

# LT28 G18/19 Engine

## Safety, Operation, Maintenance & Parts Manual

---

049055 Engine, Gas 19hp      rev. D

---

**Safety is our #1 concern!**

*Form #1343*

**Used with:**

**LT28G18**

**rev. A6.02 - A6.10**

**LT28G19**

**rev. A6.11 - A6.17**

*The G18 engine was re-designated as G19  
on /30/2015 per ECN 20372 to match the  
actual rating of the engine.*



**WARNING! Read and understand this  
manual before using this machine.**

**California**  
Proposition 65 Warning



**WARNING:** Breathing gas/diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Always start and operate the engine in a well-ventilated area.  
If in an enclosed area, vent the exhaust to the outside.  
Do not modify or tamper with the exhaust system.  
Do not idle the engine except as necessary.

For more information go to **[www.P65warnings.ca.gov](http://www.P65warnings.ca.gov)**.



**WARNING:** Drilling, sawing, sanding or machining wood products can expose you to wood dust, a substance known to the State of California to cause cancer. Avoid inhaling wood dust or use a dust mask or other safeguards for personal protection.

For more information go to **[www.P65Warnings.ca.gov/wood](http://www.P65Warnings.ca.gov/wood)**.

**Active Patents assigned to Wood-Mizer, LLC**

Wood-Mizer, LLC has received patents that protect our inventions which are a result of a dedication to research, innovation, development, and design. Learn more at: [woodmizer.com/patents](http://woodmizer.com/patents)

**©2024 Wood-Mizer LLC**

Printed in the United States of America, all rights reserved. No part of this manual may be reproduced in any form by any photographic, electronic, mechanical or other means or used in any information storage and retrieval system without written permission from

**Wood-Mizer, LLC**  
**8180 West 10th Street**  
**Indianapolis, Indiana 46214**

# Table of Contents

# Section-Page

<b>SECTION 1</b>	<b>ABOUT THIS MANUAL</b>	<b>1-1</b>
<b>SECTION 2</b>	<b>OPERATION</b>	<b>2-1</b>
2.1	Starting The Engine .....	2-1
<b>SECTION 3</b>	<b>MAINTENANCE</b>	<b>3-1</b>
3.1	Safety .....	3-1
3.2	Cooling System .....	3-1
3.3	Air Filter & Pre-Cleaner .....	3-1
3.4	Fuel Filter .....	3-1
3.5	Battery .....	3-1
3.6	RPM Adjustments .....	3-2
3.7	Miscellaneous Maintenance .....	3-2
<b>SECTION 4</b>	<b>REPLACEMENT PARTS</b>	<b>4-1</b>
4.1	Fuel Tank 4/2022+ .....	4-1
4.2	Fuel Tank A6.12 - 4/2022 .....	4-2
4.3	Fuel Tank Rev. A6.10 - A6.11 .....	4-3
4.4	Fuel Tank Rev. A3.00 - A6.09 .....	4-4
4.5	Fuel Tank Rev. A3.00 - A6.09 .....	4-5
4.6	Fuel Tank Rev. A1.00 - A2.01 .....	4-7
5.7	Engine Assembly .....	5-2
5.8	Throttle/Clutch Assembly .....	5-4

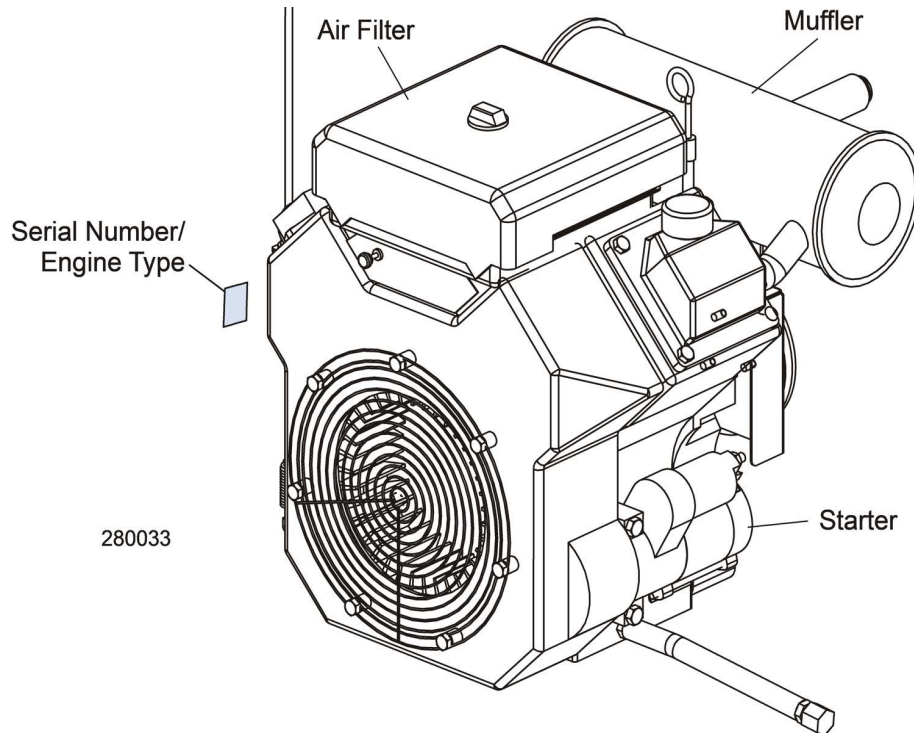
## SECTION 1 ABOUT THIS MANUAL

This manual is provided as a supplement to the equipment manufacturer's manuals. This manual provides information specific to the use of this equipment on the Wood-Mizer® sawmill. Refer to the sawmill operator's manual and manufacturer's manual before attempting to operate this equipment.



**IMPORTANT!** Read the sawmill operator's manual and engine manufacturer's manual for instructions and safety precautions before operating this equipment.

The information and instructions given in this manual do not amend or extend the limited warranties for the equipment given at the time of purchase.



**ENGINE COMPONENTS**

## SECTION 2 OPERATION

### 2.1 Starting The Engine



**DANGER!** Always be sure the blade is disengaged and clear the path of the blade before starting the engine. Failure to do so will result in serious injury or death.

