

Parts S/N 40757

Section 4

Use this Table of Contents as your checklist for the options included on your machine.

■ indicates the option your model is equipped with



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Engine Serial Number Information

- ☐ Cat 86 HP SP111 4.28
- ☐ Cat 86 HP Auto Clutch 4.28
- ☐ Cat 86 HP Pusher Fan Auto Clutch 4.28
- ☐ Cat 114 HP SP111 Clutch 4.28
- ☒ Cat 114 HP WPT Clutch 4.28
- ☐ Cat 125 HP SP211 Clutch 4.28
- ☐ Cat 125 HP WPT Clutch 4.28
- ☐ Cat 142 HP WPT Clutch 4.28
- ☐ Per 84 HP WPT Clutch 4.28
- ☐ Per 86 HP SP111 Clutch 4.28
- ☐ Per 114 HP WPT Clutch 4.28
- ☐ Per 114 HP SP111 Clutch Murphy Panel 4.28
- ☐ Per 125 HP SP211 Clutch 4.28
- ☐ Per 125 HP WPT Clutch 4.28
- ☐ JD 80 HP SP111 Clutch 4.28
- ☐ JD 80 HP WPT Clutch 4.28
- ☐ JD 115 HP SP111 Clutch 4.28
- ☐ JD 125 HP SP211 Clutch 4.28
- ☐ JD 125 HP WPT Clutch 4.28
- ☐ JD 140 HP WPT Clutch 4.28
- ☐ Kubota 84 HP SP111 4.28
- ☐ Kubota 84 HP Pusher Fan WPT Clutch 4.28
- ☐ Kubota 99 HP SP111 4.28
- ☐ Kubota 99 HP Auto Clutch 4.28
- ☐ Cummins 74 HP CX110 Clutch 4.28
- ☐ Cummins 110 HP WPT Clutch 4.28
- ☐ Cummins 130 HP WPT Clutch 4.28

- ☒ Belt Shield 4.28
- ☒ Air Cleaner Indicator 4.28
- ☒ Precleaner 4.28
- ☐ Spark Arrestor Muffler 4.28
- ☒ Block Heater 4.28
- ☐ 6 - Pole Connector
- ☐ ADR Lights
- ☐ Fuel Gauge
- ☐ Safety Stops
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Engine and Engine Components 4.30

- ☒ Clutch, Belt, Sheaves, Bushings, Filter, and Tachometer

Machine Decals

- ☒ Danger 4.32
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- ☒ Caution 4.34
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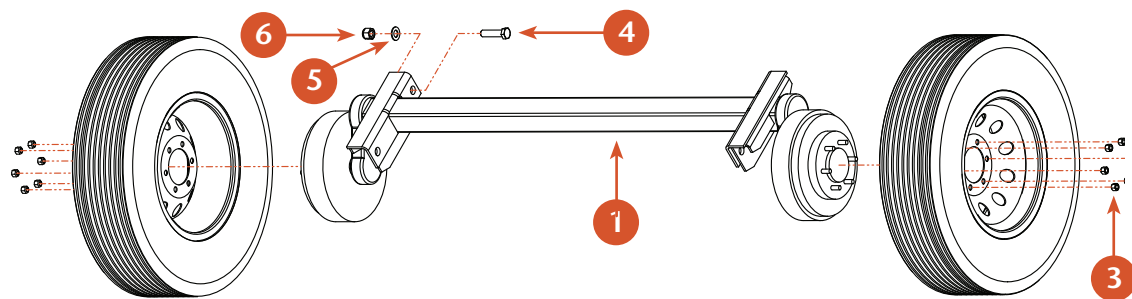
Parts color

- ☒ Morbark Standard Color
- ☐ Custom

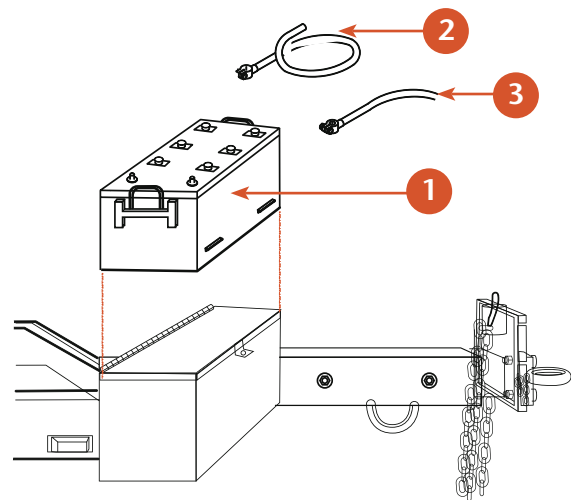
Axle and Tires



Standard Axle with Electric Brakes



Battery, Battery Box, and Cables



2

Item	Qty	Part Number	Description
1	1	29315-254	Battery, 12, Volt, 1400 C. C. A.
2	1	Order By Length	Battery Cable Positive
3	1	Order By Length	Battery Cable Negative

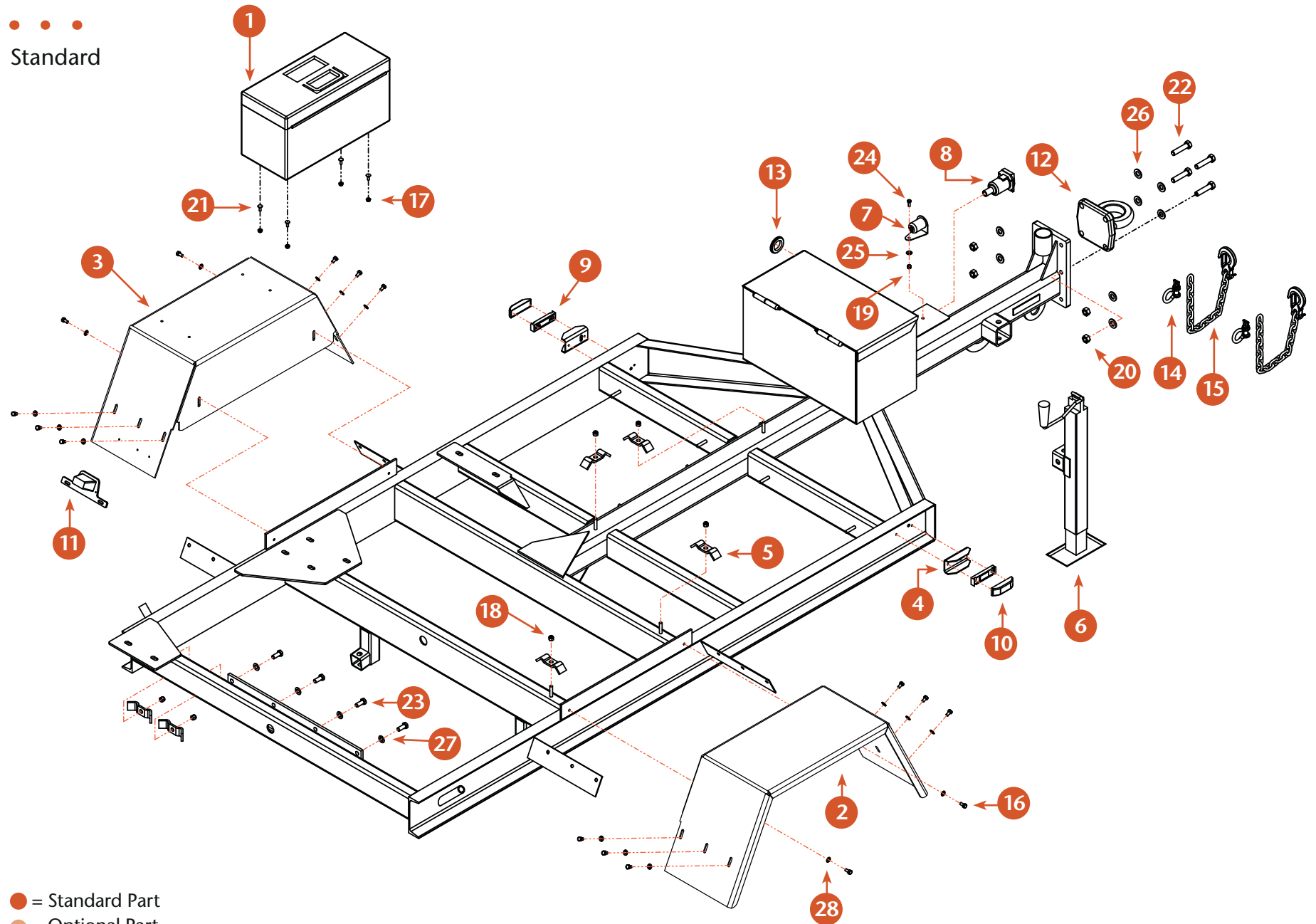
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Item	Qty	Part Number	Description
			Axle S/N 121784941
1	1	29310-514	Axle, 7,000 lb, Electric Brakes
NS	1	29307-790	Axle, 7,000 lb, Electric, W/Hand Brake Axle
NS	1	29310-453	Axle, 7,000 lb, Leaf Spring Axle
NS	1	29310-420	Hanger Kit, 7,000 lb, Leaf Spring Axle
NS	1	29310-421	Hardware, 7,000 lb, Leaf Spring Axle
NS	1	29310-657	Axle, 8,000 lb, Hyd Brakes, Hand Brake
NS	1	29308-201	Axle, 9,000 lb, Hyd Brakes, Hand Brake
2	2	29312-598	215/75R/17.5, 16 Ply, Radial on Rim
NS	2	29312-584	235/75R17.5 16 Ply, Radial on Rim
NS	2	29312-612	LT265/75R16, 10 Ply, on Aluminum Rim
3	12	29307-126	Nut, Wheel
4	2	21625-354	Bolt, 5/8" - 18 x 1 3/4" (9,000 lb axle)
5	2	21161-315	Washer, Flat, 5/8" (9,000 lb axle)
6	2	21733-410	Nut, Stover, 5/8" - 18 (9,000 lb axle)

Frame

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Standard



Item	Qty	Part Number	Description
1	1	52130-118	Tool Box, Plastic
2	1	40164-456	Fender, Aluminum, Right Hand
3	1	40163-456	Fender, Aluminum, Left Hand
4	2	31549-462	Guard, Marker Light
5	6	30005-701	Clamp, Butterfly
6	1	29341-905	Jack, 5,000 lb
7	1		Switch, Break-away, See Schematic
8	1		Plug, w/Dust Cover, See Schematic
9	2		Light, Marker, Mount, See Schematic
10	2		Light, Marker Lens, Amber, See Schematic
11	1		Holder, License Plate, See Schematic
12	1	29311-608	Ring, Lunet, 2 1/2"
13	1	24721-395	Grommet, Rubber
14	1	24711-206	Screw Pin, Anchor Shackle, 7/16"

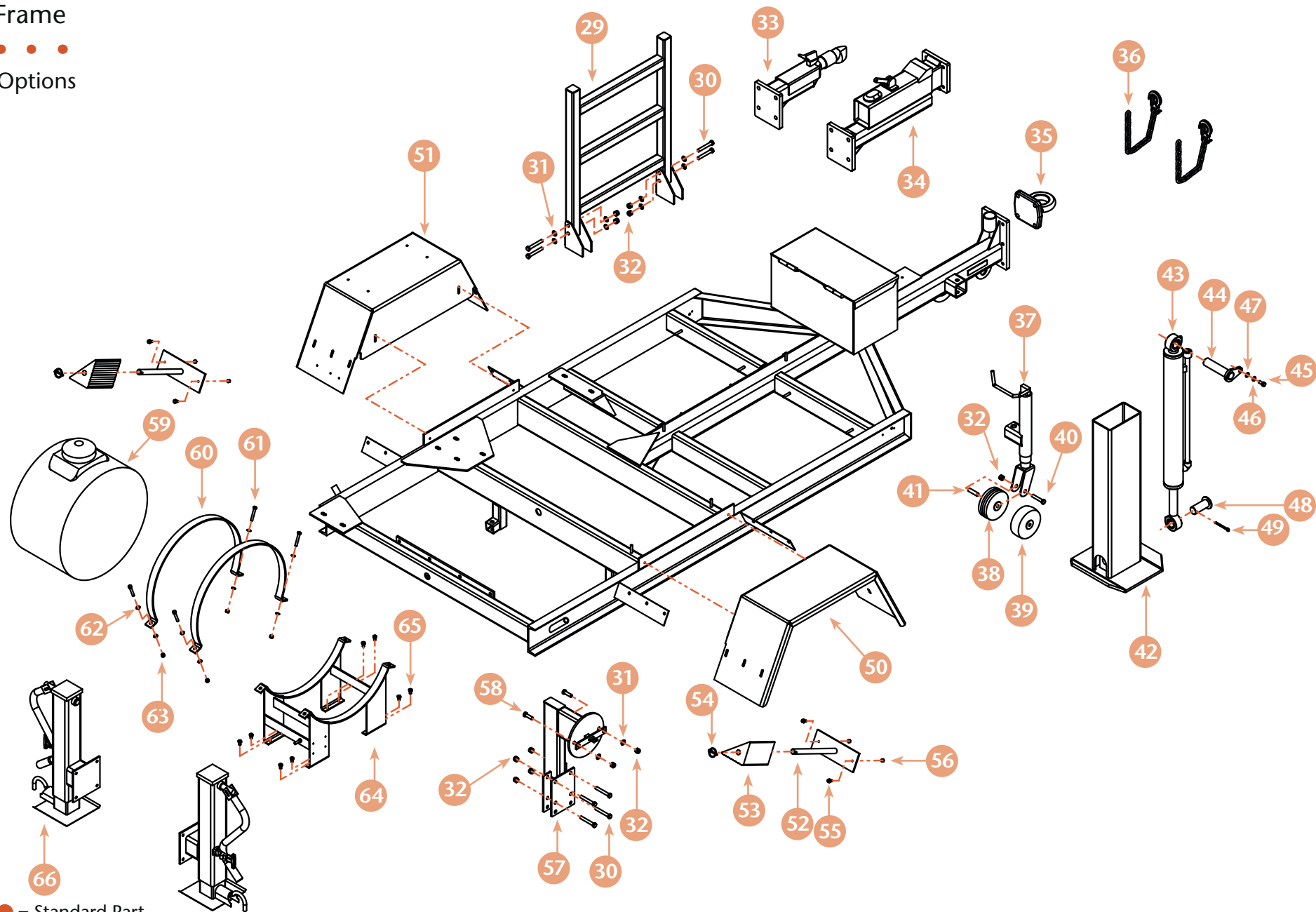
Item	Qty	Part Number	Description
15	2	29313-532	Safety Chain, with Hook
16	16	21646-146	Bolt, 5/16"-18 x 3/4"
17	4	21733-556	Nut, 1/4"-20
18	6	21733-303	Nut, Lock, 3/8"-16
19	1	21733-301	Nut, Lock - 1/4"-20
20	4	21731-070	Nut, 5/8" - 11
21	4	21661-114	Bolt, 1/4" - 20 x 3/4"
22	4	21624-358	Bolt, 5/8"-11 x 2 3/4"
23	4	21624-254	Bolt, 1/2"-13 x 1 1/4"
24	1	21624-003	Bolt, 1/4"-20 x 3/4"
25	1	21161-309	Washer, Flat, 1/4"
26	8	21161-046	Washer, Flat, 5/8"
27	4	21161-044	Washer, Flat, 1/2"
28	16	21161-062	Washer, Flat, 5/16"

NS = not shown AR = as required

Frame

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Options



• = Standard Part
• = Optional Part

Item	Qty	Part Number	Description
29	1	40154-451	Radiator Guard Assembly, All Engines
30	AR	21624-263	Bolt, 1/2" - 13 x 3 1/2"
31	AR	21161-044	Washer, Flat, 1/2"
32	AR	21733-305	Nut, Lock, 1/2" - 13
33	1	40810-460	Tongue Extension, with Ball Hitch
34	1	40290-462	Hitch, 10,000 lb Surge Brake Actuator
NS	1	40492-462	Hitch, 20,000 lbs Surge Brake Actuator
NS	1	52130-128	Box, Tool, Aluminum
35	1	29311-611	Ring, Lunet, 3"
36	1	12971-052	Safety Chain, Heat Treated
37	1	29341-869	Jack, 10,000 lb
NS	1	40475-901	Jack, 1,000 lb
NS	2	29340-905	Jack, 5,000 lb
38	1	29312-138	Wheel, Castor, Plastic
39	1	31063-460	Wheel, Castor, Steel
40	1	21625-260	Bolt, 1/2"-13 x 2 3/4"
41	1	32111-460	Wheel Spacer
42	1	40022-473	Stabilizer, Leg
43	1	82682-955	Cylinder, 2520
44	1	40025-473	Cylinder Pin, Top
45	1	21624-104	Bolt, 3/8" - 16 x 7/8"
46	1	21171-140	Washer, Lock, 3/8"
47	1	21161-042	Washer, Flat, 3/8"
48	1	40030-473	Cylinder Pin, Bottom
49	1	21126-042	Pin, Cotter, 3/16" x 2 1/2"
50	1	40211-456	Fender, Aluminum, Left Hand, Wide
51	1	40212-456	Fender, Aluminum, Right Hand, Wide

Item	Qty	Part Number	Description
52	2	40561-452	Mount, Wheel Chock
53	2	31925-901	Wheel Chock
54	2	21129-051	Pin, Lynch, 1/4"
55	4	21620-103	Bolt, 3/8" - 16 x 3/4"
56	4	21733-303	Nut, 3/8" - 16
57	1	40479-452	Mount, Spare Tire
58	2	21624-256	Bolt, 1/2"-13 x 1 3/4"
59	1	29818-616	Water Tank
60	2	32088-460	Tank Strap
61	4	21624-111	Bolt, 3/8"-16 x 2 1/2"
62	8	21161-042	Washer, Flat, 3/8"
63	4	21731-066	Nut, 3/8"-16
64	1	40127-456	Mount, Tank
65	8	21624-103	Bolt, 3/8"-16 x 3/4"
NS	2	30350-456	Rubber Strip, Btm, Strap to Tank
NS	2	30351-456	Rubber Strip, Upper, Strap to Tank
66	2	40729-452	Jack, Rear, 10,000 Lbs
NS	1	40331-451	Jack, Dual Rear, 5,000 lb, Complete
NS	1	59501-021	Fire Extinguisher
NS	1	59501-022	Mount, Fire Extinguisher
NS	1	39234-251	Pusher Paddle
NS	1	41215-462	Mount, Pusher Paddle
NS	1	29334-453	Hand Brake
NS	1	29334-459	Cable
NS	1	29334-460	Cable
NS	1	40724-460	Cone Holder

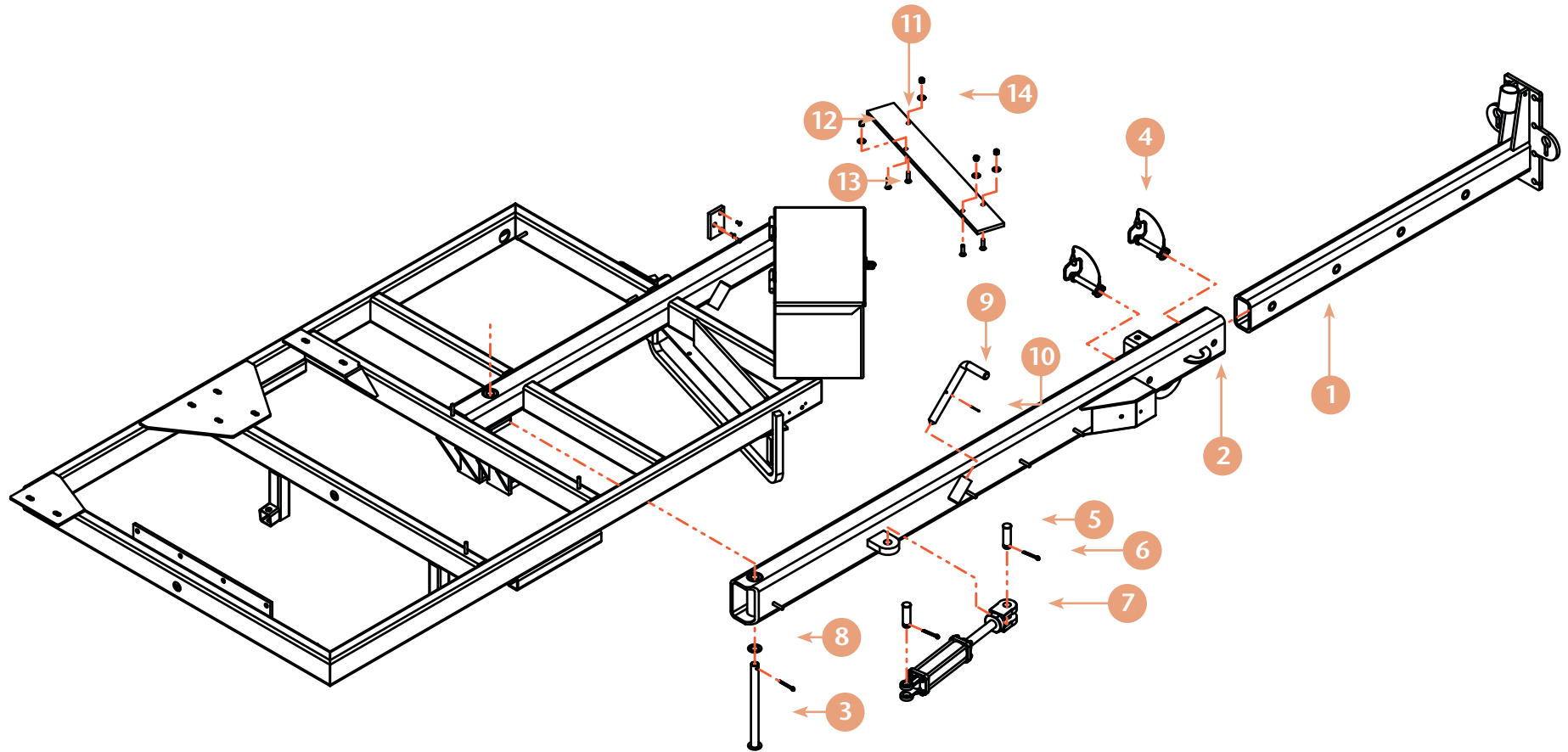
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Swing Tongue

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Option



● = Standard Part
● = Optional Part

Item	Qty	Part Number	Description
1	1	40294-452	Swing Tongue, Sliding
2	1	40165-456	Swing Tongue, Assembly
3	1	40043-451	Pin, Pivot, Swing Tongue
4	2	21129-063	Pin, Hitch
5	2	26816-538	Clevis Pin, 3 3/8"
6	3	21126-041	Pin, Cotter, 3/16" x 2"
7	4	26817-303	Cylinder, Tie Rod with Pins and Cotter Pins
8	1	21161-319	Washer, Flat, 1"
9	1	30239-456	Pin, Swing Tongue
10	1	21129-313	Hair Pin, 3/16" x 3 1/4"
11	1	30525-452	Slide, Swing Tongue
12	4	21733-303	Nut, Lock, 3/8"-16
13	4	21451-332	Bolt, 3/8"-16 x 1 1/4"
14	4	21161-311	Washer, Flat, 3/8"

