

MACHINE

Gravely Pro-Turn 148
Kawasaki FX691 petrol · hydrostatic

FUEL

Unleaded 91 or higher
Max 10% ethanol · never E85

CUT HEIGHT

38–140 mm
6.4 mm increments

CUTTING WIDTH

122 cm

BEFORE YOU START

Fuel. Two tanks, 37.9 L combined. Fresh unleaded, 91 octane or higher, ethanol no greater than 10%. The engine is not compatible with E85 or other high-ethanol blends.

Tyres. 83–103 kPa (12–15 psi), front and rear. Uneven pressures make the machine pull to one side and cut unevenly.

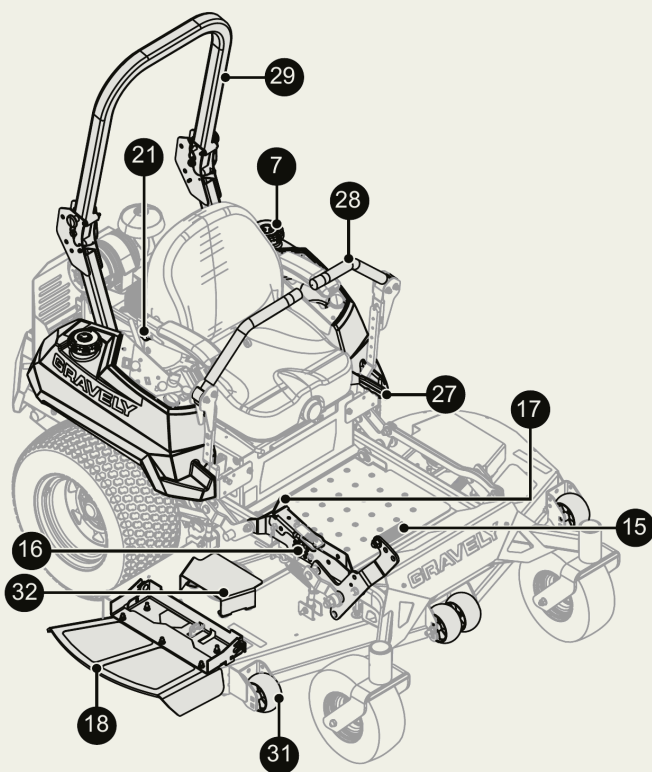
Controls. Check every control moves freely and returns, then run the interlock checks below.

Engine and hydraulic oil. Check the engine dipstick before each use. Check both hydraulic expansion tanks reach the cold fill mark with the engine cold — the seat tilts forward for access.

Deck, engine and air cleaner. Clear grass and debris from the deck, engine and cooling fins. Build-up cuts badly, overheats the engine and is a fire risk.

Hour meter. Engine runtime is recorded on the console. Your Hire Schedule sets the engine-hour allowance included in the hire.

MACHINE LAYOUT

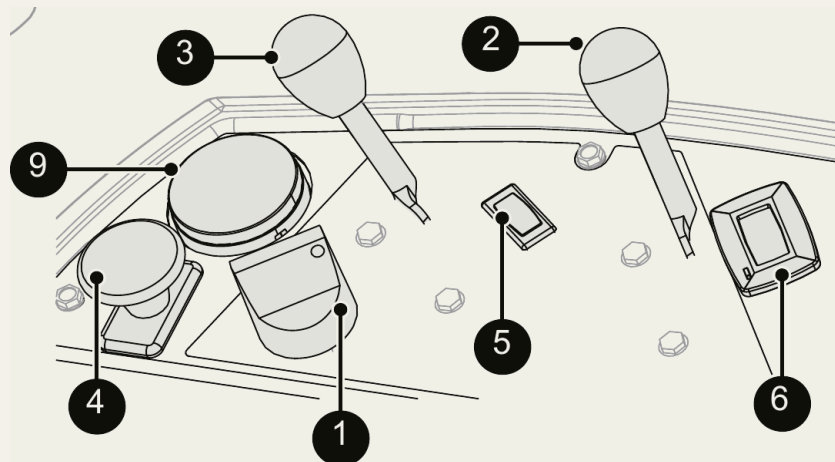


- 7 Fuel tanks and caps (two)
- 15 Deck lift pedal
- 16 Height-of-cut adjustment
- 17 Transport lock release lever
- 18 Flip-up discharge chute
- 21 Lumbar support lever
- 27 Parking brake lever
- 28 Steering levers
- 29 Rollover protection structure
- 31 Anti-scalp wheels
- 32 Belt covers — leave closed