Operate your engine/machine only in well ventilated areas. Exhaust gases can cause nausea, delirium and potentially death unless adequate ventilation is present.

Never operate an engine with a fuel or oil leak. The leaking fuel or oil could potentially come in contact with hot surfaces and ignite into flames.



**WARNING!** Do not operate engine without proper and operational spark arrester/muffler. Sparks emitted from the engine exhaust could ignite surrounding materials, causing serious injury or death.



**CAUTION!** EPA Compliant Gas Tanks Only: Always relieve all fuel pressure inside the tank prior to filling or connecting fuel fittings. Failure to do so may result in fuel spillage.

EPA Compliant Gas Tanks Only: Disconnect the fuel tank when not in use, or engine flooding or fuel spillage may result.

1. Close the engine choke by moving the choke lever to the start position.
2. Turn the key switch to the START position and release. Release the key switch to the RUN position after the engine starts.
3. When the engine starts, slowly open the choke all the way by moving the choke lever to the off position.

#### ENGINE SHUTOFF

1. Disengage the clutch handle to stop the blade if necessary.
2. Run the engine for 15 seconds with no load, then turn the key switch to the OFF position.

## SECTION 3 MAINTENANCE

Refer to the manufacturer's manual for maintenance intervals and procedures unless otherwise instructed in this manual. Follow the manufacturer's recommendations for dusty conditions.

**NOTICE** This manual only provides information about additional procedures or procedures to be performed at different time intervals than found in the manufacturer's manuals. Refer to the manufacturer's manual for complete maintenance instructions.

### 3.1 Safety

Use caution when performing maintenance or service to the engine.



**DANGER!** Always be aware of and take proper protective measures against rotating shafts, pulleys, fans, etc.

Always stay a safe distance from rotating members and make sure that loose clothing or long hair does not engage rotating members.

Never touch or perform service functions on a hot engine.



**WARNING!** Remove the blade before performing any engine service. Failure to do so may result in serious injury.

Wear proper (eye, breathing, hand, and foot) safety equipment when performing service functions.

Clean sawdust from all guards, vents, control boxes, or any area where sawdust may gather **after every shift**. Failure to do so may result in fire, causing death or serious injury.



### 3.2 Cooling System

Wash the engine or brush off sawdust and debris **every 50 hours** of operation.

Clean any screens, cooling fins, and all external surfaces.

Remove any dust, dirt, or oil.

See engine manual for further instructions.

### 3.3 Air Filter & Pre-Cleaner

Service the pre-cleaner **every four hours** of operation by gently shaking excess sawdust and debris from the foam piece.

Clean the air filter (air cleaner element) and pre-cleaner (element wrapper) **every eight hours** of operation.

Replace the air filter (cleaner) **every 200 hours** of operation.

Replace the pre-cleaner (element wrapper) **every 2000 hours** of operation.


See the engine manual for further instructions.


### 3.4 Fuel Filter

Replace the fuel filter **every 100 hours** of operation or as required for engine performance.


### 3.5 Battery

Check the battery electrolyte level **every 50 hours** of operation. See manufacturer's manual for instructions.

 **DANGER!** Batteries expel explosive gases. Keep sparks, flames, burning cigarettes, or other ignition sources away at all times. Always wear safety goggles and a face shield when working near batteries. Failure to do so will cause serious injury.

 **WARNING!** Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

### 3.6 RPM Adjustments

 **WARNING!** Remove the blade before performing any engine service. Failure to do so may result in serious injury.

Check the RPM with a tachometer **every 200 hours** of operation.

Engine	High End RPM	Low End RPM
<b>G19</b>	3750	1800

**TABLE 3-1**

Before checking the RPM, make sure belt and brake strap tensions are correct (See Sawmill Maintenance).

Check oil, fuel, and coolant levels.

Make sure the throttle cable does not affect the engine RPM when the clutch handle is disengaged. Make sure the cable is not bent or kinked.

1. Start the engine to measure the low-end RPM.
2. Refer to the engine manual to adjust the low-end RPM.
3. Engage the clutch handle to throttle the engine and measure the high-end RPM.

The high-end RPM is factory-set at 3750. Readjust the throttle cable if necessary to increase or reduce the high-end engine speed.

### 3.7 Miscellaneous Maintenance

Inspect the spark plugs **every 100 hours** of operation.

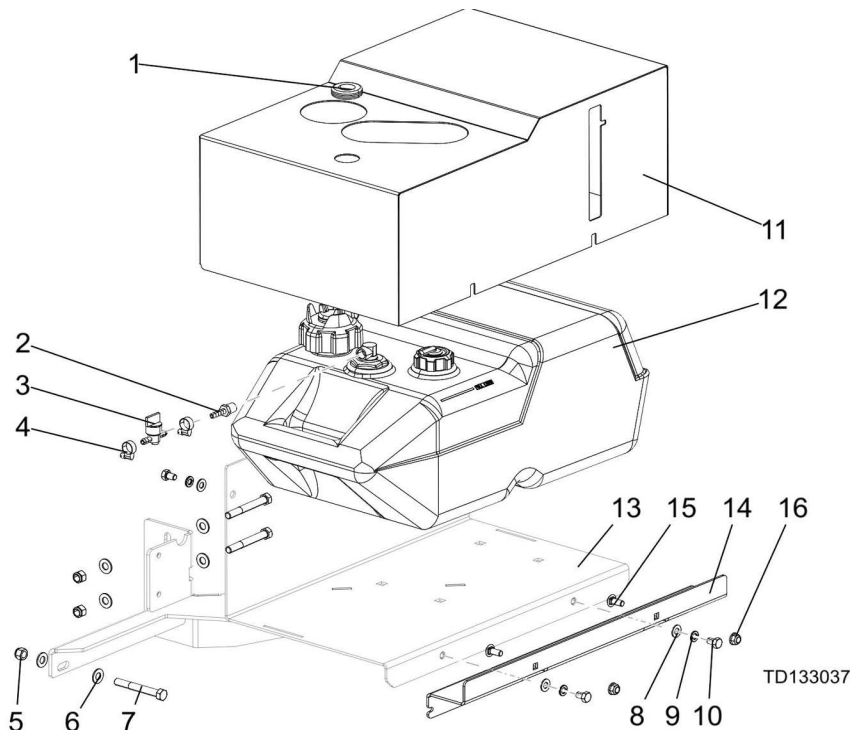
Remove any deposits and adjust gap if necessary.