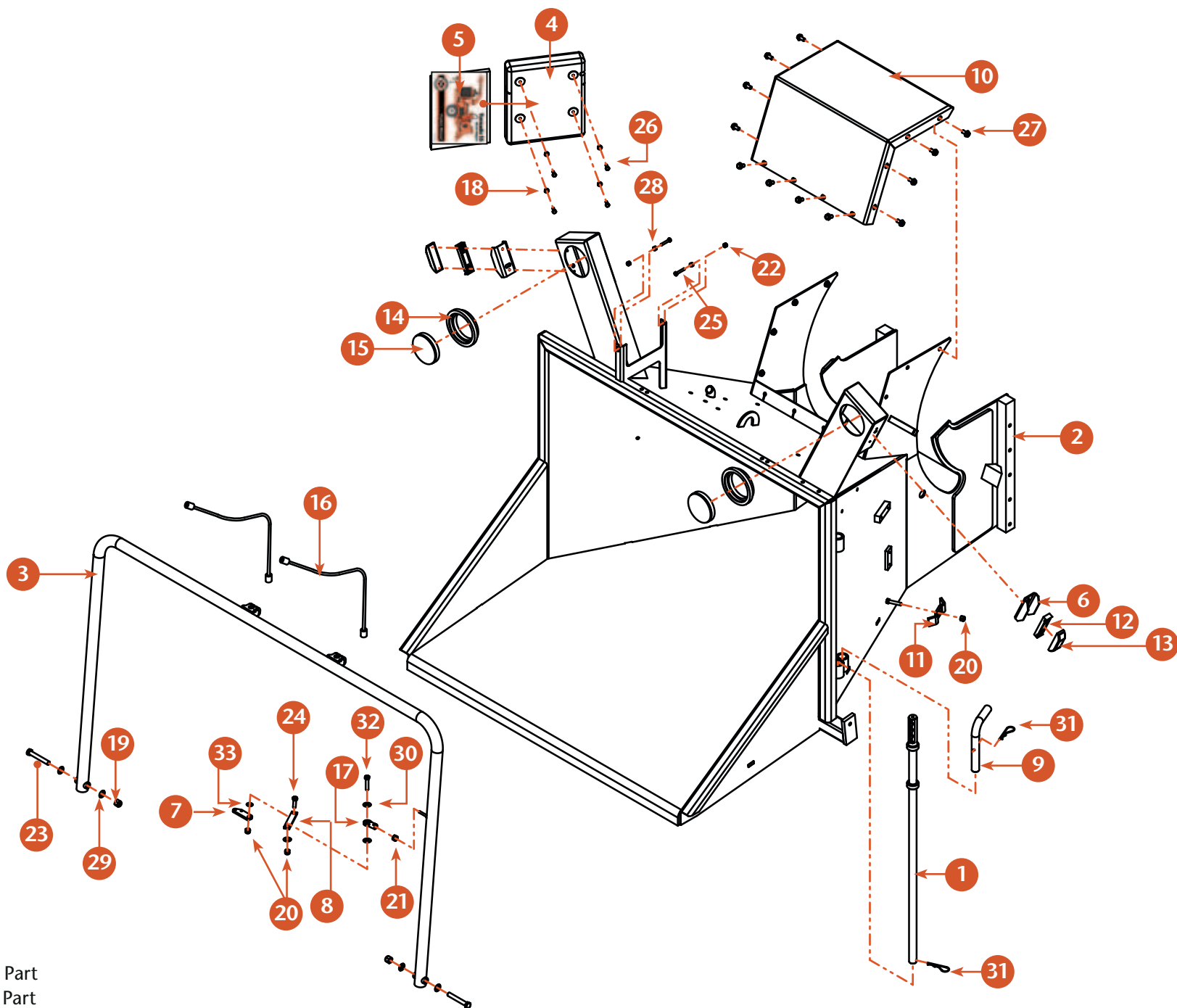
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Infeed

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Standard



● = Standard Part
● = Optional Part

Item	Qty	Part Number	Description
1	1	40363-452	Lock, Yoke
2	1	40130-451	Infeed
3	1	40160-451	Control Bar
NS	1	40165-451	Control Bar, Left Hand
4	1	39234-205	Manual, Holder
5	1	76340-254	Manual, Part & Operators
6	2	31549-462	Guard, Marker Light
7	1	31170-462	Linkage, Valve Bank
8	1	31168-462	Linkage, Valve Bank
9	1	31030-462	Pin, Drum
10	1	30134-451	Hood, Yoke
11	1	30005-701	Clamp, Tube & Hose
12	2		Light, Marker, Mount, See Schematic
13	2		Light, Marker, Red, See Schematic
14	2	29316-313	Seal, Tail Light
15	2		Tail Light, Red, See Schematic
16	2	24714-308	Cable, Safety

NS = not shown

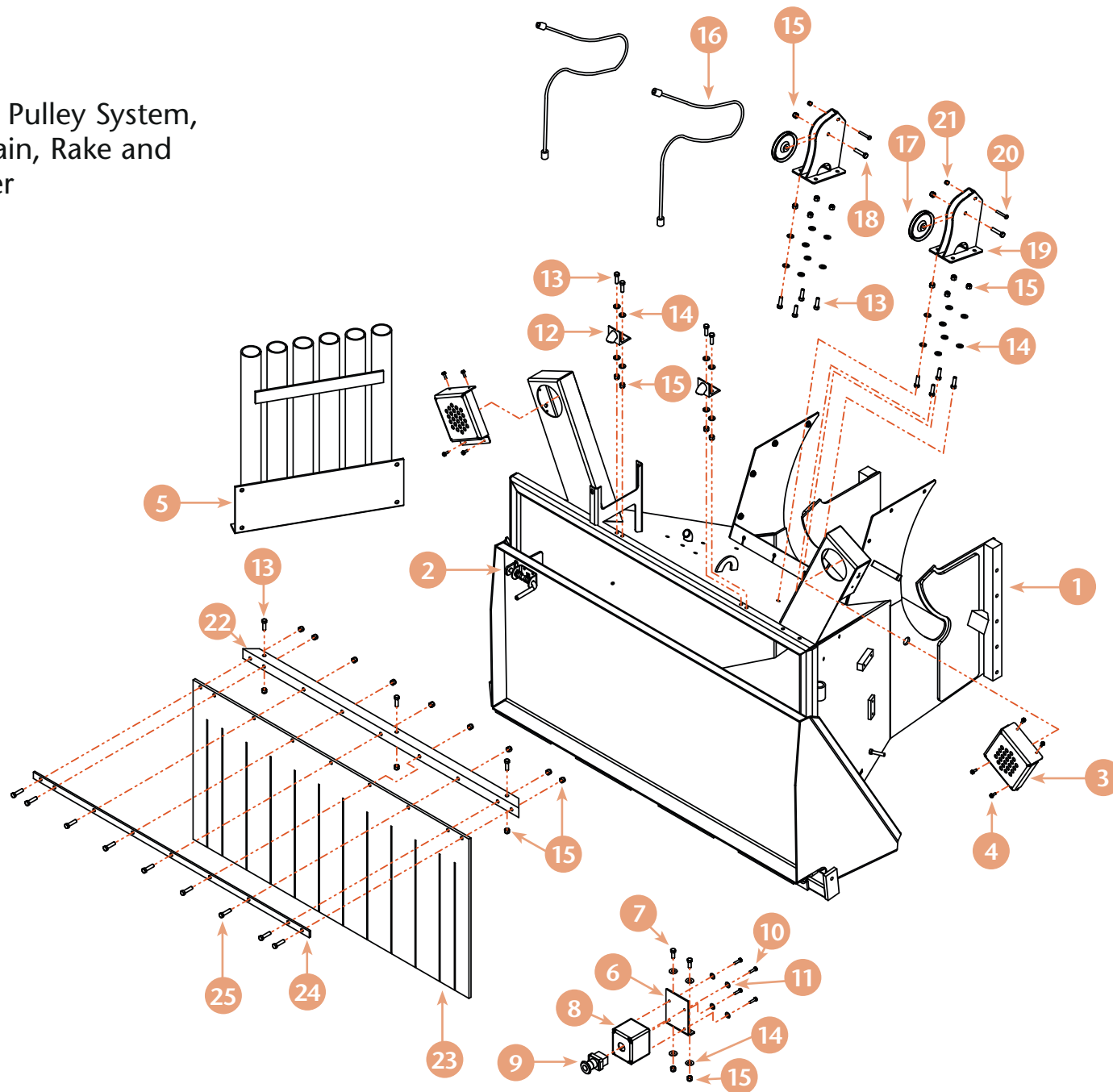
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Item	Qty	Part Number	Description
17	1	24733-026	Heim Joint
18	4	21733-556	Nut, 1/4"-20
19	2	21733-305	Nut, Lock, 1/2"-13
20	AR	21733-303	Nut, Lock, 3/8"-16
21	2	22531-006	Nut, Lock, 3/8"-24
22	2	21733-301	Nut, Lock, 1/4"-20
23	2	21624-263	Bolt, 1/2"-13 x 3 1/2"
24	1	21624-106	Bolt, 3/8"-16 x 1 1/4
25	2	21624-007	Bolt, 1/4"-20 x 1 1/2"
26	4	21624-003	Bolt, 1/4"-20 x 3/4"
27	12	21612-310	Bolt, Spinlock - 3/8-16 x 3/4"
28	2	21731-064	Nut - 20 x 1/4"
29	4	21161-044	Washer, Flat, 1/2"
30	AR	21161-661	Washer, Flat, 3/8"
31	2	21129-313	Hair Pin, 3/16" x 3 1/4"
32	1	21625-108	Bolt, 3/8" - 16 x 1 3/4"
33	1	21161-011	Washer, Flat, 3/8"

Infeed

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Folding Tray, Pulley System,
Rubber Curtain, Rake and
Shovel Holder



● = Standard Part
● = Optional Part

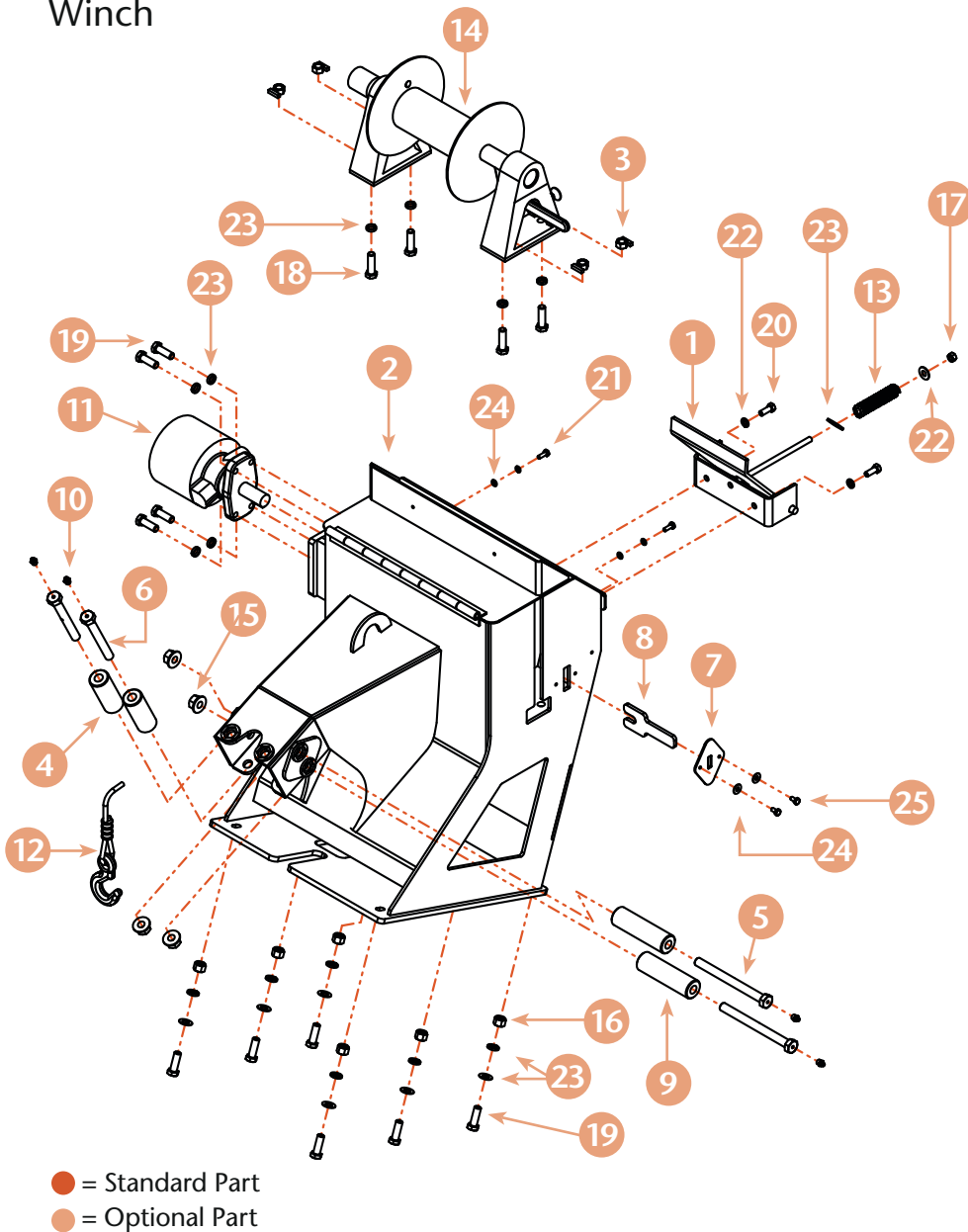
Item	Qty	Part Number	Description
Folding Tray with Optional Components			
1	1	40131-451	Folding Tray, Infeed
NS	1	40132-451	T-Bar, Folding Tray, Infeed
2	1	24717-270	Latch 1/2"
3	2	30847-452	Guard, Light
4	8	21266-010	Screw, 10-16 x 3/4"
5	1	40921-452	Holder, Rake and Shovel
6	1	30692-452	Mount, Emergency Stop
7	2	21624-105	Bolt, 3/8"-16 x 1"
8	1	27182-910	Box, Electrical
9	1	27347-155	Button, Emergency Stop
10	4	21624-005	Bolt, 1/4"-20 x 1"
11	4	21161-309	Washer, Flat, 1/4"

NS = not shown AR= as required

Item	Qty	Part Number	Description
Rubber Curtain and Pulley System			
12	2	40433-452	Mount, Safety Cable
13	AR	21624-106	Bolt, 3/8"-16 x 1 1/4"
14	AR	21161-063	Washer, Flat, 3/8"
15	AR	21733-303	Nut, Lock, 3/8"-16
16	2	24714-312	Safety Cable
17	2	24714-456	Pulley
18	2	21624-108	Bolt, 3/8"-16 x 1 3/4"
19	2	40137-456	Box, Safety Cable
20	2	21624-008	Bolt, 1/4"-20 x 1 3/4"
21	4	21733-301	Nut, Lock, 1/4"-20
22	1	30153-451	Mount, Flap, Infeed
23	1	30080-451	Flap, Infeed
NS	1	30221-451	Flap, Clear, Infeed
24	1	30081-451	Clamp Bar, Flap, Infeed
25	9	21624-107	Bolt, 3/8"-16 x 1 1/2"

Infeed

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Winch

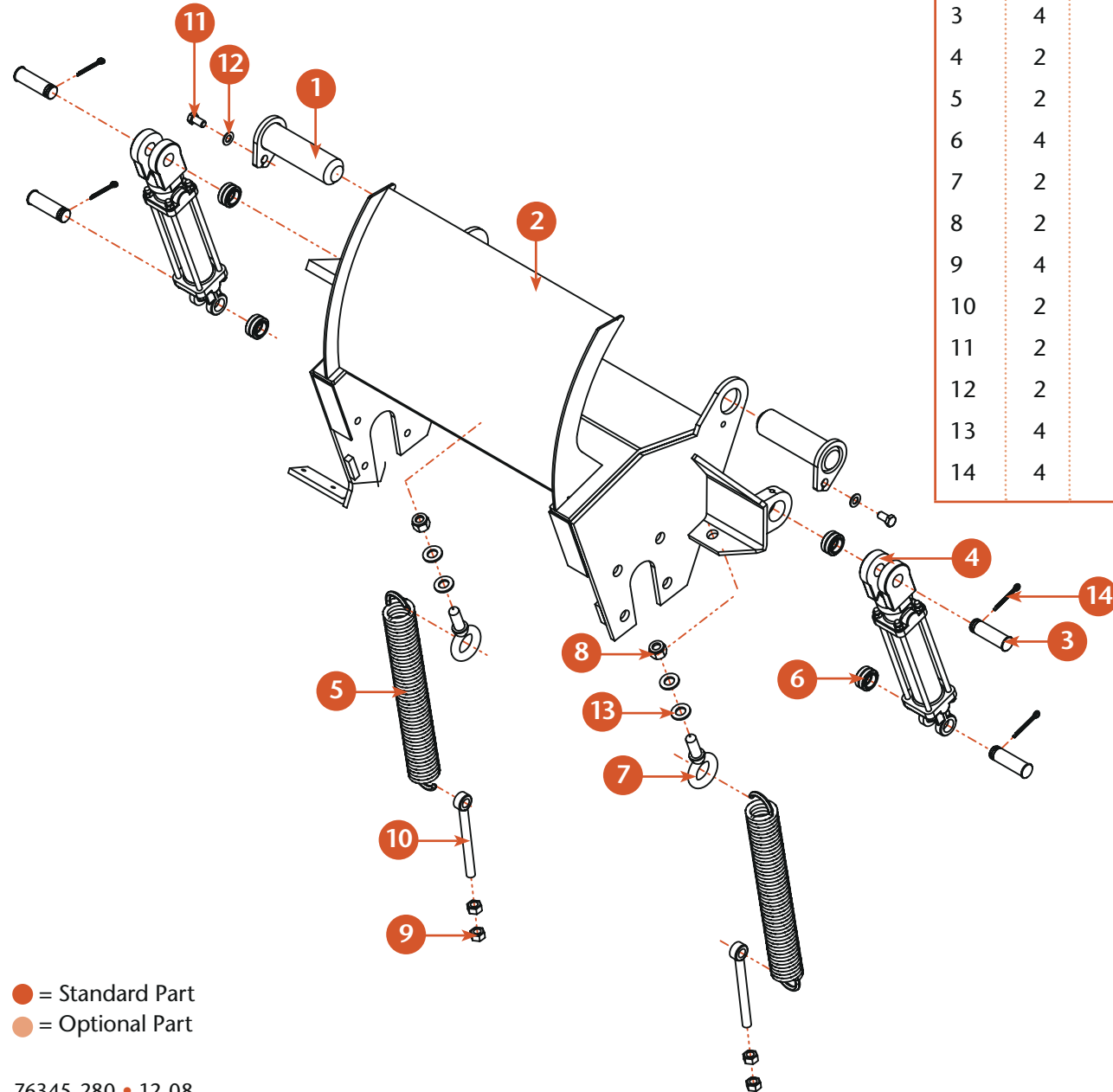


Item	Qty	Part Number	Description
1	1	40503-452	Tensioner
2	1	41071-462	Mount, Winch, Short Arm
NS	1	40448-452	Mount, Winch, Long Arm
3	4	40399-452	Nut, Stop, 1/2"
4	2	31482-462	Roller
5	2	31312-901	Bolt, 5/8" - 11 x 7 1/2"
6	2	31311-901	Bolt, 5/8" - 11 x 5"
7	1	30804-452	Release Cover
8	1	30803-452	Release Lever
9	2	30653-452	Roller
10	4	26891-001	Grease Fitting, 1/8"
11	1		Motor, Hydraulic, See Schematic
12	1	24714-311	Cable, 5/16" x 75'
NS	1	24714-356	Rope, 3/8" x 100'
13	1	24714-141	Spring
14	1	24714-110	Winch
15	4	21733-410	Nut, Stover - 5/8"-11
16	6	21733-305	Nut, Lock, 1/2"-13
17	1	21731-066	Nut, 3/8"-16
18	4	21624-256	Bolt - 1/2" - 13 x 1 3/4"
19	AR	21624-255	Bolt, 1/2" - 13 x 1 1/2"
20	2	21624-105	Bolt, 3/8" - 16 x 1"
21	2	21624-003	Bolt, 1/4" - 20 x 3/4"
22	AR	21161-042	Washer, Flat, 3/8"
23	AR	21161-044	Washer, Flat, 1/2"
24	AR	21161-061	Washer, Flat, 1/4"
25	2	21624-00	Bolt, 1/4" - 20 x 1/2"

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Yoke

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Standard



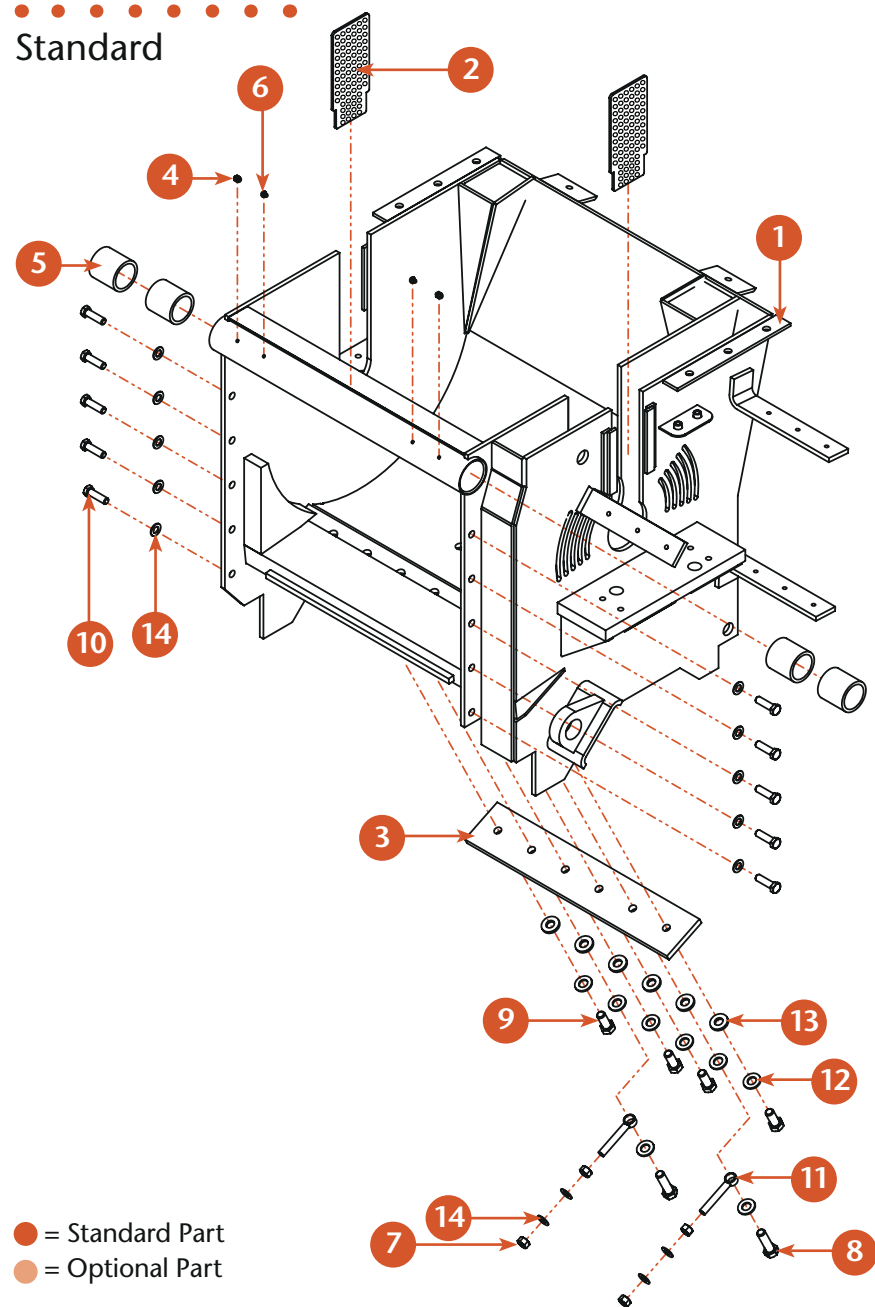
Item	Qty	Part Number	Description
1	2	40567-462	Pivot Pin
2	1	40073-451	Yoke with Spring Mount
3	4	26816-538	Clevis Pin, 3 3/8"
4	2	26817-303	Cylinder, Tie Rod
5	2	24741-621	Spring
6	4	23191-004	Bushing, Spherical
7	2	22511-120	Bolt, Eye, 3/4" x 2"
8	2	21733-308	Nut, Lock, 3/4"-10
9	4	21731-070	Nut, 5/8"-11
10	2	21711-029	Bolt, Eye, 5/8" x 7"
11	2	21624-253	Bolt, 1/2"-13 x 1"
12	2	21161-044	Washer, Flat, 1/2"
13	4	21161-047	Washer, Flat, 3/4"
14	4	21126-041	Cotter Pin, 3/16" x 2"

NS = not shown AR = as required

• = Standard Part
• = Optional Part

Chipper Base

Standard



Item	Qty	Part Number	Description
1	1	40259-451	Base
2	2	30842-061	Cover, Base, Drum Shaft
3	1	30412-462	Base, Anvil
4	2	26891-001	Grease, Fitting, 1/8"
5	4	23131-113	Bushing, Fiber, 2 1/2"
6	2	22255-005	Screw, 1/2"-28 x 3/8"
7	4	21731-068	Nut, 1/2"-13
8	2	22424-356	Bolt, 5/8"-18 x 2 1/4"
9	4	22424-353	Bolt, 5/8"-18 x 1 1/2"
10	10	21624-256	Bolt, 1/2"-13 x 1 3/4"
11	2	21171-018	Bolt, Eye, 1/2" x 3"
12	8	21161-359	Washer, Flat, 5/8"
13	6	21161-046	Washer, Flat, 5/8"
14	14	21161-044	Washer, Flat, 1/2"
NS	1	30985-452	Belly Band

