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# Parts S/N 60667



## 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

**Axle and Tires . . . . . 4.2**

**Battery, Battery Box and Cables . . . . . 4.2**

### Frame

- ☒ Ball Hitch . . . . . 4.3
- ☒ Safety Chain . . . . . 4.3
- ☒ Jack, Travel, 2,000 lb. . . . . 4.3
- ☐ Fire Extinguisher . . . . . 4.3
- ☐ Mount, Spare Tire . . . . . 4.3
- ☐ Pusher Paddle . . . . . 4.3

**Infeed . . . . . 4.5**

**Yoke and Feedwheel . . . . . 4.7**

**Chipper Drum . . . . . 4.8**

### Hydraulic Oil/Fuel Tank

- ☐ Fuel Gauge, Option . . . . . 4.9

**Discharge Chute . . . . . 4.10**

### Engine and Engine Drive

- ☒ Kohler, 27 H.P. . . . . 4.11
- ☐ Honda, 24 H.P. . . . . 4.13

**Engine and Engine Components . . . . . 4.15**

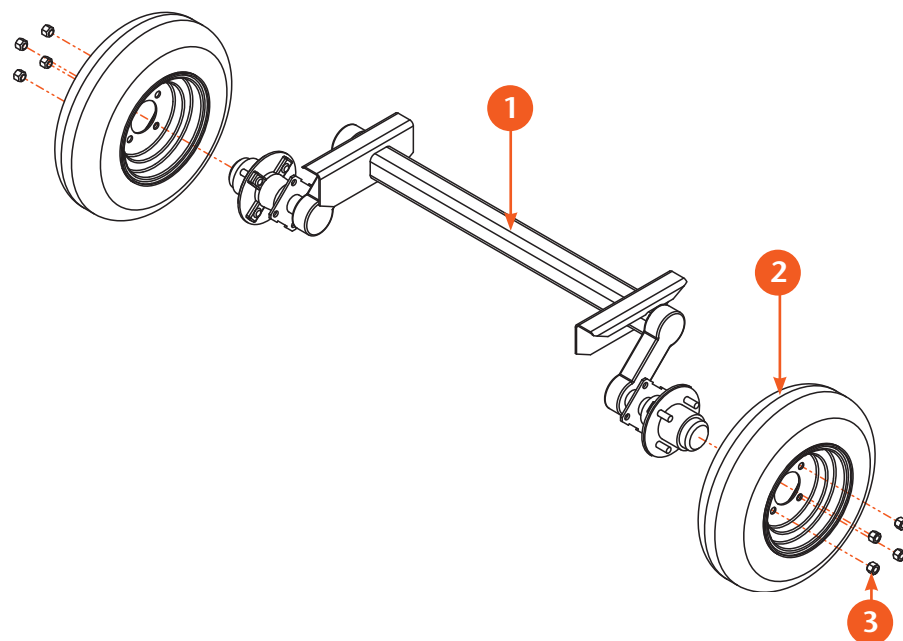
### Machine Decals

- ☒ Danger . . . . . 4.16
- ☒ Warning . . . . . 4.17
- ☒ Caution . . . . . 4.18
- ☒ General Use . . . . . 4.19
- ☒ Decorative . . . . . 4.20

### Parts color

- ☒ Morbark Standard Color
- ☐ Custom

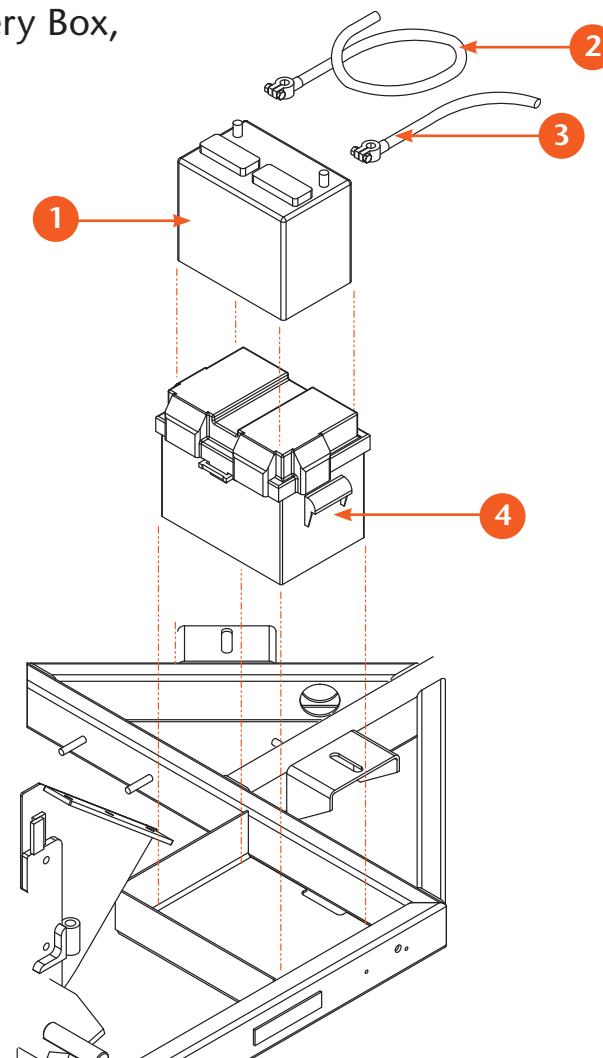
## Axle and Tires



Item	Qty	Part Number	Description
1	1	29309-504	Axle, 1,800 lb s/n: 122636925
2	2	29312-419	20.5 x 8 X 10, 8 Ply, Radial on Rim
3	8	29310-373	Nut, Wheel

NS = not shown AR = as required

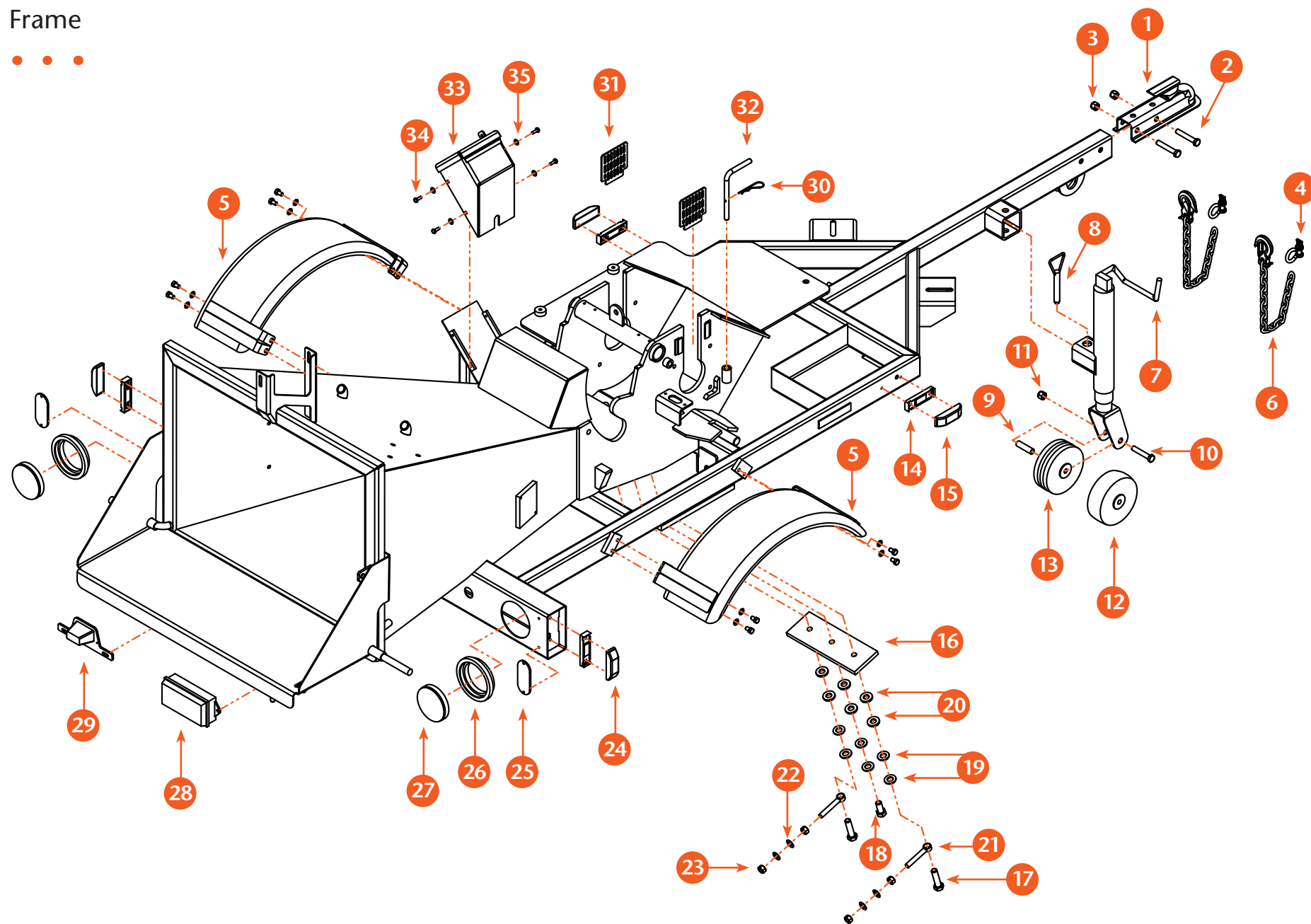
## Battery, Battery Box, and Cables



Item	Qty	Part Number	Description
1	1	29315-021	Battery, 12, Volt, 800 C. C. A.
2	1	29315-520	Battery Cable, Positive
3	1	29315-521	Battery Cable, Negative
4	1	29315-003	Box, Battery, Plastic

# Frame

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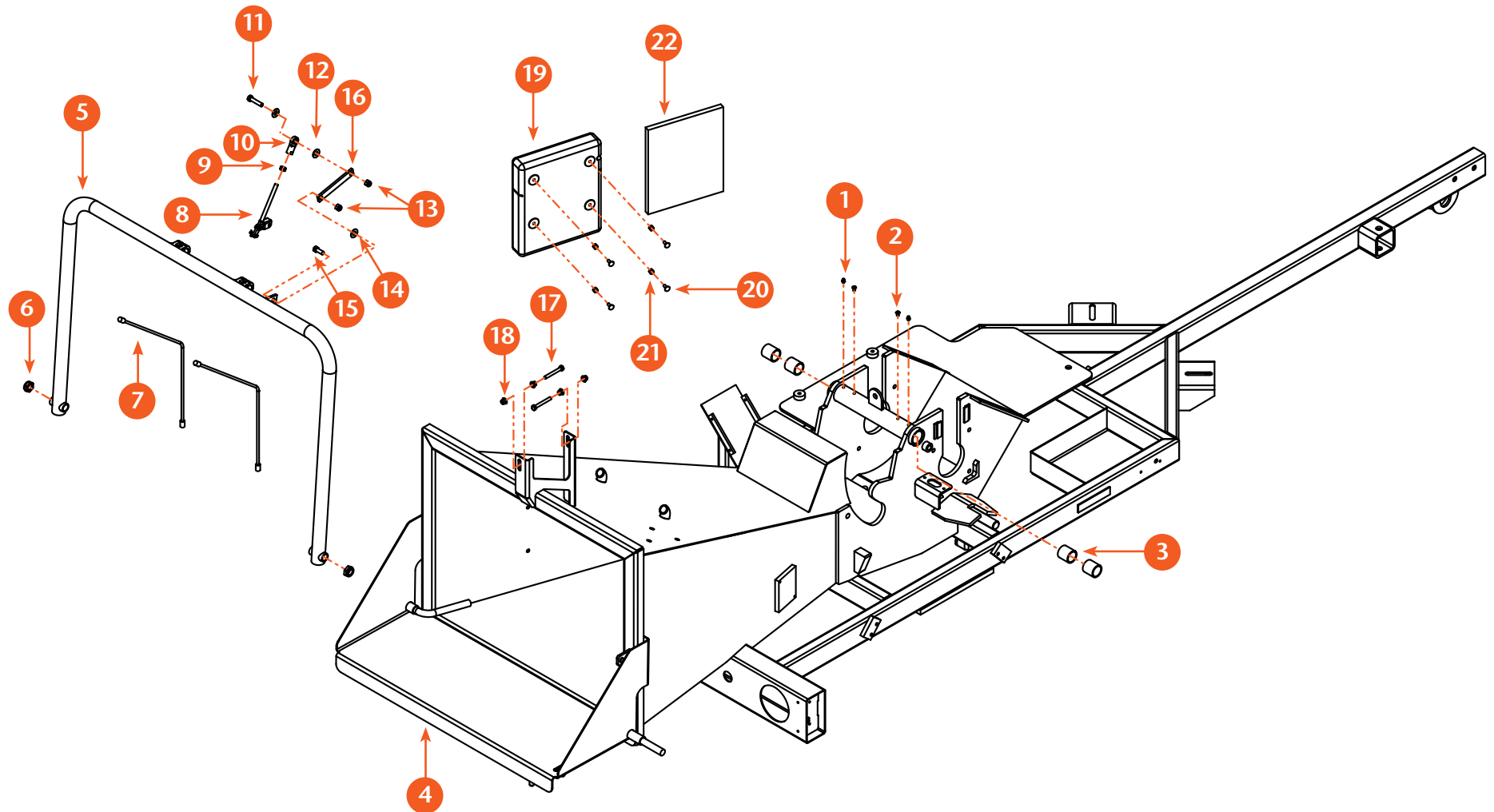


Item	Qty	Part Number	Description
1	1	29341-939	Hitch, Ball Assembly, 2"
2	2	21624-261	Bolt, 1/2"-13 x 3"
3	2	21733-305	Nut, Lock, 1/2"-13
4	2	24711-206	Screw Pin, Anchor Shackle, 7/16"
5	2	40201-201	Fenders
6	2	29313-530	Safety Chain with Hook, 44"
7	1	29341-843	Jack, 2000 LB
NS	1	29340-302	Jack, 2000 LB
8	1	29341-846	Pin, Jack
9	1	32111-460	Bushing, Jack
10	1	21625-260	Bolt,, 1/2" - 13 x 2 3/4"
11	1	21733-305	Nut, Lock, 1/2" - 13
12	1	29312-139	Wheel, Steel
13	1	29312-138	Wheel, Plastic
14	4		Light, Marker, Mount, See Schematic
15	2		Light, Marker, Amber, See Schematic
16	1	30087-061	Base, Anvil
17	2	21624-357	Bolt, 5/8"-11 x 2 1/2"
18	1	21624-353	Bolt, 5/8"-11 x 1 1/2"
19	6	21161-046	Washer, Flat, 5/8"
20	6	21161-359	Washer, Flat, 5/8"