Review the manufacturer's engine manual for maintenance intervals.

See engine manual for further information.

## SECTION 4 REPLACEMENT PARTS

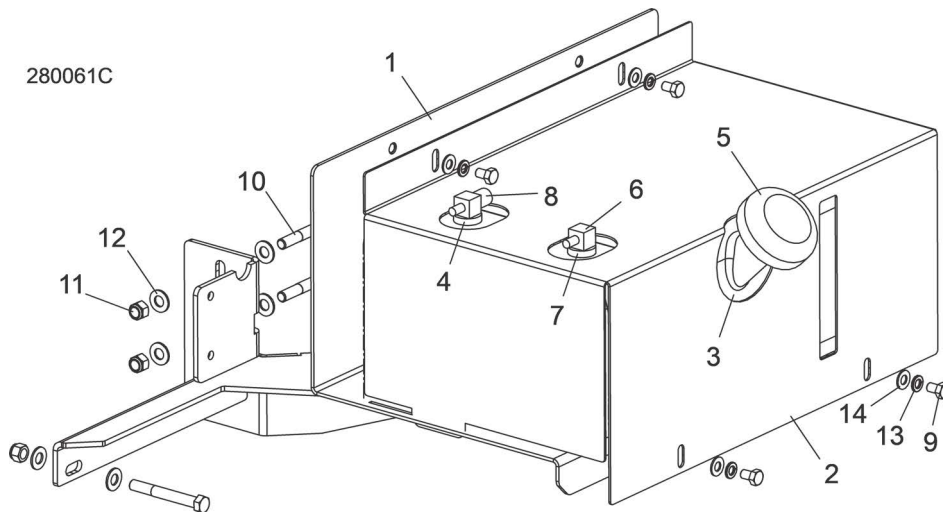
### 4.1 Fuel Tank 4/2022+



REF	PART #	DESCRIPTION	COMMENTS	QTY.
	133037	Assembly, Fuel Tank Tray, LT28/35		
<b>1</b>	P702	Grommet, 7/8In IDx1 1/4In Groove Dia		1
<b>2</b>	P05393	Barb, 1/4 Hose 1/4NPT		1
<b>3</b>	P851	Valve, Fuel, In Line Shut Off		1
<b>4</b>	P649	Hose Clamp, 7/32in-5/8in		2
<b>5</b>	F05010-10	Nut, 3/8-16 Hex Nyl Lock		3
<b>6</b>	F05011-3	Washer, 3/8 Flat SAE		6
<b>7</b>	F05007-73	Bolt, 3/8-16x3 HH Gr5		3
<b>8</b>	F05011-17	Washer, 5/16 SAE Flat		4
<b>9</b>	F05011-13	Washer, 5/16 Split Lock		4
<b>10</b>	F05006-15	Bolt, 5/16-18x1/2 HH Gr5		4
<b>11</b>	130288	Cover Weldment, Fuel Tank, Domestic		1
<b>12</b>	130286	Fuel Tank, Domestic 6 Gal		1
	133484	Assy, 6.50" Portable Tank Pick Up		1
	133483	Cap, 2.25" One Way Kelch		1
	133438	Kit, Slant Roll Valve		1
	133485	Cap, Ultra 3/6/12 Lens		1
<b>13</b>	103810	Weldment, Fuel Tank Tray		1
<b>14</b>	130283	Extension, Fuel Tray		1
<b>15</b>	F05006-86	Bolt, 5/16-18x3/4 Carriage		2
<b>16</b>	F05010-221	Nut, 5/16-18 Flanged Hex Nylock		2
	R02423-1	Hose, Fuel 3/16" EPA 15G CARB		6 Ft
	R02423-2	Hose, Fuel 1/4" EPA 15G CARB		6 Ft