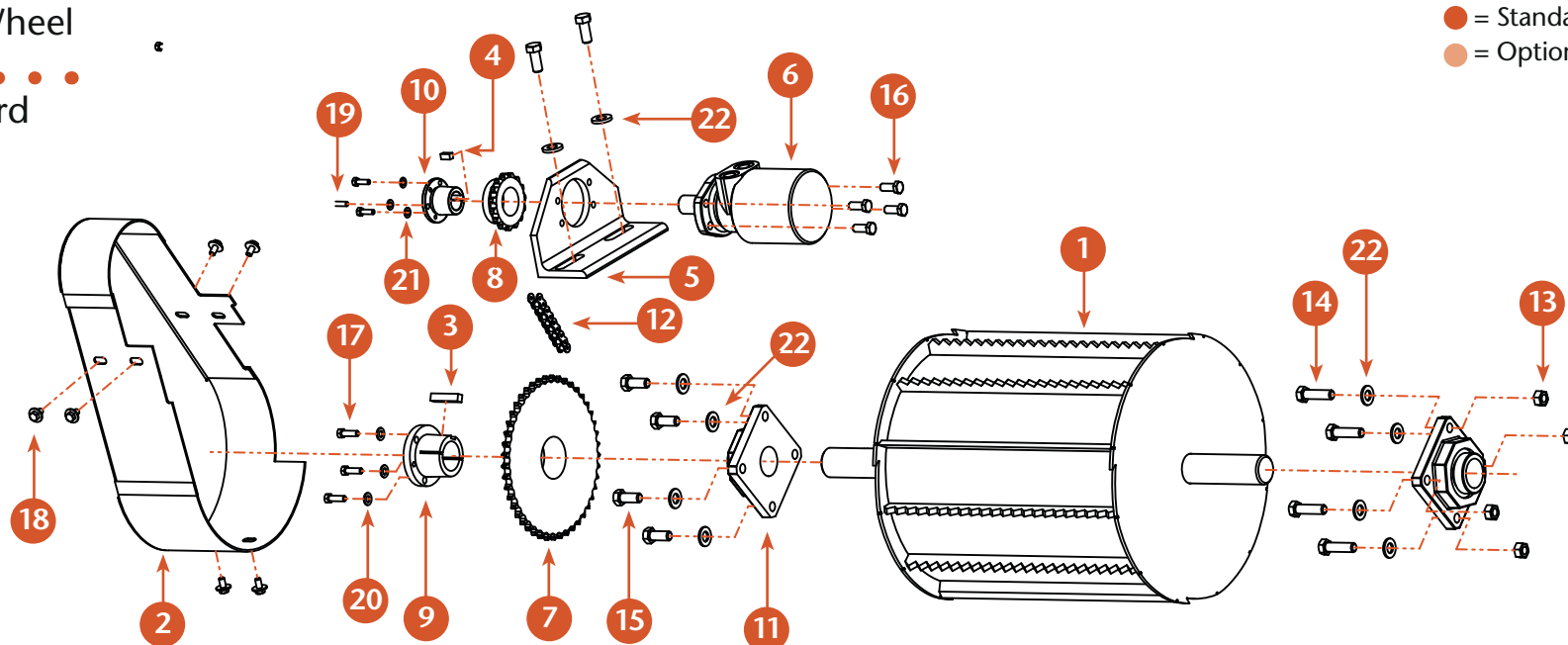
NS = not shown

AR = as required

Feed Wheel

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Standard

● = Standard Part
● = Optional Part



Item	Qty	Part Number	Description
1	1	40434-452	Feed Wheel
NS	1	40487-452	Top Feed Wheel, Knife Bar, Optional
2	1	40018-451	Guard, Drive
3	1	36359-700	Key
4	1	30828-703	Key
5	1	30480-701	Mount, Motor
6	1		Motor, Hydraulic, See Schematic
7	1	24264-837	Sprocket, 60Q45
8	1	24264-753	Sprocket, H60P15
9	1	24132-212	Bushing, Taper Lock, 2"
10	1	24132-105	Bushing, Taper Lock, 1 1/4"
11	2	23918-622	Bearing, FB, 2"
12	1	24251-090	Chain, 60H

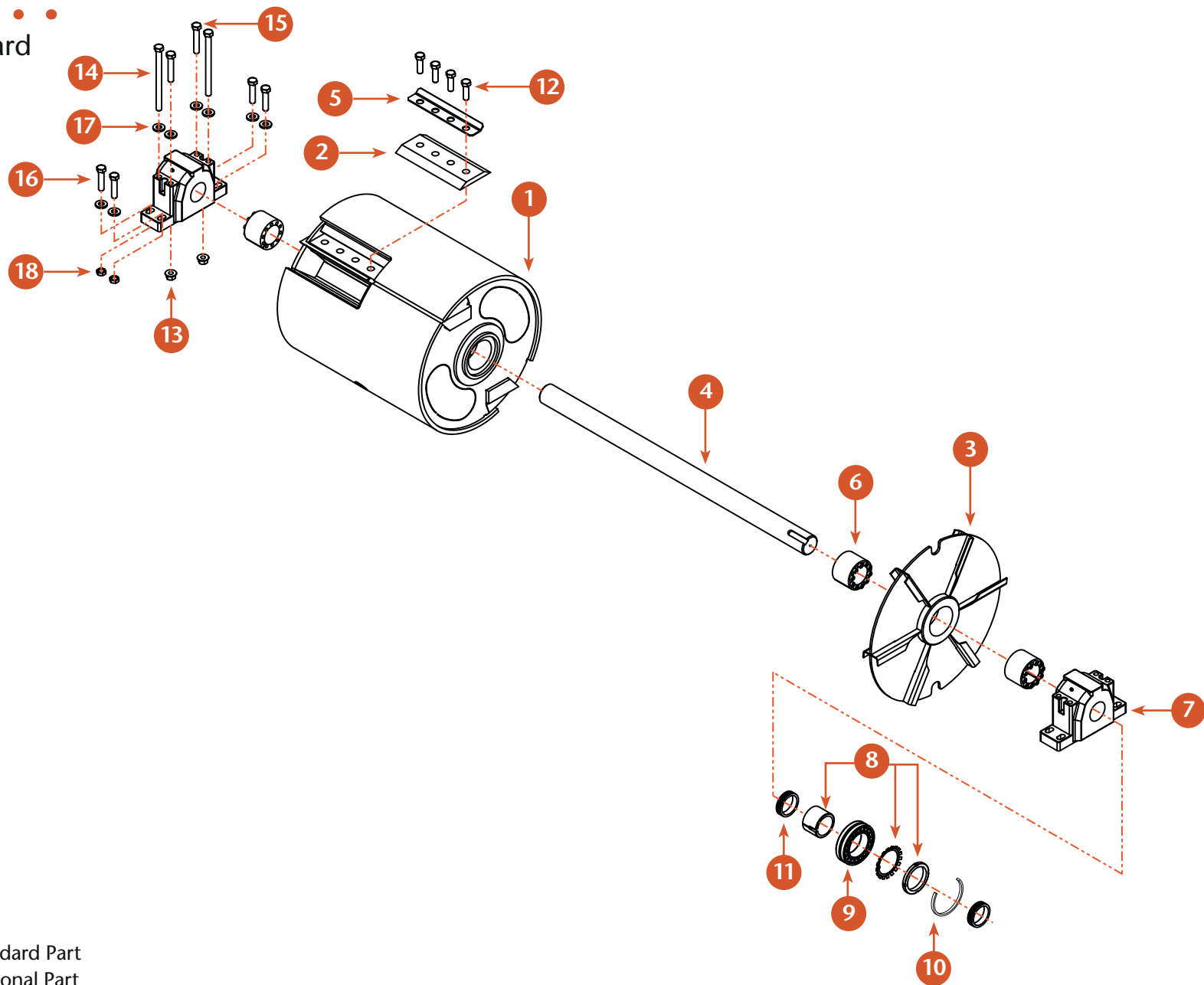
Item	Qty	Part Number	Description
NS	1	24251-027	Chain, Master Link
NS	1	24251-028	Chain, Half Link
13	4	21731-070	Nut, 5/8"-11
14	4	21624-356	Bolt, 5/8"-11 x 2 1/4"
15	AR	21624-353	Bolt, 5/8"-11 x 1 1/2"
16	4	21624-254	Bolt, 1/2"-13 x 1 1/4"
17	3	21624-106	Bolt, 3/8"-16 x 1 1/4"
18	6	21620-103	Bolt, 3/8"-16 x 3/4"
19	3	21624-055	Bolt, 5/16"-18 x 1"
20	3	21161-042	Washer, Flat, 3/8"
21	3	21161-062	Washer, Flat, 5/16"
22	AR	21161-046	Washer, Flat, 5/8"

NS = not shown

AR = as required

Chipper Drum

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Standard



● = Standard Part
● = Optional Part

Item	Qty	Part Number	Description
1	1	40202-451	Drum
2	2	39233-813	Knife
3	1	40314-451	Fan
4	1	30863-452	Shaft, Drum
5	2	30130-101	Clamp, Knife
6	3	24114-607	Bushing, B-Loc
7	2	23973-645	Housing, Bearing
8	2	23962-255	SNW, Bearing, 2 7/16"
9	2	23661-360	Bearing
10	1	23973-687	Stabilizer Ring, Bearing
11	4	23973-226	Slinger, Bearing, 2 7/16"
12	8	22424-404	Bolt, 3/4" - 16 x 1 3/4"
13	4	21733-409	Nut, Stover, 1/2" - 13
14	4	21624-272	Bolt, 1/2" - 13 x 7 1/2"
15	4	21624-263	Bolt, 1/2" - 13 x 3 1/2"
16	8	21624-259	Bolt, 1/2" - 13 x 2 1/2"
17	16	21161-044	Washer, Flat. 1/2"
18	8	21731-459	Nut, Jam, 5/8"-11

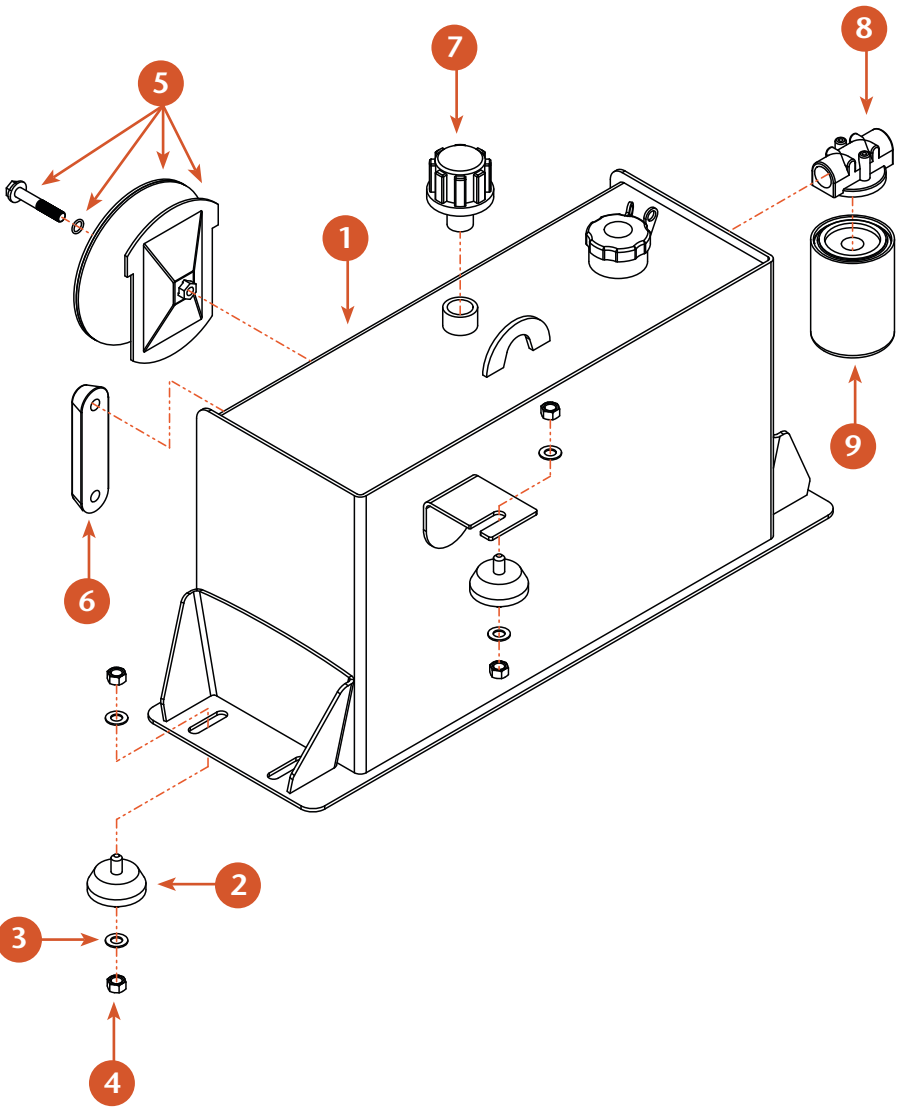
NS = not shown

AR = as required



NS = not shown AR = as required

Hydraulic Oil Tank

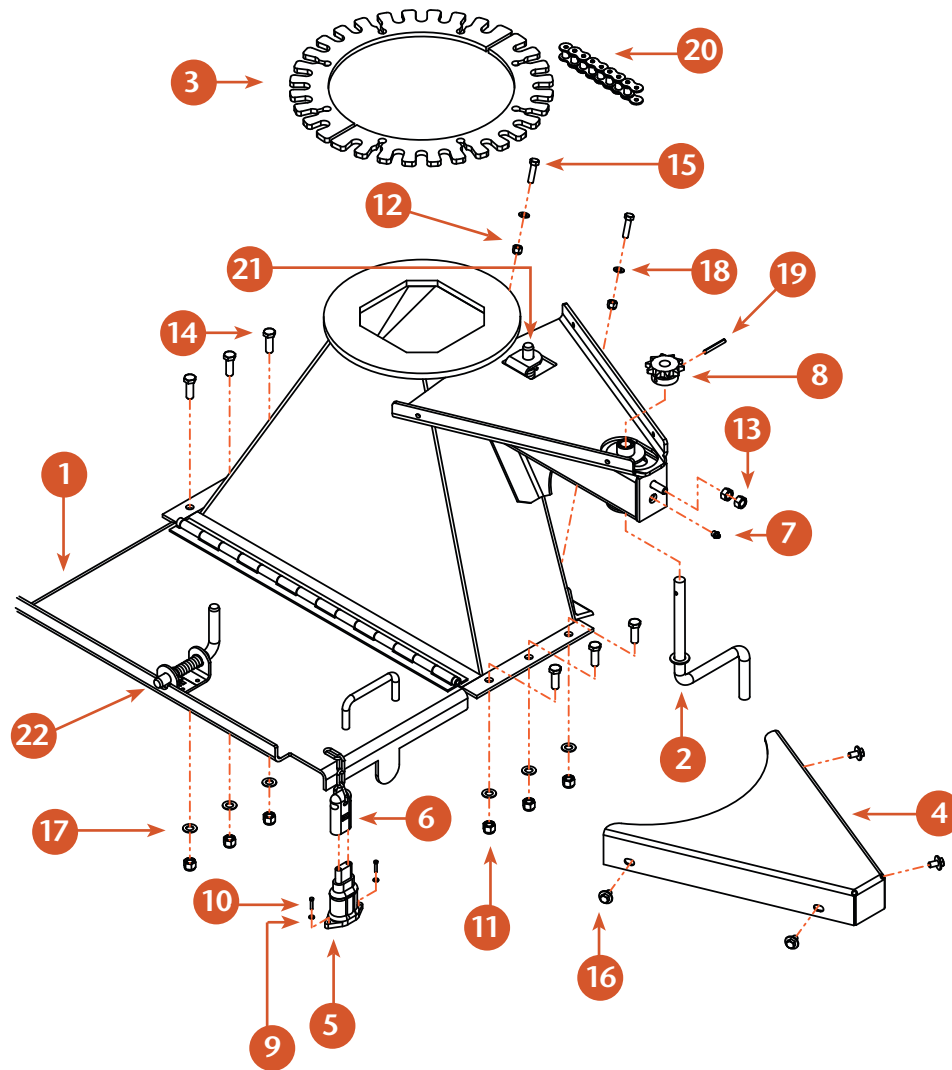


Item	Qty	Part Number	Description
1	1	40113-451	Tank, Oil
2	5	24721-017	Bushing, Rubber
3	10	21161-044	Washer, Flat, 1/2"
4	10	21733-305	Nut, Lock, 1/2" - 12
5	1	26849-403	Cover, Clean Out
6	1	26831-016	Gauge, Sight
7	1	26849-061	Breather
8	1	26838-061	Filter Head, Oil
9	1	26838-071	Filter Element, Oil
NS	1	39251-435	Magnet

NS = not shown AR = as required

Manual Swivel, Standard

• • • • •



● = Standard Part
 ● = Optional Part

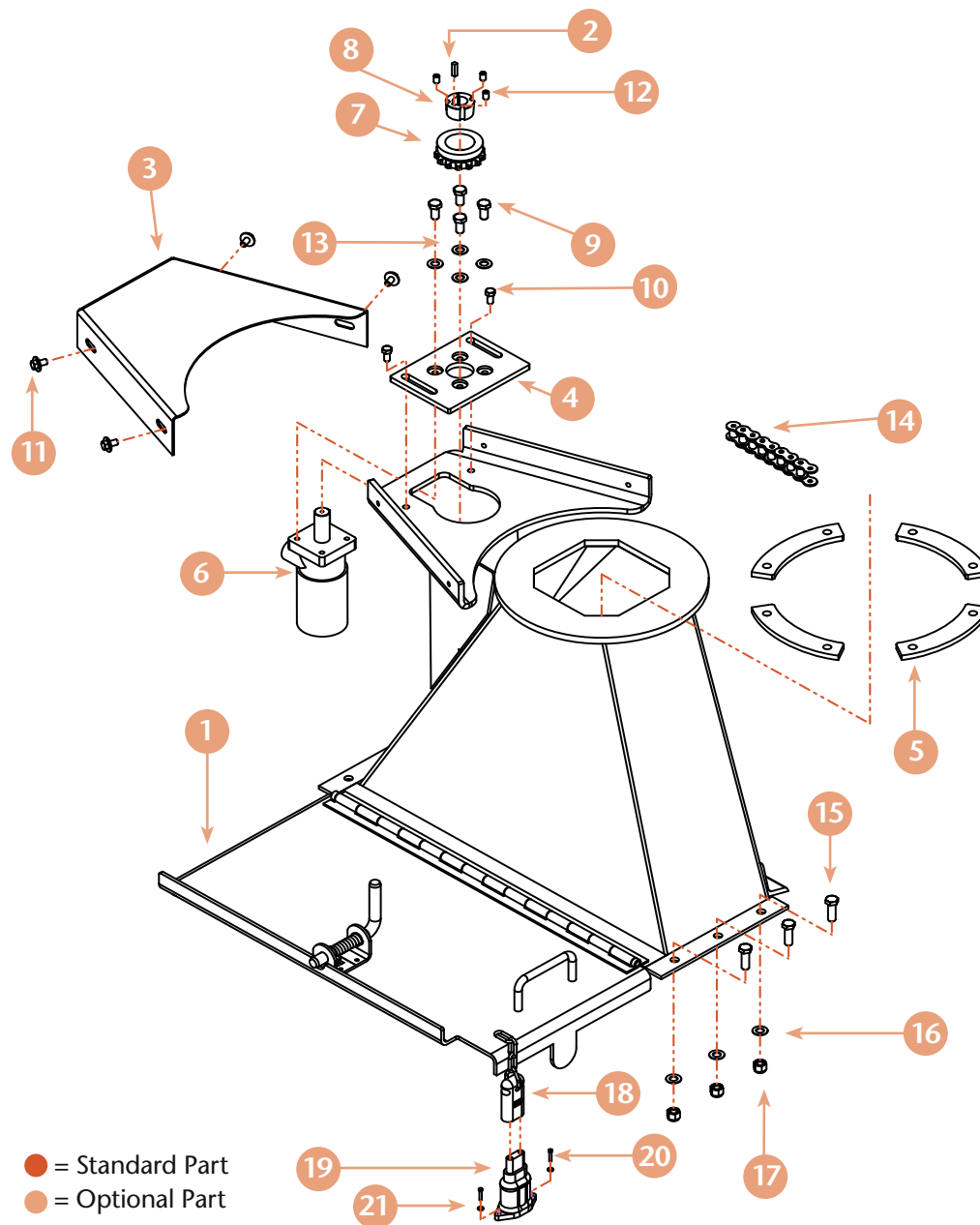
Item	Qty	Part Number	Description
1	1	40579-452	Swivel Transition, Manual
2	1	40324-452	Crank Handle
3	2	30759-452	Clamp Ring
4	1	30595-452	Guard, Drive
5	1	32077-901	Switch, Safety, Female End
6	1	32051-901	Switch, Safety, Male End
7	1	26891-001	Fitting, Grease, 1/8"
8	1	24264-102	Sprocket, 60B10
9	2	21733-301	Washer, Lock, 1/4"
10	2	21624-005	Bolt, 1/4" - 20 x 1"
11	6	21733-305	Nut, Lock, 1/2" - 13
12	2	21733-303	Nut, Lock, 3/8" - 16
13	2	21731-068	Nut, 1/2" - 13
14	6	21624-255	Bolt, 1/2" - 13 x 1 1/2"
15	2	21624-107	Bolt, 3/8" - 16 x 1 1/2"
16	4	21620-103	Bolt, 3/8" - 16 x 3/4"
17	6	21161-044	Washer, Flat, 1/2"
18	2	21161-042	Washer, Flat, 3/8"
19	1	21133-151	Pin, Dowel
20	1	24251-096	Chain, 60H
NS	1	24251-027	Chain, Master Link
NS	1	24251-028	Chain, Half Link
21	1	24717-273	Latch, 3/4"
22	1	31989-901	Latch, Hood

NS = not shown

AR = as required

Hydraulic Swivel Option

• • • • •



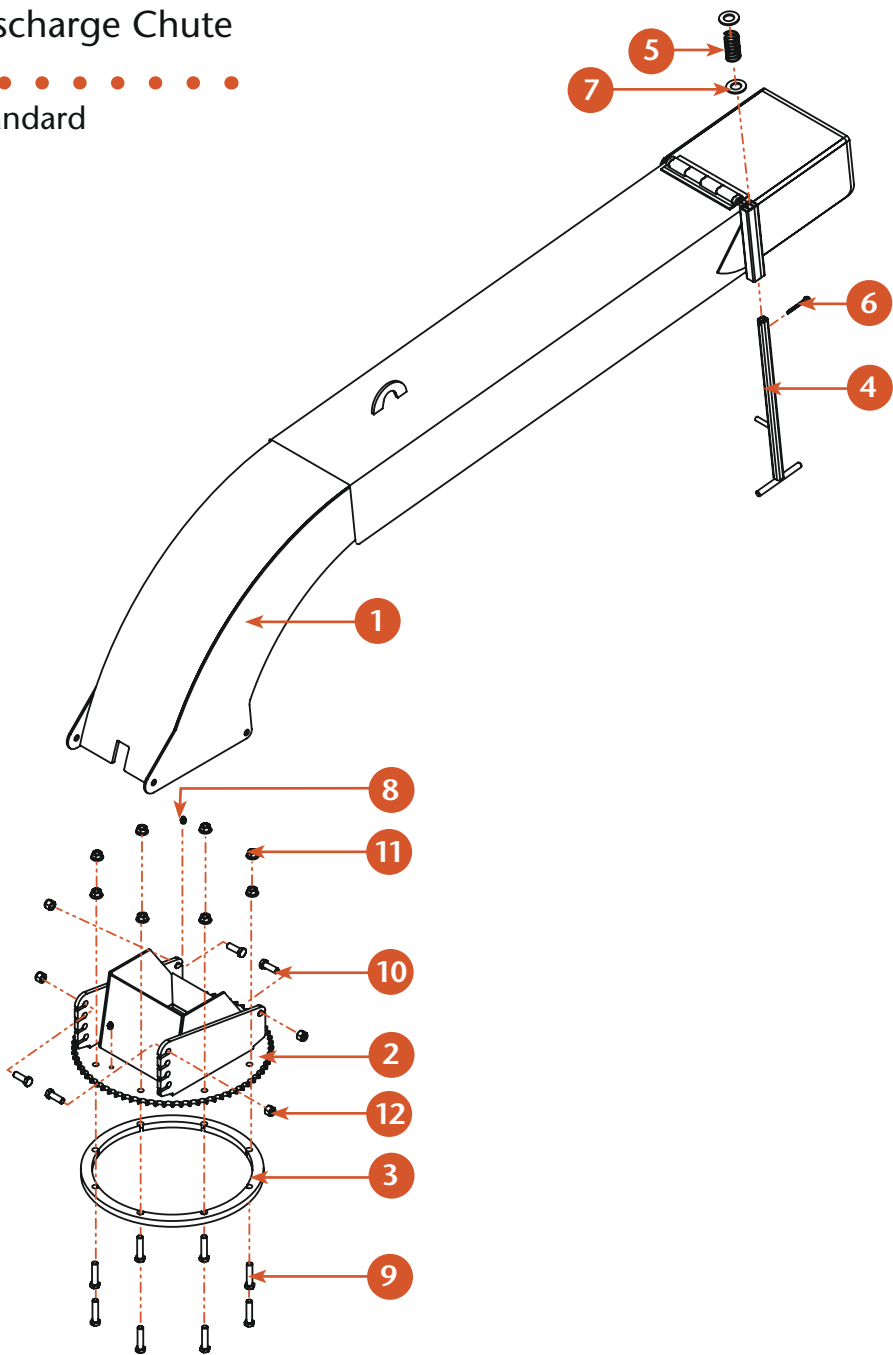
Item	Qty	Part Number	Description
1	1	40634-452	Swivel Transition, Hydraulic
2	1	31980-700	Key
3	1	31390-462	Guard, Drive
4	1	31388-462	Mount, Motor
5	4	31366-460	Ring, Clamp
6	1		Motor, Hydraulic, See Schematic
7	1	24264-306	Sprocket, H60P13
8	1	24131-143	Bushing, Taper Lock, 1"
9	4	21624-103	Bolt - 3/8" - 16 x 3/4"
10	2	21624-254	Bolt - 1/2" - 13 x 1 1/4"
11	4	21620-103	Bolt, 3/8" - 16 x 3/4"
12	3	21421-243	Screw, Set, 3/8" - 16 x 5/8"
13	4	21161-042	Washer, Flat, 3/8"
14	1	24251-089	Chain, 60H
15	6	21624-255	Bolt, 1/2" - 13 x 1 1/2"
16	6	21161-044	Washer, Flat, 1/2"
17	6	21733-305	Nut, Lock, 1/2" - 13
18	1	32077-901	Switch, Safety, Female End
19	1	32051-901	Switch, Safety, Male End
20	2	21624-005	Bolt, 1/4" - 20 x 1"
21	2	21733-301	Washer, Lock, 1/4"
NS	1	24251-027	Chain, Master Link
NS	1	24251-028	Chain, Half Link