NS = not shown

Item	Qty	Part Number	Description
21	2	21711-018	Bolt, Eye, 1/2" x 3"
22	4	21161-044	Washer, Flat, 1/2"
23	4	21731-068	Nut, 1/2"-13
24	2		Light, Marker, Red, See Schematic
25	2	29316-301	Reflector, Red
26	2	29316-313	Seal, Tail Light
27	2		Tail Light, Red, See Schematic
28	1		Box, Junction, See Schematic
29	1		Holder, License Plate, See Schematic
30	1	21129-313	Hair Pin, 3/16" x 3 1/4"
31	2	30428-201	Cover, Base, Drum Shaft
32	1	30323-201	Pin, Drum
33	1	40283-455	Autofeed Box
34	4	21624-003	Bolt, 1/4" - 20 x 3/4"
35	4	21161-061	Washer, Flat, 1/4"
NS	1	59501-021	Fire Extinguisher
NS	1	59501-022	Mount, Fire Extinguisher
NS	1	40236-201	Mount, Spare Tire
NS	1	39234-251	Pusher Paddle
NS	1	41215-462	Mount, Pusher Paddle

## Infeed

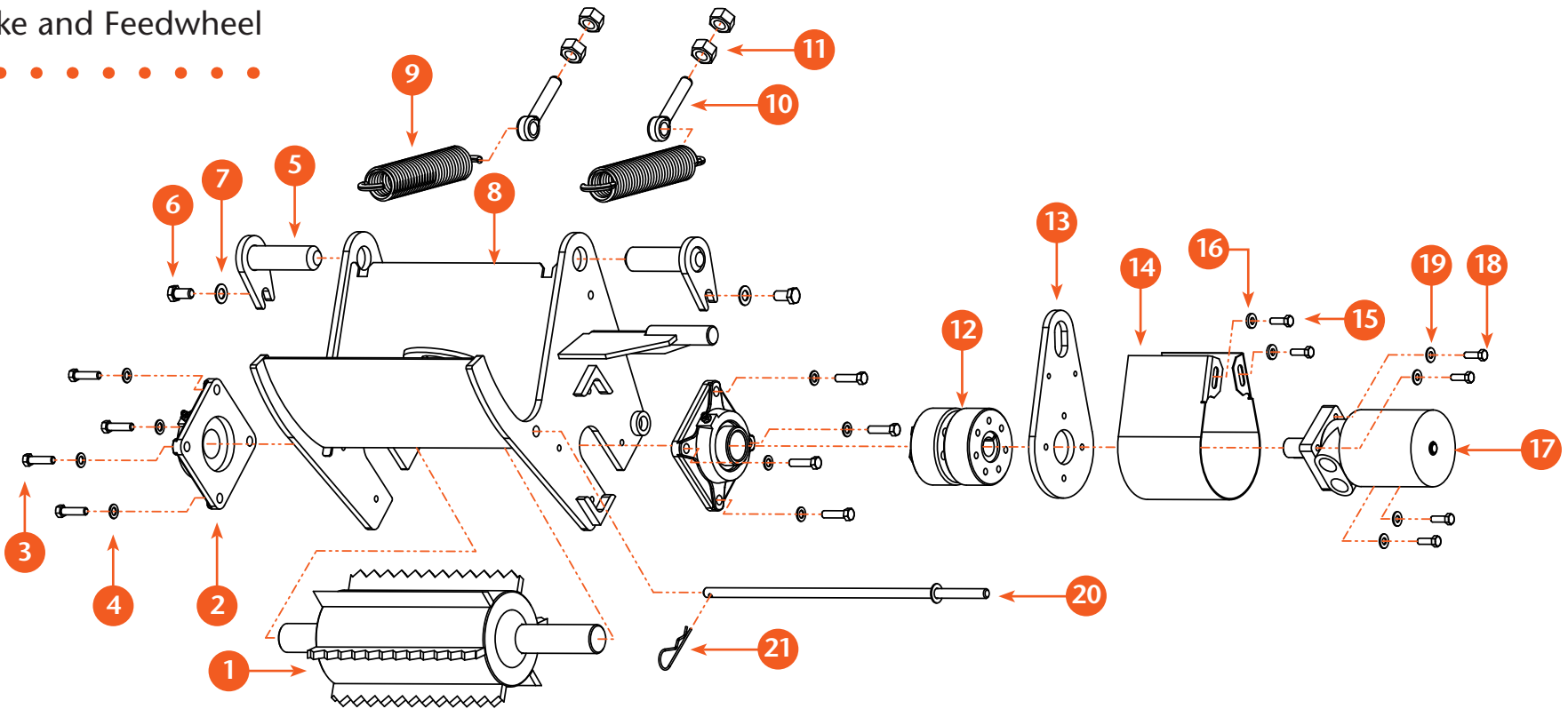


Item	Qty	Part Number	Description
1	2	26891-005	Grease, Fitting, 1/4"
2	2	22255-005	Screw, 1/4"-28 x 3/8"
3	4	23131-108	Bushing, Fiber, 1 1/2"
4	1	24717-270	Latch, 1/2"
5	1	40198-201	Control Bar
6	2	21733-201	Nut, Lock, 3/4"-10
7	2	24714-308	Cable, Safety
8	1	40321-901	Linkage, Valve
9	1	22531-006	Nut, 3/8"-24
10	1	24733-026	Ball Joint
11	1	21625-108	Bolt, 3/8"-16 x 1 3/4"
12	2	21161-661	Washer, Flat, 3/8"

NS = not shown

Item	Qty	Part Number	Description
13	2	21733-303	Nut, Lock, 3/8"-16
14	1	21161-311	Washer, Flat, 3/8"
15	1	21624-105	Bolt, 3/8"-16 x 1"
16	1	31168-462	Linkage, Valve
17	2	21624-061	Bolt, 5/16"-18 x 2 1/2"
18	4	21733-406	Nut, Lock, 5/16"-18
19	1	39234-205	Holder, Manual, Plastic
20	4	21661-114	Bolt, 1/4"-20 x 3/4"
21	4	21733-301	Nut, Lock, 1/4"-20
22	1	76345-276	Manual, Part
23	1	76347-276	Manual, Operator

Yoke and Feedwheel



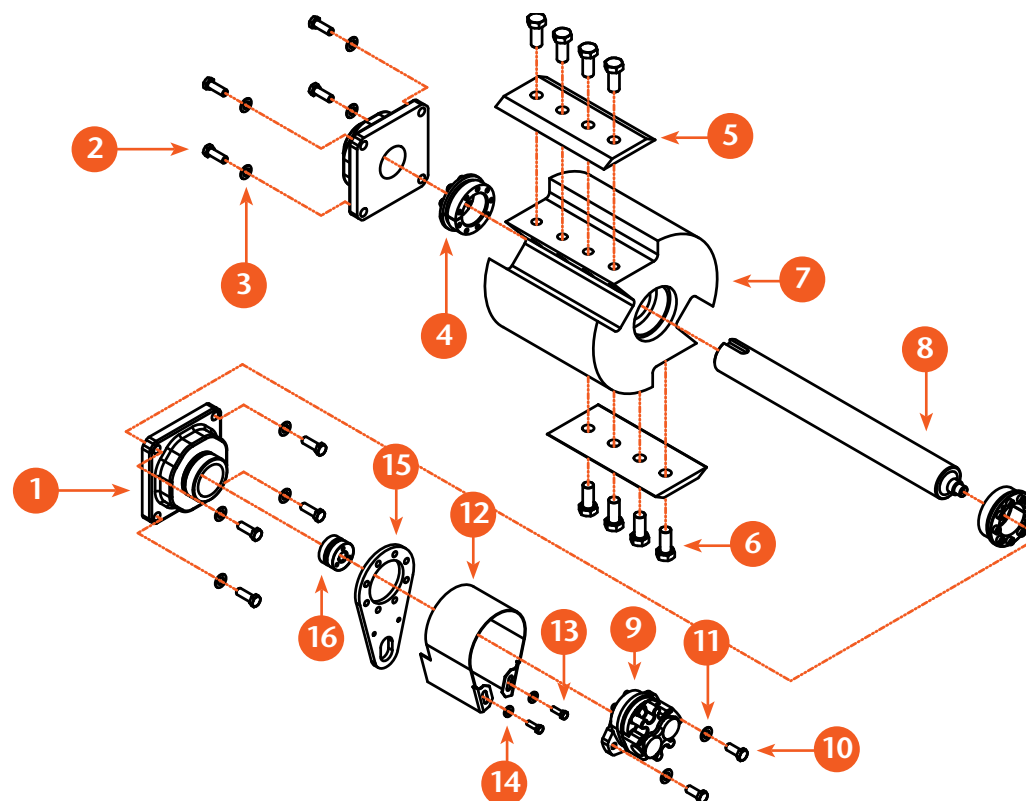
Item	Qty	Part Number	Description
1	1	40141-201	Feedwheel
2	2	23918-018	Bearing, FB, 1 1/2"
3	8	21624-107	Bolt, 3/8"-16 x 1 1/2"
4	8	21161-042	Washer, Flat, 3/8"
5	2	40200-061	Pivot Pin
6	2	21161-044	Washer, Flat, 1/2"
7	2	21624-253	Bolt, 1/2"-13 x 1"
8	1	40200-201	Yoke
9	2	24741-601	Spring
10	2	21711-203	Bolt, Eye, 1/2"-13 x 6"
11	4	21731-068	Nut, 1/2"-13

Item	Qty	Part Number	Description
12	1	24114-726	Bushing, B-Loc
13	1	39216-416	Torque Arm
14	1	30880-701	Guard, Drive
15	2	21646-148	Bolt, 5/16"-18 x 1"
16	2	21167-017	Washer, Flat, 5/16"
17	1	26735-011	Motor, Hydraulic, 32.3 C.I.
18	4	21624-254	Bolt, 1/2"-13 x 1 1/4"
19	4	21161-044	Washer, Flat, 1/2"
20	1	40153-201	Pin, Yoke Lock
21	1	21129-313	Pin, Hair, 3/16" x 3 1/4"

NS = not shown



## Chipper Drum



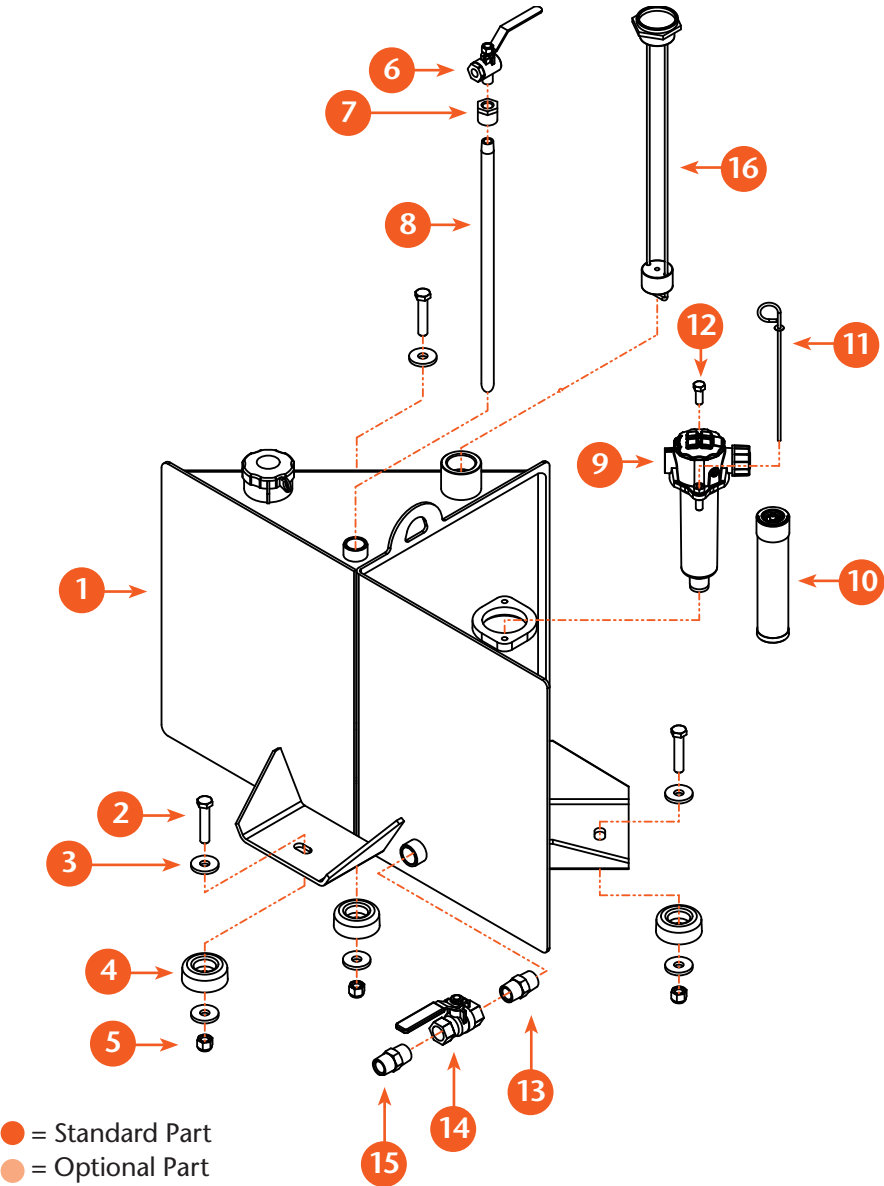
Item	Qty	Part Number	Description
1	2	23918-629	Bearing, FB, 2 7/16"
2	8	21624-255	Bolt, 1/2"-13 x 1 1/2"
3	8	21161-044	Washer, Flat 1/2"
4	2	24114-572	Bushing, B-Loc
5	2	39233-692	Knife
6	8	22424-404	Bolt, 3/4"-16 x 1 3/4"
7	1	30375-201	Drum
8	1	30392-201	Shaft, Drum

Item	Qty	Part Number	Description
9	1	26709-003	Gear Pump
10	2	21624-254	Bolt, 1/2"-13 x 1 1/4"
11	2	21161-044	Washer, Flat 1/2"
12	1	30331-201	Guard, Drive
13	2	21646-148	Bolt, 5/16"-18 x 1"
14	2	21161-017	Washer, Flat 5/16"
15	1	30876-701	Torque Arm
16	1	24114-724	Coupler, B-Loc