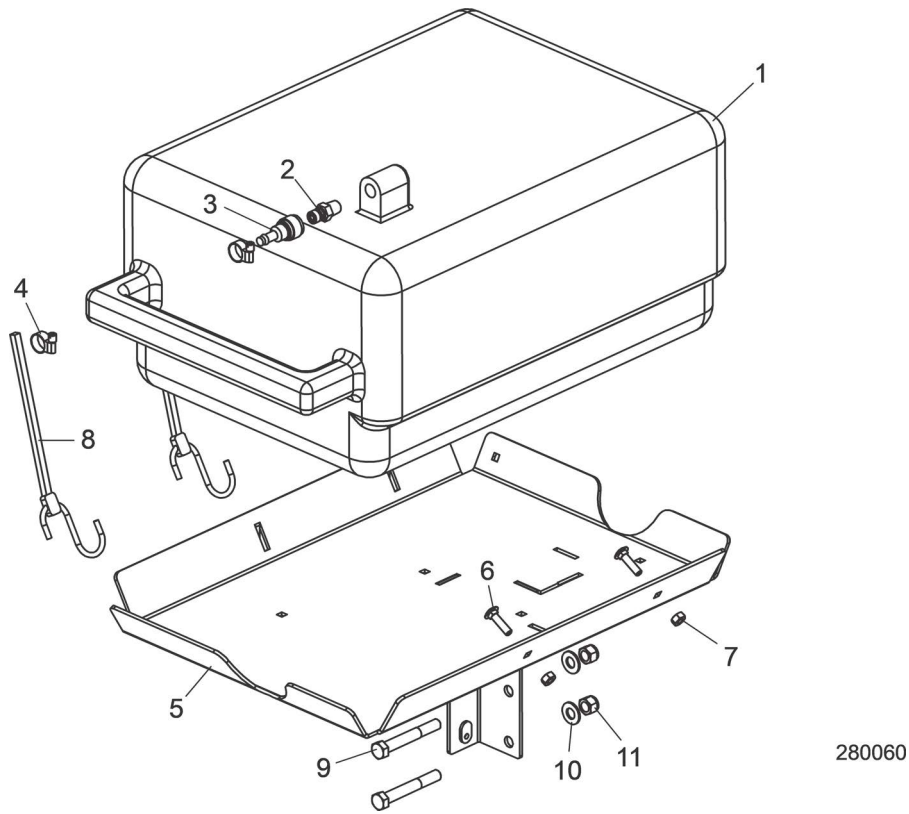


## 4.2 Fuel Tank A6.12 - 4/2022



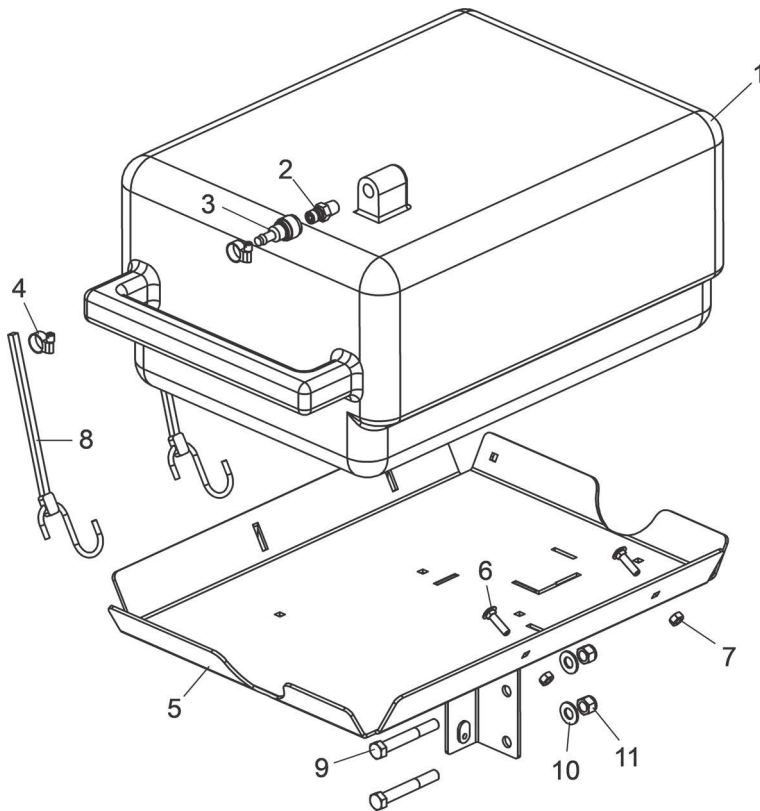
REF	PART #	DESCRIPTION	COMMENTS	QTY.
	103816	<b>TRAY ASSEMBLY, LT28/35 FUEL TANK</b>		1
<b>1</b>	103810	Weldment, Fuel Tank Tray		1
<b>2</b>	103867	Cover, Fuel Tank		1
<b>3</b>	103878	Tank, 5 Gallon Low Pro EPA Fuel		1
<b>4</b>	061250	Grommet, Shut Off		1
<b>5</b>	061251	Gas Cap, LT15		1
<b>6</b>	061252	Valve, Slosh		1
<b>7</b>	061253	Grommet, Slosh Valve		1
<b>8</b>	074943	Fitting, Fuel Pick-Up With Shut-Off		1
<b>9</b>	F05006-15	Bolt, 5/16-18 x 1/2" Hex Head Grade 5		4
<b>10</b>	F05007-73	Bolt, 3/8-16 x 3" Hex Head Grade 5		3
<b>11</b>	F05010-10	Nut, 3/8-16 Hex Nyloc		3
<b>12</b>	F05011-3	Washer, 3/8" Flat SAE		6
<b>13</b>	F05011-13	Washer, 5/16" Split Lock		4
<b>14</b>	F05011-17	Washer, 5/16" SAE Flat		4
	R02423-1	Hose, Fuel 3/16" EPA 15G CARB		6 Ft
	R02423-2	Hose, Fuel 1/4" EPA 15G CARB		6 Ft

### 4.3 Fuel Tank Rev. A6.10 - A6.11



REF	PART #	DESCRIPTION	COMMENTS	QTY.
	076479	<b>TRAY ASSEMBLY, LT28 GAS CAN</b>		1
	074643	Tank Assembly, 6 Gallon Gas Service		1
<b>1</b>	076478	Tank, Gasoline	Available in assemblies only.	1
<b>2</b>	015583	Fitting, 1/4" NPT Male Quick Disconnect		1
<b>3</b>	015582	Fitting, Female Quick Disconnect Barb		1
<b>4</b>	P649	Clamp, 7/32" - 1/2" Hose		2
<b>5</b>	076480	Tray Weldment, LT28 Fuel		1
<b>6</b>	F05005-34	Bolt, 1/4-20 X 1" Carriage		2
<b>7</b>	F05010-21	Nut, 1/4-20 Swaged		2
<b>8</b>	P11668	Strap, 20 Rubber W/Hooks		2
<b>9</b>	F05007-29	Bolt, 3/8-16 x 2 3/4" Hex Head		2
<b>10</b>	F05011-3	Washer, 3/8" SAE Flat		2
<b>11</b>	F05010-10	Nut, 3/8-16 Hex Nylon Lock		2
	R02423-2	Hose, Fuel 1/4" EPA 15G CARB		6.1 Ft

