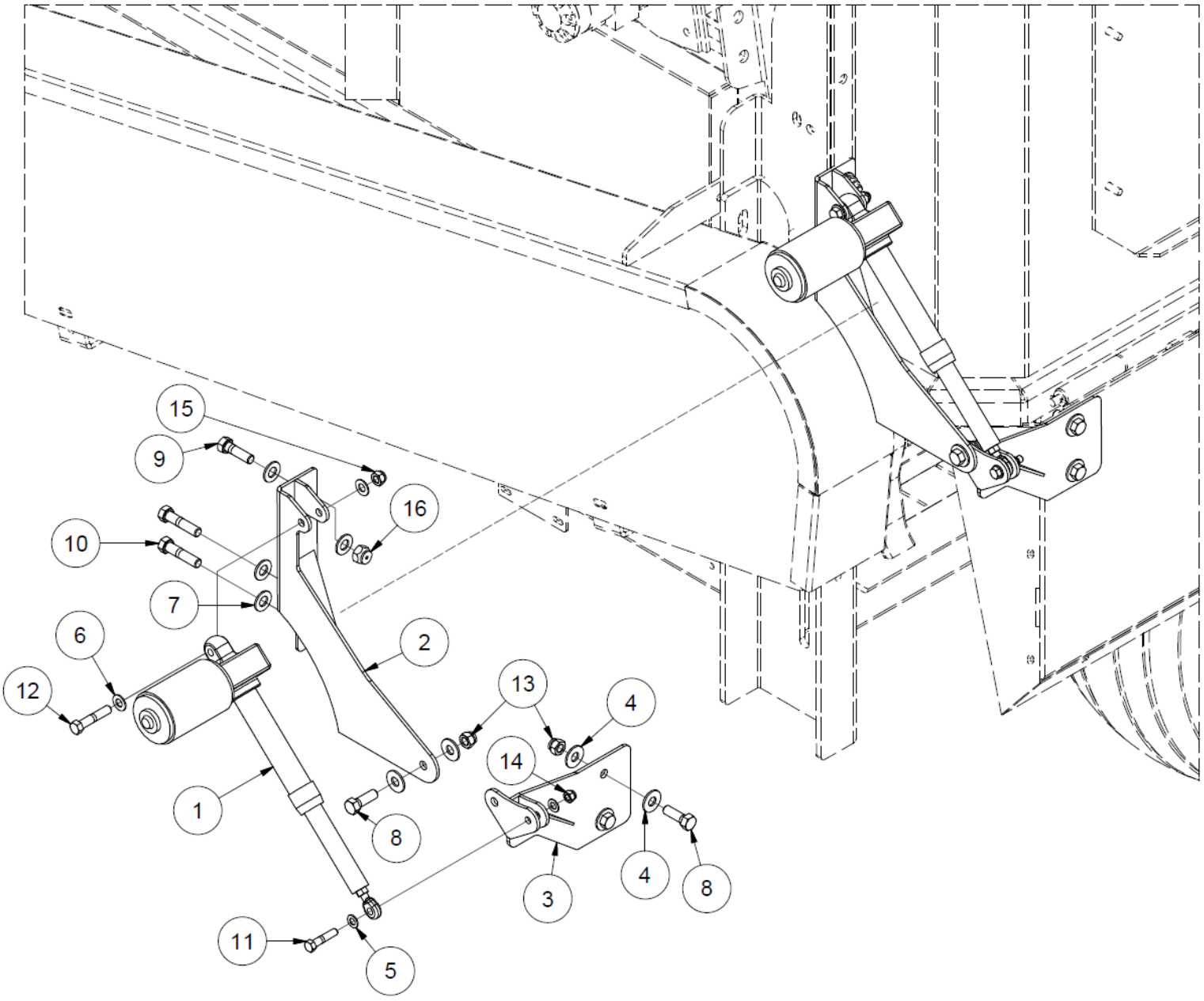
Knife Kit (Option) Assembly



Knife Kit (Option) Assembly

Item	Qty	Part #	Description
1		BOSSCK	Knife Kit (Ref # 1-7)
2	2	200038	Tee Handle
3	2	LW 5/8	Lock Washer
4	2	FW 5/8	Flat Washer
5	18	200058	Knife
6	1	200034	Knife Support Bracket
7	1	SS 5/16 x 3/8	Setscrew
8		200050	Knife Kit