NS = not shown

AR = as required

Discharge Chute

● ● ● ● ● ● ● ● ● ●
Standard



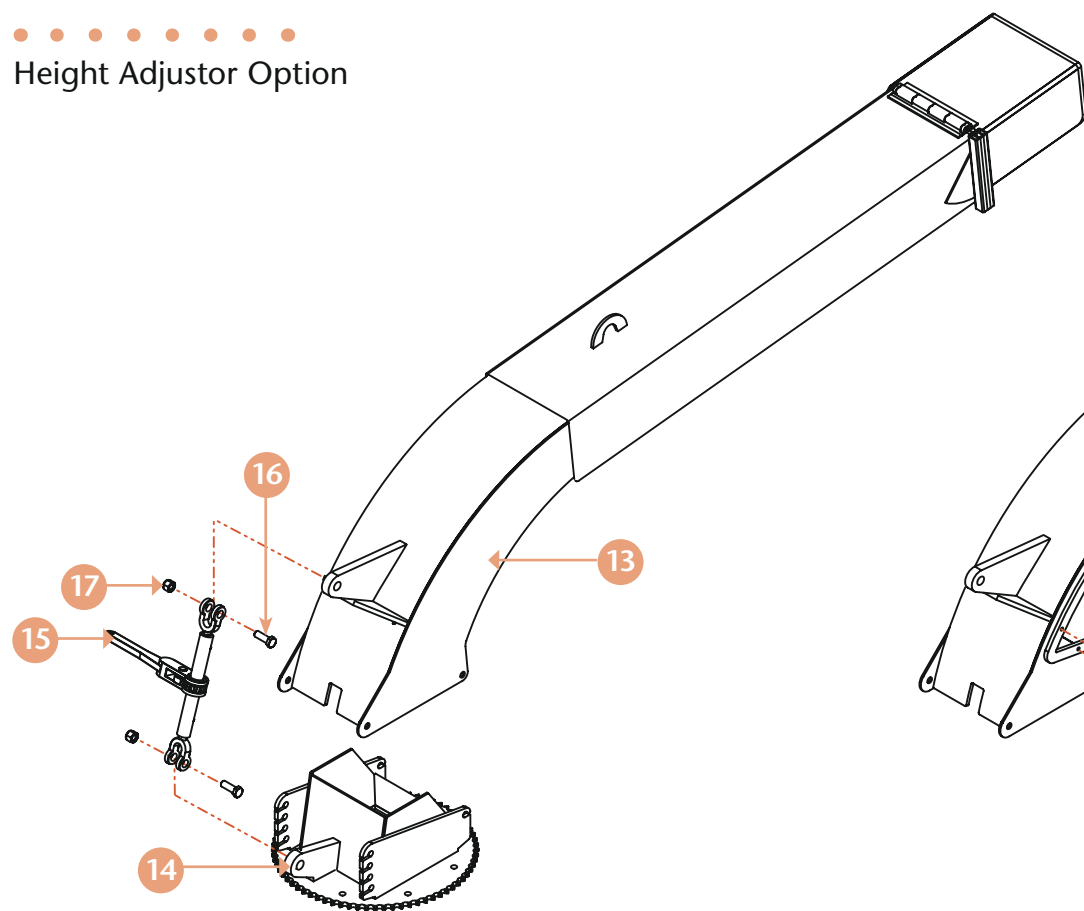
Item	Qty	Part Number	Description
1	1	40459-452	Discharge, Chute
2	1	40461-452	Swivel/Tilt Discharge
3	1	31056-462	Spacer Ring
4	1	40115-061	Handle
5	1	26664-315	Spring
6	1	21126-041	Pin, Cotter, 3/16" x 2"
7	2	21161-048	Washer, Flat, 7/8"
8	2	26891-001	Grease Fitting, 1/8"
9	8	21624-258	Bolt, 1/2" - 13 x 2 1/4"
10	4	21624-255	Bolt, 1/2" - 13 x 1 1/2"
11	8	21733-409	Nut, Lock, 1/2" - 13
12	4	21733-305	Nut, Lock, 1/2" - 13

NS = not shown AR = as required

● = Standard Part
● = Optional Part

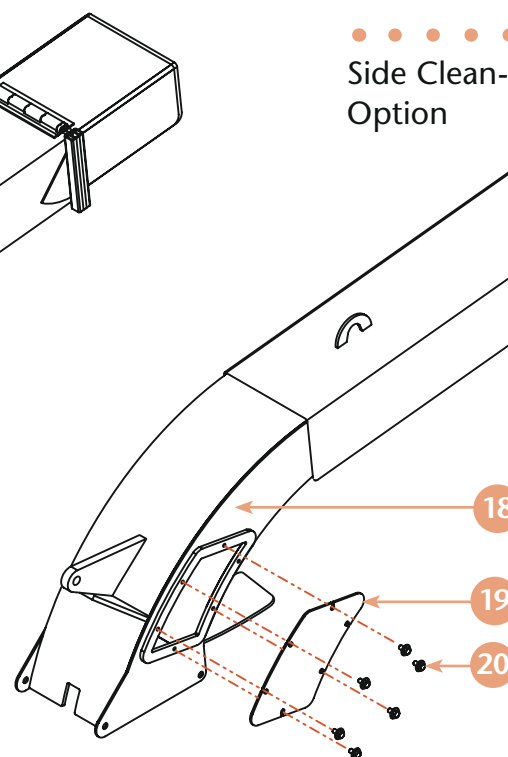
Discharge Chute

● ● ● ● ● ● ● ●
Height Adjustor Option



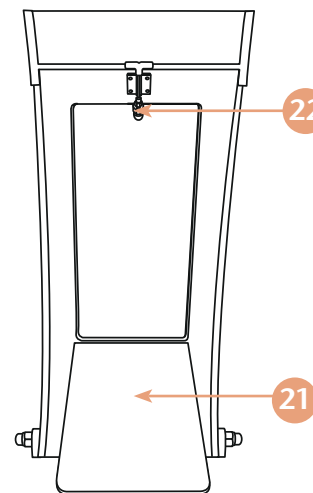
Discharge Chute

● ● ● ● ● ● ● ●
Side Clean-out Option



Discharge Chute

● ● ● ● ● ● ● ●
Bottom Clean-out Option



● = Standard Part

● = Optional Part

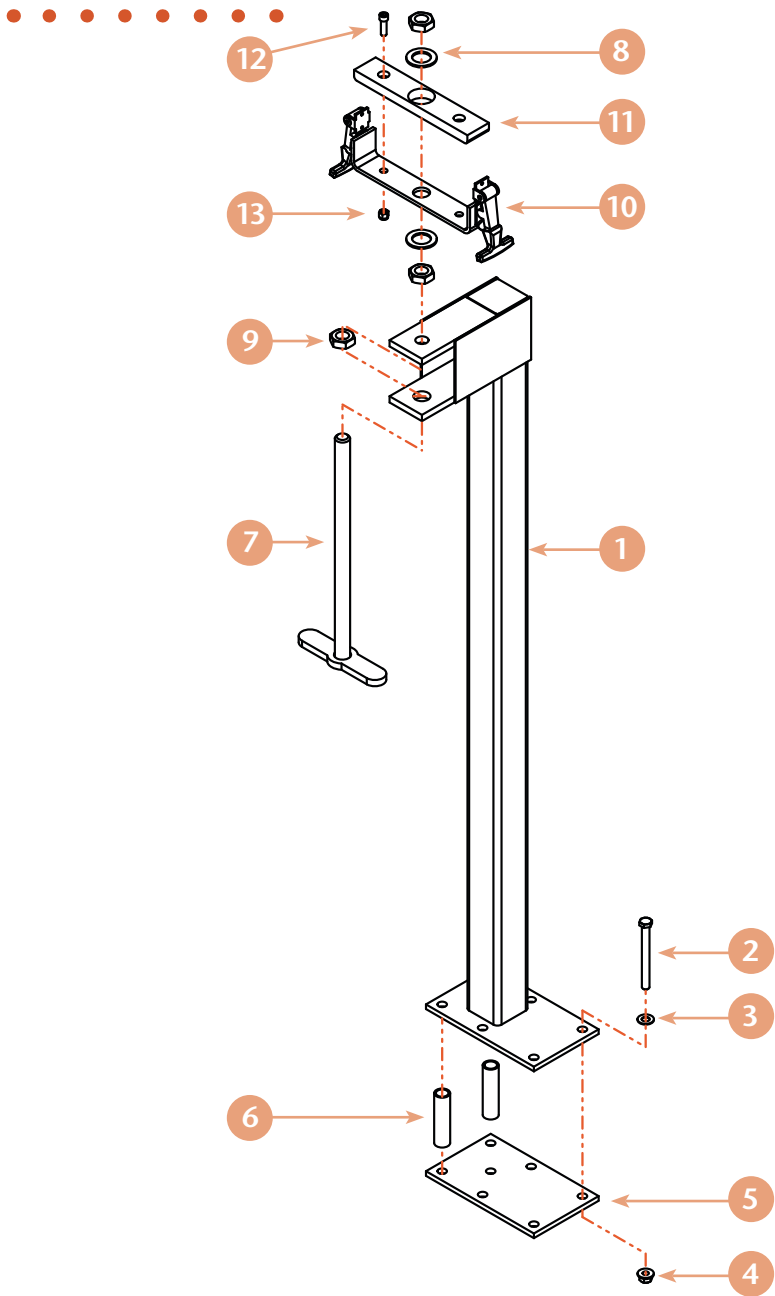
NS = not shown

AR = as required

Item	Qty	Part Number	Description
13	1	40538-452	Discharge Chute, Tilt Adjustor
14	1	40517-452	Swivel/Tilt Discharge, Adjustor
15	1	24713-075	Adjustor
16	2	21624-407	Bolt, 3/4" - 10 x 2 1/2"
17	2	21733-308	Nut, Lock, 3/4" - 10

Item	Qty	Part Number	Description
18	1	40462-452	Discharge Chute, Bottom Side Clean-out
19	1	31663-462	Side Clean-out Cover
20	6	21620-103	Bolt, 3/8" - 16 x 3/4"
21	1	40513-452	Discharge Chute, Bottom Clean-out
22	1	52113-619	Clamp, Toggle
NS	1	40978-452	Discharge Chute, Support Stanchion

Discharge Chute Support



Item	Qty	Part Number	Description
1	1	41607-462	Support, Discharge
2	6	21624-268	Bolt, 1/2" - 13 x 5 1/2"
3	6	21161-044	Washer, Flat, 1/2"
4	6	21733-409	Nut, Lock, 1/2" - 13
5	1	32420-462	Plate, Mount
6	2	30377-700	Spacer
7	1	41605-462	Support, Adjustor
8	2	23112-023	Washer, Bronze, 1 1/4"
9	3	21731-463	Nut, 1" - 8
10	1	41604-462	Support, Latch
NS	2	24717-125	Latch
11	1	32411-462	Support, Block
12	2	21452-085	Bolt, SHCS, 3/8" - 16 x 1 1/4"
13	2	21733-303	Nut, Lock, 3/8" - 16

NS = not shown AR = as required

● = Standard Part
● = Optional Part

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GENUINE MORBARK PARTS

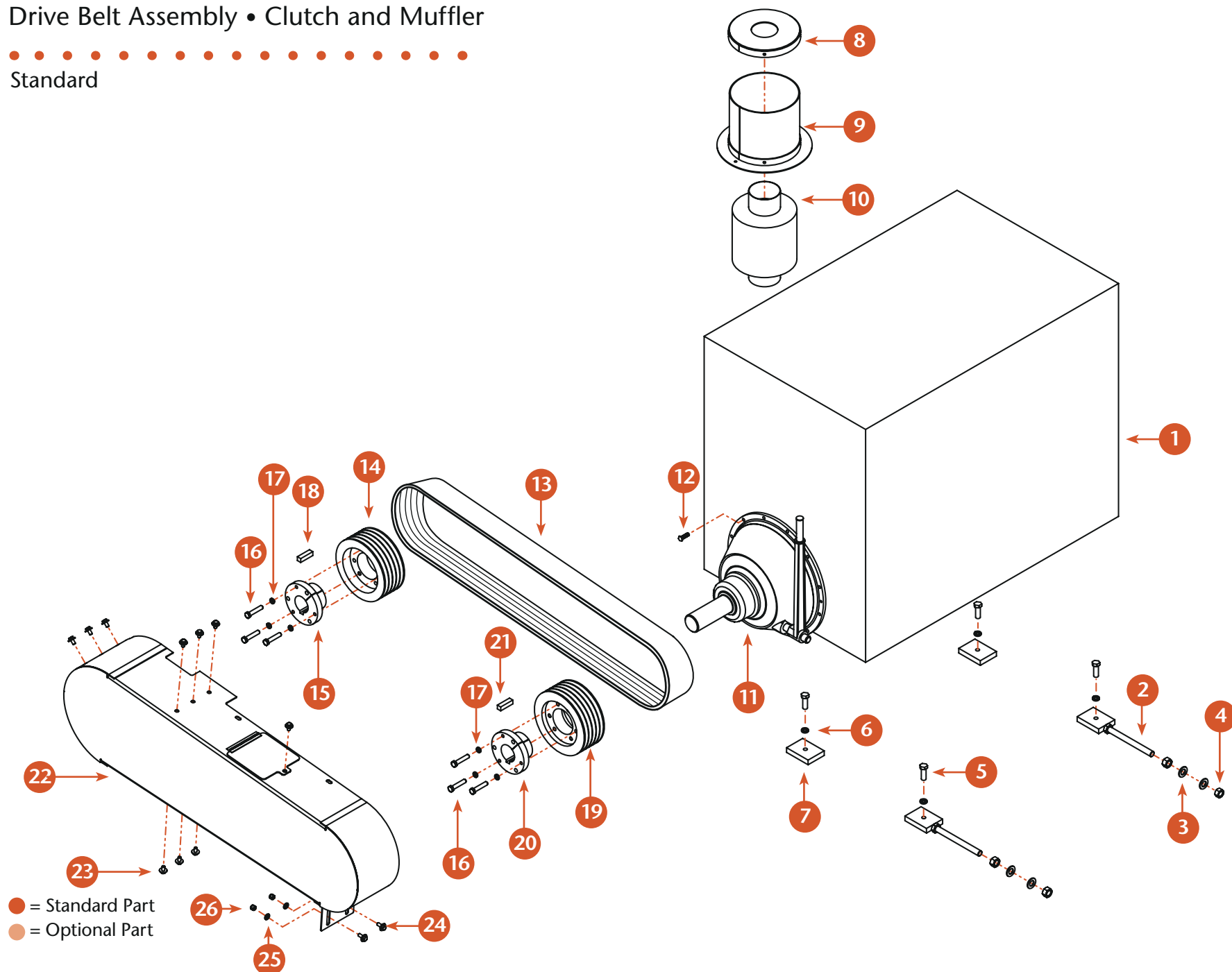
800-255-8839

800-832-5618 fax

www.morbark.com

Drive Belt Assembly • Clutch and Muffler

.....
Standard



Item	Qty	Part Number	Description	Item	Qty	Part Number	Description
1	1	*	Engine, S/N 44419763	17	AR	21171-113	Washer, Lock, 1/2"
NS	1	26726-515	Pump, Hydraulic	18	1	34263-700	Key
2	2	40547-462	Block, Adjuster	19	1	*	Sheave, 5/5V9.25
3	4	21161-047	Washer, Flat, 3/4"	20	1	*	Bushing, Taper Lock, 2 1/2"
4	4	21731-071	Nut, 3/4" - 10	21	1	30954-901	Key, SP111 Clutch
5	4	21624-355	Bolt, 5/8" - 11 x 2"	NS	1	31267-700	Key, SP211 Clutch
6	4	21171-115	Washer, Lock, 5/8"	NS	1	30724-700	"Key, Auto Clutch
7	2	32204-701	Block, Tapped	22	1	40617-452	Belt Shield, All Engines except Cum
8	1	40534-452	Guard, Muffler, Spark Arrestor Cap	NS	1	40143-451	Belt Shield, All Cum Engines, JD 80 H.P.
NS	1	40059-451	Guard, Muffler, Spark Arrestor Cap, Sm Eng	NS	1	30236-451	Gap Cover, John Deere, 80 H.P.
9	1	40533-452	Guard, Muffler, Spark Arrestor	23	AR	21620-103	Bolt, 3/8" - 16 x 3/4"
NS	1	40068-451	Guard, Muffler, Spark Arrestor, Sm Eng	24	2	21620-105	Bolt, 3/8" - 16 x 1"
10	1	**	Muffler	25	2	21161-063	Washer, Flat, 3/8"
NS	1	29323-031	Muffler, Spark Arrestor, 2 1/2"	26	2	21733-303	Nut, Lock, 3/8" - 16
NS	1	29323-033	Muffler, Spark Arrestor, 3"	NS	1	29233-551	Block Heater, Cat and Perkins
NS	1	29323-039	Muffler, Spark Arrestor, 4"	NS	1	29228-227	Block Heater, John Deere
11	1	*	Clutch, S/N 1200880712	NS	1	29218-036	Block Heater, Cummins, 74 HP
12	12	21611-867	Bolt, M10 x 1.5 x 30	NS	1	29217-932	Block Heater, Cummins, 115 HP
13	1	*	Belts	NS	1	29217-933	Block Heater, Cord, Cummins, 115 HP
14	1	*	Sheave, 5/5V9.0	NS	1	29321-244	Air Cleaner Indicator
15	1	*	Bushing, Taper Lock, 2 7/16"	NS	1	29321-559	Precleaner, John Deere, 60-80 HP
16	AR	21624-259	Bolt, 1/2" - 13 x 2 1/2"	NS	1	29321-562	Precleaner, John Deere, 115-200 HP

NS = not shown AR = as required

** Comes with the engine.

* For part numbers on a specific engine and engine components, see next page

Engine and Engine Components

CAT Engine	86 HP SP111 Clutch	86 HP Auto Clutch	86 HP Pusher Fan Auto Clutch	114 HP SP111 Clutch	114 HP WPT Clutch	125 HP SP211 Clutch	125 HP WPT Clutch	142 HP WPT Clutch
Engine	29247-450	*29247-462	*29247-526	*29252-109	29252-112	*29252-108	29252-113	29252-114
Clutch	24542-103	24532-103	24532-103	24542-103	24545-101	24541-255	24545-301	24545-101
Belt	24181-659	24181-659	24181-659	24181-659	24181-659	24181-659	24181-659	24181-659
Drive Sheave	24217-667	24217-667	24217-667	24217-667	24217-667	24217-668	24217-668	24217-667
Drive Bushing	24133-587	24133-579	24133-579	24133-587	24133-587	24133-592	24133-592	24133-587
Driven Sheave	24217-669	24217-669	24217-669	24217-669	24217-669	24217-669	24217-669	24217-669
Driven Bushing	24133-591	24133-591	24133-591	24133-591	24133-591	24133-591	24133-591	24133-591
Primary Air Filter	29320-618	29320-618	29320-618	29320-661	29320-661	29320-661	29320-661	29320-661
Secondary Air filter	29320-619	29320-619	29320-619	29320-662	29320-662	29320-662	29320-662	29320-662
Oil Filter	29247-230	29247-230	29247-230	29247-230	29247-230	29247-230	29247-230	29247-230
Fuel Filter	29248-460	29248-460	29248-460	29249-948	29249-948	29249-948	29249-948	29249-948
Water Separator	29247-597	29247-597	29247-597	29252-126	29252-126	29252-126	29252-126	29252-126
Tachometer	39252-093	39252-093	39252-093	39252-054	39252-054	39252-054	39252-054	39252-054

Perkins Engine	84 HP WPT Clutch	86 HP SP111 Clutch	114 HP WPT Clutch	T3 114 HP SP111 Clutch Murphy Panel	125 HP SP211 Clutch	125 HP WPT Clutch
Engine	29234-213	29233-523	*29233-536	*29233-548	*29233-546	*29233-818
Clutch	24545-101	24542-103	24545-101	24542-103	24541-255	24545-301
Belt	24181-659	24181-659	24181-659	24181-659	24181-659	24181-659
Drive Sheave	24217-667	24217-667	24217-667	24217-667	24217-668	24217-667
Drive Bushing	24133-587	24133-587	24133-587	24133-587	24133-592	24133-592
Driven Sheave	24217-669	24217-669	24217-669	24217-669	24217-669	24217-669
Driven Bushing	24133-591	24133-591	24133-591	24133-591	24133-591	24133-591
Primary Air Filter	29230-618	29230-618	29320-661	29320-661	29320-661	29320-661
Secondary Air filter	29230-619	29230-619	29320-662	29320-662	29320-662	29320-662
Oil Filter	29234-552	29234-552	29234-552	29234-552	29234-552	29234-552
Fuel Filter	29247-472	29247-472	29233-613	29233-613	29233-613	29233-613
Water Separator	29247-504	29247-504	29233-614	29233-614	29233-614	29233-614
Tachometer	39252-093	39252-093	39252-054	39252-054	39252-054	39252-054

John Deere Engine	80 HP SP111 Clutch	80 HP WPT Clutch	115 HP SP111 Clutch	125 HP SP211 Clutch	125 HP WPT Clutch	140 HP WPT Clutch
Engine	29228-519	29228-519	29228-520	29228-521	29228-521	29228-522
Clutch	24542-103	24545-101	24542-103	24541-255	24545-301	24545-301
Belt	24181-659	24181-662	24181-659	24181-659	24181-662	24181-662
Drive Sheave	24217-668	24217-668	24217-668	24217-667	24217-667	24217-667
Drive Bushing	24133-587	24133-587	24133-587	24133-592	24133-592	24133-592
Driven Sheave	24217-669	24217-669	24217-669	24217-679	24217-669	24217-669
Driven Bushing	24133-591	24133-591	24133-591	24133-591	24133-591	24133-591
Primary Air Filter	29321-145	29321-145	29230-432	29230-432	29230-432	29230-432
Secondary Air filter	29321-146	29321-146	29230-431	29230-431	29230-431	29230-431
Oil Filter	29230-180	29230-180	29230-168	29230-168	29230-168	29230-168
Fuel Filter	29229-424	29229-424	29230-182	29228-353	29228-353	29228-353
Water Separator	29229-424	29229-424	29230-182	29228-352	29228-352	29228-352
Tachometer	W/Eng	W/Eng	W/Eng	W/Eng	W/Eng	W/Eng

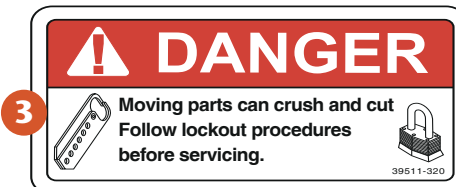
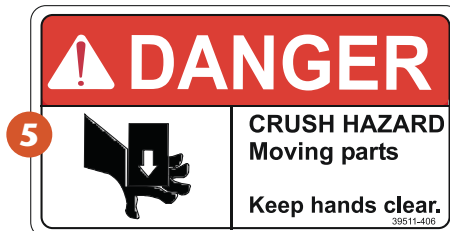
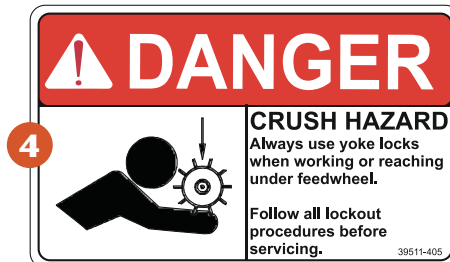
Note: This chipper has several engine options. Check your engine operators manual for specific parts and part numbers on engine components not mentioned in the charts.