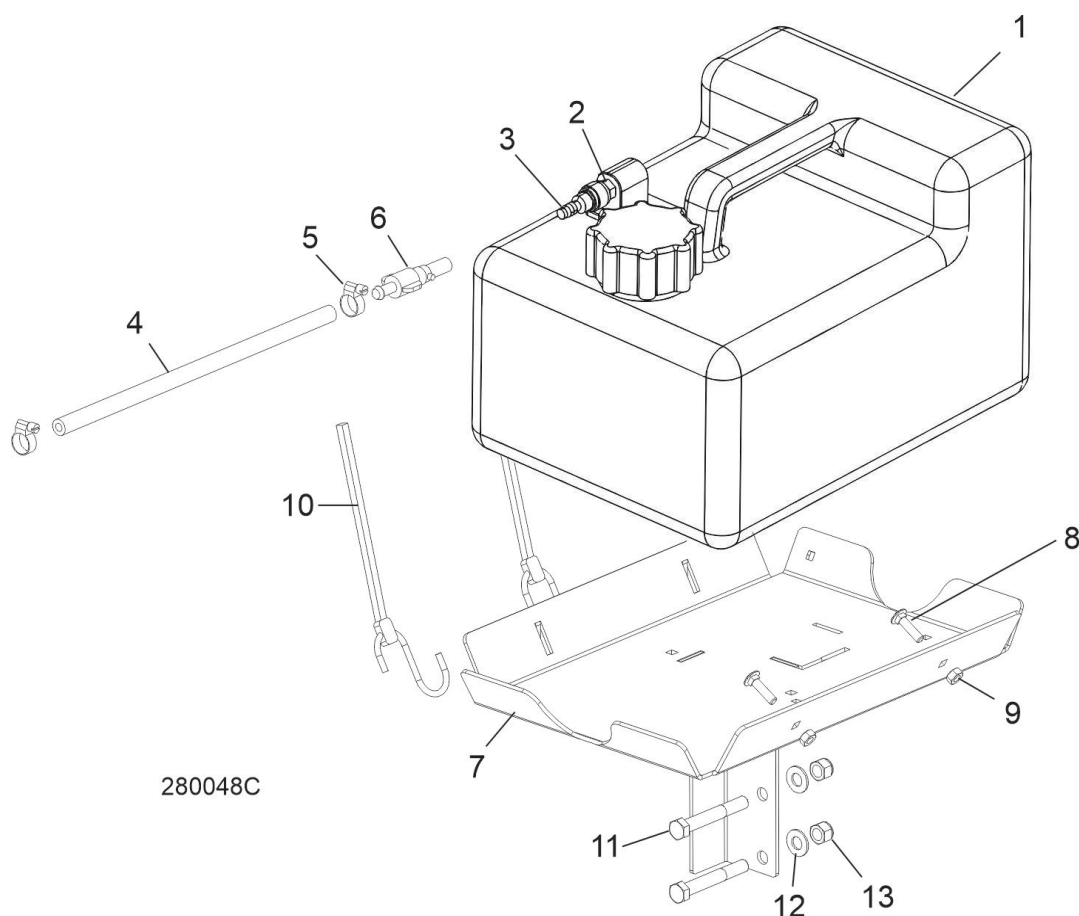
### 4.4 Fuel Tank Rev. A3.00 - A6.09



280060-2

REF	PART #	DESCRIPTION	COMMENTS	QTY.
	076479	<b>TRAY ASSEMBLY, LT28 GAS CAN</b>		1
	074643	Tank Assembly, 6 Gallon Gas Service	5 gallon gas can assemblies are available only for customers with sawmills and edgers manufactured prior to 2010 (See Section 4.4).	1
1	076478	Tank, Gasoline	Available in assemblies only.	1
2	015583	Fitting, 1/4" NPT Male Quick Disconnect		1
3	015582	Fitting, Female Quick Disconnect Barb		1
4	P649	Clamp, 7/32" - 1/2" Hose		2
5	076480	Tray Weldment, LT28 Fuel		1
6	F05005-34	Bolt, 1/4-20 X 1" Carriage		2
7	F05010-21	Nut, 1/4-20 Swaged		2
8	P11668	Strap, 20 Rubber W/Hooks		2
9	F05007-29	Bolt, 3/8-16 x 2 3/4" Hex Head		2
10	F05011-3	Washer, 3/8" SAE Flat		2
11	F05010-10	Nut, 3/8-16 Hex Nylon Lock		2
	R02423-2	Hose, Fuel 1/4" EPA 15G CARB		6.1 Ft