Optional Electric Actuator Assembly

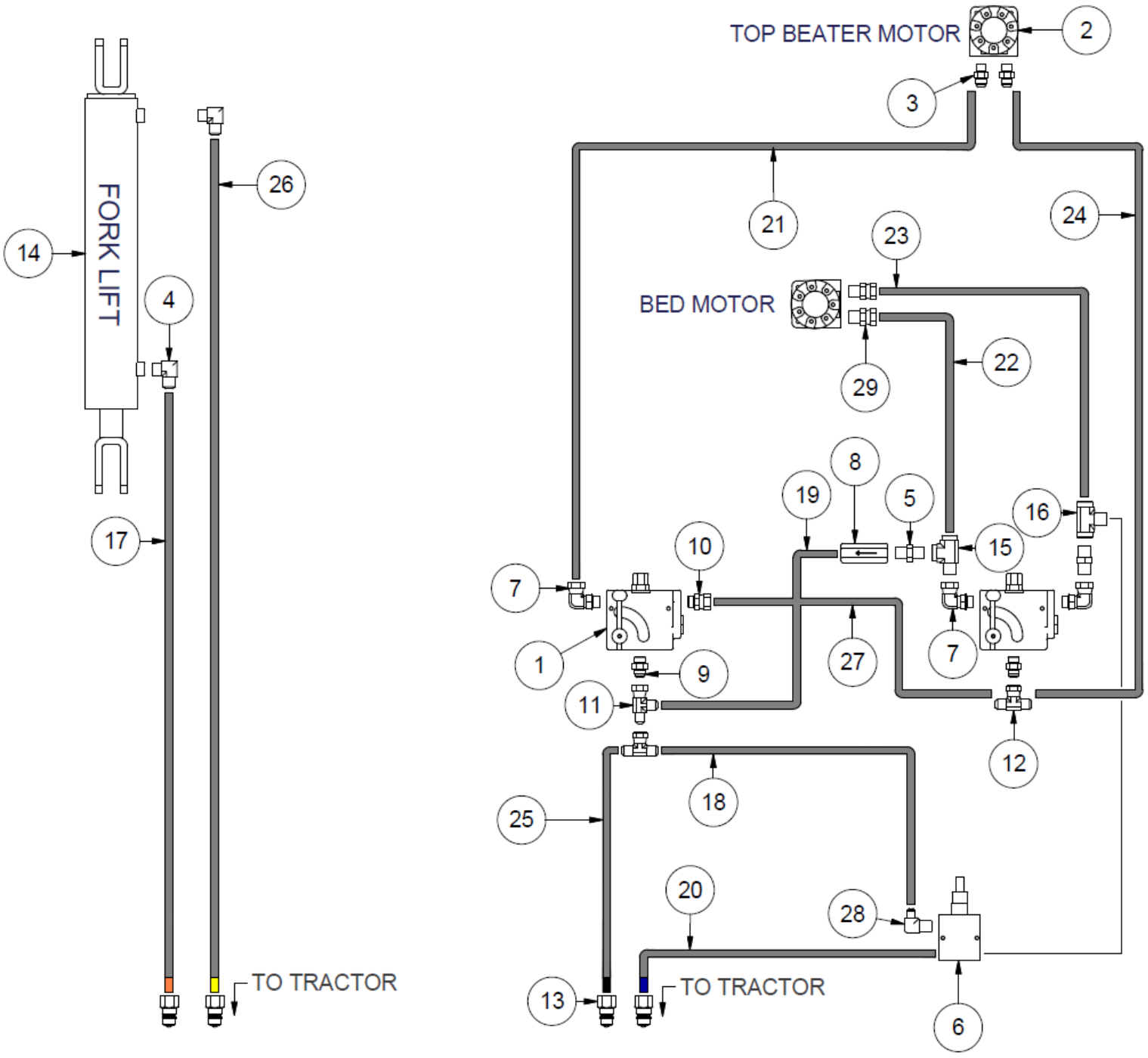


Optional Electric Actuator Assembly

*Order part # **32703** for complete kit*

Item	Qty	Part #	Description
1	1	31929	Actuator Deflector Pivot
2	1	31930	Actuator Pivot
3	1	32702	Electric Actuator
4	6	FW 1/2	Flat Washer
5	2	FW 3/8	Flat Washer
6	2	FW 7/16	Flat Washer
7	6	FW 9/16	Flat Washer
8	3	HB 1/2 X 1 1/2	Hex Bolt
9	1	HB 1/2 X 1 3/4	Hex Bolt
10	2	HB 1/2 X 2 1/4	Hex Bolt
11	1	HB 3/8 X 1 3/4	Hex Bolt
12	1	HB 7/16 X 2 1/4	Hex Bolt
13	3	LN 1/2	Lock Nut
14	1	LN 3/8	Lock Nut
15	1	LN 7/16	Lock Nut
16	3	LN 9/16	Lock Nut