Note: * Indicates the Engine number includes clutch.

Kubota Engine	84 HP SP111 Clutch	84 HP PF SR WPT Clutch	99 HP SP111 Clutch	99 HP Auto Clutch
Engine	29211-216	29211-223	29211-904	*29211-902
Clutch	24542-103	24545-101	24542-103	24532-103
Belt	24181-659	24181-659	24181-659	24181-659
Drive Sheave	24217-667	24217-667	24217-667	24217-667
Drive Bushing	24133-587	24133-587	24133-587	24133-579
Driven Sheave	24217-669	24217-669	24217-669	24217-669
Driven Bushing	24133-591	24133-591	24133-591	24133-591
Primary Air Filter	29211-926	29211-926	29211-926	29211-926
Secondary Air filter	29211-927	29211-927	29211-927	29211-927
Oil Filter	29211-826	29211-826	29211-826	29211-826
Fuel Filter	29211-827	29211-827	29211-827	29211-827
Water Separator	N/A	N/A	N/A	N/A
Tachometer	39252-093	39252-093	39252-093	39252-093

Cummins Engine	74 HP CX110 Clutch	110 HP WPT Clutch	130 HP WPT Clutch
Engine	29218-007	29217-902	29217-905
Clutch	24541-108	24545-101	24545-101
Belt	24181-659	24181-662	24181-662
Drive Sheave	24217-666	24217-668	24217-668
Drive Bushing	24133-587	24133-587	24133-587
Driven Sheave	24217-669	24217-669	24217-669
Driven Bushing	24133-591	24133-591	24133-591
Primary Air Filter	29218-091	29217-926	29217-926
Secondary Air filter	29218-092	29217-927	29217-927
Oil Filter	29218-047	29217-917	29217-917
Fuel Filter	29218-090	29217-829	29217-829
Water Separator	NA	29217-826	29217-826
Tachometer	39252-093	39252-054	39252-054

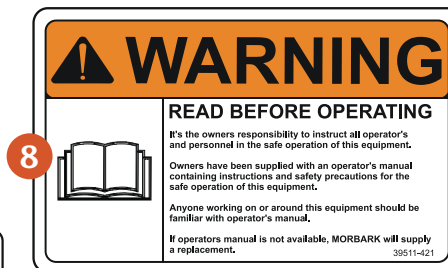
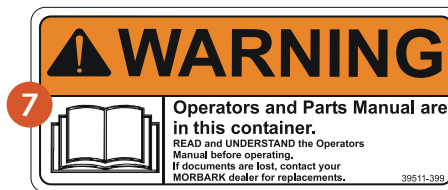
Danger



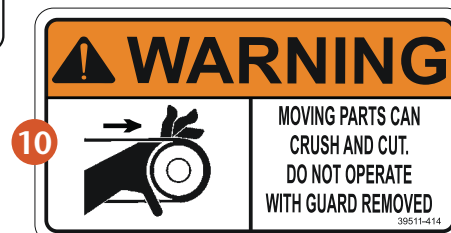
Item	Qty	Part Number	Description
1	1	39511-402	Danger, Entanglement, Right
2	1	39511-403	Danger, Entanglement, Left
3	AR	39511-320	Danger, Lock-out
4	2	39511-405	Danger, Crush Hazard, Use Yoke Lock
5	2	39511-406	Danger, Crush Hazard, Moving Parts
6	1	39511-427	Danger, Flying Material, Right
7	1	39511-428	Danger, Flying Material, Left
8	2	39511-401	Danger, Rotating Blades



Warning



Item	Qty	Part Number	Description
1	1	39511-422	Warning, Fire Explosion Hazard
2	1	39511-408	Warning, Flammable
3	2	39511-416	Warning, Autofeed System
4	1	39511-420	Warning, Do Not Remove
5	1	39511-426	Warning, Always Use Chipper Lock
6	1	39511-404	Warning, Wear Proper Safety Gear
7	1	39511-399	Warning, Operator and Parts Manual
8	1	39511-421	Warning, Read Before Operating
9	1	39511-415	Warning, Moving Parts, Chain
10	1	39511-414	Warning, Moving Parts, Belt
11	1	39511-234	Warning, Stay Clear



Caution



1

CAUTION

Clean and re-pack chipper bearings every 1000 hours or twice yearly.

39511-413

2

CAUTION

BEFORE WELDING ON MACHINE

Disconnect all cables to the batteries.
Disconnect all connectors to the ECM.
Do not use the ECM or engine, to ground welder.
Locate the welding ground as close as possible to welding area.

39511-430

3

CAUTION

DO NOT engage or disengage clutch above engine idle.
DO NOT use clutch as a brake to slow chipper.
DO NOT use clutch to unplug chipper.
DO NOT allow the engine to idle for more than 3 minutes with clutch disengaged.
Keep clutch properly adjusted, refer to clutch manual.
Most failures are attributed to operator abuse.
Clutch failures are almost never covered under warranty.

39511-407

4

CAUTION

HYDRAULIC OIL SIGHT GAUGE MUST BE 3/4 FULL.
CHANGE HYDRAULIC OIL FILTERS EVERY 400 HOURS.
CHANGE OIL AND CLEAN TANK EVERY 2,000 HOURS

HYDRAULIC OIL

This reservoir was initially filled with MORBARK HYDREX XV hydraulic fluid
When refilling the system we recommend MORBARK HYDREX XV hydraulic fluid or equivalent.
OPERATING RANGE
-40° to 170° F (-40° to 77° C)

If temperature exceeds 170° F, change interval to every 1,000 hours.
For every 15° F temperature increase, reduce interval by 50%. Extended drain acceptable, only with ongoing oil trend analysis program and temperatures averaging less than 140° F.

FLUID PROPERTIES:
245 viscosity index
Anti-wear properties,
Excellent oxidation stability,
Rust, Corrosion, Foam resistance,
Good demulsibility,
High dielectric strength,

39511-400

5

CAUTION

Before towing check axles, tires, hitch, rims and safety chains for loose bolts, cracks and defective equipment.

39511-417

Item	Qty	Part Number	Description
1	1	39511-413	Caution, Clean Chipper
2	1	39511-430	Caution, Before Welding
3	1	39511-407	Caution, Clutch
4	1	39511-400	Caution, Hydraulic Oil
5	1	39511-417	Caution, Before Towing

General Use



1

AUTOFEED

TO TURN OFF AUTOFEED OR RUN HYDRAULICS AT LOW R.P.M.'S PRESS OFF BUTTON FOR 2 SECONDS. THIS MODE WILL ALTERNATE DISPLAY SHOWING RPM'S ON AND OFF FOR 9-10 SECONDS. TO TURN BACK ON PUSH ON BUTTON. TO READ HOURS PUSH THE HOURS BUTTON.
39511-187

2

FEED WHEELS
FORWARD - NEUTRAL - REVERSE

39511-215

3

FEED WHEELS
REVERSE - NEUTRAL - FORWARD

39511-216

4

GREASE POINT 1-433

39511-433

5

PUSH TO REVERSE
FEED WHEELS
SAFETY CONTROL BAR
PUSH TO REVERSE
FEED WHEELS
39511-312

6

DOWN ← **YOKE** → **UP**
39511-448

7

WORK POSITION ← **SWING TONGUE** → **TRANSPORT POSITION**
39511-384

8

DIESEL FUEL
39511-412

9

HYDRAULIC OIL
39511-411

10

FUEL SHUTOFF
39511-410

11

YOKE LOCK
39511-434

12

CHIPPER LOCK
39511-418

13

CHECK BELT TENSION DAILY
39511-419

14

TRAYMOR INCORPORATED
PATENT # 59885396000642
39511-508

Item	Qty	Part Number	Description
1	1	39511-187	Autofeed
2	1	39511-215	Feedwheel, Forward
3	1	39511-216	Feedwheel, Reverse
4	AR	39511-433	Grease Point
5	1	39511-312	Safety Control Bar
6	1	39511-448	Yoke Down
7	1	39511-384	Swing Tongue (Option Only)
8	1	39511-412	Diesel Fuel
9	1	39511-411	Hydraulic Oil
10	1	39511-410	Fuel Shutoff
11	1	39511-434	Yoke Lock
12	1	39511-418	Chipper Lock
13	1	39511-419	Check Belt Tension Daily
14	1	39511-117	Traymor Patent
15	1	39511-508	Patents

15

THIS PRODUCT MAY BE COVERED BY ONE OR MORE OF THE FOLLOWING UNITED STATES PATENTS OR OTHER PATENTS PENDING:

5,005,620	6,523,768
5,148,844	6,622,951
5,419,502	6,880,774
5,638,879	6,953,167
5,713,525	7,007,878
6,179,232	7,055,770
6,474,579	

39511-508

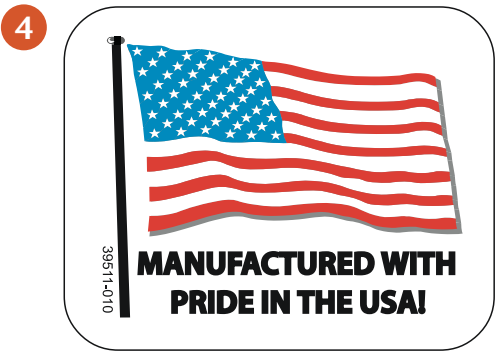
76345-280 • 12-08

4.35

Decorative



Item	Qty	Part Number	Description
1	1	39511-637	Beever, Large Decal
2	1	39511-638	Beever, Small Decal
3	2	39511-639	Morbark Logo
4	1	39511-010	Made in USA



General Maintenance



- Maintenance Overview 5.2
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- Hydraulic Schematic 5.27
- Warranty 5.29
- Warranty Claims 5.30

Maintenance Overview



Table 5.1 • Routine Maintenance Schedule

Chipper Component	Required Maintenance	Start Up	8 hours	40 hours	120 hours	400 hours	2x yearly
Complete machine	Visual inspection (see Safety section) and	X	X				
	Clean machine		X				
Extended Tongue	Remove and inspect for cracks along bolt holes, replace if cracks are present				X		
Fasteners (except drum knife bolts)	Assemble using Loc-Tite 242 (blue)						
Engine oil	Maintain according to OEM manual	X	X				
Engine coolant	Maintain according to OEM manual	X	X				
Engine air pre-cleaner	Tap & blow out with compressed air		X				
Engine air filter	Clean when indicator (optional feature) is red ¹						
Radiator screen	Tap & blow out with compressed air		X				
Clutch	Adjust ² , adjust according to OEM manual						
Drum bearings	Clean and repack ³ , check clearance when repacking						X
Drum bearing grease zerts	Use same grease used in the drum bearings ⁴		X				
Drum knives	Inspect, sharpen or replace when chip quality deteriorates.		X				
Drum knife bolts	Inspect when checking the drum knives, replace when worn or damaged ⁵			X			
Drum knife clearance	Adjust when changing knives			X			
Drum anvil	Inspect when changing knives, adjust or replace when worn or damaged			X			
Drum drive belts	Inspect, tighten to proper tension, replace when worn ⁶		X	X			
Feed wheel teeth	Cut off and replace when worn						
Tires	Check air pressure before moving	X	X				
Chain drives	Check tension, alignment and lubrication	X	X				
Oil filters	Replace					X	
Hydraulic oil	Replace, check, increase to 3/4 full ⁷						

1. The indicator may change due to engine compression. Reset by pressing the rubber button before cleaning pre-cleaner or changing air filters.

2. Adjustment of new clutch must be done several times within a short period of time to insure proper operation. See OEM manual for adjustment procedures.

3. Fill bearing with EP-2 rated grease, then fill bottom half of bearing housing with grease.

4. Only grease zert above aluminum grease seals need to be greased.

5. Apply a coating of anti-seize lubricant before tightening

6. Check the belts every 8 hours during the first week of operation. After the first week of operation check the belts weekly.

7. Change every 2,000 hours.

Air Filter



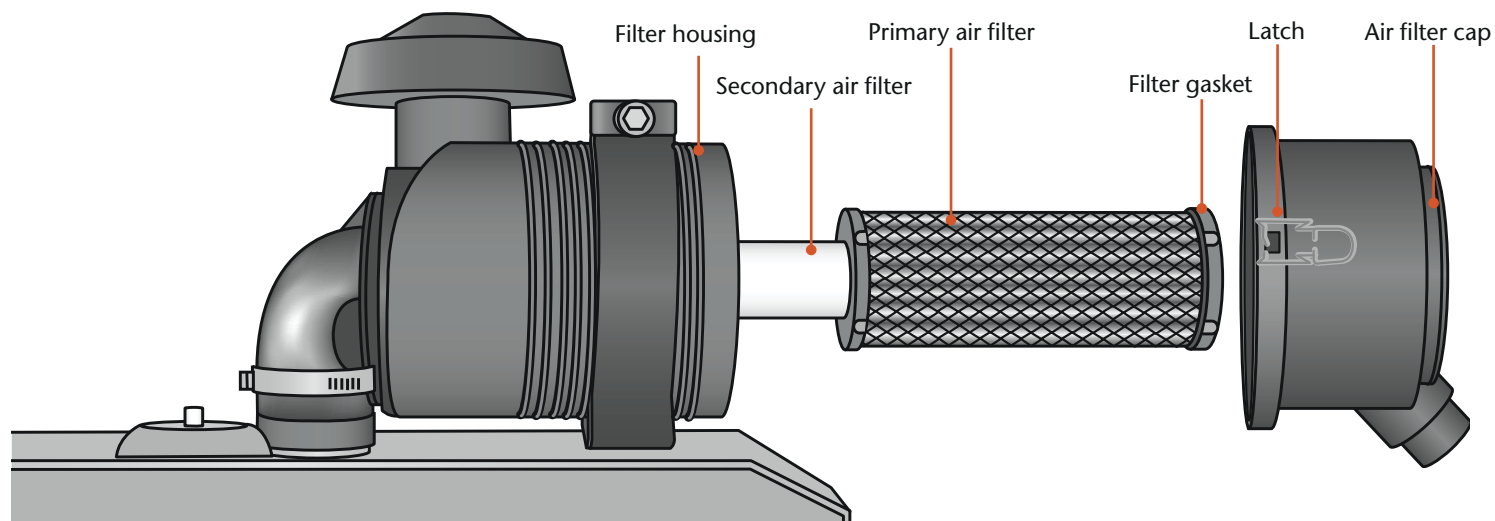
A clean air filter is critical to the performance of the chipper and the life of the engine. Dirt inside the engine will ruin it. The filter should be maintained, changed when necessary. At a minimum, changing should occur every 200 hours or at the time of an oil change. Only use the correct model filter.

To replace the air filter:

1. Inspect the outside of the housing and air transfer tubing for cracks, dents, or holes. Check that all connection points from the filter housing to the engine are tight and sealed. Dust trails indicate leaks.
2. Unlatch the air filter cap from the filter housing. Gently remove the old filter to avoid dirt and dust dropping inside the clean side of the filter housing and causing contamination.
3. Remove the filter and clean the inside of the housing and gasket seal using a clean damp cloth. Make sure all hardened dirt ridges are removed. Wipe every surface inside the housing.
4. Inspect the old filter for evidence of dust leakage and gasket sealing problems. If you see a pattern on the elements clean side, it is a sign that the old filter was not firmly sealed or a dust leak exists. Identify the cause and fix it before placing the new filter in the housing.
5. When installing the filter back into the housing make sure it is seated evenly. If it is not seated evenly, the engine will not be protected from dirt and dust.
6. Ensure the housing, connections and ducts (e.g.: clamps, flange joints and air cleaner mounting bolts) are air-tight.

Note: The gasket on the filter is one of the most important features of the filter. Make sure it is a highly compressible gasket that springs back promptly when you release it from finger pressure.

• • • **Figure 5.1**



Lubrication



Lubricating the machine is vital to its operation. There are 25 points of lubrication on the machine. These include the wheel axle, feed wheel bearings, yoke cylinder pins, yoke pivot pins, clutch, discharge chute swivel and crank handle, chipper drum bearing grease slingers, control bar, and battery box. Use only EP rated grease. Lubricate the grease points as outlined on the schedule below.

Note: The following maintenance intervals apply for normal operating conditions only. Intervals are hours of operation based on 8 hours per day, 5 days per week. If your operating conditions are difficult, adjust the specified intervals.

Table 5.2 • Routine Lubrication Schedule

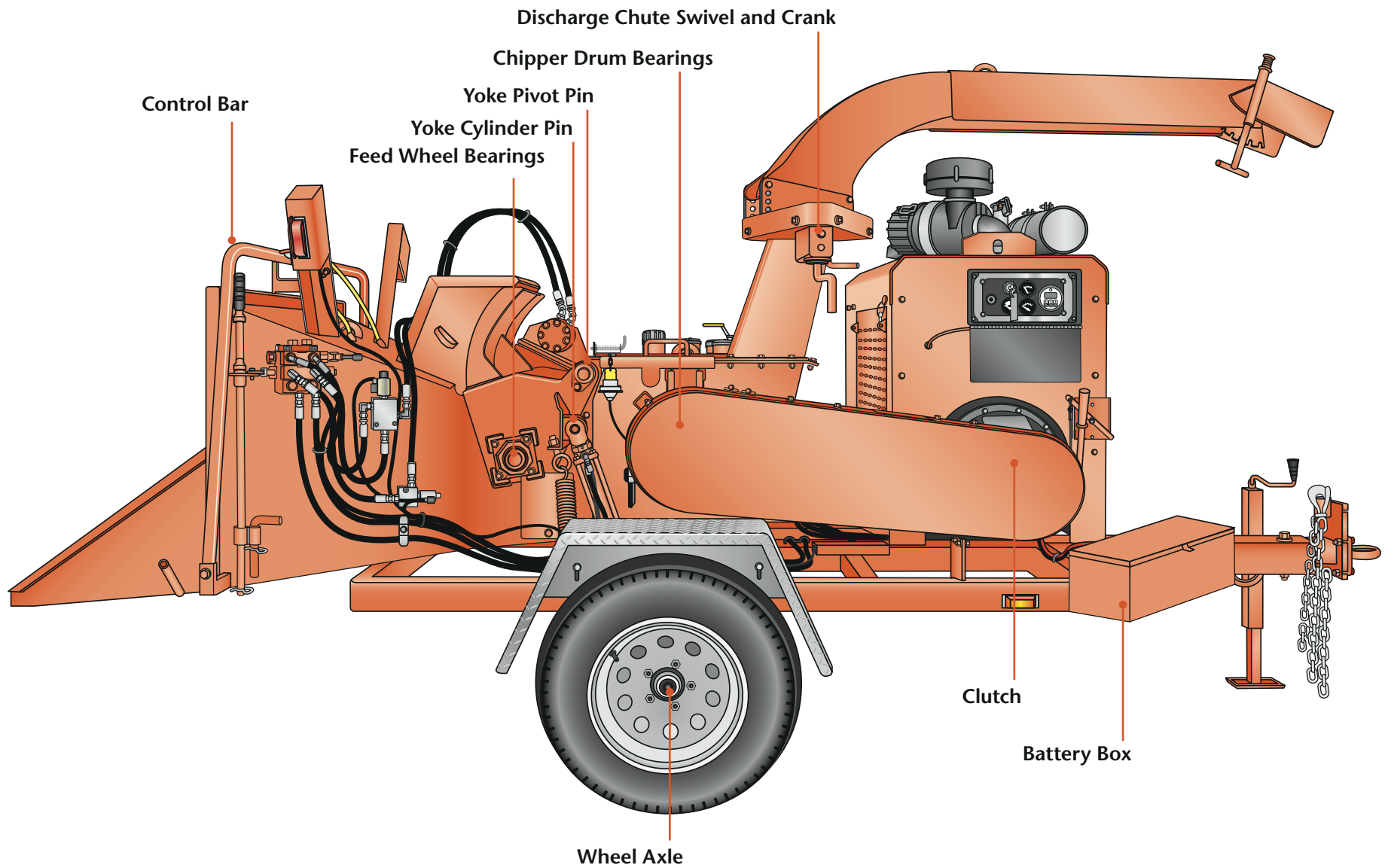
Description	Number of locations	Start up	8 hours	40 hours
Wheel axle	2		See OEM manual	
Feed wheel bearings	2			X
Yoke cylinder pins	4			X
Yoke pivot pin	2			X
Clutch	4		See OEM manual	
Discharge chute swivel & crank handle	3			X
Drum bearing grease slingers (1,2)	4		X	
Control bar	2	X	X	
Battery box	2			X

- 1. Only grease zert above aluminum grease seals.
- 2. Use the same grease that is in the bearing.

Key:
X = 1 shot of grease (Use only EP rated grease)

Lubrications Points

• • • Figure 5.2



Bolts & Torque



Making sure that all the bolts are regularly checked and tightened to the proper torque is critical. The chart below shows the proper torque relative to the bolt size and type. When using this chart, keep the following guidelines in mind:

- The values in the chart are based on use of clean, dry threads.
- Use the next higher torque value when specific torque values are not available.
- When replacing a cap screw with a higher grade, use the torque specifications of the new screw.

- Do not use the torque values shown in this chart in place of those specified in other sections of the manual.
- When oil is used as a lubricant, reduce the torque by 10%.
- When using new plated cap screws, reduce the torque by 20%.
- Use the Grade 5 torque chart when using cap screws that are threaded into aluminum. These may require reductions in torque of 30% or more and must attain two cap screw diameters of thread engagement.
- When using rivet nuts, do not exceed 25 ft-lb of torque.

Table 5.3 • Torque Guides

Grade 5 - Coarse Thread

Size	Clamp Load	Plain	Plated
1/4-20 (.250)	2,025	8 ft-lb	76 in-lb
5/16-18 (.3125)	3,338	17 ft-lb	13 ft-lb
3/8-16 (.375)	4,950	31 ft-lb	23 ft-lb
7/16-14 (.4375)	6,788	50 ft-lb	37 ft-lb
1/2-13 (.500)	9,075	76 ft-lb	57 ft-lb
9/16-12 (.5625)	11,625	109 ft-lb	82 ft-lb
5/8-11 (.625)	14,400	150 ft-lb	112 ft-lb
3/4-10 (.750)	21,300	266 ft-lb	200 ft-lb
7/8-9 (.875)	29,475	430 ft-lb	322 ft-lb
1-8 (1.000)	38,625	644 ft-lb	483 ft-lb
1 1/8-7 (1.125)	42,375	794 ft-lb	596 ft-lb
1 1/4-7 (1.250)	53,775	1120 ft-lb	840 ft-lb
1 3/8-6 (1.375)	64,125	1470 ft-lb	1102 ft-lb
1 1/2-6 (1.500)	78,000	1950 ft-lb	1492 ft-lb

Grade 5 - Fine Thread

Size	Clamp Load	Plain	Plated
1/4-28 (.250)	2,325	10 ft-lb	87 in-lb
5/16-24 (.3125)	3,675	19 ft-lb	14 ft-lb
3/8-24 (.375)	5,588	35 ft-lb	26 ft-lb
7/16-20 (.4375)	7,575	55 ft-lb	41 ft-lb
1/2-20 (.500)	10,200	85 ft-lb	64 ft-lb
9/16-18 (.5625)	12,975	122 ft-lb	91 ft-lb
5/8-18 (.625)	16,350	170 ft-lb	128 ft-lb
3/4-16 (.750)	23,775	297 ft-lb	223 ft-lb
7/8-14 (.875)	32,475	474 ft-lb	355 ft-lb
1-12 (1.000)	42,300	705 ft-lb	529 ft-lb
1-14 (1.000)	32,275	721 ft-lb	541 ft-lb
1 1/8-12 (1.125)	47,475	890 ft-lb	668 ft-lb
1 1/4-12 (1.250)	59,550	1241 ft-lb	930 ft-lb
1 3/8-12 (1.375)	72,975	1672 ft-lb	1254 ft-lb
1 1/2-12 (1.500)	87,750	2194 ft-lb	1645 ft-lb

Grade 8 - Coarse Thread

Size	Clamp Load	Plain	Plated
1/4-20 (.250)	2,850	12 ft-lb	9 ft-lb
5/16-18 (.3125)	4,725	25 ft-lb	18 ft-lb
3/8-16 (.375)	6,975	44 ft-lb	33 ft-lb
7/16-14 (.4375)	9,600	70 ft-lb	52 ft-lb
1/2-13 (.500)	12,750	106 ft-lb	80 ft-lb
9/16-12 (.5625)	16,350	153 ft-lb	115 ft-lb
5/8-11 (.625)	20,325	212 ft-lb	159 ft-lb
3/4-10 (.750)	30,075	376 ft-lb	282 ft-lb
7/8-9 (.875)	41,550	606 ft-lb	454 ft-lb
1-8 (1.000)	54,525	909 ft-lb	682 ft-lb
1 1/8-7 (1.125)	68,700	1288 ft-lb	966 ft-lb
1 1/4-7 (1.250)	87,225	1817 ft-lb	1363 ft-lb
1 3/8-6 (1.375)	103,950	2382 ft-lb	1787 ft-lb
1 1/2-6 (1.500)	126,450	3161 ft-lb	2371 ft-lb

Grade 8 - Fine Thread

Size	Clamp Load	Plain	Plated
1/4-28 (.250)	3,263	14 ft-lb	10 ft-lb
5/16-24 (.3125)	5,113	27 ft-lb	20 ft-lb
3/8-24 (.375)	7,875	49 ft-lb	37 ft-lb
7/16-20 (.4375)	10,650	78 ft-lb	58 ft-lb
1/2-20 (.500)	14,400	120 ft-lb	90 ft-lb
9/16-18 (.5625)	18,300	172 ft-lb	129 ft-lb
5/8-18 (.625)	23,025	240 ft-lb	180 ft-lb
3/4-16 (.750)	33,600	420 ft-lb	315 ft-lb
7/8-14 (.875)	45,825	668 ft-lb	501 ft-lb
1-12 (1.000)	59,700	995 ft-lb	746 ft-lb
1-14 (1.000)	61,125	1019 ft-lb	764 ft-lb
1 1/8-12 (1.125)	77,025	1444 ft-lb	1083 ft-lb
1 1/4-12 (1.250)	96,600	2012 ft-lb	1509 ft-lb
1 3/8-12 (1.375)	118,350	2712 ft-lb	2034 ft-lb
1 1/2-12 (1.500)	142,275	3557 ft-lb	2668 ft-lb

Belt Tension




DANGER!