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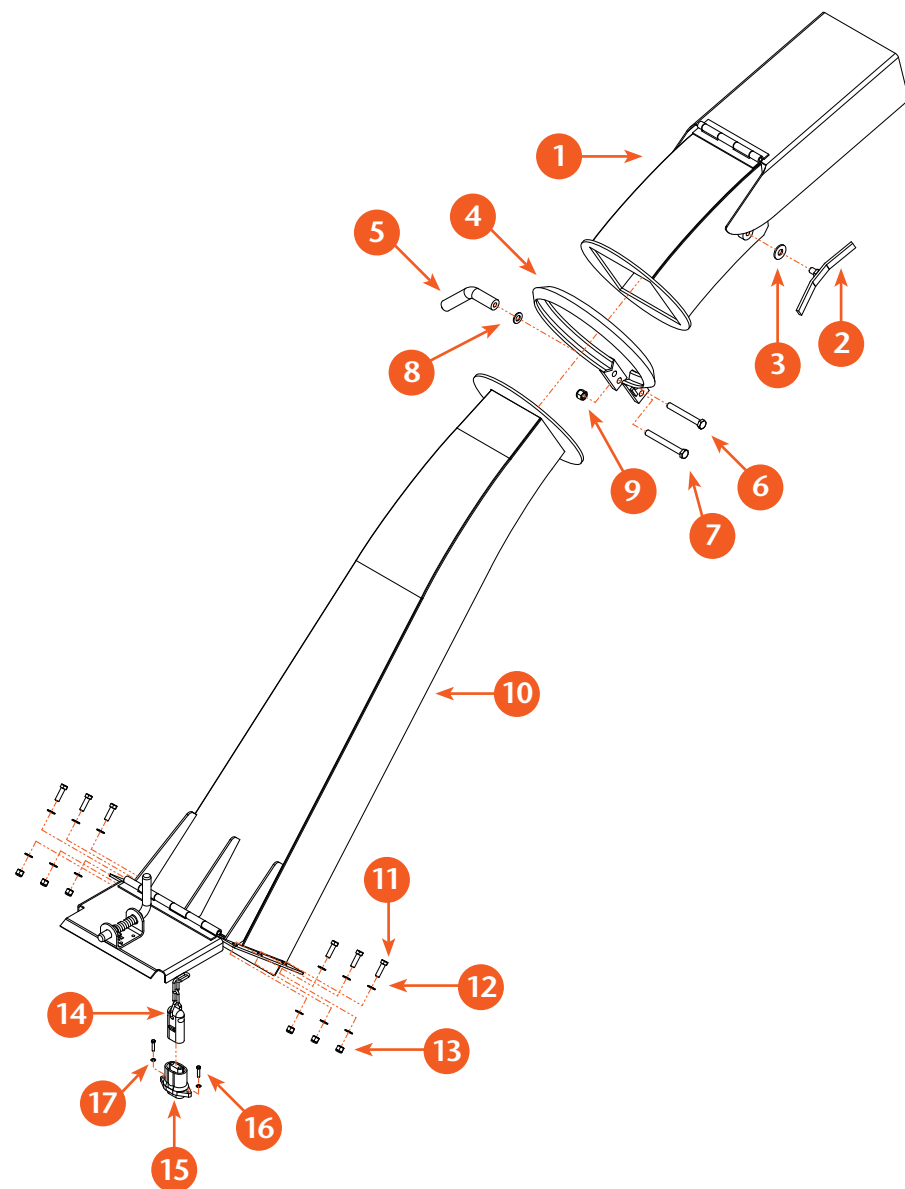
Oil/Fuel Tank

● ● ● ● ● ● ● ●  
Standard and Option



Item	Qty	Part Number	Description
1	1	40192-201	Tank, Oil/Fuel
2	3	21624-259	Bolt, 1/2"-13 x 2 1/2"
3	6	21161-364	Washer, Flat, 1/2"
4	3	24721-635	Bushing, Rubber
5	3	21733-305	Nut, Lock, 1/2"-13
6	1	25975-554	Valve, Shut off, 1/4"- 90 Deg.
7	1	25312-051	Bushing, Steel
8	1	30415-201	Tube, Drop, 3/8" SCH 80 x 16 1/2"
9	1	26849-251	Filter Cap/Housing - Oil
10	1	26849-261	Filter Element - Oil
11	1	26849-271	Dipstick
12	1	21624-105	Bolt, 3/8" - 16 x 1"
13	1	25892-312	Fitting, Straight
14	1	25975-153	Valve, Shut off, 3/4" Straight
15	1	26511-417	Fitting, Straight
NS	2	39251-435	Magnet, Oil/Fuel
NS	1	25311-002	Drain Plug, Fuel
NS	1	25311-205	Drain Plug, Oil
16	1	26849-040	Gauge, Oil/Fuel, 18 1/2"

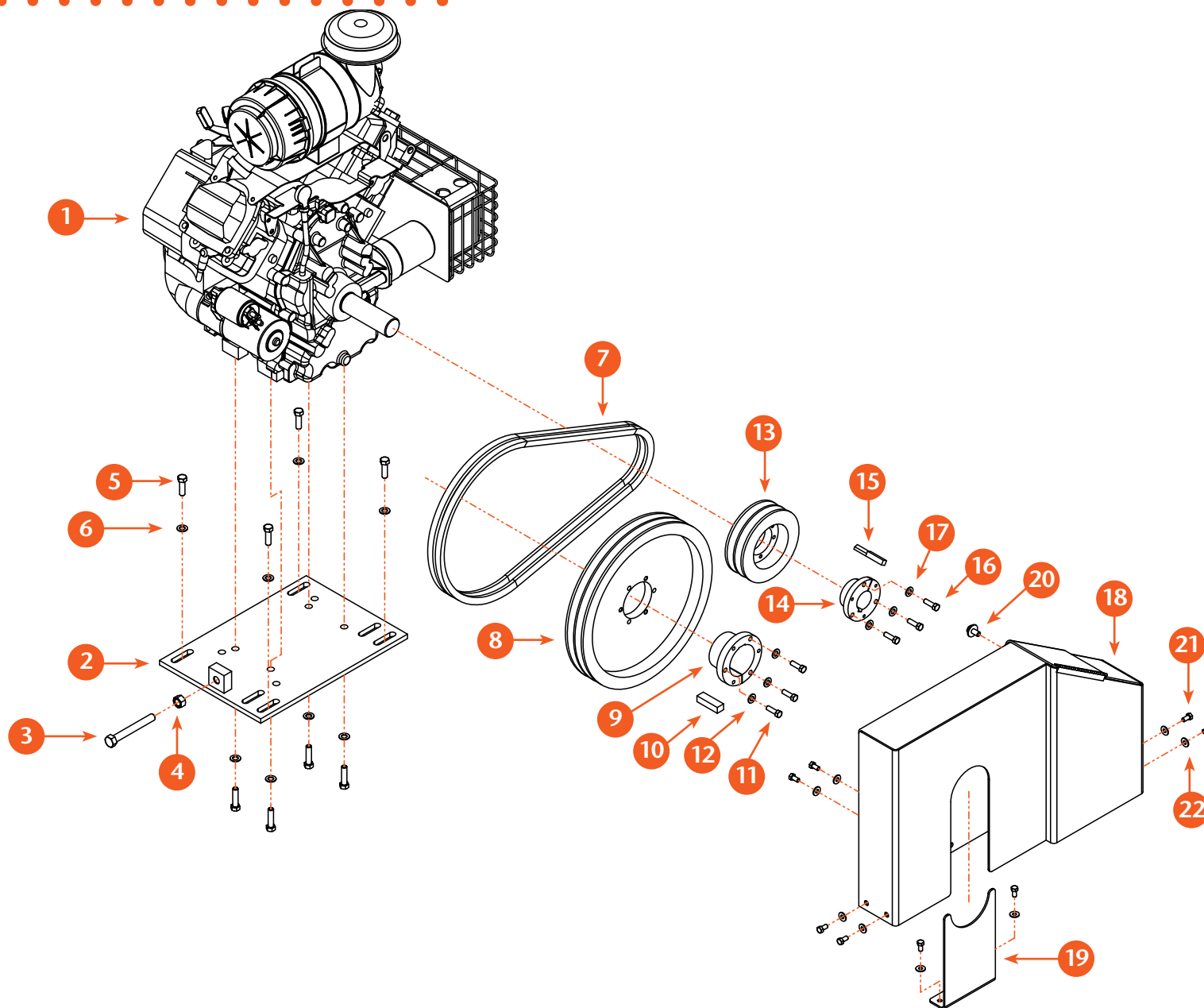
## Discharge Chute



Item	Qty	Part Number	Description
1	1	40184-201	Discharge chute, rotary
2	1	40189-201	Lock Handle
3	1	21161-513	Washer, Flat, 1/2"
4	1	40044-462	Swivel Clamp, Includes items 5-9
5	1	30351-462	Clamp, Handle
6	1	21624-265	Bolt, 1/2" - 13 x 4"
7	1	21624-266	Bolt, 1/2" - 13 x 4 1/2"
8	1	21161-044	Washer, Flat, 1/2"
9	1	21733-305	Nut, Lock, 1/2" - 13
10	1	40199-201	Discharge chute
11	6	21624-106	Bolt, 3/8" - 16 x 1 1/4"
12	12	21161-042	Washer, Flat, 3/8"
13	6	21733-303	Nut, Lock, 3/8"-16"
14	1	32051-901	Switch, Safety, Female End
15	1	27257-302	Switch, Safety, Male End
16	2	21624-005	Bolt, 1/*4" - 20 x 1"
17	2	21733-301	Washer, Lock, 1/4"

NS = not shown

## Engine & Engine Drive



Item	Qty	Part Number	Description
1	1	*	Engine, Kohler, 27 h.p. s/n: 3914004141
2	1	40231-455	Mount, Engine
3	1	21611-905	Bolt, Adjustment
4	1	21731-068	Nut, Adjustment
5	8	21624-107	Bolt, 3/8"-16 x 1 1/2"
6	8	21161-042	Washer, Flat, 3/8"
7	2	*	Belt
8	1	*	Sheave, Driven
9	1	*	Bushing, Driven
10	1	31602-703	Key
11	3	21624-059	Bolt, 5/16" - 18 x 2"

Item	Qty	Part Number	Description
12	3	21161-062	Washer, Flat, 5/16"
13	1	*	Sheave, Drive
14	1	*	Bushing, Drive
15	1	30343-455	Key
16	3	21624-008	Bolt, 1/4" - 20 x 1 3/4"
17	3	21161-061	Washer, Flat, 1/4"
18	1	40209-201	Guard
20	1	21620-103	Bolt, 3/8" - 16 x 3/4"
21	8	21624-002	Bolt, 1/4" - 20 x 5/8"
22	8	21161-061	Washer, Flat, 1/4"

NS = not shown    AR = as required

\* For part numbers on a specific engine and engine components, see page 4.15



Item	Qty	Part Number	Description
1	1	*	Engine, Honda, 24 h.p. s/n:
2	4	21624-108	Bolt, 3/8" - 16 x 1 3/4"
3	AR	21161-042	Washer, Flat, 3/8"
4	1	40223-201	Mount, Engine
5	1	21611-905	Bolt, Adjustment
6	1	21731-068	Nut, Adjustment
7	5	21624-105	Bolt, 3/8"-16 x 1 1"
8	1	30342-201	Key
9	1	30473-201	Jack Shaft
10	2	23936-019	Bearing, FB, 1 3/4"
11	4	21624-354	Bolt, 5/8" - 11 x 1 3/4"
12	4	21161-046	Washer, Flat, 5/8"
13	2	*	Belt
14	1	31602-703	Key

Item	Qty	Part Number	Description
15	1	*	Sheave, Driven
16	1	*	Bushing, Driven
17	1	37076-700	Key
18	1	*	Sheave, Drive
19	1	*	Bushing, Drive
20	1	30486-201	Guard, Cover
21	AR	21624-003	Bolt, 1/4" - 20 x 3/4"
22	AR	21161-061	Washer, Flat, 1/4"
23	1	40222-201	Guard, Front
24	1	40221-201	Guard
25	1	40218-201	Mount, Bearing, Jack Shaft
26	4	21624-254	Bolt, 1/2" - 13 x 1 1/4"
27	4	21161-044	Washer, Flat, 1/2"

NS = not shown    AR = as required

\* For part numbers on a specific engine and engine components, see page 4.15

## Engine and Engine Components



Kohler Engine	27 HP
Engine	29135-803
Belt	24166-627
Pump	26709-003
Drive Sheave	24226-056
Drive Bushing	24133-451
Driven Sheave	24226-060
Driven Bushing	24133-520
Primary Air Filter	29135-771
Secondary Air filter	29135-772
Oil Filter	29135-727
Fuel Filter	29135-770
Tachometer	39251-331

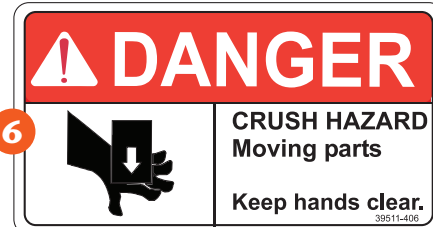
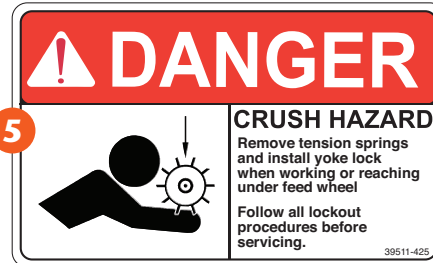
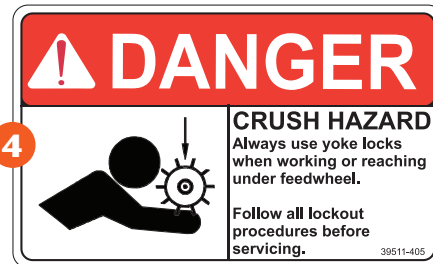
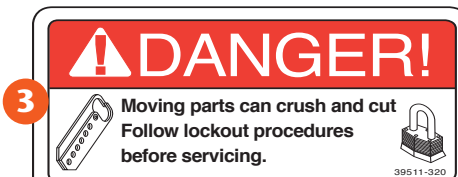
**Note:** This chipper has several engine options. Check your engine operators manual for specific parts and part numbers on engine components not mentioned in these charts.