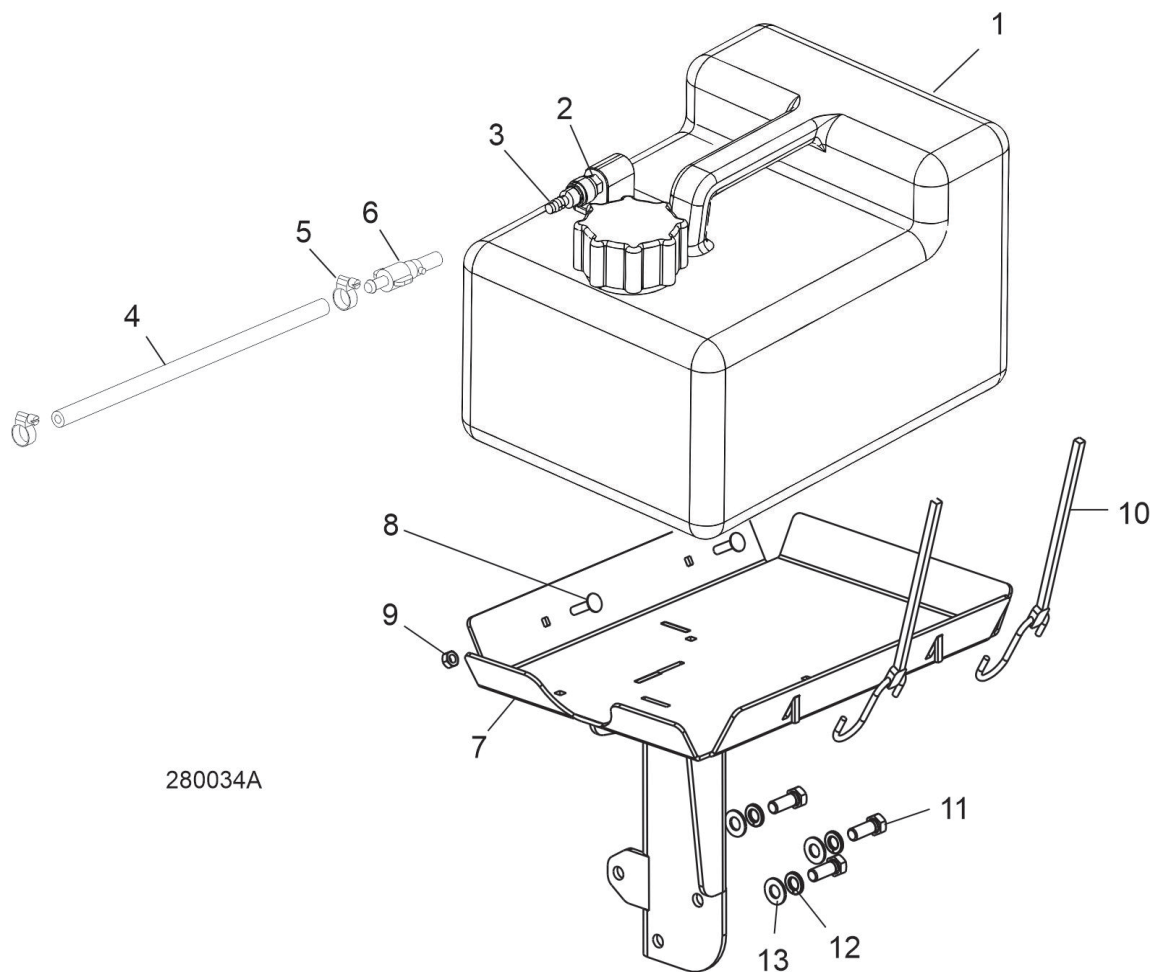
### 4.5 Fuel Tank Rev. A3.00 - A6.09



REF	PART #	DESCRIPTION	COMMENTS	QTY.
	049138	<b>TRAY ASSEMBLY, LT28 GAS CAN</b>		1
	074664	Assy, 3 Gallon Gas Tank, Single Line	Replaced A12285 for service after 9/28/23 per ECN 39168	1
<b>1</b>	X200-1144	Can, 3 Gallon Gas		1
<b>2</b>	015583	Fitting, 1/4 NPT Male Quick Disconnect		1
<b>3</b>	015582	Fitting, Female Quick Disconnect Barb		1
	A12285	Tank Assembly, 5-gallon Red Gasoline	Customers with sawmills manufactured in 2010 and later need to use new EPA approved 3 or 6 gallon gas can assemblies. Replace with 074664.	1
	P12167	Tank, 5-Gallon Red Fuel	Deleted after 9/28/2023 per ECN 39168	1
	P12172	Pickup, 9" Fuel		1
	P09683	Cap, 3 or 5-Gallon Fuel Tank		1
	P12175	Fitting, 1/4" NPT Plastic Female Disconnect		1
	P10367	Fitting, 3/8" NPT Hex Plug		1
<b>4</b>	P642	Hose, 1/4" ID Fuel		4 Ft
<b>5</b>	P649	Clamp, 7/32 - 1/2 Hose		2
<b>6</b>	P12176	Fitting, 1/4" NPT Plastic Male Disconnect		1
<b>7</b>	048600	Tray Weldment, LT28 Fuel		1
<b>8</b>	F05005-34	Bolt, 1/4-20 X 1" Carriage		2

REF	PART #	DESCRIPTION	COMMENTS	QTY.
9	F05010-21	Nut, 1/4-20 Swaged		2
10	P11258	Strap, 24 Rubber W/Hooks		2
11	F05007-29	Bolt, 3/8-16 x 2 3/4" Hex Head		2
12	F05011-3	Washer, 3/8" SAE Flat		2
13	F05010-10	Nut, 3/8-16 Hex Nylon Lock		2