Hydraulic Schematic

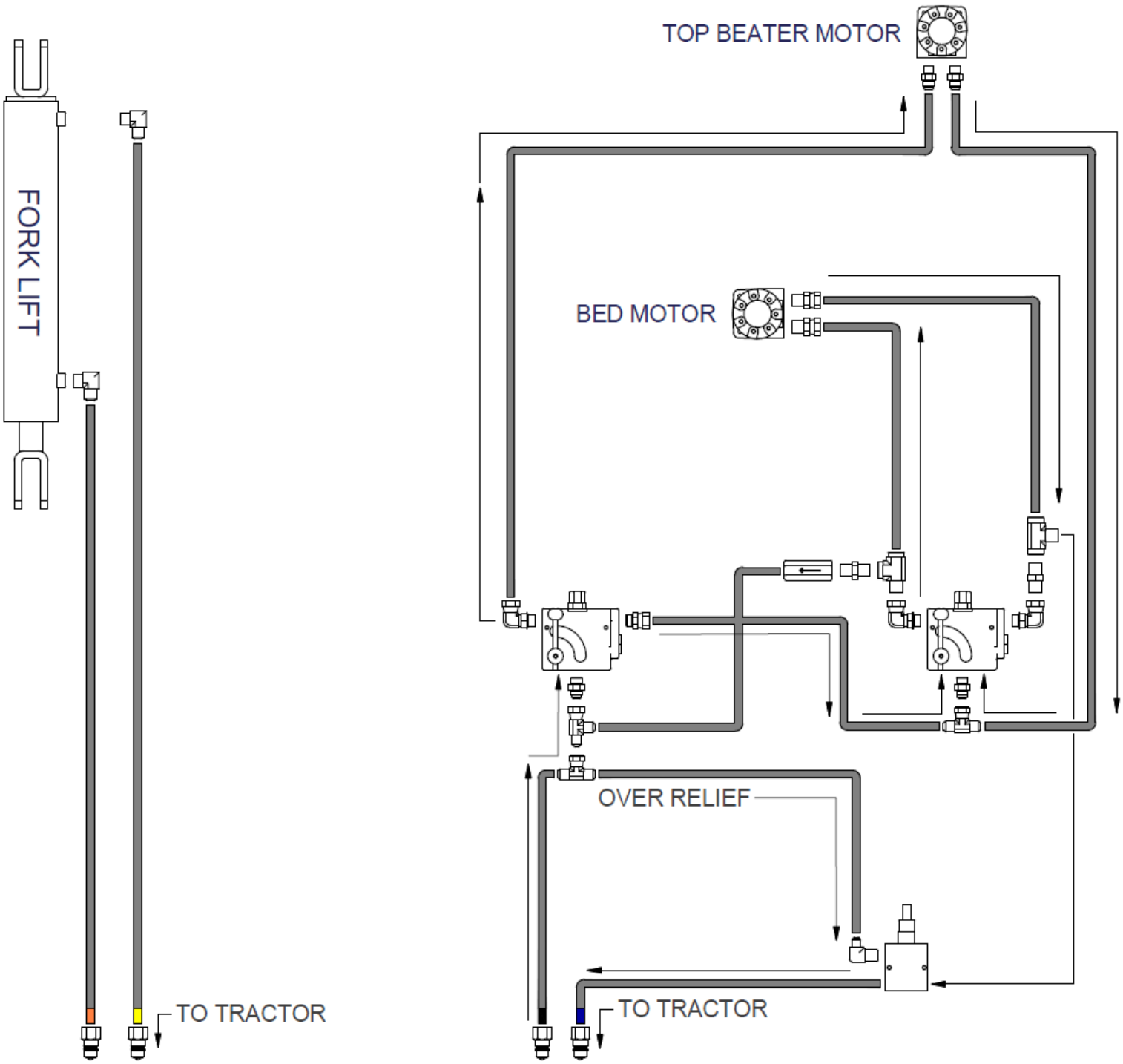


Hydraulic Schematic

Item	Qty	Part #	Description
1	2	VAL HYSFCR51-8SAE (0-8)	Flow Control
2	2	VAL 1005	Hydraulic Motor
3	2	HF 2404-8-8	Hydraulic Fitting
4	2	HF 2501-8-8	Hydraulic Fitting
5	2	HF 5404-8-8	Hydraulic Fitting
6	1	VAL VMP B L 10-12 TS S SAE	Relief Valve
7	3	HF 6901-8-8	Hydraulic Fitting
8	1	CHECK VALVE	Check Valve
9	2	HF 6400-8-8	Hydraulic Fitting
10	4	HF 6900-8-8	Hydraulic Fitting
11	1	HF 6602-8-8	Hydraulic Fitting
12	1	HF 6600-8-8-8	Hydraulic Fitting
13	1	HF 8010-4	Coupler
14	1	BS 199899A	Cylinder
15	1	HF 5602-8-8-8	Hydraulic Fitting
16	1	HF 5604-8-8-8	Hydraulic Fitting
17	1	HH BS-01 (128”)	Hydraulic Hose
18	1	HH BS-02 (20”)	Hydraulic Hose
19	1	HH BS-03 (16”)	Hydraulic Hose
20	1	HH BS-04 (150”)	Hydraulic Hose
21	1	HH BS-05 (96”)	Hydraulic Hose
22	1	HH BS-06 (40”)	Hydraulic Hose
23	1	HH BS-07 (27”)	Hydraulic Hose
24	1	HH BS-08 (68”)	Hydraulic Hose
25	1	HH BS-09 (120”)	Hydraulic Hose
26	1	HH BS-10 (140”)	Hydraulic Hose
27	1	HH 27214 (17”)	Hydraulic Hose
28	1	HF 2501-6-8	Hydraulic Fitting
29	2	HF 1404-8-8	Hydraulic Fitting