Honda Engine	24 HP
Engine	29126-404
Belt	24166-627
Drive Sheave	24266-056
Drive Bushing	24133-456
Driven Sheave	24226-060
Driven Bushing	24133-520
Primary Air Filter	29126-420
Oil Filter	29126-421
Fuel Filter	29331-255
Tachometer	39251-331



## Machine Decals

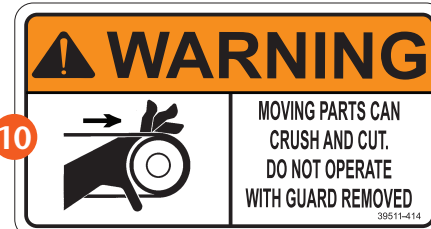
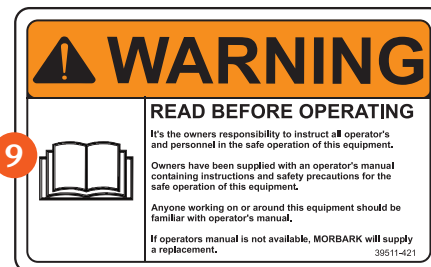
### Danger



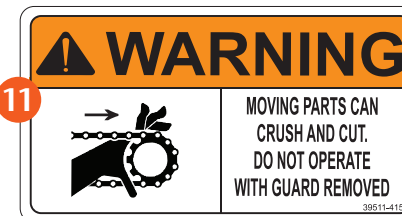
Item	Qty	Part Number	Description
1	1	39511-402	Danger, Entanglement, Right
2	1	39511-403	Danger, Entanglement, Left
3	AR	39511-320	Danger, Lock-out
4	2	39511-405	Danger, Crush Hazard, Use Yoke Lock
5	1	39511-425	Danger, Crush Hazard, Remove Spring
6	2	39511-406	Danger, Crush Hazard, Moving Parts
7	1	39511-427	Danger, Flying Material, Right
8	1	39511-428	Danger, Flying Material, Left
9	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	39511-424	Warning, Direct Drive
7	1	39511-404	Warning, Wear Proper Safety Gear
8	1	39511-399	Warning, Operator and Parts Manual
9	1	39511-421	Warning, Read Before Operating
10	1	39511-414	Warning, Moving Parts, Belt
11	1	39511-415	Warning, Moving Parts, Chain
11	1	39511-423	Warning, Raise Infeed Tray
12	2	39511-234	Warning, Stay Clear



Machine Decals

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 800 R.P.M.  
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



<div><div>1</div><div><div>AUTOFEED</div><div><div><div><div>↓</div><div>↑</div><div>○</div></div><div><div>○</div><div>○</div><div>○</div></div><div>OFFHOURSON</div></div><div>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.</div><div>39511-187</div></div></div></div> <div><div>2</div><div><div>FEED WHEELS</div><div>FORWARD - NEUTRAL - REVERSE</div><div><div><div>←</div><div>→</div></div><div>39511-215</div></div></div></div> <div><div>3</div><div><div>FEED WHEELS</div><div>REVERSE - NEUTRAL - FORWARD</div><div><div><div>←</div><div>→</div></div><div>39511-216</div></div></div></div> <div><div>4</div><div><div>GREASE POINT</div><div>1-433</div></div></div> <div><div>5</div><div><div>PUSH TO REVERSE FEED WHEELS</div><div><div>SAFETY CONTROL BAR</div><div>39511-312</div></div><div>PUSH TO REVERSE FEED WHEELS</div></div></div> <div><div>6</div><div><div>DOWN</div><div>←YOKE→</div><div>UP</div><div>39511-448</div></div></div> <div><div>7</div><div><div>GASOLINE</div><div>39511-409</div></div></div> <div><div>8</div><div><div>DIESEL FUEL</div><div>39511-412</div></div></div> <div><div>9</div><div><div>HYDRAULIC OIL</div><div>39511-411</div></div></div> <div><div>10</div><div><div>FUEL SHUTOFF</div><div>39511-410</div></div></div> <div><div>11</div><div><div>YOKE LOCK</div><div>39511-434</div></div></div> <div><div>12</div><div><div>CHIPPER LOCK</div><div>39511-418</div></div></div> <div><div>13</div><div><div>CHECK BELT TENSION DAILY</div><div>39511-419</div></div></div> <div><div>14</div><div><div>TRAYMOR INCORPORATED</div><div>PATENT # 59885396000642</div><div>39511-117</div></div></div> <div><div>15</div><div><div>THIS PRODUCT MAY BE COVERED BY ONE OR MORE OF THE FOLLOWING UNITED STATES PATENTS OR OTHER PATENTS PENDING:</div><div><div><div>5,005,620</div><div>5,148,844</div><div>5,419,502</div><div>5,638,879</div><div>5,713,525</div><div>6,179,232</div><div>6,474,579</div></div><div><div>6,523,768</div><div>6,622,951</div><div>6,880,774</div><div>6,953,167</div><div>7,007,878</div><div>7,055,770</div><div></div></div></div><div>39511-508</div></div></div> <table><tr><th>Item</th><th>Qty</th><th>Part Number</th><th>Description</th></tr><tr><td>1</td><td>1</td><td>39511-187</td><td>Autofeed</td></tr><tr><td>2</td><td>1</td><td>39511-215</td><td>Feedwheel, Forward</td></tr><tr><td>3</td><td>1</td><td>39511-216</td><td>Feedwheel, Reverse</td></tr><tr><td>4</td><td>AR</td><td>39511-433</td><td>Grease Point</td></tr><tr><td>5</td><td>1</td><td>39511-312</td><td>Safety Control Bar</td></tr><tr><td>6</td><td>1</td><td>39511-448</td><td>Yoke Down</td></tr><tr><td>7</td><td>1</td><td>39511-409</td><td>Gasoline</td></tr><tr><td>8</td><td>1</td><td>39511-412</td><td>Diesel Fuel</td></tr><tr><td>9</td><td>1</td><td>39511-411</td><td>Hydraulic Oil</td></tr><tr><td>10</td><td>1</td><td>39511-410</td><td>Fuel Shutoff</td></tr><tr><td>11</td><td>1</td><td>39511-434</td><td>Yoke Lock</td></tr><tr><td>12</td><td>1</td><td>39511-418</td><td>Chipper Lock</td></tr><tr><td>13</td><td>1</td><td>39511-419</td><td>Check Belt Tension Daily</td></tr><tr><td>14</td><td>1</td><td>39511-117</td><td>Traymor Patent</td></tr><tr><td>15</td><td>1</td><td>39511-508</td><td>Patents</td></tr></table>	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	39511-409	Gasoline	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
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15	1	39511-508	Patents																																																													

Decorative



Item	Qty	Part Number	Description
1	1	39511-640	Beever, Large Decal
2	1	39511-641	Beever, Small Decal
3	2	39511-642	Morbark Logo
4	1	39511-010	Made in USA

# General Maintenance

.....

Maintenance Overview .....	5.2
Air Filter .....	5.3
Lubrication .....	5.4
Lubrication Points .....	5.4
Bolts & Torque .....	5.6
Belt Tension .....	5.8
Chipper Knife .....	5.10
Knife Anvil .....	5.14
Chipper Flange Bearing .....	5.16
Hydraulics .....	5.18
Hydraulic Pump Troubleshooting Guide .....	5.20
Engine .....	5.21
Fuel .....	5.22
Tires .....	5.23
Chipper Troubleshooting Guide .....	5.24
Pressure Guide .....	5.24
Electrical Schematic .....	5.25
Electrical Schematic .....	5.26
Hydraulic Schematic .....	5.27
Warranty .....	5.28
Warranty Claims .....	5.292

## Maintenance Overview



Table 5.1 • Routine Maintenance Schedule

Chipper Component	Required Maintenance	Start Up	8 hours	40 hours	400 hours	1000 hours
Complete machine	Visual inspection (see Safety section)	X	X			
	Clean machine		X			
Fasteners (except knife bolts)	Assemble using Loc-Tite 242 (blue)					
Engine oil	Maintain according to OEM manual	X	X			
Engine air filter	Tap filter and blow out with compressed air (see page 5.3)		X			
Drum knife	Inspect, sharpen or replace when chip quality deteriorates (see page 5.12)		X			
Drum knife bolts	Inspect when checking the knife, replace when worn or damaged <sup>1</sup>			X		
Drum knife clearance	Adjust when changing knife			X		
Drum anvil	Inspect when changing knife, adjust or replace when worn or damaged			X		
Drum drive belts	Inspect, tighten to proper tension, replace when worn <sup>3</sup>		X	X		
Feed wheel teeth	Cut off and replace when worn					
Tires	Check air pressure before moving					
Oil filters	Replace				X	
Hydraulic oil	Replace, check, increase to 3/4 full <sup>2</sup>					

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

2. Change every 2,000 hours.

## Air Filter

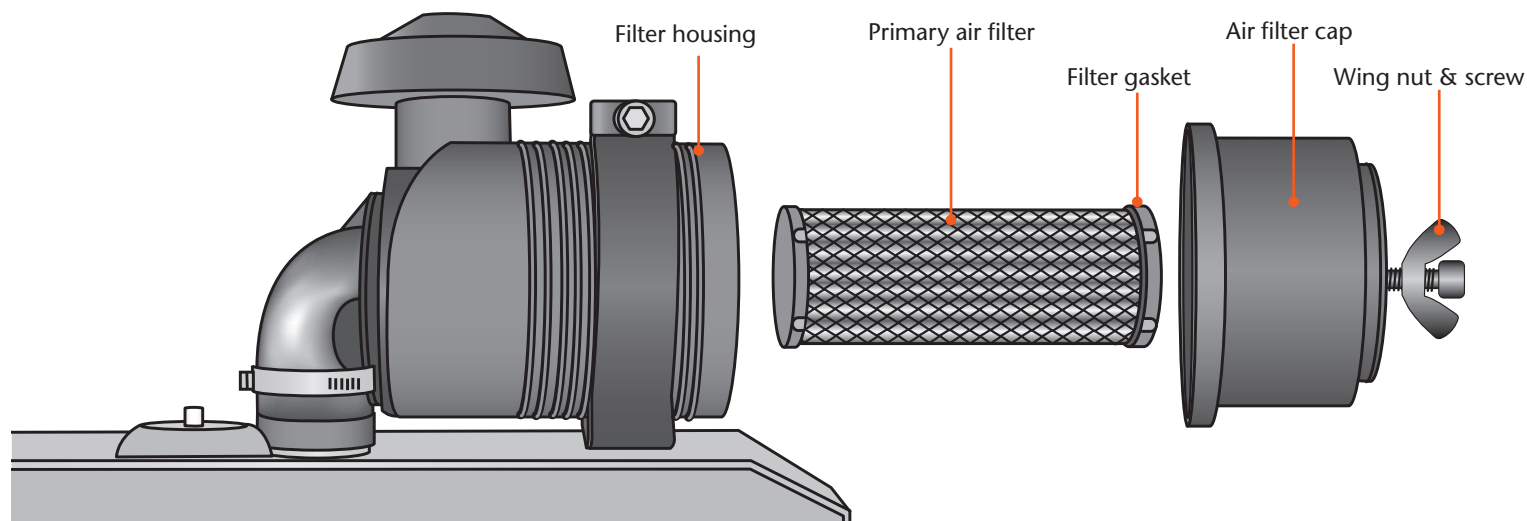
A clean air filter is critical to the performance of the chipper and the life of the engine. Dirt inside the engine will ruin it. The filter should be maintained, changed when necessary. At a minimum, changing should occur every 200 hours or at the time of an oil change. Only use the correct model filter.

### 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. Unscrew the wing nut and remove 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 8 points of lubrication on the machine. These include the wheel axle, feed wheel bearings, yoke pivot pin, chipper drum bearing. 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.

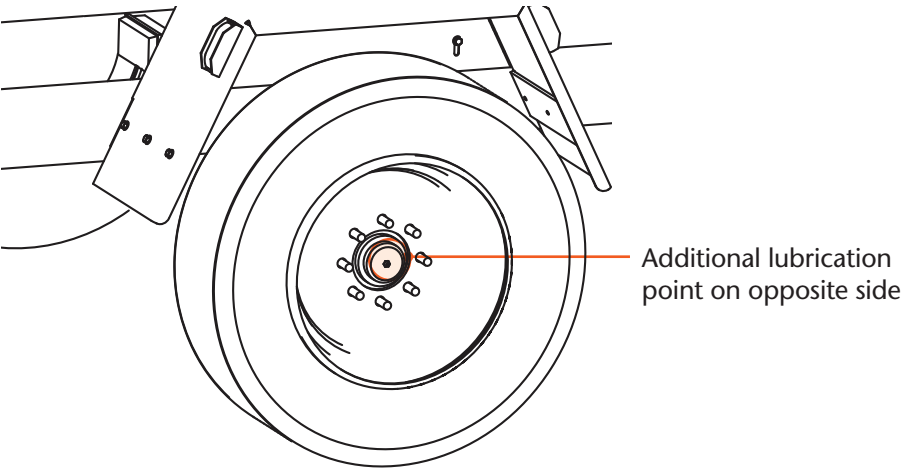
Table 5.2 • Routine Lubrication Schedule

Description	Number of locations	8 hours	40 hours
Wheel axle	2	See OEM manual	
Feed wheel bearings	2		X
Yoke pivot pin	2		X
Drum bearing	2	X	

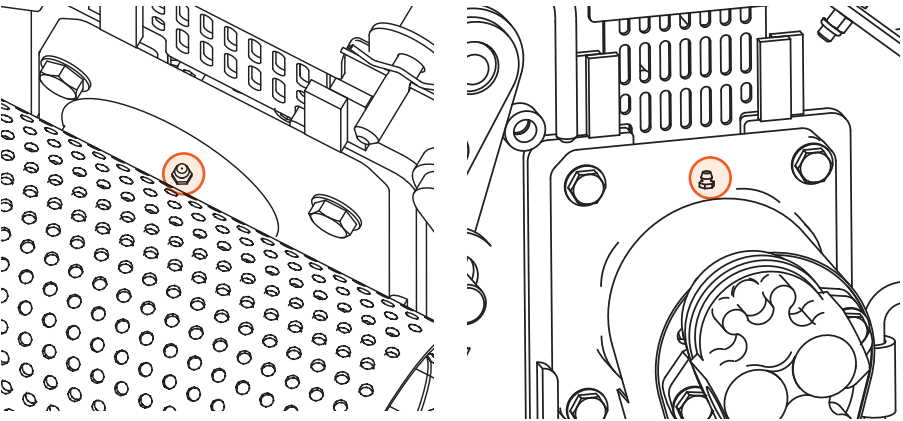
**Key:**  
X = 1 shot of grease (Use only EP rated grease)