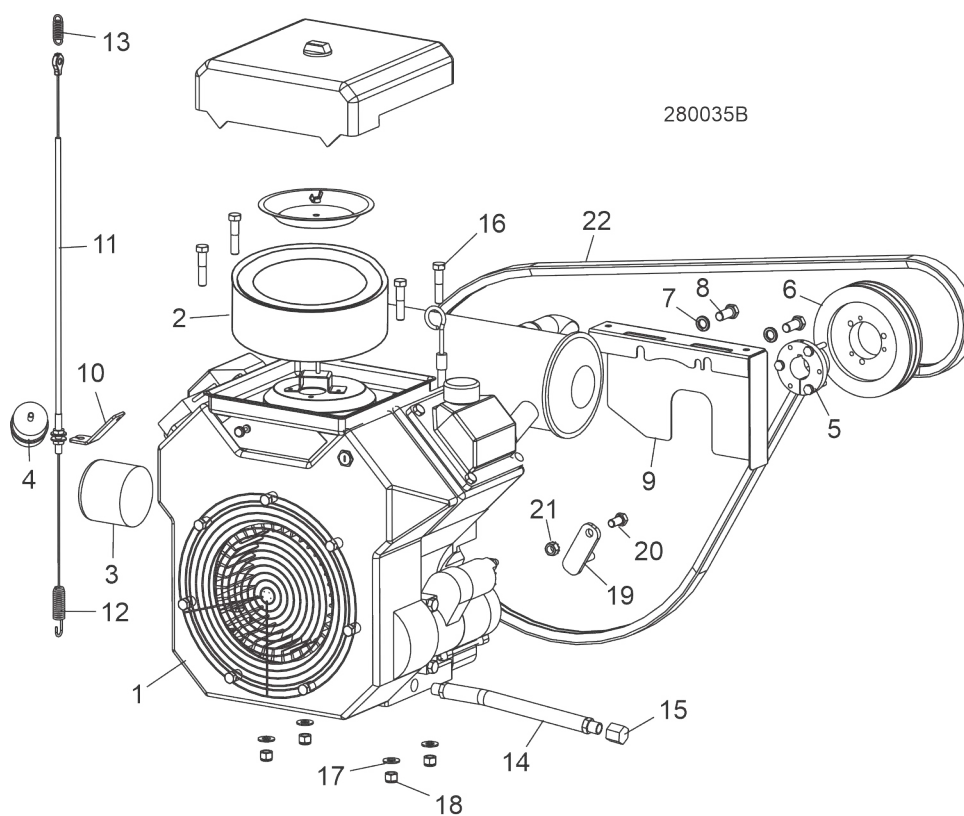
### 4.6 Fuel Tank Rev. A1.00 - A2.01



REF	PART #	DESCRIPTION	COMMENTS	QTY.
	049138	<b>TRAY ASSEMBLY, LT28 GAS CAN</b>		1
	074664	Assy, 3 Gallon Gas Tank, Single Line	Replaced A12285 for service after 9/28/23 per ECN 39168	1
<b>1</b>	X200-1144	Can, 3 Gallon Gas		1
<b>2</b>	015583	Fitting, 1/4 NPT Male Quick Disconnect		1
<b>3</b>	015582	Fitting, Female Quick Disconnect Barb		1
	A12285	Tank Assembly, 5-gallon Red Gasoline	Customers with sawmills manufactured in 2010 and later need to use new EPA approved 3 or 6 gallon gas can assemblies. Replace with 074664.	1
	P12167	Tank, 5-Gallon Red Fuel	Deleted after 9/28/2023 per ECN 39168	1
	P12172	Pickup, 9" Fuel		1
	P09683	Cap, 3 or 5-Gallon Fuel Tank		1
	P12175	Fitting, 1/4" NPT Plastic Female Disconnect		1
	P10367	Fitting, 3/8" NPT Hex Plug		1
<b>4</b>	P642	Hose, 1/4" ID Fuel		4 Ft
<b>5</b>	P649	Clamp, 7/32 - 1/2 Hose		2

REF	PART #	DESCRIPTION	COMMENTS	QTY.
6	P12176	Fitting, 1/4" NPT Plastic Male Disconnect		1
7	049137	Tray Weldment, LT28 Fuel		1
8	F05005-34	Bolt, 1/4-20 X 1" Carriage		2
9	F05010-21	Nut, 1/4-20 Swaged		2
10	P11258	Strap, 24 Rubber W/Hooks		2
11	F05007-87	Bolt, 3/8-16 x 1" Hex Head Grade 5		3
12	F05011-4	Washer, 3/8" Split Lock		3
13	F05011-3	Washer, 3/8" SAE Flat		3