Moving belts and chipper drum can pinch body parts, entangle loose clothing, jewelry, and long hair which may result in cuts, mutilation, serious injury or death. Shut down the engine, wait for the belts and chipper drum to completely stop rotating before initiating maintenance. Always have belt guards attached to the machine before initiating operation.



Debris may be projected during the maintenance of the chipper knives and result in eye injury, skin punctures, and cuts. Always wear protective equipment and gear such as goggles and work gloves.



Performing maintenance with the engine ON may cause serious injury or death. Turn the engine OFF and lock out the machine before servicing it.

NOTE

Cleaning belts with flammable solvents will cause the belt to deteriorate. Use a non-flammable cleaner or soap to remove grease and oil.

Use of hard tools, such as screwdrivers, crowbars, and wedges to place a belt on the sheave can result in damage to the belt and drive.

Failure to follow the preceding guidelines may result in premature belt failure, belt rollover, and PTO bearing failure.

Before adjusting the belt tension:

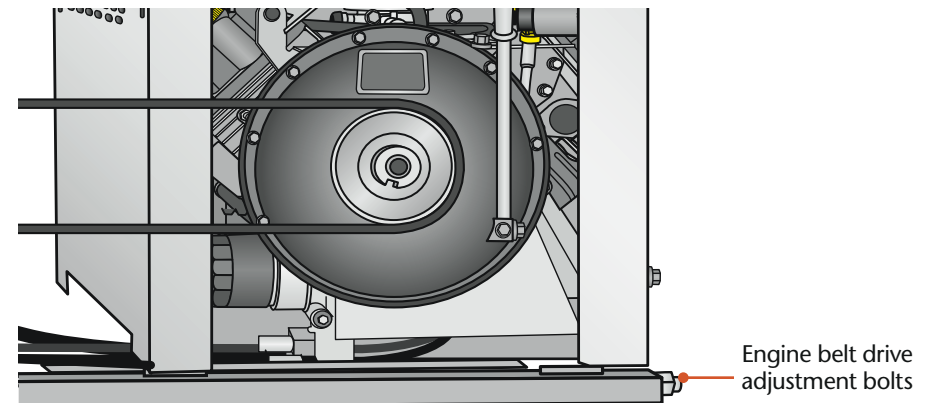
1. Throttle the engine down and disengage the clutch.
2. Shut off the engine, remove the key and conduct machine lockout.
3. Remove the belt guard.
4. If maintenance is required, loosen the engine bolts, remove the belt and fix before setting belt tension.
5. Inspect and/or repair the following:
 - **Grease and oil on the belt:** Grease and oil on a belt will cause rapid deterioration. Clean oil and grease from the sheaves, wipe the belt with a clean cloth.
 - **Burrs and rust in the sheave grooves:** Remove burrs and rust..
 - **Wear, damage and misalignment of the sheaves and sprockets.** Replace if excessively worn, frayed or soft.
 - **Belt clearance and shaft misalignment:** Adjust belt guard and shaft.

Use a V-Belt tension gauge to set the belt tension by following these steps:

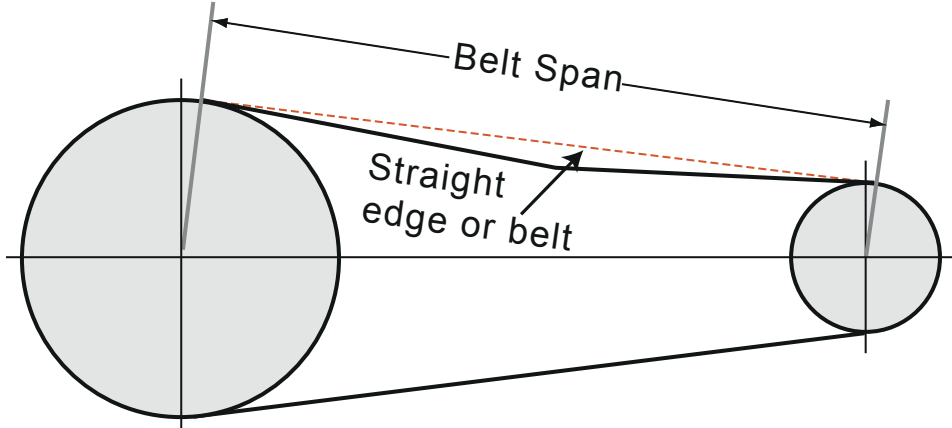
Note: Always install a matched set when installing new belts.

1. Turn the engine belt drive adjustment bolts until the belt is fairly tight.

• • • **Figure 5.3**



• • • Figure 5.4



2. Measure the belt span length of the drive, and lay a straight edge across the drive (see figure 5.4).
3. Set the large rubber O-ring on the body of the tension gauge at the dimension equal to span length (See inset picture in figure 5.5).
4. Set the small O-ring on the plunger to "0" against the body of the tension gauge (see figure 5.5).
5. With the tension gauge perpendicular to the span, apply force to the belt in the center of the span. Deflect the belt until the bottom of the large O-ring is even with the bottom of the straightedge laid across the top of the drive. Release the pressure and read the pounds of force used at the O-ring on the plunger (See inset picture in figure 5.5).
6. Compare the result with the ranges in the Table. The proper tension is the lowest tension at which the belts won't slip under peak load conditions.
7. Tighten the engine adjustment bolts until the belt tension is in the recommended range. Put the belt guard on.

Important! Adjust both sides evenly to ensure proper sheave alignment.

Note: Tension on newly installed belts drops rapidly during the first hours of operation. Check and adjust frequently during the first 24 hours. It is recommended the tensioning deflection force should fall between the minimum and maximum values shown in the table.

• • • Figure 5.5

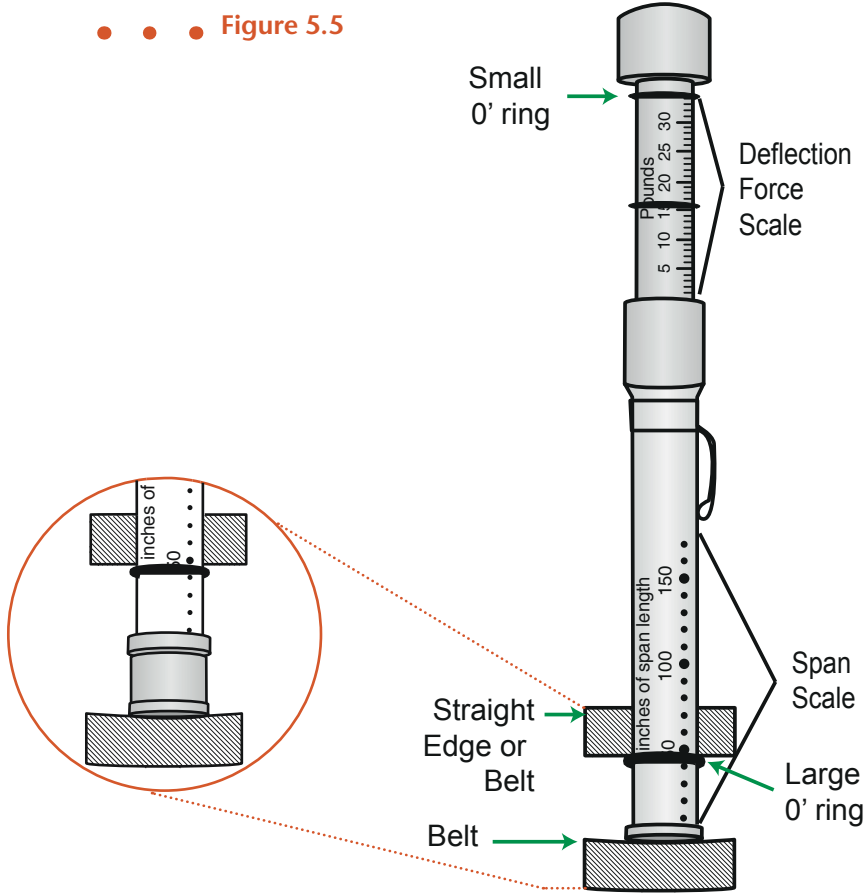


Table 5.4 • Recommended Belt Tension

V-belt- Section	Small Sheave		Deflection force in lbs. for Drive Speed Ratio of;			
	Speed Range	Diameter				
			1.0	1.5	2.0	4.0+
5VX	1200 - 3600	4.4	6.5	7.5	8.0	9.0
	1200 - 3600	5.2	8.0	9.0	9.5	10.0
	1200 - 3600	6.3	9.5	10.0	11.0	12.0
	1200 - 3600	7.1	10.0	11.0	12.0	13.0
	900 - 1800	9.0	12.0	13.0	14.0	15.0
	900 - 1800	14.0	14.0	15.0	16.0	17.0

Chipper Knives



**DANGER!**



A rotating chipper drum can pinch body parts, entangle loose clothing, jewelry and long hair which may result in cuts, mutilation, serious injury or death. Before initiating maintenance throttle the engine down and shut the engine OFF. Wait for the chipper drum to completely stop rotating and insert the drum lock pin.



The chipper drum will coast for several minutes after the machine is shut off. Do not open the chipper hood until the drum rotation has completely stopped. Serious injury, mutilation or death can occur.



Debris may be projected during the maintenance of the chipper knives and result in eye injury, skin punctures and cuts. Always wear protective equipment and gear such as goggles and work gloves.

NOTE

Excessive heat, indicated by discoloration of the knife edge, will lead to microscopic cracks that can cause the knife to break when it is put back into service. Do not use knives that have been exposed to excessive heat from sharpening.

To ensure maximum efficiency of the chipping operation the chipper knives must be properly maintained. The time between sharpening or replacement will depend on the type of wood and operating conditions. Indication of dull knives include poor quality, excessive oversize chips and poor feed characteristics. Always maintain proper knife sharpness. It is important to follow these guidelines to ensure efficient chipping:

- Use original Morbark Inc. knives with the correct steel composition and hardness. Immediately replace worn knives.

- Keep the knife edge sharp and anvil square. Use matched sets.
- Maintain the proper clearance between the chipper knife and anvil.
- Use the correct hardware to mount the knife to the holder and maintain the correct torque to the bolt. Keep the knife pocket and holder clean and free of debris.

1. Place the safety control bar into the neutral position.
2. Throttle the engine down.
3. When the engine has reached an idle, disengage the clutch.

 **WARNING:** Make sure disc has come to a complete stop before opening chipper disc hood.

4. Turn the ignition OFF and lockout the machine.

NOTE: Panel will vary with engine make and model and is shown for illustrative purposes only.

5. Slide back the chipper hood locking pin and open the chipper hood.

Before inspecting or maintaining the chipper knives:

6. Slowly rotate the chipper drum by hand so the first knife is accessible.
7. Insert the chipper drum locking pin.


WARNING!

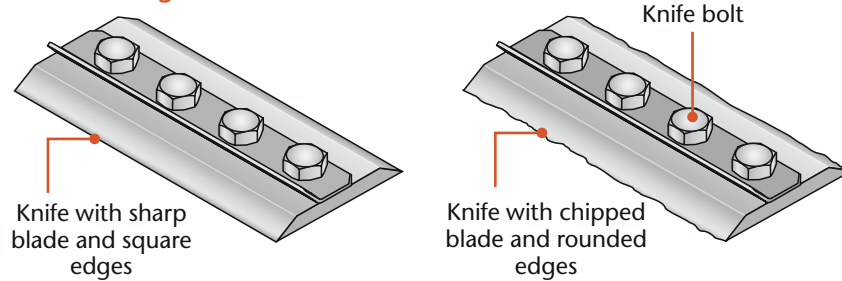



Sharp edges and flying debris may cause serious injury. Always wear protective gloves and goggles while maintaining the chipper knives.

Inspect the knife assembly:

1. Check that the corners of the knife are square and the edge is sharp. Remove the knife if sharpening or replacement is needed.
2. Check that the torque on the knife bolts is 375 ft/lbs. Retorque if necessary.

• • • **Figure 5.6**



3. Remove the drum lock pin and rotate the chipper drum to the next knife. Re-insert the drum lock pin. Repeat steps 1 & 2.
4. If there is no need to turn, sharpen or replace a knife then close the chipper hood and put the hood locking pin back in place.

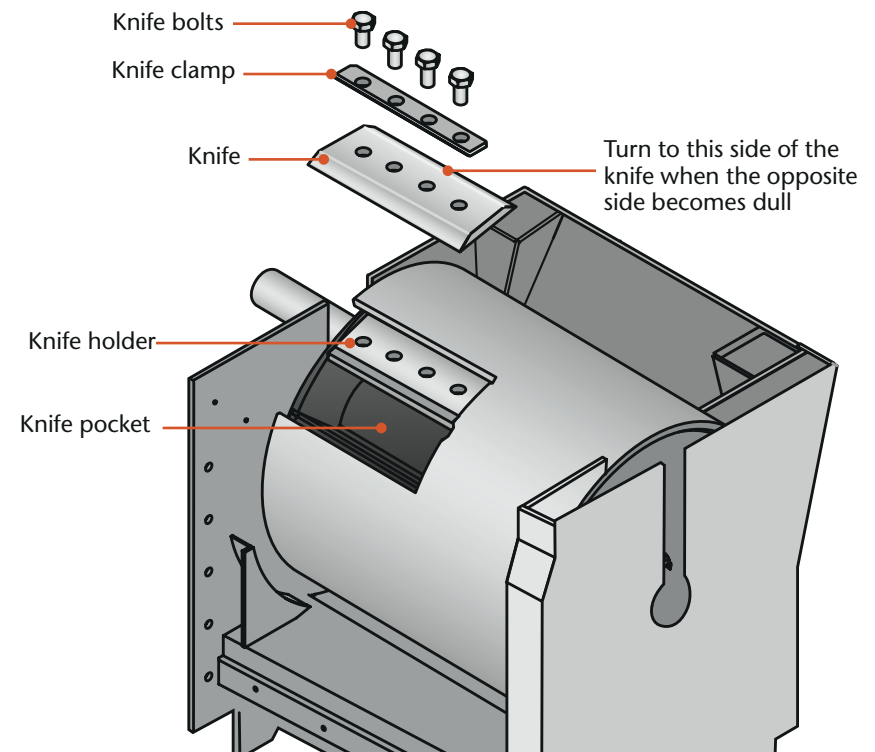
To Turn or Replace the Knives:

1. Remove the four knife bolts.
2. Clean debris from the knife and knife pocket with a wire brush.
3. Inspect the knife holder, knife clamp, knife bolt, and threads for wear or damage.

Note: If the knife holder face has a groove worn more than a 1/4" from the leading edge, it must be replaced.

4. When replacing the knife, apply a coat of anti seize to each bolt before assembly and torque to 375 ft/lbs.
5. Each knife is double-edged and may be turned when one knife edge becomes dull.

• • • **Figure 5.7**



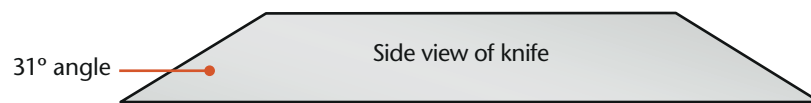
To Sharpen the Knife Edge:

When sharpening the knife edge, use proper grinding techniques (hand file, power belt sander with fine paper or conventional knife grinder with coolant system) to reduce the possibility of excessive heat build up and provide a good cutting edge. Do not use straight wheel grinding. This method will result in a hollow or concave effect and shorten the life of the knife.

Use a non-petroleum base coolant such as De Santo (orange label) grinding coolant when using a grinding machine. Mix approximately one part coolant to 50 parts of water. The coolant should be applied on the wheel about 1" above the knife with full pressure. This will keep the wheel clear and free to cut without burning or damaging knives. Do not overfeed the grinding machine.

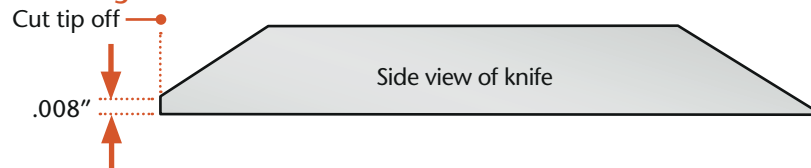
1. Grind the angle of the knife edge to 31°. **Note:** Under exceptional conditions an angle between 29° and 31° may improve performance. Never grind the angle greater than 31°.

• • • Figure 5.8



2. Cut the very tip of the knife off by using a 10" single cut bastard mill file. File the knife edge down to approximately .008" width.

• • • Figure 5.9



3. File a 45° angle on the back side of the knife edge. Use a honing stone to remove any burr edges left from filing. **Note:** Depending on the type of wood (tough or dry) being chipped the back grind angle may need to be greater than 45°. Experiment and test to determine optimum angle.

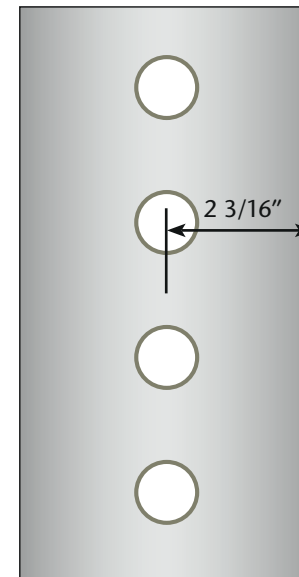
• • • Figure 5.10



4. Place the knife back onto the knife holder. Apply a light coat of anti-seize lubricant to the bolts and clamp.
5. Slide the knife back (away from the anvil) against the knife bolts. Tighten the bolt to the 375 ft/lbs.
6. Remove the drum lock pin and rotate the chipper drum to the next knife. Re-insert the drum lock pin. Repeat steps 1-4 for both chipper knives.

Note: When the distance from the outside of the knife to the center of the mounting holes reaches 2 3/16", the knife must be replaced.

• • • Figure 5.11



After Replacing, Turning or Sharpening the Knives:

1. Close the chipper hood and put the hood lock pin back in place after maintaining the chipper knives.
2. Before conducting chipping operation the clearance between the knives and anvil must be set. (See Knife Anvil section for more information.)

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Knife Anvil

⚠ WARNING!



Failure to lockout the machine (e.g. yoke, shut power off) may result in unexpected operation and cause serious injury or death. Always lockout the machine before conducting maintenance (see Section One, Safety Lockout Procedure).



A rotating chipper drum can pinch body parts, entangle loose clothing, jewelry and long hair which may result in cuts, mutilation, serious injury or death. Shut down the engine, wait for the chipper drum to completely stopped rotating and insert the drum lock pin before initiating maintenance.

NOTE

Incorrect clearance between a chipper knife and anvil will result in poor chipping performance, damage to the chipper knives and undue stress on the chipper. Always maintain the proper knife-anvil clearance.

The anvil is located under the machine, and behind the infeed. The anvil and chipper drum work together in chipping the brush, therefore it is important the clearance between the anvil and knife are accurate. See figure 5.15 for the anvil location.

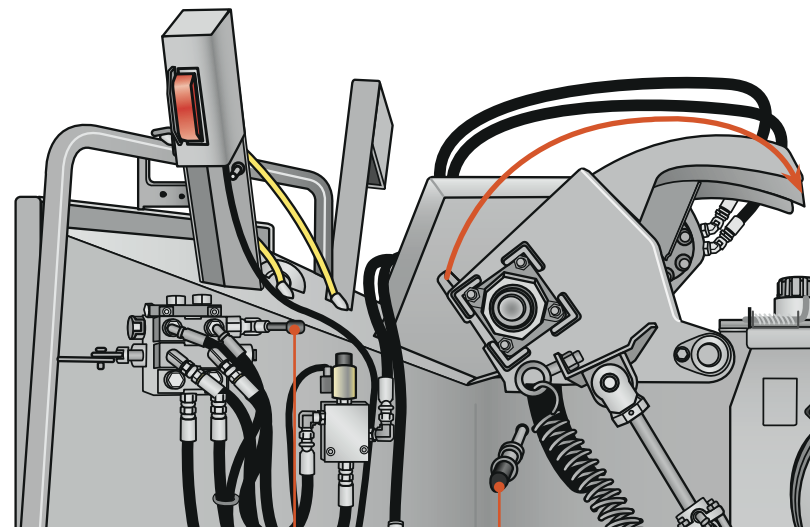
To ensure maximum efficiency of the chipping operation the anvil must be properly maintained. It is important to follow these guidelines to ensure efficient chipping:

- Keep the anvil square.
- Maintain the proper clearance between the chipper knife and anvil.
- Two people are required to adjust the anvil.

Before inspecting or maintaining the anvil:

1. Raise the yoke and insert locking pin (see Lockout Procedure in safety section).
2. Follow steps 1-4 in chipper knife section to shut-down the machine.

• • • **Figure 5.12**



Lift the yoke by activating the yoke valve bank handle.

Yoke locking pin goes through the infeed housing and is locked into place by a hitch clip on the left side of the machine.