Lubrications Points

• • • Figure 5.2 Wheel Axle



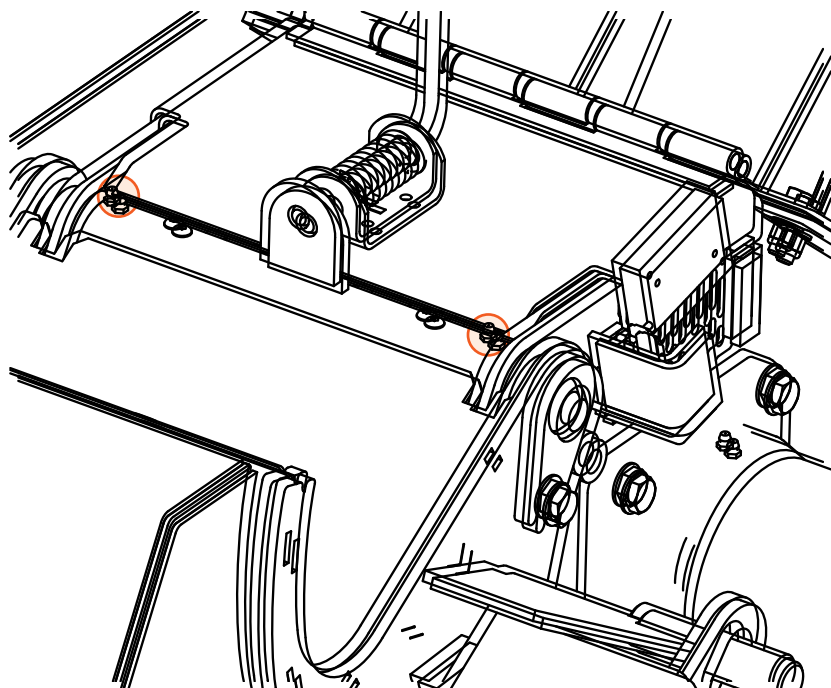
• • • Figure 5.3 Feed Wheel Bearings




 = Lubrication point

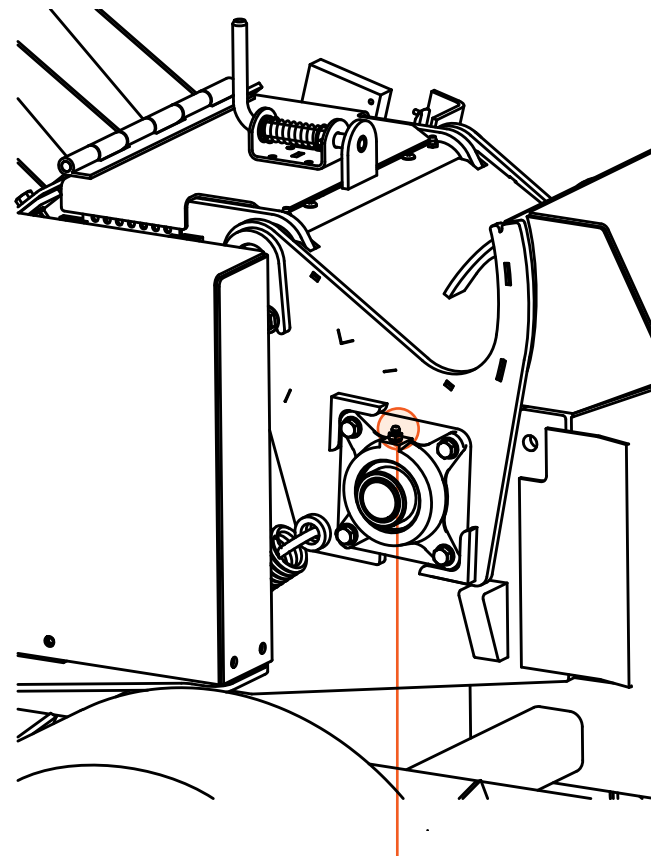
## Lubrications Points

• • • Figure 5.4 Yoke Pivot Pin



 = Lubrication point

• • • Figure 5.5 Feedwheel



Additional lubrication  
point on opposite side

## 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 - Course 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 - Course 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 disc can pinch body parts, entangle loose clothing, jewelry, and long hair which will result in cuts, mutilation, serious injury or death. Shut down the engine, wait for the belts and chipper disc 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 will cause serious injury or death. Turn the engine OFF and lock out the machine before servicing it.

**CAUTION**

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:

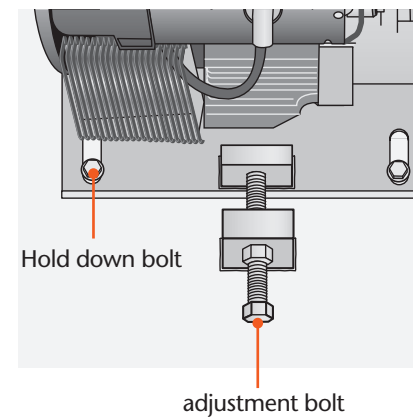
1. Idle the engine down.
2. Shut off the engine, remove the key and conduct machine lockout.
3. Remove the belt guard.

4. If maintenance is required, loosen the engine hold down bolts, remove the belt and repair 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.

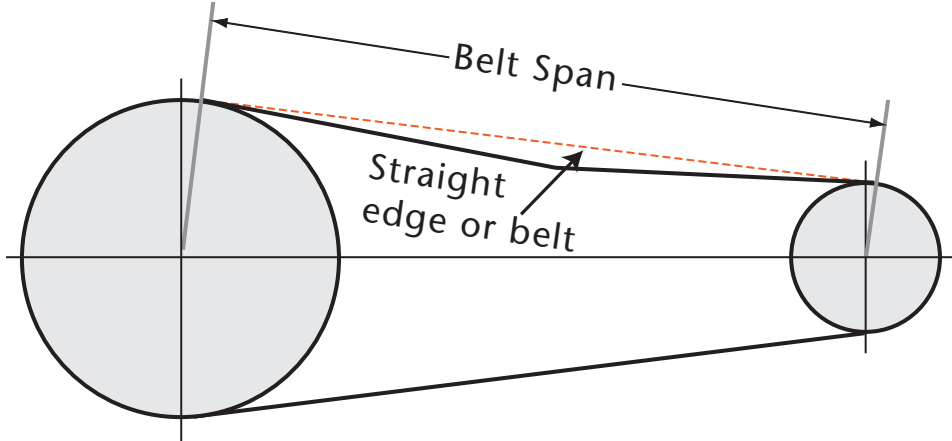
Using a V-belt tension gauge, set the belt tension by following these steps:  
**Note:** Always install a matched set when installing new belts.

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

• • • Figure 5.6



• • • Figure 5.8



2. Measure the belt span length of the drive, and lay a straight edge across the drive (see Figure 5.8).
3. Set the large rubber O-ring on the body of the tension gauge at the dimension equal to span length (See inset in Figure 5.9).
4. Set the small O-ring on the plunger to "0" against the body of the tension gauge (see Figure 5.9).
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 in Figure 5.9).
6. Compare the result with the ranges in Table 5.4. 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 Table 5.4.

• • • Figure 5.9

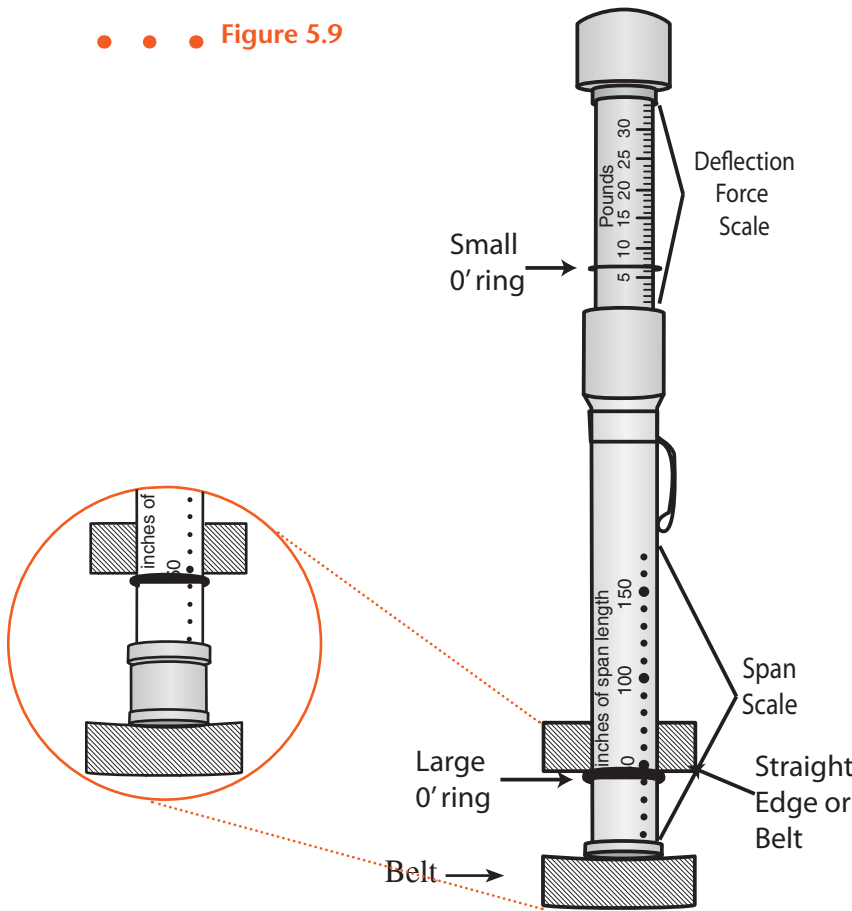




Table 5.4 • Recommended Belt Tension

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+
B	1200 - 1800	4.6	3.7	4.3	4.5	5.0
	1200 - 1800	5.0	4.1	4.6	4.8	5.6
	1200 - 1800	6.0	4.8	5.3	5.5	6.3
	1200 - 1800	8.0	5.7	6.2	6.4	7.2


## Chipper Knife





**DANGER!**



A rotating chipper disc 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 disc to completely stop rotating and insert the disc lock pin.



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



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

**CAUTION**

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 knife that have been exposed to excessive heat from sharpening.

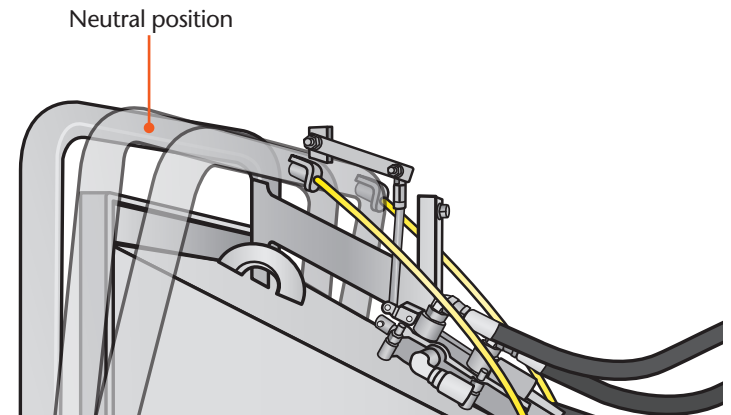
To ensure maximum efficiency of the chipping operation the chipper knife must be properly maintained. The time between sharpening or replacement will depend on the type of wood and operating conditions. Indication of dull knife include poor quality, excessive oversize chips and poor feed characteristics.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

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

- Keep the knife edge sharp and anvil square.
- 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.

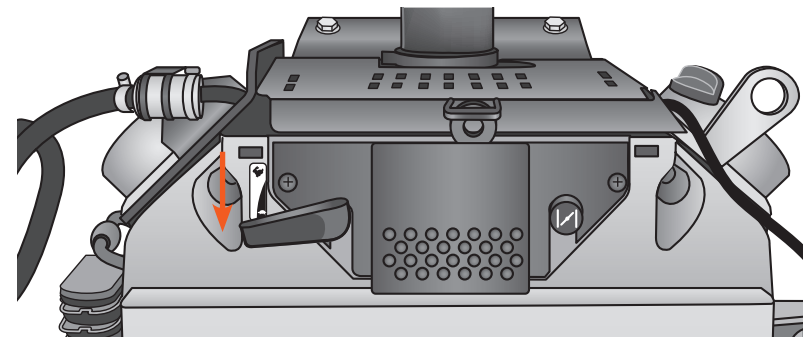
1. Place the safety control bar into the neutral position.

• • • **Figure 5.9**



2. Throttle the engine down.

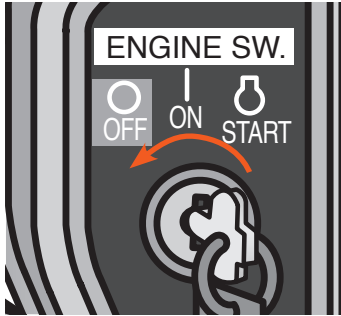
• • • **Figure 5.10**





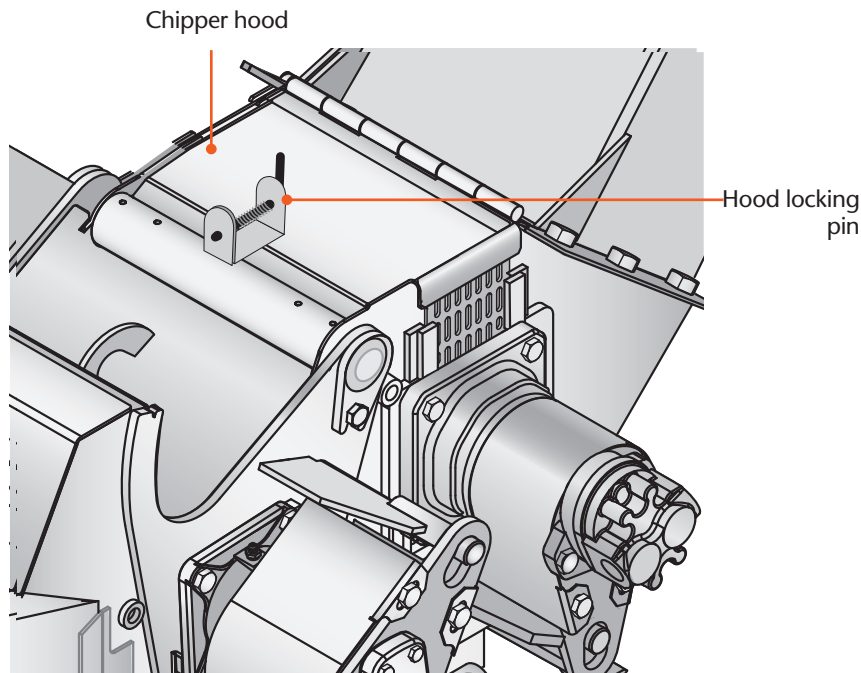
3. Turn the ignition OFF and lockout the machine.