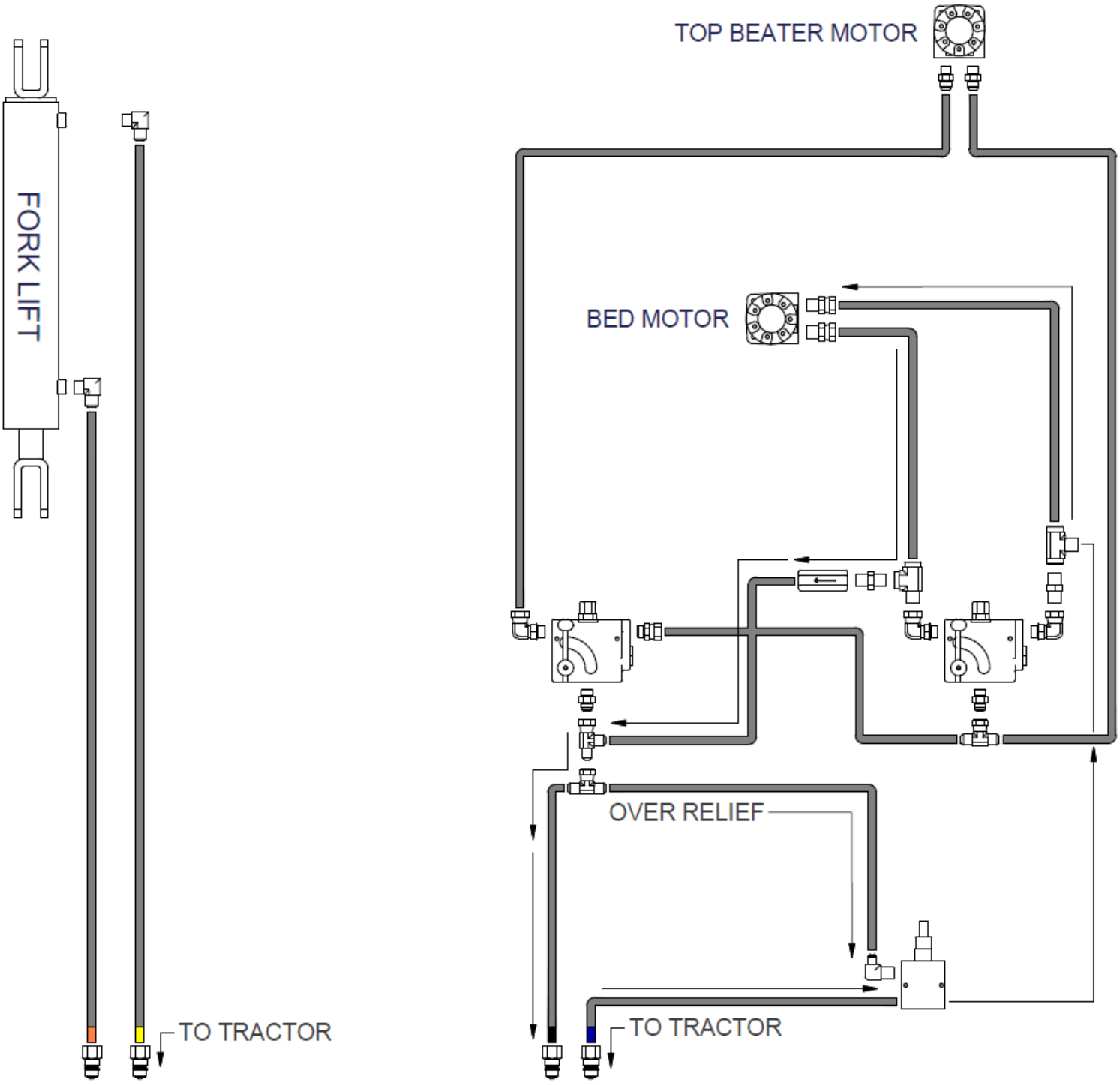
Hydraulic Flow Layout

Forward Direction

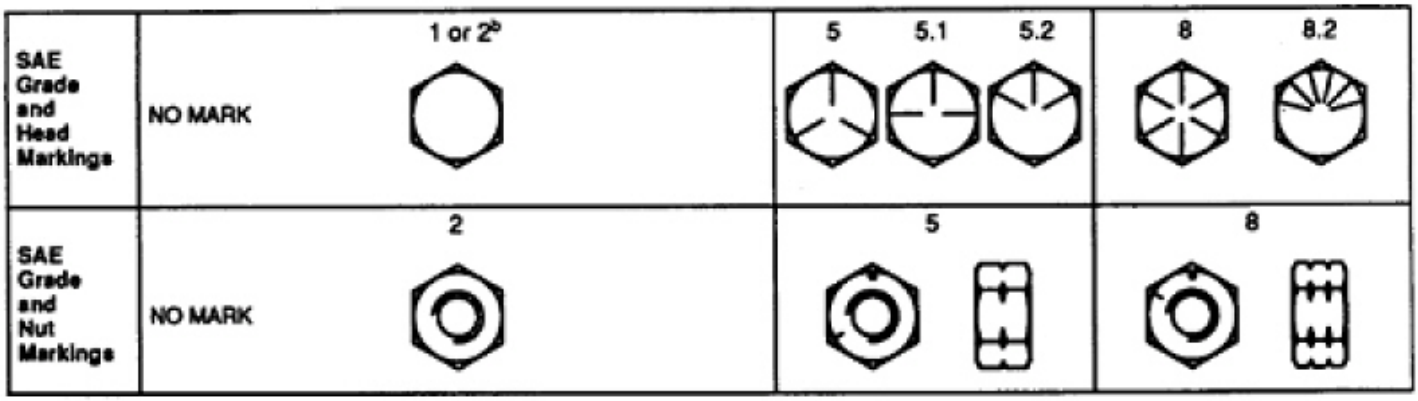


Hydraulic Flow Layout

Reverse Direction



UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES



Size	Grade 1				Grade 2[b]				Grade 5, 5.1, or 5.2				Grade 8 or 8.2			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft
1/4	3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5
5/16	7.7	5.5	10	7	12	9	15	11	20	15	25	18	28	21	35	26
3/8	14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46
7/16	22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75
1/2	33	25	42	31	53	39	67	50	85	63	110	80	120	90	150	115
9/16	48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160
5/8	67	50	85	62	105	78	135	100	170	125	215	160	240	175	300	225
3/4	120	87	150	110	190	140	240	175	300	225	375	280	425	310	550	400
7/8	190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650
1	290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1300	975
1-1/8	400	300	510	375	400	300	510	375	900	675	1150	850	1450	1075	1850	1350
1-1/4	570	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1950