Inspect the anvil:

1. Inspect the anvil for wear and damage. The anvil edge should be square.

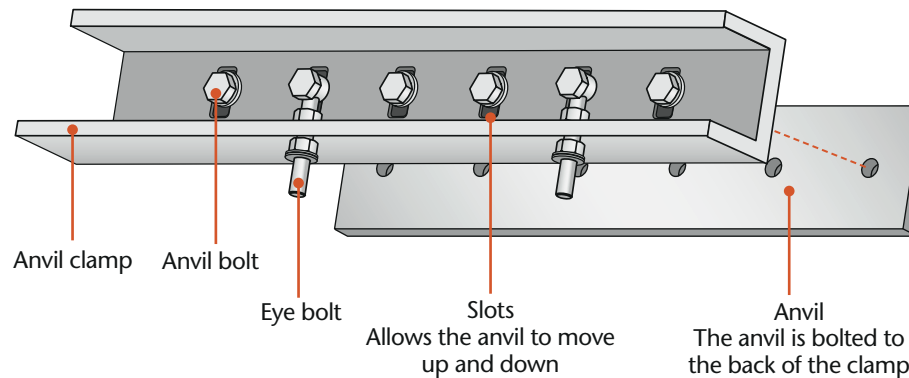
• • • **Figure 5.13**



2. Check the torque on the bolts that hold the anvil. Tighten if necessary (see torque chart).

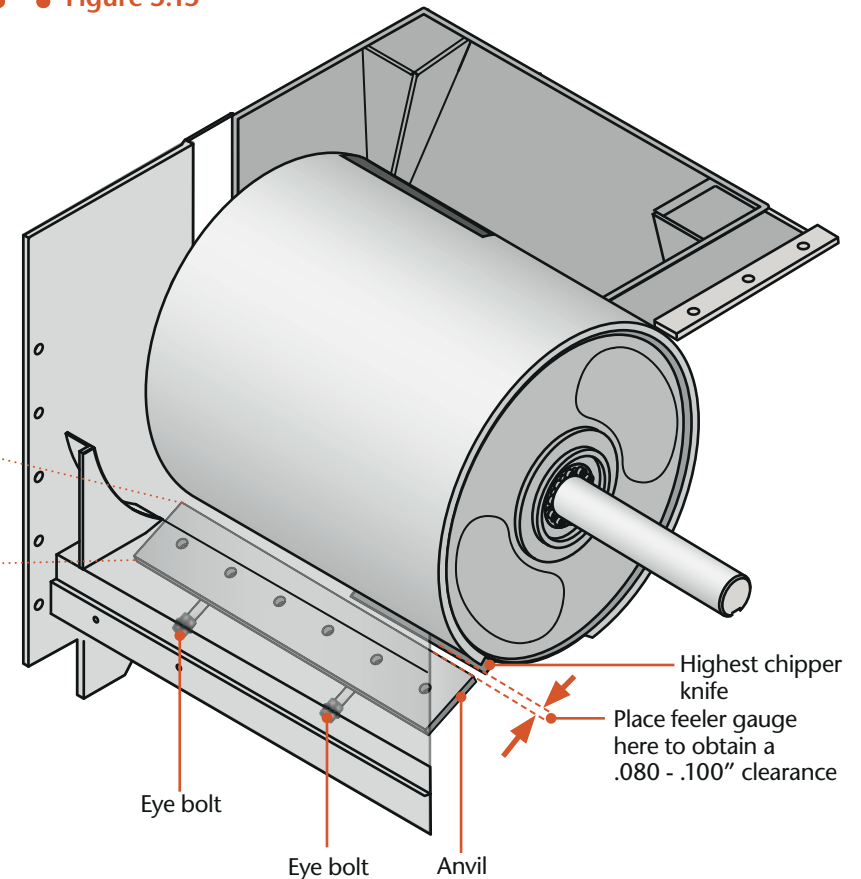
To Flip or Replace the Anvil:

1. Remove the six anvil bolts.
2. Clean debris from the anvil and anvil clamp slots with a wire brush.
3. If the anvil edge is rounded, flip to a new edge or replace. Anvil can be flipped 4 times.
4. Place the anvil back onto the anvil slot. Apply a light coat of Loc-tite lubricant to the bolts and insert.

● ● ● **Figure 5.14****To Set the Chipper Drum Knife/Anvil Clearance:**

1. Reach into the infeed and slowly rotate the chipper drum so the highest chipper knife closest to the anvil is positioned over the anvil. **Important!** Keep loose clothing, jewelry, long hair and body parts away from rotating parts.
2. With a feeler gauge, check the clearance between the chipper knife and anvil. It should be set between .080" and .100".
3. If necessary, loosen the six anvil bolts until the anvil is loose.
4. Turn the two eye bolts behind until the anvil is set to the correct clearance.
5. Rotate the chipper drum backwards to the next knife and check the clearance of the next knife.

6. Tighten the bolts to the proper (see torque chart).

● ● ● **Figure 5.15****After Maintaining the Anvil:**

1. Remove the yoke locking pin.
2. Lower the yoke by activating the yoke valve bank handle.

Chipper Bearing



WARNING!



Performing maintenance with the power source ON may result in unexpected operation of the machine and may cause serious injury or death. Turn OFF and lock out the power source before servicing.

The chipper bearings support the chipper drum shaft and should be cleaned and repacked twice per year.

Before performing maintenance on the chipper bearings:

1. Follow steps 1-4 in chipper knife section to shut-down the machine.
2. Inspect the chipper drum shaft. Ensure that it is smooth, free of any nicks or cuts, straight and clean.
3. Inspect the bearing for contamination.
4. Protect the bearing from exposure to dirt or moisture.
5. Do not remove slushing compound. This protects and lubricates the bearing and is also compatible with standard greases.
6. Unbolt the bearing housing and lift off the top to obtain access to the bearing assembly. Lift the chipper drum and shaft from the chipper drum housing.

To Maintain the Bearings:

1. Slide the inner grease slinger ring onto the drum shaft.
2. Slide the tapered sleeve onto the drum shaft. The threaded end should be toward the outside.
3. Slide the bearing onto tapered sleeve. Match the inner taper on the bearing.
4. Slide the washer onto the drum shaft. The tabs should be pointed away from the bearing.

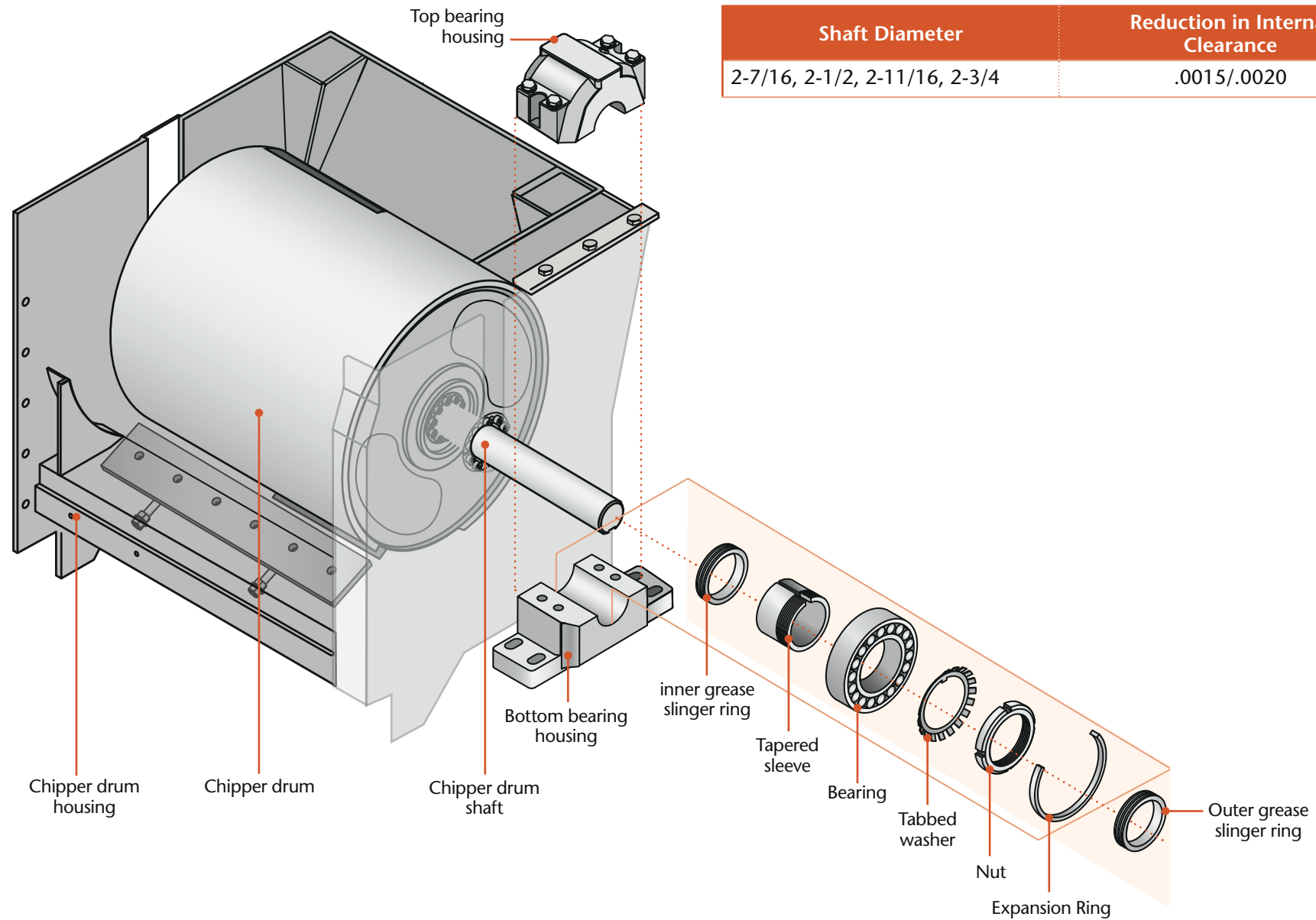
5. Install the nut and washer.
6. Tighten nut until it is snug against the bearing. Leave enough space to install the expansion ring in step 9.
7. Install outer grease slinger. Repeat steps 2 - 8 for the opposite side.
8. Place the drum into the chipper drum housing ensuring that the grease slingers on both sides mate with the grooves in the bottom bearing housing. Check that they turn easily when full weight of drum is resting on the housings.
9. Install the expansion ring into the bearing housing between the housing and bearing (on the drive side of the bearing). Rotate and push down until the ring meets the bottom of the bearing housing and the ends are equal on the side of the shaft.
10. With the chipper drum weight on the bearings, use a feeler gauge to take an initial reading of the internal clearance between the bearing rollers and the top of the bearing. Record the reading.
11. With a spanner wrench, turn the nut in a clockwise rotation. This will drive the bearing onto the tapered sleeve and decrease the internal clearance between the bearing rollers and the top of the bearing.

Continue turning the nut until the internal clearance is reduced to the distance specified for the shaft diameter (e.g.: internal clearance for a 2 7/16/ diameter shaft is .0015"/.0020, see table).
12. On the idler side of the drum, pull the bearing to the outside groove of the housing before tightening nut. That way when tightening the bearing it will move towards the middle of the housing.
13. Fill bottom of bearing housing with EP2 rated grease so it is level with the top.

After performing maintenance on the chipper bearings:

1. Replace the top of the bearing housing.

• • • Figure 5.16



Hydraulics




WARNING!



Hydraulic oil will vaporize and potentially ignite resulting in explosion, fire and possible serious injury. Keep hydraulic oil away from ignition sources (e.g.: flame, smoking etc.).



Hydraulic oil leaks will result in puddles and slippery conditions which may result in serious injury. Always clean up spills and fix leaks immediately.



Pressure may be stored in the hydraulic system even after the power unit is turned OFF. Relieve hydraulic pressure and lockout the machine before conducting maintenance.



Hydraulic oil is under pressure. Spraying fluid from a leak can burn or penetrate the skin and cause serious injury. If fluid penetrates the skin, **immediately** seek medical attention to have it surgically removed!



The hydraulic components (pump, motor) and oil are hot during operation and can cause severe burns. Always wear protective face gear and clothing during operation and maintenance.

NOTE

Never increase hydraulic pressure settings. Doing so voids the manufacturer's warranty.

When conducting maintenance on the hydraulic system be cautious of leaks, hot components (pumps, motors, relief valves) and stored energy. Always follow safety warnings and procedures when conducting maintenance on the hydraulic system.

Before Conducting Maintenance:

- Allow the machine to cool down
- Relieve pressure within the hydraulic system. Examples of where energy may be stored include: stalled feed wheels, suspended loads, charged accumulators and electric voltage.
- Check for leaks. Use a piece of cardboard to check for leaks. Never use your hand!

The hydraulic system provides the fluid that powers certain parts of the machine's operation. The main components requiring maintenance includes the hydraulic oil, filter and pump.

Hydraulic Oil

The hydraulic oil should be tested every 250 hours or if there are signs of oil degradation. Signs of degradation include:

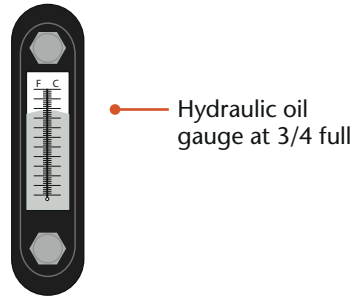
- A change in oil color
- Bad aroma to the oil
- Dirty or gritty feel to the oil
- Regular hydraulic component failure
- Louder than normal operation sound

The oil quality may be checked using a commercially available test kit or a simple Blotter Spot test. The Blotter Spot test consists of placing a drop of oil on a piece of blotter paper. If the blotter remains colorless or develops only a light yellow ring, oxidation is under control. Even when color develops but is uniform throughout, the oil is serviceable. If the sample shows distinct rings,

the fluid should be changed. When a dark spot remains in the middle but lighter-colored oil migrates outward in the blotter paper, the oil has or is about to dump sludge or other products into the system. This indicates that the time for fluid replacement has passed.

Under normal conditions hydraulic oil should be changed every 2000 operating hours or yearly, whichever comes first. In more severe conditions it should be changed every 1000 hours or six months. Always use hydraulic oil that contains anti-wear additives. Always keep the level of oil in the tank at 3/4 full. Failure to do so can result in air getting into the pump, a reduction of oil pressure, and slow operation.

● ● ● Figure 5.17



Hydraulic Oil Filter

The hydraulic oil filter should be replaced after 500 hours of operation or when the hydraulic oil is changed. Always use a filter rated at 10 micron.

Hydraulic Oil Pump

The hydraulic pump is critical to the operation of the chipper. Operators should always be alert for possible problems with the pump during operation. Symptoms indicating problems with the pump include (see Table 5.6):

- A noisy pump
- Overheating
- High discharge pressure
- Pump not pumping
- Low system pressure
- Sluggish start-up

Troubleshooting the hydraulic system involves talking with the operators, understanding the schematics and inspection of the machine. After identifying the problem determine the root causes. It is possible there is more than one cause of the malfunction.

Start by creating a list of possible causes. Put the easiest ones to eliminate and do not require dis-assembly or down time first. Systematically test, eliminate or repair possible causes.

Initiate corrective action to avoid future maintenance problems and operation downtime.

Table 5.6 • Hydraulic System Maintenance Schedule

Item	Maintenance	Schedule
Oil	Maintain level at 3/4 full	Daily or as needed
	Test	250 hours or signs of degradation
	Change (under normal conditions)	2,000 hours or yearly
	Change (under severe conditions)	As needed
Filter	Replace (with filter rated 10 micron)	400 hours or with change
Pump	As needed	See troubleshooting chart
Hoses & Fittings	Replace	When worn or damaged

Table 5.7 • Hydraulic Pump Troubleshooting Guide

Symptom	Possible Cause	Corrective Action
Noisy Pump	Air in the system	Tighten loose fittings. Replace cracked hoses and damaged parts. Maintain hydraulic oil level in tank. Keep 3/4 full.
	Cavitation (vacuum in pump)	Open clogged or restricted intake line or plugged air vent in tank.
	Loose or worn parts	Replace worn gaskets. Ensure the oil is the proper type and clean.
	Stuck pump vanes, valves, pistons	Dis-assemble pump and clean with solvent and dry thoroughly before reassembling. Do not use hard tools, files or emery cloth on machined surfaces. Replace rusted parts.
	Pump/Drive misalignment	Maintain constant oil temperature.
Overheating	Outside temperature thickens oil	Use oil with higher viscosity index. See fluid manufacturers recommendations.
	Low oil	Maintain hydraulic oil level in tank. Keep 3/4 full.
High discharge pressure	Parts misalignment	Check parts for excessive friction. Replace if necessary. Ensure all parts are aligned.
Pump not pumping	Shaft turning in wrong direction	Shut the machine off immediately! Replace existing pump with one that turns in the correct direction.
	Intake clogged	Clean tank and maintain oil at 3/4 full.
	Air leak in intake	Tighten or replace fittings, hose or damaged parts.
	Oil too thick	Drain tank and replace with oil of the proper viscosity.
Low system pressure	Relief valve setting too low	Block pressure line beyond relief valve and check line pressure with a pressure gauge, adjust relief valve setting so fluid flows to point of use.
	Relief valve stuck open	Clean dirty relief valve. Check oil for dirt and deterioration. Change if necessary.
	Broken, worn or stuck parts	Block pressure line beyond relief valve and check line pressure with a pressure gauge. No pressure buildup and functional relief valve indicate mechanical problems. Inspect pump for worn or broken parts. Replace if necessary.
	Valves sticking or binding	Check oil for deterioration (e.g.: dirt, sludge, varnishes and lacquers). Change if necessary.
		Inspect pump parts for misalignment, wear or damage. Replace if necessary.
Sluggish start-up	Oil too thick at starting temperature	Run the machine for short period and see if the oil thins out. If not, change the oil to a lighter viscosity. See fluid manufacturers recommendations.

Engine



WARNING!

Wood dust and chipping material in the engine area may ignite and result in fire, burns or serious injury. Clean the engine area before operation of the machine and when excessive material build-up occurs. Do not clean the engine area with the engine running!

NOTE

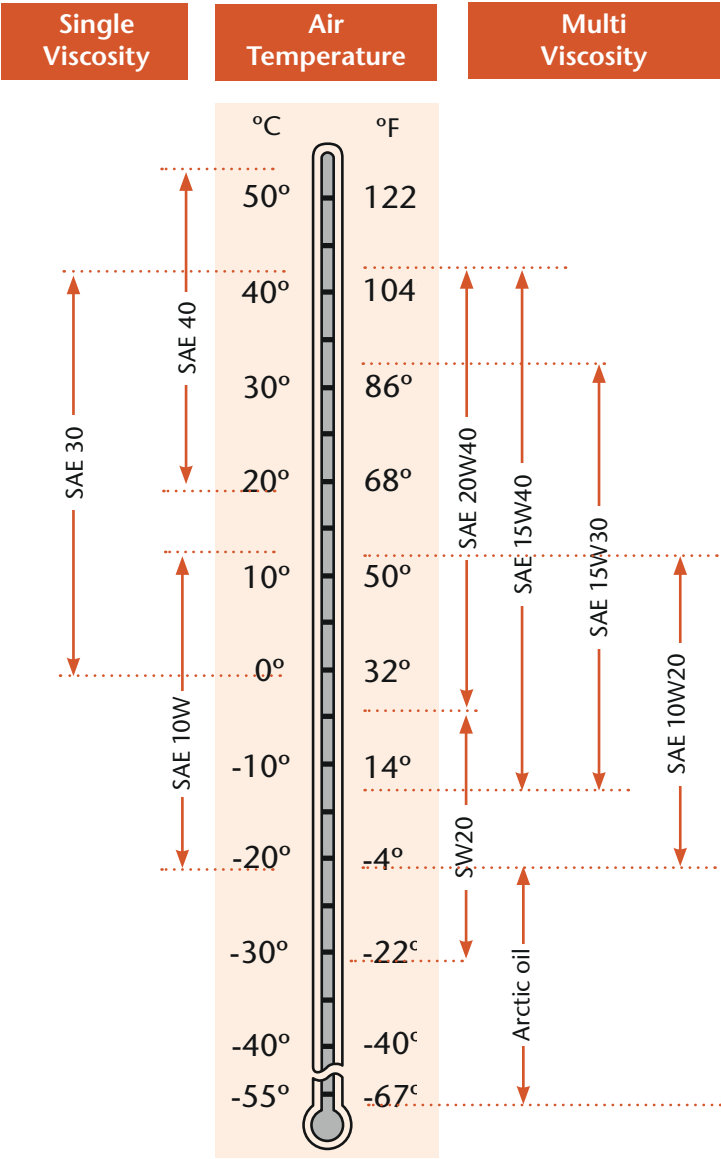
Refer to the engines OEM manual for specific maintenance guidelines and procedures. Failure to follow the engine OEM guidelines and procedures may result in a void of the engine OEM warranty.

The engine area should be cleaned before every use and if there is excessive material build-up (wood dust, chips) during operation. Always turn the engine OFF before cleaning the engine area.

Engine Oil

Refer to the engine OEM manual for drain intervals. Quality engine oils are blended so additives are neither required or recommended. Match the choice of oil viscosity to the air temperature the chipper will be operating in (see Chart 5.1). Use only premium engine oils that meet OEM performance requirements.

Chart 5.1 Oil Viscosity



Fuel




DANGER!



Ignition sources (e.g: lit cigarettes, open flame, sparks, excessive heat) will ignite diesel fuel and result in burns or serious injury. Always stop the engine and keep away from ignition sources when refueling. Do not smoke while refueling!

Fuel Specifications

Use No. 2-D diesel fuel (reference ASTM D975) under normal operating conditions. In extremely cold conditions No. 1-D diesel fuel is recommended. Refer to the engine OEM manual for specific information regarding the type of fuel to use. Always purchase the fuel from a reputable supplier.

Principal concerns of diesel fuel requirements include:

- **Sulfur content:** relates to fuel emission and control. ULSD or Ultra Low Sulfur Diesel has 15 ppm (part per million) is suitable for all diesel engines. LSD or Low Sulfur Diesel may have 550 ppm and permanently damage emission control equipment.
- **Cetane number:** is a measure of the ease with which the fuel is ignited in your engine. It is most significant in relation to low-temperature and ability to start, warm-up and smooth, even combustion. The cetane number of the fuel should meet your engine manufacturer's minimum recommendation for the type of service. Most engine manufacturers recommend diesel fuels with a cetane number of at least 40.
- **Cleanliness:** refers to the absence of water and particulate contamination. This characteristic is important because dirt and water can plug fuel filters in your engine and cause severe damage to your fuel injection system because of the close tolerances within fuel pumps and injectors. All diesel engine manufacturers equip their engines with fuel filters to protect the fuel delivery system. You should replace these filters according to the manufacturer's recommendations. Some manufacturers also provide filters with drain valves and recommend periodic draining of any water that may accumulate from condensation and careless handling in tanks.

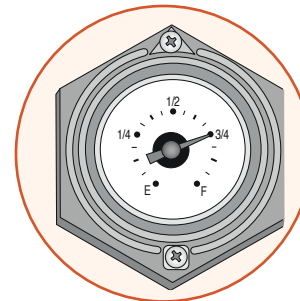
- **Lubricity:** is the characteristic that ensures protection against fuel pump and injector wear.
- **Low-temperature operability:** is the ability of the fuel to flow and to be pumped through diesel fuel system filters without plugging at low temperatures. Filter plugging due to the presence of wax crystals in the fuel can be estimated by measuring the cloud point temperature or other low temperature fluidity and filterability tests.
- **Stability:** is the term used to describe a fuel's resistance to the formation of gums and insoluble oxidation products. Fuels with poor oxidation stability contain insoluble particles that can plug fuel filters. This may lead to decreased engine performance or engine stalling from fuel starvation.

Filling & Storage of Fuel

Fuel should be stored in approved containers and kept in a clean, protected environment. Avoid storing fuel over a long period of time. The fuel tank should be filled 3/4 full at the end of each days operation.

This will help prevent condensation as the air cools and allow for vapor expansion when the temperature rises. The fuel could overflow if the tank is filled completely and there is an increase in temperature.

• • • Figure 5.18



Fuel gauge at
3/4 full

Tires




WARNING!



Over inflated tires may cause a tire to explode and result in serious injury or death. Always maintain a safe distance away from the tire during inflation. Use a hose with a pressure gauge. Never over inflate a tire!



Improper support of the chipper during a tire change may result in the machine tipping over and causing serious injury or death. Always set up on a flat, solid surface and ensure the machine is properly supported.

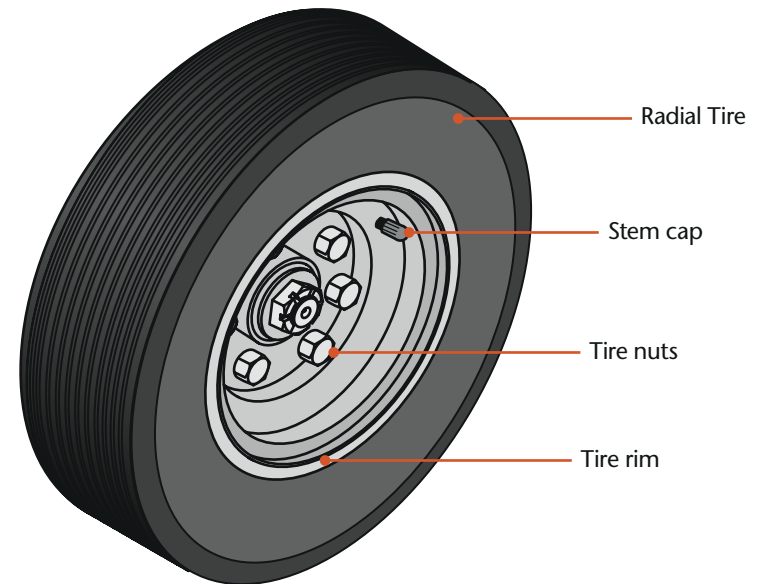
Maintaining proper air pressure in the machine's tires is critical to safe operation. Correct air pressure provides balance and stability during transportation and operation. Never exceed maximum inflation pressures when sealing tire beads on rims.

To add air to the tires remove the stem cap and place the air pump nozzle securely on the stem. Avoid twisting or bending the stem while adding air. Inflate the tire to the recommended pressure listed on the tire. After inflating the tire, replace the stem cap. Doing so will prevent loss of air pressure.