• • • **Figure 5.11**



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

• • • **Figure 5.12**



**Before inspecting or maintaining the chipper knife:**

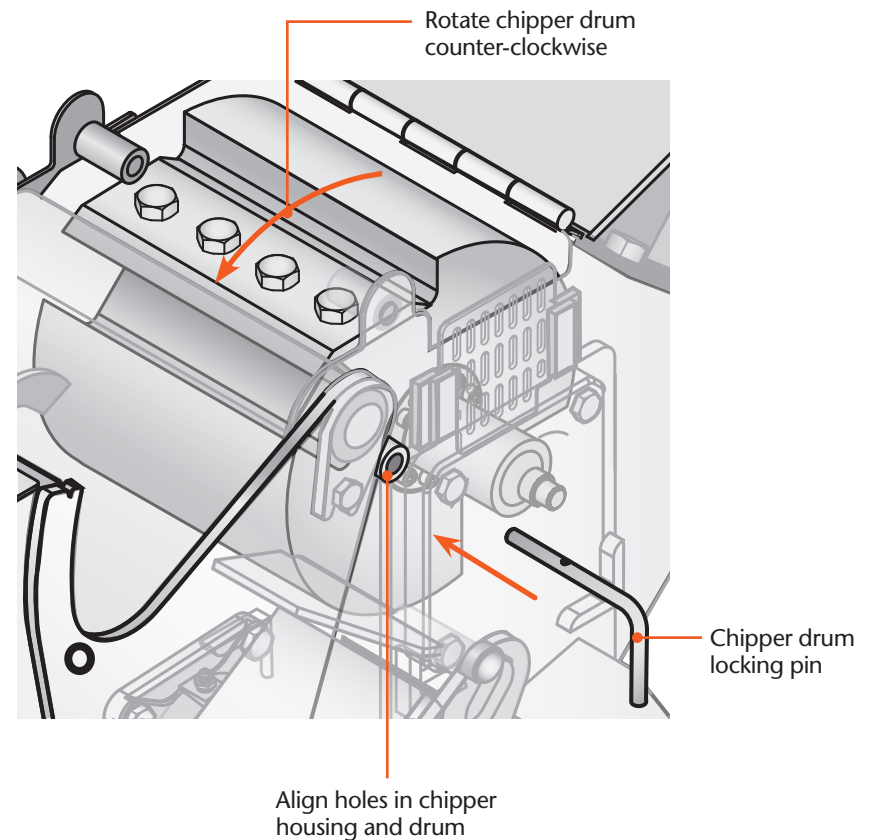
5. Slowly rotate the chipper drum by hand so the knife is accessible, and the holes of the chipper drum and housing align.

**Important:** keep loose clothing, jewelry, long hair and body parts away from rotating parts!

6. Insert the chipper drum locking pin through the aligned holes.

7. Remove knife and perform maintenance (see page 5.13).

• • • **Figure 5.13**





**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 knife. Do not overfeed the grinding machine.

1. Grind the angle of the knife edge to 31°.

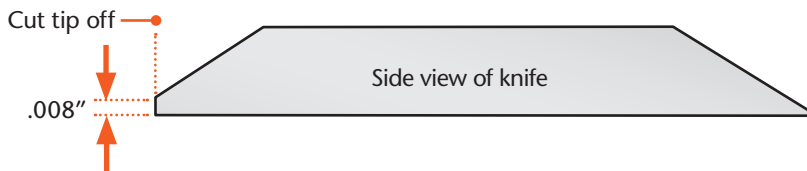
**Note:** Under exceptional conditions an angle between 29° and 31° may improve performance. Never grind the angle greater than 31°.

● ● ● **Figure 5.16**



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 5.17**



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.

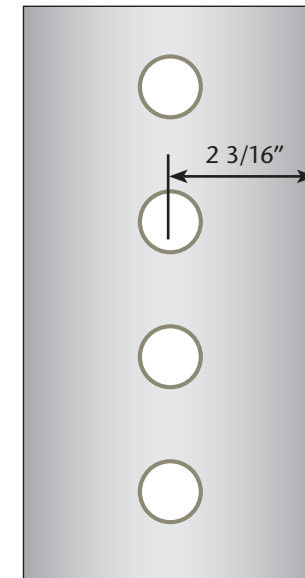
● ● ● **Figure 5.18**



4. Place the knife back onto the knife pocket. Apply a light coat of anti-seize lubricant to the bolts.
5. Tighten the bolt to the 375 ft/lbs.

**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 5.19**

**After Replacing, Turning or Sharpening the Knife:**

1. Close the chipper hood and secure the hood by putting the hood / yoke locking pin back in place.
2. Before conducting chipping operation the clearance between the knife and anvil must be set (see Knife Anvil on page 5.14).



To ensure maximum efficiency of the chipping operation, the chipper drum must be properly balanced. In a single knife drum, as the knife is sharpened, the drum will become unbalanced. It is important to adhere to the following guidelines. Failure to do so may result in a denied warranty claim.

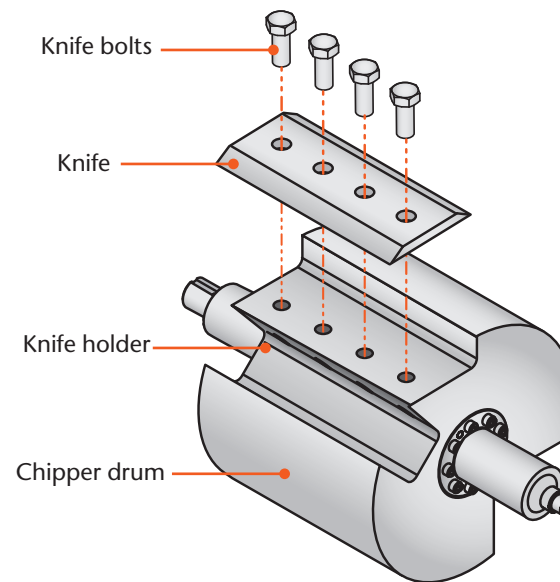
#### Inspect the knife assembly:

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 the torque on the knife and scraper bolts. Tighten if necessary (see torque chart on page 5.6).
3. Remove the drum lock pin and rotate the 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 holder with a wire brush.
3. Inspect the knife bolts for wear or damage.
4. Each knife is double-edged and may be turned when one knife edge becomes dull.

• • • Figure 5.18




## Knife Anvil


**DANGER!**



Failure to lockout the machine (e.g. yoke, shut power off) will 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 will 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.

**CAUTION**

Incorrect clearance between a chipper knife and anvil will result in poor chipping performance, damage to the chipper knife 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 5.22 for the anvil location.

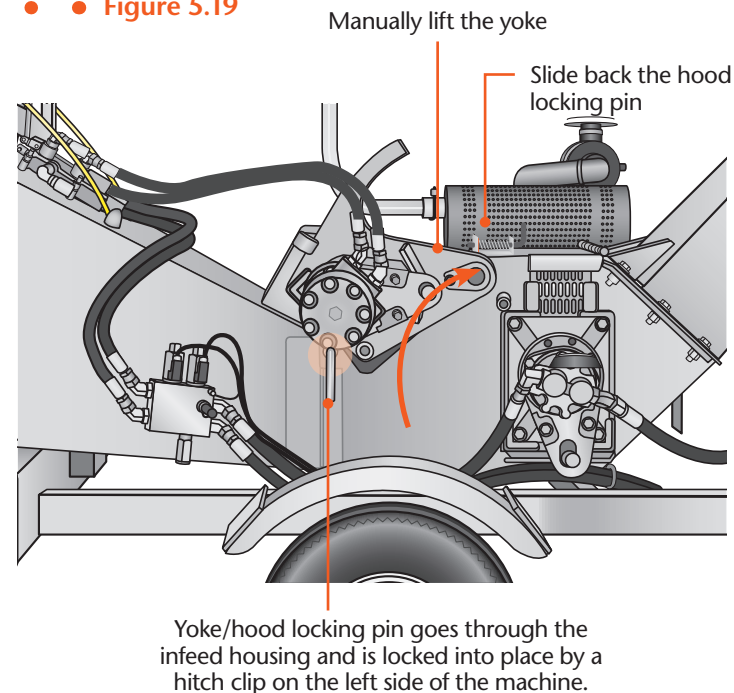
To ensure maximum efficiency of the chipping operation the anvil must be properly maintained. It is important to follow these guidelines to ensure efficient chipping:

- 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, page 1.9).
2. Follow steps 1-3 on page 5.10 and 5.11 to shut-down the machine.

#### • • • Figure 5.19



### Inspect the anvil:

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

#### • • • Figure 5.20

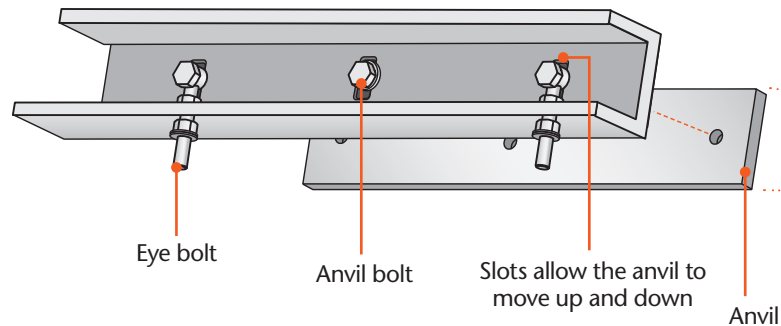


2. Check the torque on the bolts that hold the anvil. Tighten if necessary (see torque chart on page 5.6).

**To Flip or Replace the Anvil:**

1. Remove the 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 Blue lubricant to the bolts and insert.

• • • Figure 5.21

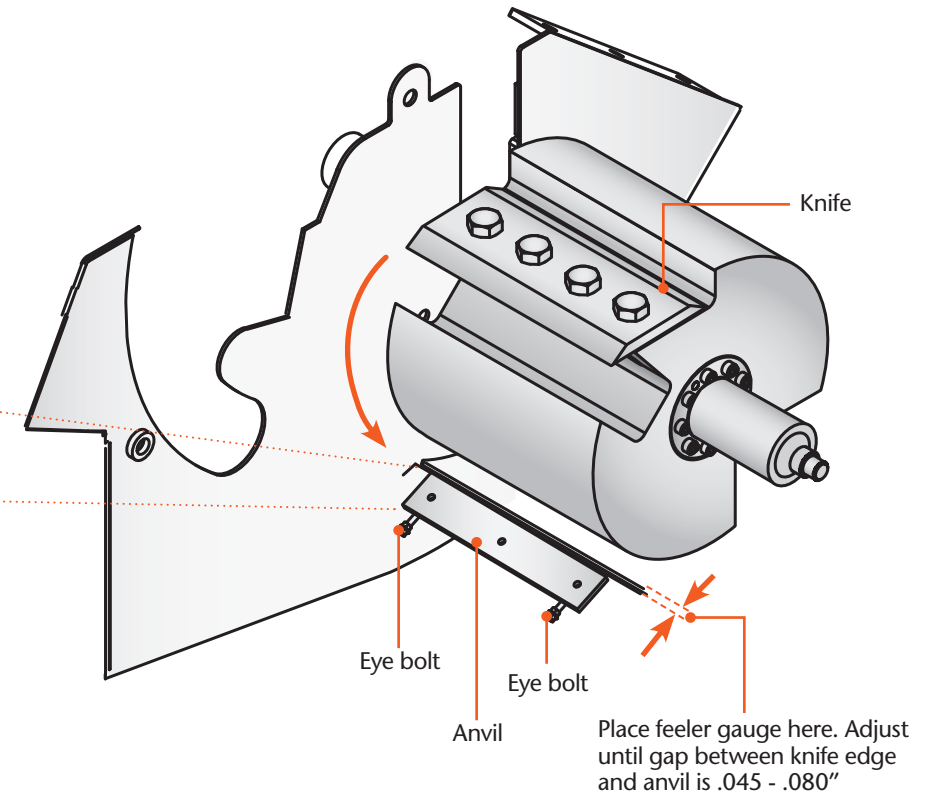
**To Set the Chipper Drum Knife/Anvil Clearance:**

1. Open the drum hood and slowly rotate the chipper drum so the chipper knife is positioned over the anvil.

**Important!** Keep loose clothing, jewelry, long hair and body parts away from rotating parts.

2. With a feeler gauge, reach into the infeed and check the clearance between the chipper knife and anvil. It should be set between .045" and .080".
3. If necessary, loosen the anvil bolts until the anvil is loose.
4. Turn the two eye bolts behind until the anvil is set to the correct clearance.
5. Tighten the bolts to the proper torque (see torque chart on page 5.6).

• • • Figure 5.22

**After Maintaining the Anvil:**

1. Remove the hood / yoke locking pin.
2. Manually lower the yoke.
3. Place the hood / yoke locking pin in the holes for the chipper hood. Secure the chipper hood.

## Chipper Flange Bearing



### **DANGER!**



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 flange bearings support the chipper drum shaft and should be greased according to the maintenance schedule.