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2150	1550	2700	2000	3400	2550
1-1/2	1000	725	1250	925	990	725	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

[a] "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

[b] Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long. Grade 1 applies for hex cap screws over 152 mm (6-in.) long, and for all other types of bolts and screws of any length.

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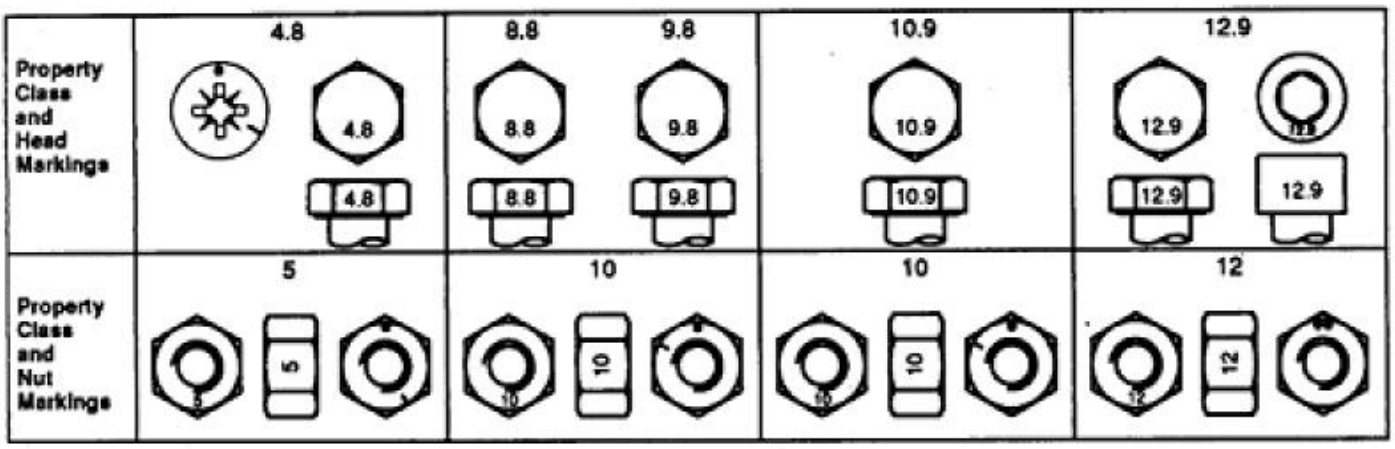
METRIC BOLT AND CAP SCREW TORQUE VALUES



TS1163 -19-04MAR91

Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190
M16	100	73	125	92	190	140	240	175	275	200	350	255	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class.

Fasteners should be replaced with the same or higher property class. If higher property class fasteners are used, these should only be tightened to the strength of the original.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

[a] *"Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.*

DX,TORQ2 -19-20JUL94

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