Repairing or replacing a tire should only be done by an individual that has the proper equipment and training. In the absence of either always have a qualified tire repair service conduct the maintenance. Detailed tire mounting instructions, including safety precautions, are available from the Rubber Manufacturers Association or the tire manufacturer.

The chipper comes with high-grade tires. Replace with a similar grade.

• • • Figure 5.19



General Maintenance • Troubleshooting Chart

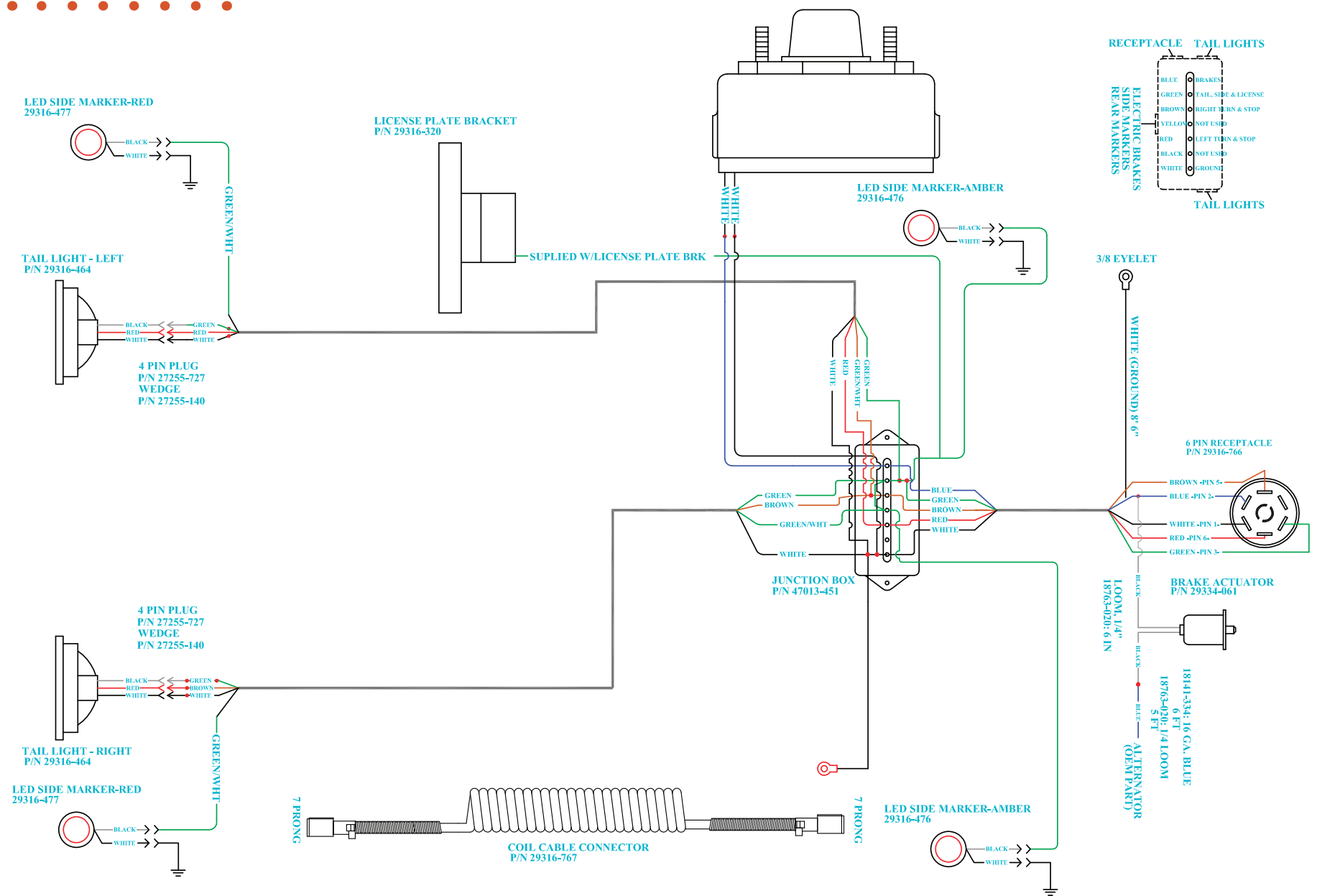
Table 5.8 • Chipper Troubleshooting Guide

Problem	Probable Cause	Corrective Action
Chipper will not feed properly	Dull chipper knives	Turn, sharpen or replace knives
	Loose belts	Check for proper belt tension
	Knives ground at incorrect angle	Grind knives at 31°
	Obstruction in infeed spout	Raise the yoke and insert yoke lock pin. Turn OFF the engine and lockout the machine. Wait for the chipper drum to come to a complete stop. Carefully remove the obstructing material from the infeed.
Chipper bearing running too hot (210° F maximum)	Not enough or too much lubrication	Lubricate according to manufacturers recommendations
	Drum rpm too high	Do not exceed 2,250 rpm
Discharge spout plugged	Obstruction in discharge spout	Lower discharge or if equipped open clean out door and clean out
	Chipper drum RPM too low	Always run the chipper at full throttle when chipping
Chipper drum wobbles	Bushings are loose	Torque to 80 ft-lb
	Bearing cap is loose	Torque to 80 ft-lb
	Chipper bearings are worn or damaged	Replace bearings
	Knife pockets are plugged with material	Unplug pockets
Chipper drum will not turn	Obstruction in chipper housing	Turn OFF the engine and lockout the machine. Carefully remove the obstructing material from the chipper housing.
	Drum bearings have seized up	Check chipper bearings and lubricate or replace
Contaminates in chipper bearing	Loss of grease seal between Ler ring and shaft	Lubricate drum bearing Ler ring

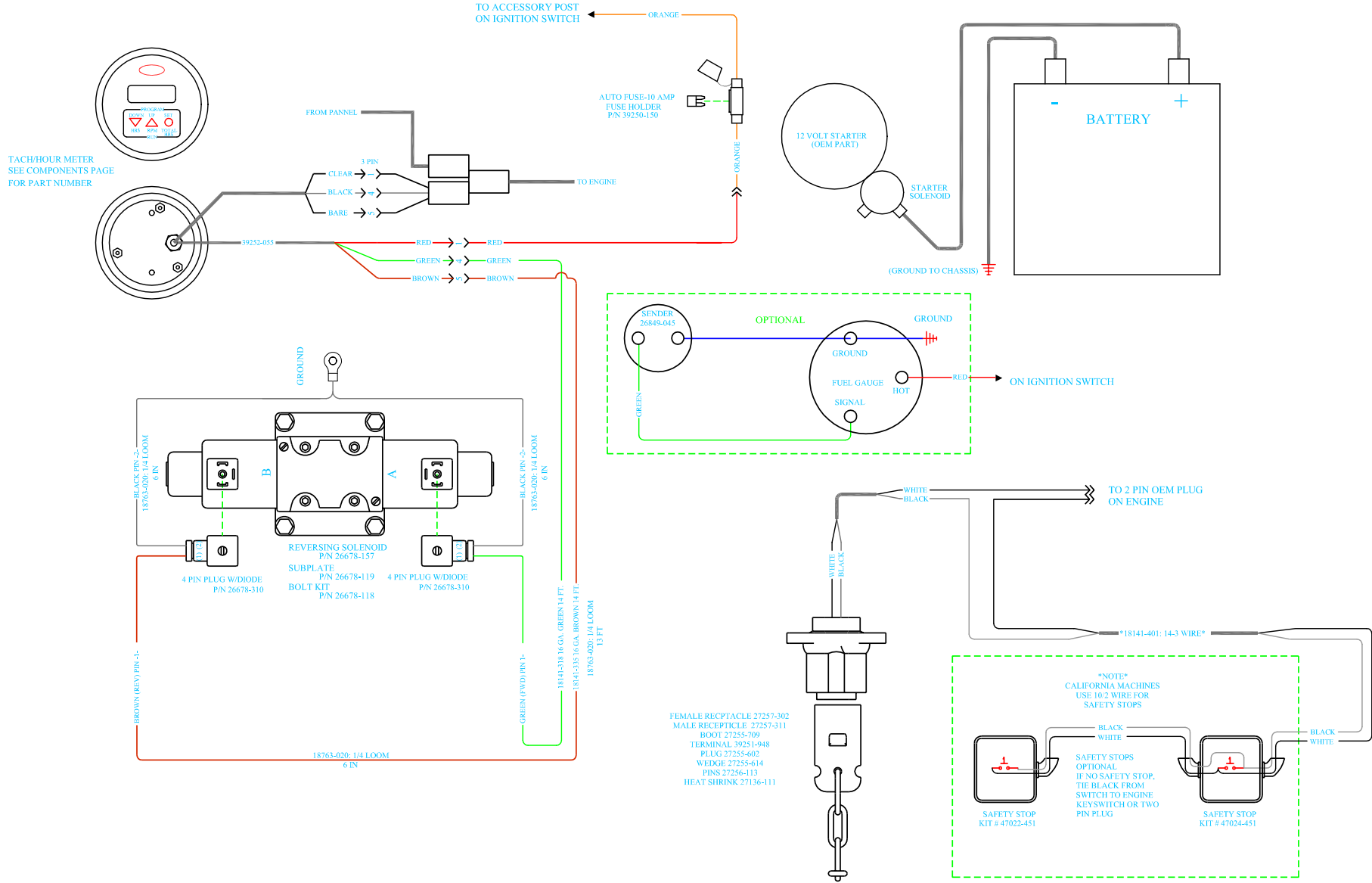
Table 5.9 • Pressure Guide

Model	Main Relief	Added Down Pressure	Feed Wheel rpm
M14R	2,000 psi	1,600 psi	17

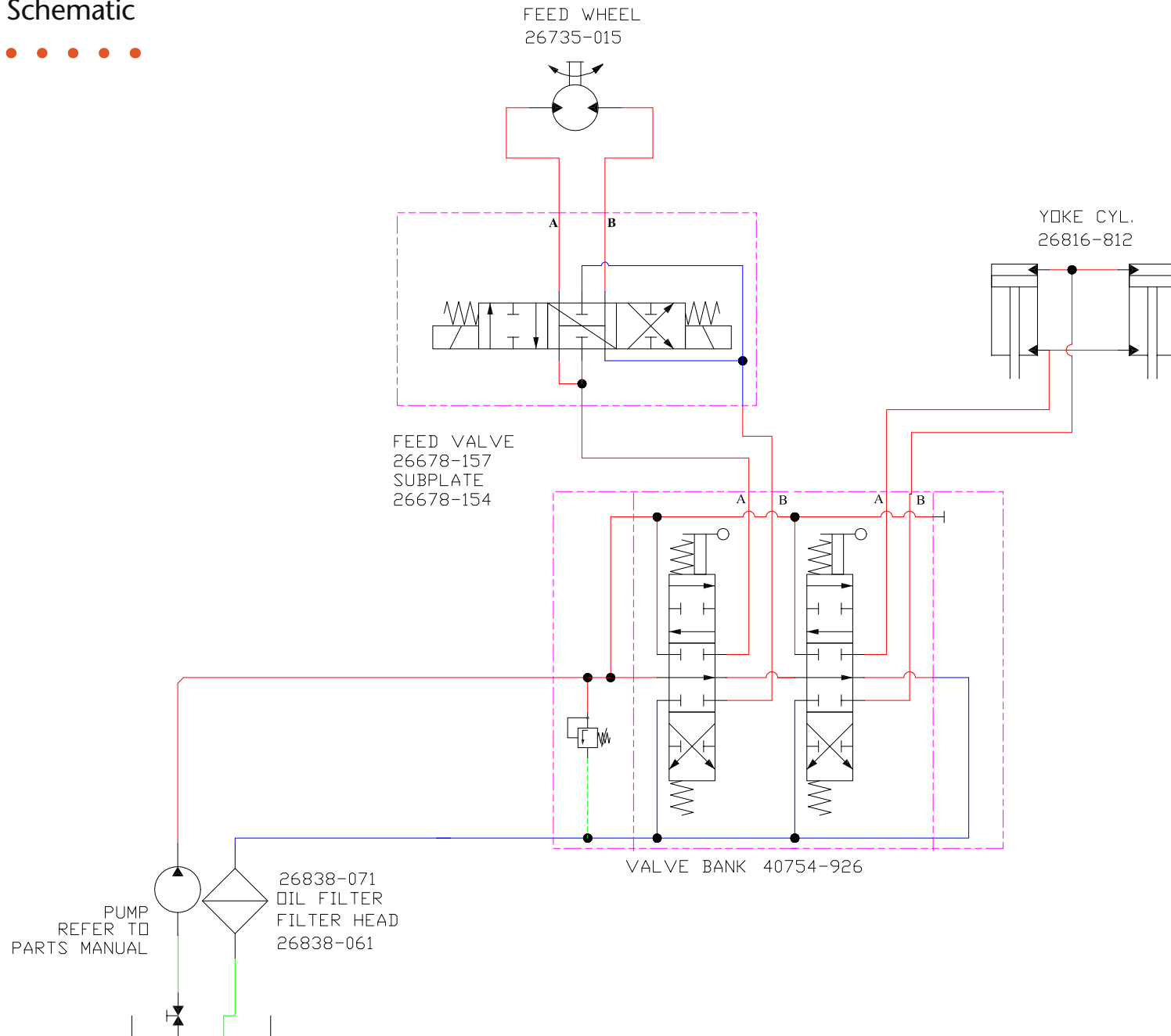
Electrical Schematic



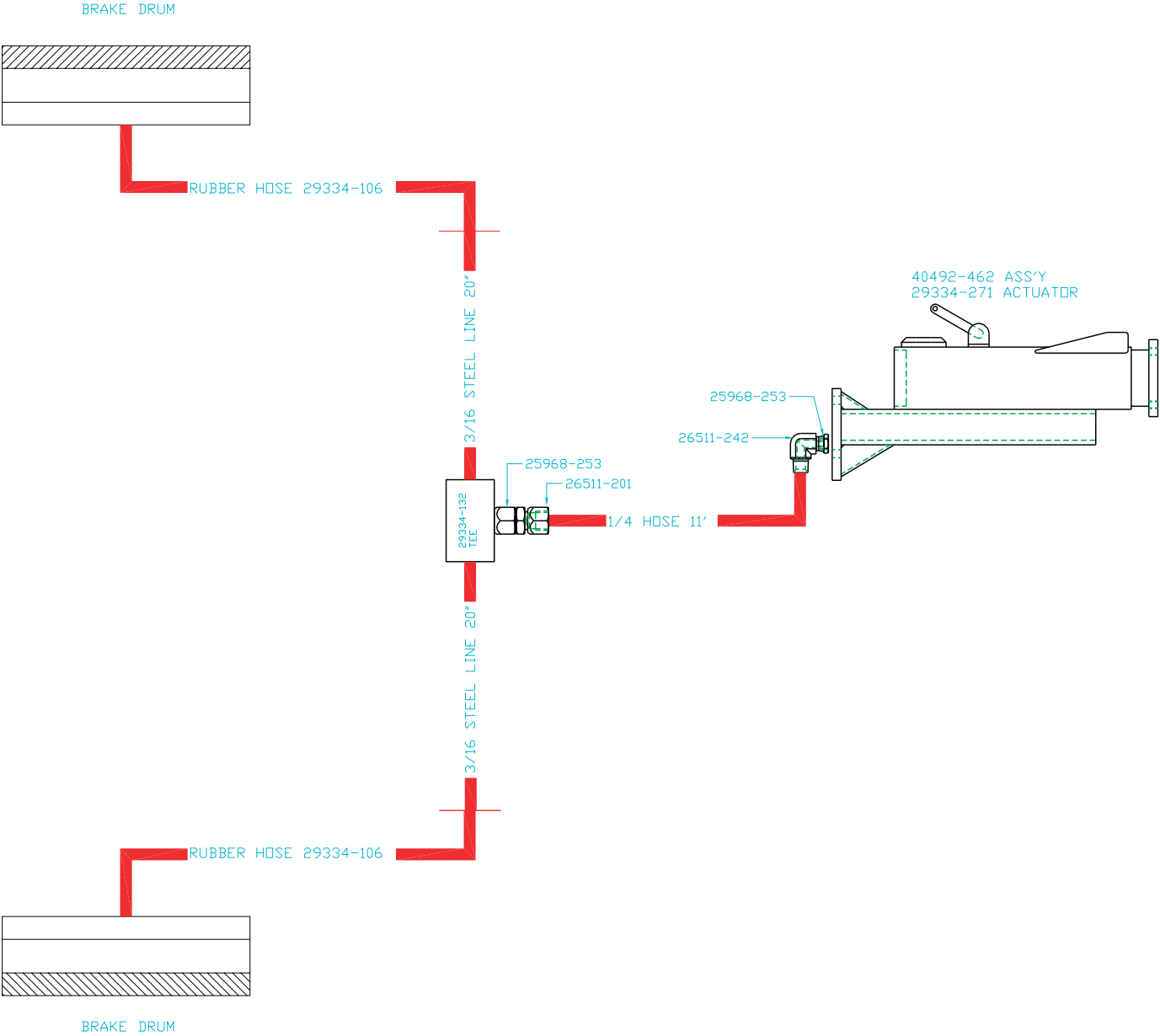
Electrical Schematic



Hydraulic Schematic



Hydraulic Schematic



Warranty

Morbark, Inc. (Morbark) warrants to the original purchaser that this product will be free from defects in materials and workmanship under normal use and operating conditions subject to the conditions and exclusions stated below. No representative, agent, dealer of Morbark, or any other person is authorized to modify, expand, or extend this warranty in any manner, or make any representation on Morbark's behalf in connection with the sale of any equipment covered by this Warranty.

Warranty Period. The Warranty period is as follows:

1. One (1) years from the date of original delivery with extended one - year warranty on Morbark manufactured components only for hand fed brush chippers.

Exclusions. This Warranty shall not apply to:

1. Equipment that has been subjected to misuse, neglect, modification, alteration, accident, or lack of normal maintenance or service.
2. Replacement of routine maintenance items and wear parts such as knives, anvils, hammers, screens, belts, bearings, etc.
3. Fire damage.
4. Components manufactured by others that are warranted by the manufacturers thereof, including engines, engine components, batteries, tires, etc.



8507 Winn Road, Winn Michigan
989•866•2381

Purchasers Exclusive Remedy. The exclusive remedy for the purchaser in the event the equipment does not conform to this Warranty, shall be the repair or replacement of the equipment is returned to Morbark's factory 8507 Winn Road, Winn, Michigan, or at such other location designated in writing by Morbark. Morbark is not responsible for the cost of transport or related charges in connection with return of any equipment to Morbark under this Warranty. Morbark shall have sole discretion to determine whether, and to what extent, the equipment is defective. If Morbark determines the equipment is not covered by this Warranty, the equipment shall be returned to the purchaser at purchasers expense.

Warranty Validation. Morbark shall be under no warranty obligation unless a Warranty Validation Report is completed and returned to Morbark, Inc., 8507 Winn Road, Winn Michigan, properly dated and signed by the purchaser within thirty (30) days of delivery of the equipment.

Disclaimer of Warranties. This Warranty is in lieu of all other Warranties express or implied. Morbark makes no other Warranties as to the equipment, and in particular, makes no implied Warranty of merchantability or fitness for a particular purpose, which are expressly disclaimed.

Limitation of Damages. Morbark shall not be liable for any incidental or consequential damages, directly or by subrogation, including but not limited to any claims for lost profits, downtime, or loss of use, in the event the equipment is defective or does not comply with any Warranty.

Warranty Claims



Morbark, Inc. is committed to making sure that your machine is operational and productive at all times. We carry an extensive inventory of parts so that if a part on your machine fails, we'll get a replacement part to you as soon as possible.

To better help you please follow these steps:

1. Contact us at (800) 255-8839 and order the part
 - Let us know whether the part is under warranty. We will send to you a claim form(s) that includes instructions for filling it out.
2. Fill out the claim form(s)
 - If there are labor expenses that need to be reviewed for reimbursement, then a completed and approved "Prior Authorization" form must be attached to the warranty claim form and sent to Morbark, Inc.
 - All replacement parts are invoiced to the customer. A credit is issued after the completed warranty claim form and failed part are received at Morbark, Inc. and the cause of failure determined to be a defect in materials or workmanship.
3. Install the new part and send the defective part to Morbark, Inc.

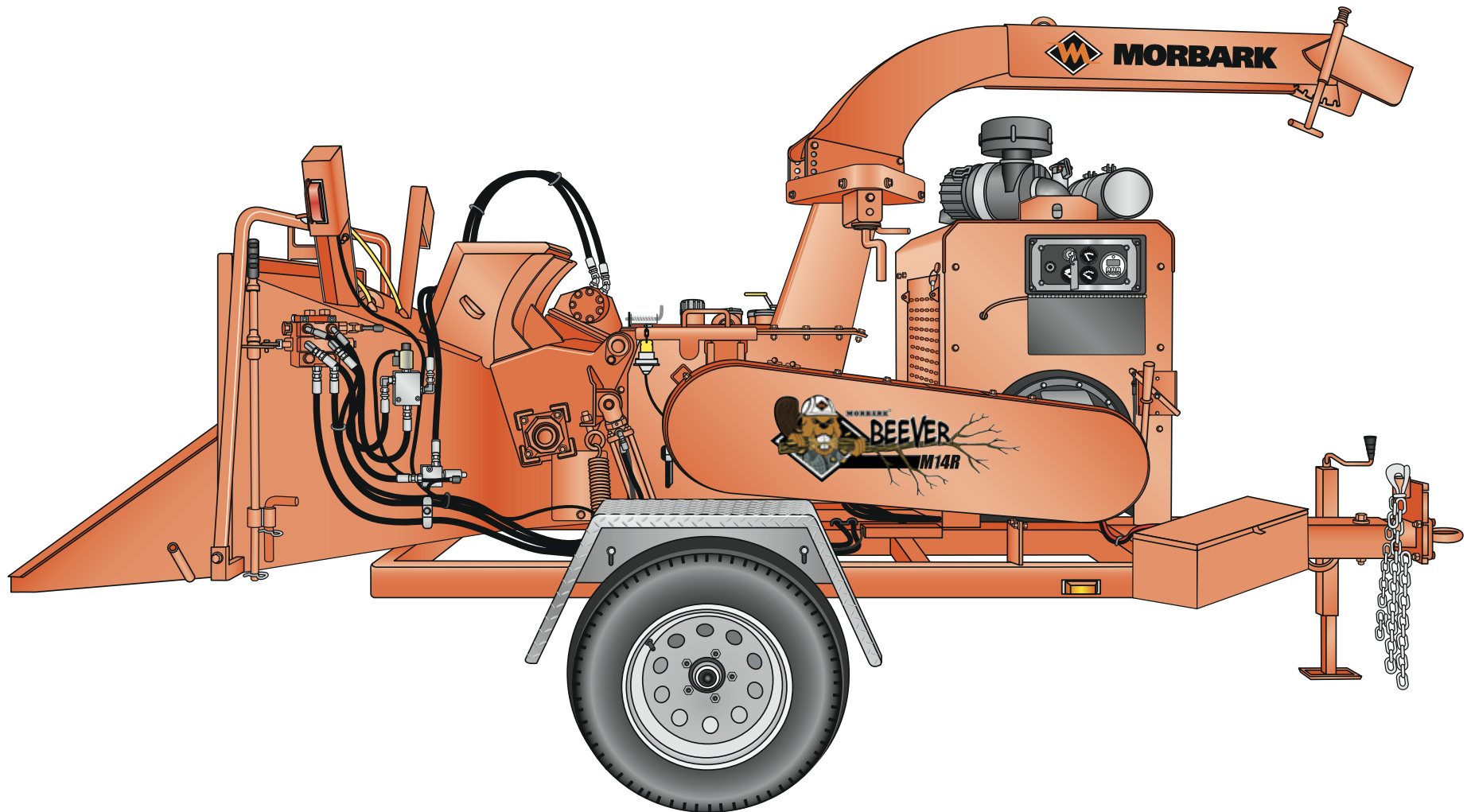
- Attach the Morbark, Inc. invoice received for the replacement part. If the replacement part was purchased from a Morbark distributor, then attach the distributor's invoice. Morbark retains the right to refuse any claim when original Morbark replacement parts have not been used.

- Ship the defective part to Morbark, Inc., 8507 S. Winn Road, Winn, MI, 48896 Attention: Warranty Returns. All returned parts must be shipped freight prepaid.

Use the pink copy and Morbark invoice as a packing slip. Keep the golden rod copy for your records and any future inquiries concerning the claim.

- The white, yellow, and green copies need to be mailed to Morbark Warranty, PO Box 1000, Winn, MI, 48896. Both the part and claim form need to be received for warranty consideration.

If you have any questions about the warranty claim process, please call us and ask for the warranty department.



MORBARK

P.O. Box 100
Winn, Michigan 48896
www.morbark.com