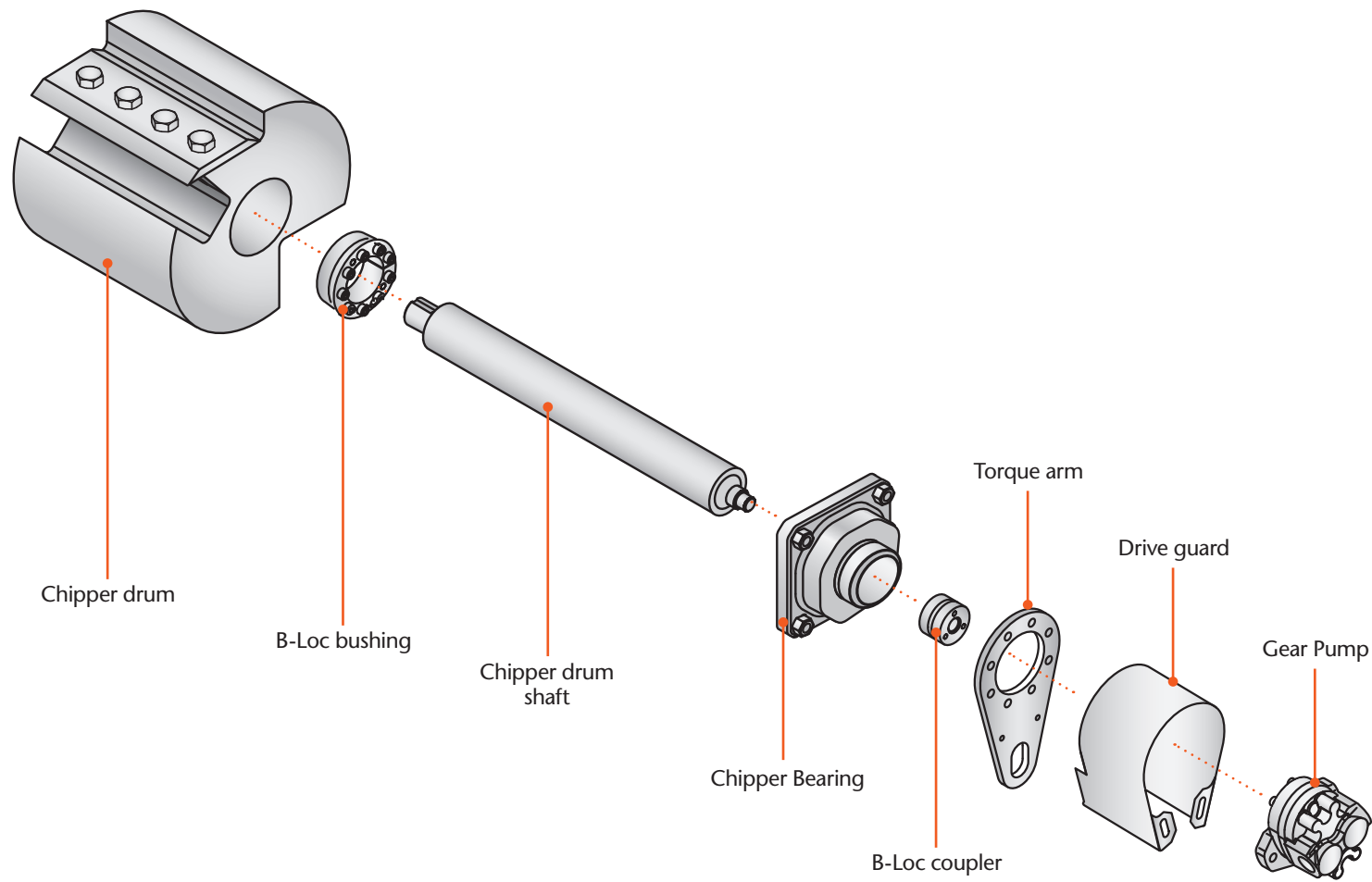
#### **Before performing maintenance on the chipper bearings:**

1. Follow steps 1-3 on page 5.10 and 5.11 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.

#### **After performing maintenance on the chipper bearings:**

1. Slide the chipper bearings on both the idler and drive side of the drum after you have inserted the drum into the base.
2. Start the bolts into both the flange bearings after applying a coat of Loc Tite Blue, then tighten.
3. Spin the drum, if it hits on any side of the inside of the drum, move the drum to the opposite side just enough to clear the drum side. Re-spin the drum and repeat if necessary until the drum does not hit on any side and is centered into the base.
4. Slide the flange bearing lock collars onto the drum shaft and lock onto the bearings. Tighten the lock collar allen head bolts until tight. Then take out the allen head bolts and identify the mark left by the bolt making contact with the shaft and drill a hole in the shaft to seat the end of the bolt into the shaft
5. With a torque wrench, torque the flange bearing bolts to correct torque.


• • • Figure 5.23




## 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.

**CAUTION**

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 2,000 operating hours or yearly, whichever comes first. In more severe conditions it should be changed every 1,000 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.

#### 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 5.5 • 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 5.6 • 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!

**CAUTION**

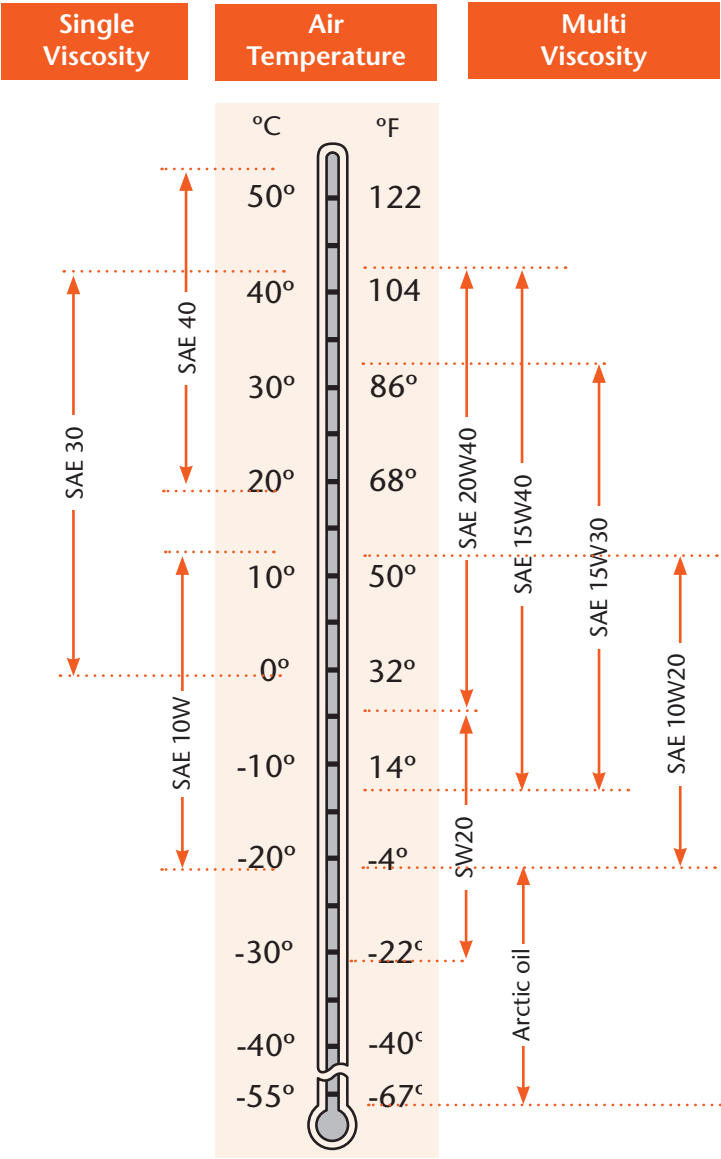
Refer to the engines OEM manual for specific maintenance guidelines and procedures. Failure to follow the engine OEM guidelines and procedures may result in a void of the engine OEM warranty.

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

Refer to the engine OEM manual for specific information regarding the type of fuel to use. Always purchase the fuel from a reputable supplier.

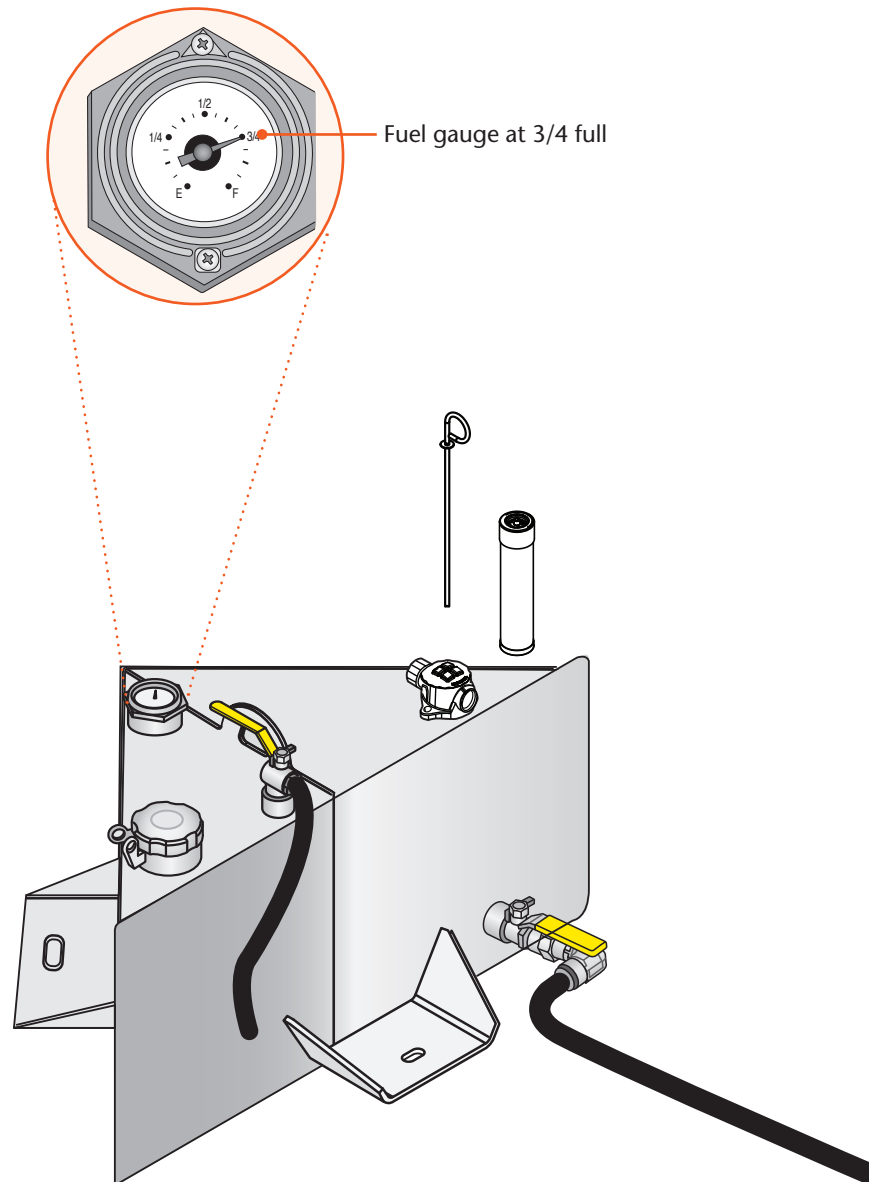
### Regular Unleaded Gasoline

The recommended gasoline for most cars is regular 87 octane. One common misconception is that higher octane gasoline contains more cleaning additives than lower octane gas. All octane grades of all brands of gasoline contain engine cleaning detergent additives to protect against engine deposit build-up. In fact, using a gasoline with too high of an octane rating may cause damage to the emissions system. Mid-Grade Gasoline The octane ratings 'regular', 'mid-grade', and 'premium' are not consistent. In the United States, for example, one state may require a minimum octane rating of 92 for premium gasoline, while another may allow an octane rating of 90 to be premium. Check the octane rating on the yellow sticker on the gas pump rather than relying on descriptive labels.

### Premium Gasoline


Certain high performance engines benefit from use of high octane fuel. For other engines, using a fuel with a higher octane rating than the vehicle requires sends unburned fuel into the emissions system and catalytic converter. This puts unnecessary stress on the emissions system. For some vehicles, a rotten egg smell coming from the tailpipe signals use of too-high octane gas.