## 5.7 Engine Assembly

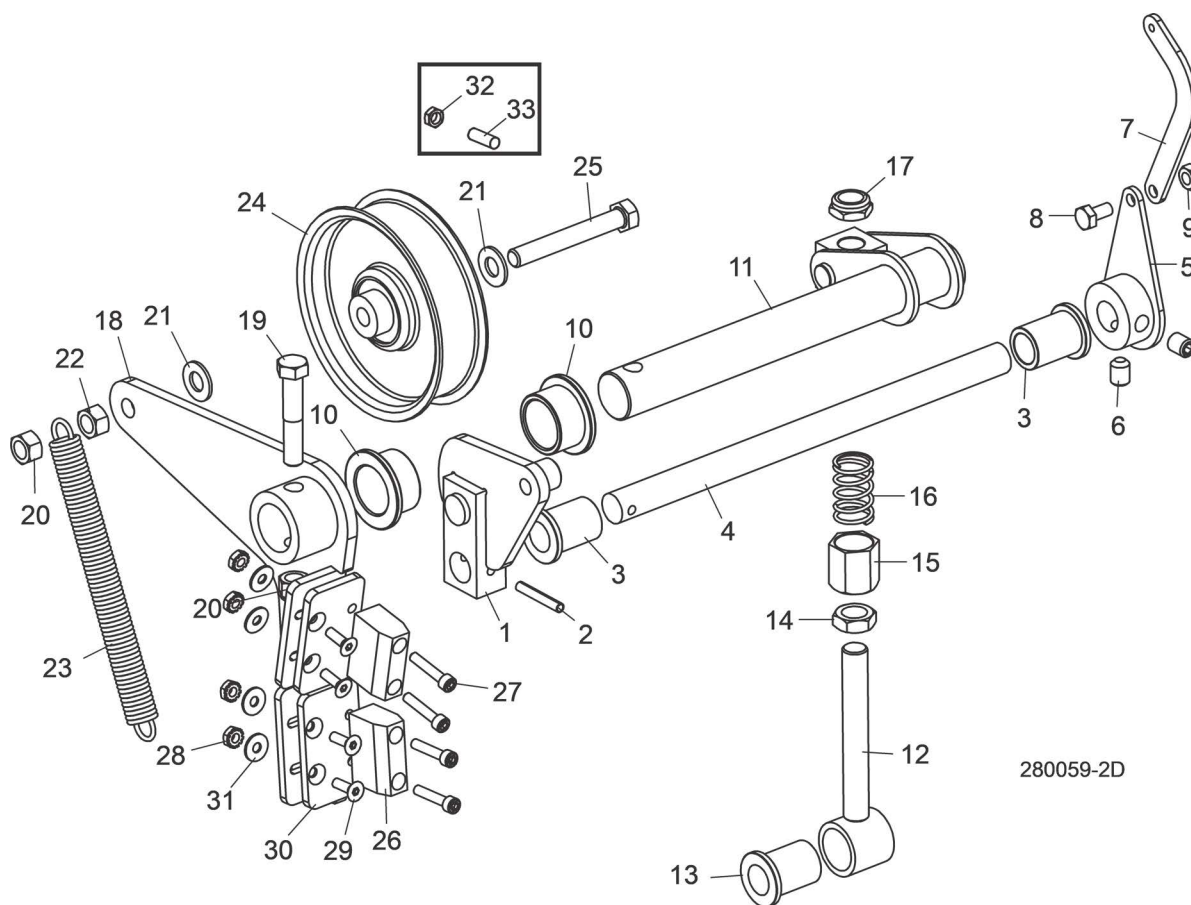


REF	PART #	DESCRIPTION	COMMENTS	QTY.
	P12393	<b>COVER, ENGINE</b>		1
	049055	<b>ENGINE ASSEMBLY, LT28 GAS 19HP</b>		1
<b>1</b>	016899	Engine, 19HP Kohler #PA62590	Available in assemblies only.	1
	046943	Regulator, Overvolt Kohler		1
<b>2</b>	141022	Filter, 19hp Kohler Air&PreClnr Kit		1
	006907	Filter, Kohler Air	006907 and 006931 combined to make kit 141022 on 08/2024	1
	006931	Pre Cleaner, Kohler	006907 and 006931 combined to make kit 141022 on 08/2024	1
	P12757	Plug, RC12YC Kohler Spark #12-132-02		2
<b>3</b>	014717	Filter, Kohler Oil #52-050-02		1
<b>4</b>	P12758	Filter, Kohler Fuel #24-050-13		1
	061371	Starter, Kohler Engine KH# 25 098 21S		1
	048391	Pump, Kohler Fuel #24-393-16S		1
	061150	Switch, Ignition G18/25		1
<b>5</b>	038432	Bushing, 1 1/8" SH		1
<b>6</b>	047742	Pulley, 3V5.6 x 2" SH		1
<b>7</b>	F05011-48	Washer, 7/16" Split Lock		2
<b>8</b>	F05007-145	Bolt, 7/16-14 x 1" Hex Head Grade 5		2
<b>9</b>	016493	Plate, Engine Guard		1
<b>10</b>	047750	Plate, Throttle Cable Mount		1
<b>11</b>	047749	Cable, LT15 G25 Throttle		1
<b>12</b>	016033	Spring, Throttle		1



REF	PART #	DESCRIPTION	COMMENTS	QTY.
13	015952	Spring, Throttle Extension		1
14	P10082	Hose, 3/8" NPT Oil Drain		1
15	P04332	Cap, Oil Drain Hose		1
	061072	Switch, G18/G25 Ignition Plastic		1
NO EXTERNAL ALTERNATOR. ENGINE USES INTERNAL CHARGING SYSTEM.				
16	F05007-119	<b>BOLT, 3/8-16 X 1 3/4" HEX HEAD GRADE 5</b>		4
17	F05011-3	<b>WASHER, 3/8" SAE FLAT</b>		4
18	F05010-10	<b>NUT, 3/8-16 HEX NYLON LOCK</b>		4
19	048237	<b>SUPPORT WELDMENT, DRIVE BELT</b>		1
20	F05007-118	<b>BOLT, 3/8-16 X 3/4" HEX HEAD GRADE 5</b>		1
21	F05010-19	<b>NUT, 3/8-16 SELF-LOCKING HEX</b>		1
22	047751	<b>BELT, 2/3VFL900 DRIVE</b>		1
	061326	<b>CARB KIT, G18 DE-ICING 24 755 64S</b>		1

## 5.8 Throttle/Clutch Assembly



REF	PART #	DESCRIPTION	COMMENTS	QTY.
1	065574	<b>BLOCK WELDMENT, LINKAGE CLUTCH/BRAKE</b>	Replaces 049139 to make clutch pivot stop adjustable (Rev. A6.05). T	1
2	F05012-16	<b>PIN, 3/16" X 1 1/4" ROLL</b>		1
3	016486	<b>BUSHING, 5/8" ID X 7/8" OD X 1 1/4" LONG FL BRONZE</b>		2
4	049340	<b>SHAFT, LT28 THROTTLE</b>		1
5	034815	<b>ACTUATOR WELDMENT, THROTTLE LT15D&amp;G</b>		1
6	F05007-68	<b>SCREW, 3/8-16 X 3/8" SOCKET HEAD CUP PT SET</b>		2
7	034818	<b>LINKAGE, THROTTLE LT15D&amp;G</b>		1
8	F05005-15	<b>BOLT, 1/4-20 X 1/2" HEX HEAD</b>		1
9	F05010-21	<b>NUT, 1/4-20 SWAGED</b>		1
10	P737	<b>BUSHING, 1" X 1 1/4" X 3/4" FLANGED BRONZE</b>		2
11	034608	<b>PIVOT WELDMENT, CLUTCH/BRAKE</b>		1
	034605	<b>LINKAGE ASSEMBLY, W/BEARING</b>		1
12	034604	Boss Weldment, Clutch/Brake Linkage		1
13	016486	Bushing, 5/8" ID x 7/8" OD x 1 1/4" Long Flanged Bronze		1
	038778	<b>NUT ASSEMBLY, 1/2-13 SPRING LOCKING</b>	Spring Locking Nut Assembly 038778 added Rev. A3.00 (replaces F05010-35 1/2-13 Hex Nut and F05011-9 1/2" Split Lock Washer).	1

REF	PART #	DESCRIPTION	COMMENTS	QTY.
14	F05010-31	Nut, 1/2-13 Hex Jam		1
15	038777	Nut, 1/2-13 Spring Lock		1
16	046975	Spring, .72" OD x .576" ID x 1.25L Compression		1
17	F05010-127	Nut, 1/2-13 Half Nylon Lock		1
	065874	<b>BRAKE/CLUTCH ASSEMBLY</b>		1
18	065873	Arm Weldment, Clutch/Brake		1
19	F05007-124	Bolt, 3/8-16 x 2 Hex Head Grade 5		1
20	F05010-10	Nut, 3/8-16 Hex Nyl Lock		2
21	F05011-3	Washer, 3/8" Flat SAE		3
22	F05010-25	Nut, 3/8-16 Swaged		1
23	034810	Spring, Idler Arm LT15/D/E/G		1
24	034602	Idler, 4" O.D. x 3/8" Bore		1
25	F05007-125	Bolt, 3/8-16 x 2-1/2" Hex Head Grade 5		1
26	016488	Block, LT15 Brake		2
27	F05004-2	Bolt, #10-24 x 1" Socket Head Cup		4
28	F05010-14	Nut, #10-24 Keps		8
29	F05004-282	Screw, 10-24 x 5/8" FSHC		4
30	065872	Plate, Brake Adjustment		2
31	F05011-18	Washer, #10 SAE Flat		4
32	F05010-29	<b>NUT, 3/8-16 JAM</b>		1
33	F05007-18	<b>SCREW, 3/8-16 X 1 1/4 SHOP SET</b>		1