• • • Figure 5.24




## 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 5.25

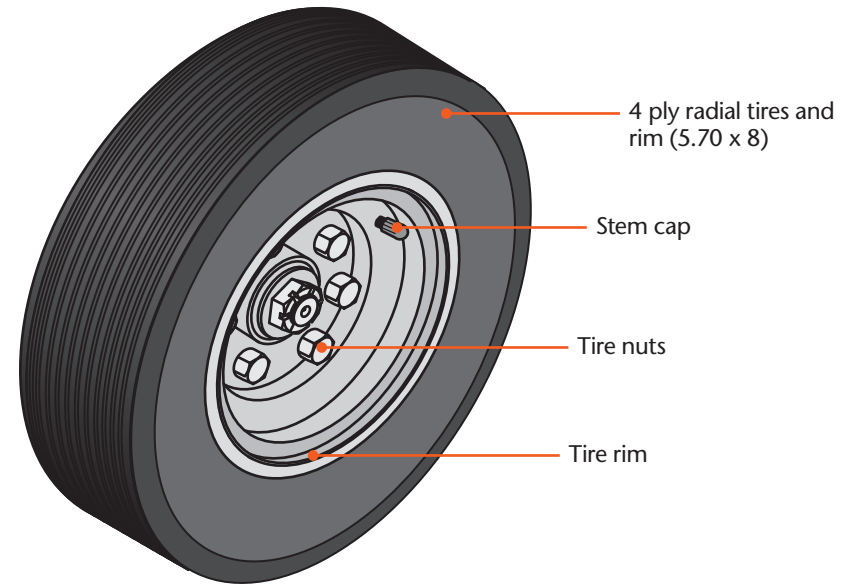


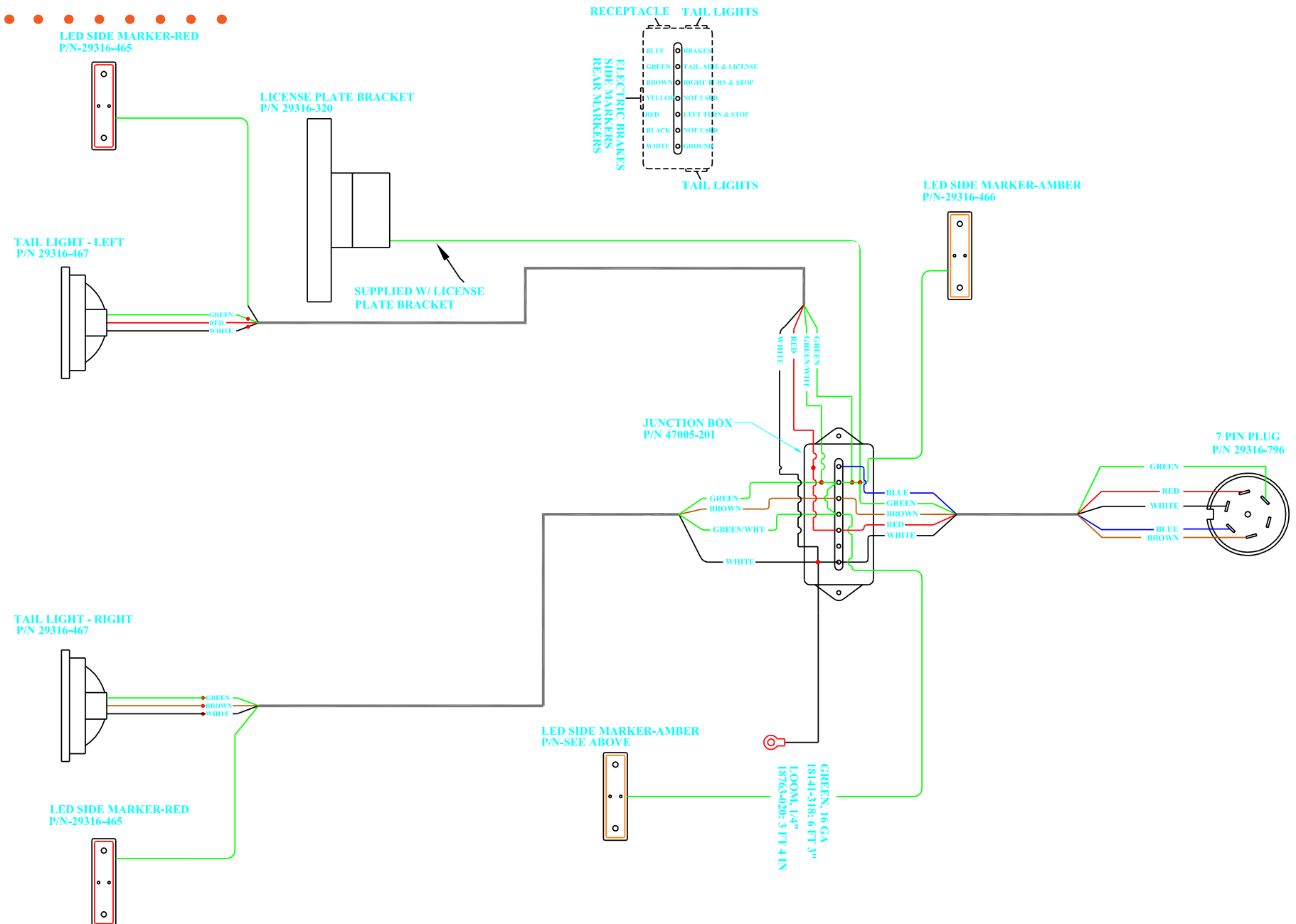
Table 5.7 • Chipper Troubleshooting Guide

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
	Knife ground at incorrect angle	Grind knife 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 to hot (210° F maximum)	Not enough or too much lubrication	Lubricate according to manufacturers recommendations
	Drum rpm too high	Do not exceed 3,600 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

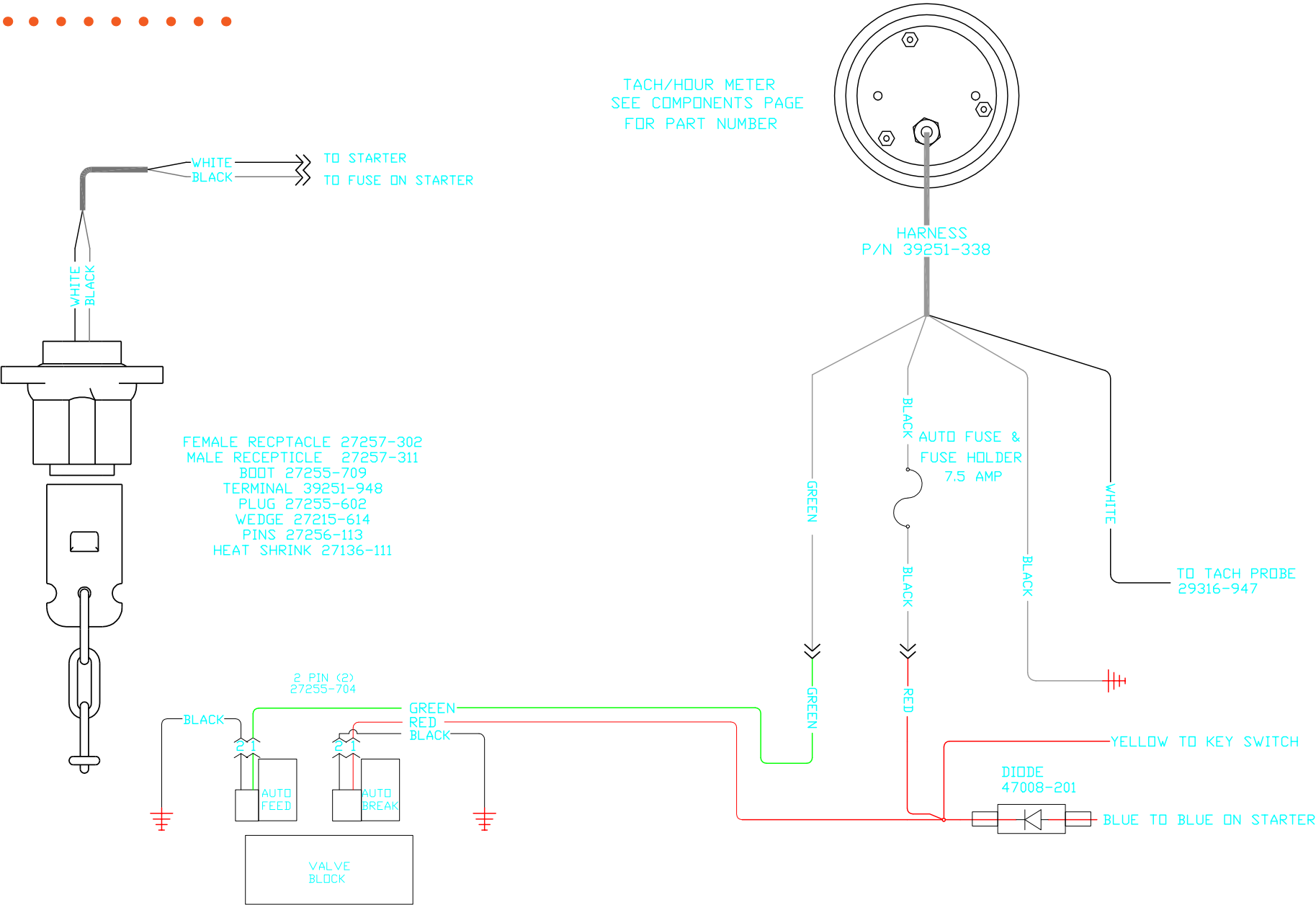
Table 5.8 • Pressure Guide

Model	Brake	Main Relief		Feed Wheel rpm
M6R	2,700 psi	Feed	1,800 psi	49

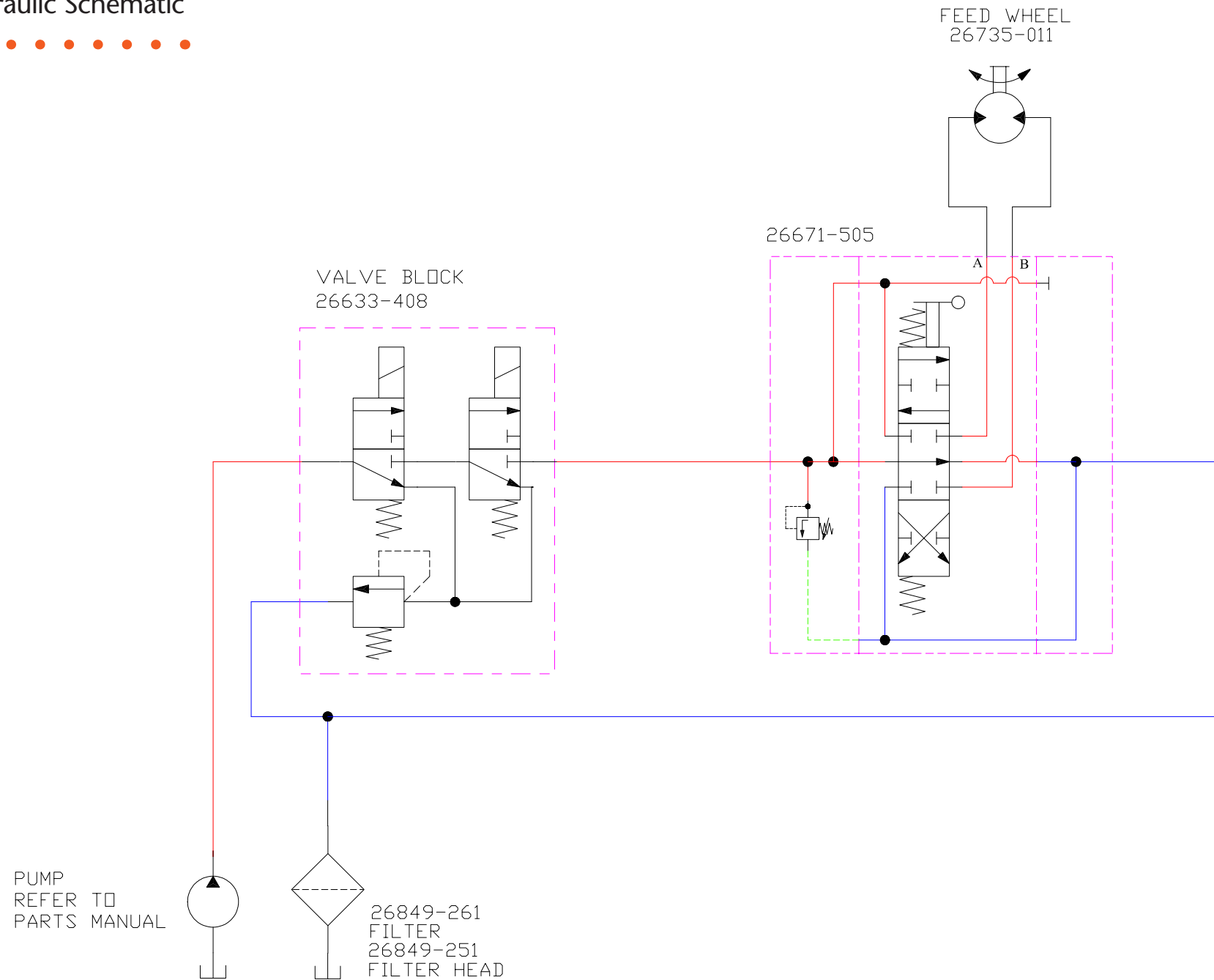
## Electrical Schematic



Electrical 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.

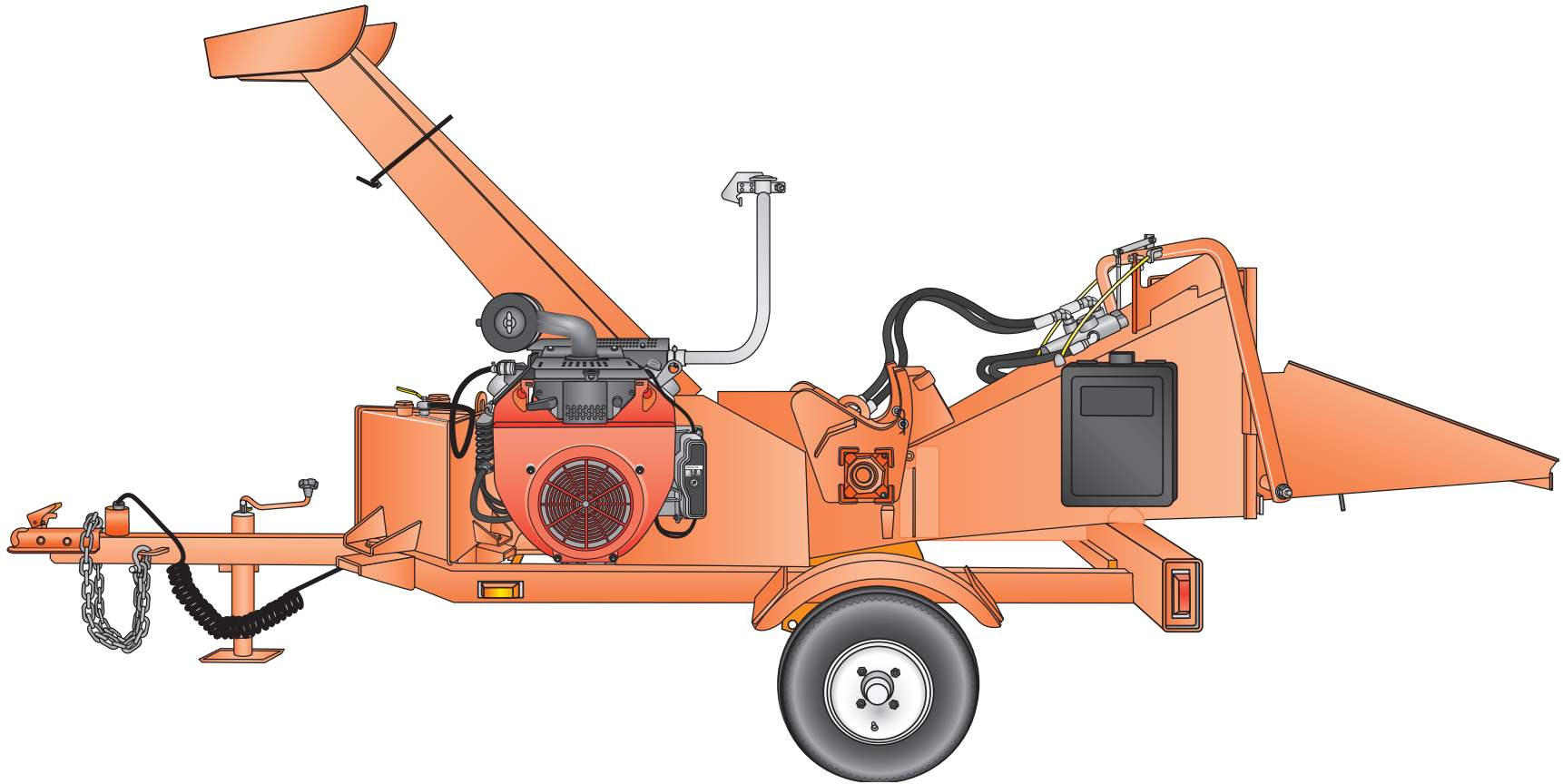
- Attach the Morbark, Inc. invoice received for the replacement part. If the replacement part was purchased from a Morbark distributor, then attach the distributor's invoice. Morbark retains the right to refuse any claim when original Morbark replacement parts have not been used.
- Ship the defective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





P.O. Box 100  
Winn, Michigan 48896  
[www.morbark.com](http://www.morbark.com)

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