SAFETY INTERLOCKS

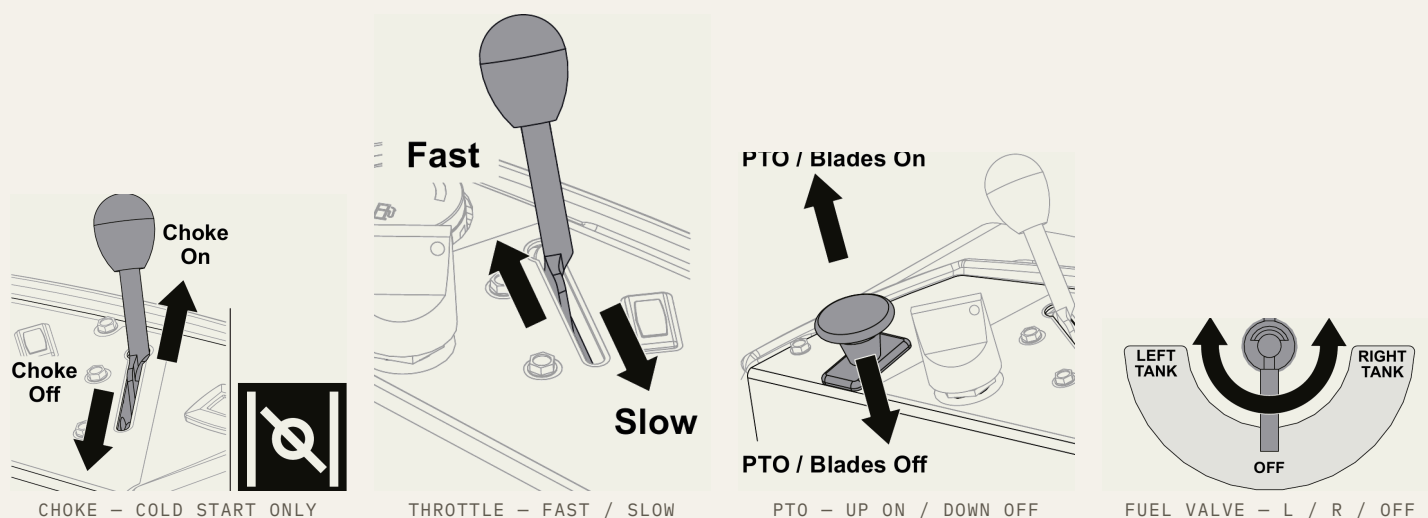
- The engine will only start with the PTO switch off and the parking brake engaged. Put the steering levers in neutral as well — that is step one of the start procedure.
- The engine shuts off if you lift off the seat with the PTO engaged, or with the parking brake released.
- Check both before you start work each day. If the engine starts with the PTO on or the brake off, or keeps running when you leave the seat, stop using the mower and contact us.
- Wear the seatbelt whenever the ROPS centre bar is raised. Never wear it with the bar lowered.

OPERATOR'S CONSOLE



- 1 Ignition key — cannot be removed in the on position
- 2 Choke control lever
- 3 Throttle control lever
- 4 Power take-off (PTO) switch — the blades
- 5 Oil pressure warning light — stop the engine immediately if it lights
- 6 Hour meter
- 9 Fuel gauges (one per tank)

CONTROL POSITIONS



STARTING AND STOPPING

START

In this order, every time

1. Steering levers in neutral.
2. Parking brake engaged.
3. PTO switch pushed down, off.
4. Fuel valve turned to the tank you want.
5. Choke on — only if the engine is cold.
6. Throttle to three-quarter fast.
7. Turn the key to start; release it as the engine fires.
8. Ease the choke off once it is running.

STOP

Wait for everything to stop before you get off

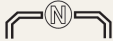
1. Steering levers to neutral.
2. Parking brake engaged.
3. Throttle back to three-quarter.
4. PTO switch pushed down, off.
5. Throttle to slow.
6. Key off and removed.
7. Fuel valve off if the mower is being parked overnight or transported.

TO START MOWING Release the parking brake · throttle to full fast · then pull the PTO switch up.

CRANKING Never crank for more than 10 seconds at a time. Allow 60 seconds between attempts.

EMERGENCY STOP Levers to neutral and rotated outward · parking brake on · PTO off · key out.

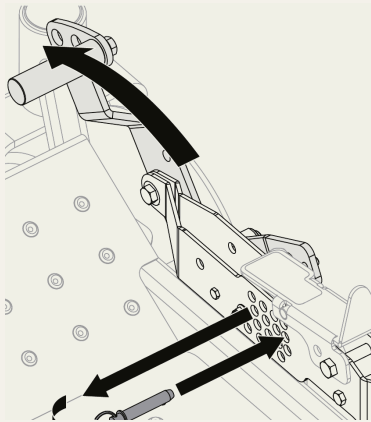
DRIVING

DIRECTION	STEERING LEVERS	
Forward		Push both levers forward from neutral.
Reverse		Pull both levers back from neutral.
Right turn		Push the left lever further forward than the right.
Left turn		Push the right lever further forward than the left.
Stop		Return both levers to neutral.

Go slowly at first. Move the levers gently and keep the throttle low until you are used to how the machine responds. Slopes can cause loss of steering control — be ready for it.

Turning. Aggressive turns scuff and tear lawns. Keep both wheels rotating; never turn with the inside wheel stopped. For the tightest turn, reverse the inside wheel slowly while the outside wheel creeps forward.

SETTING THE CUTTING HEIGHT



1. Push the deck lift pedal fully forward until the transport lock engages.
2. Put the adjustment pin through the hole for the height you want — 38 to 140 mm in 6.4 mm steps.
3. Push the pedal slightly forward, release the transport lock, then let the pedal back slowly until the deck rests on the pin.

Six anti-scalp wheels sit under the deck to stop it contacting the ground over high spots. If the deck is scalping, contact us — repositioning them is our job, not yours.

MOWING WELL

Full throttle, always. Mow at full throttle and only engage the PTO at full throttle. Engaging it at part throttle causes heavy belt wear.

Take a third at a time. When mulching, remove no more than a third of the grass length and never more than 25 mm in a pass. For very tall grass, mow it twice rather than dropping the deck.

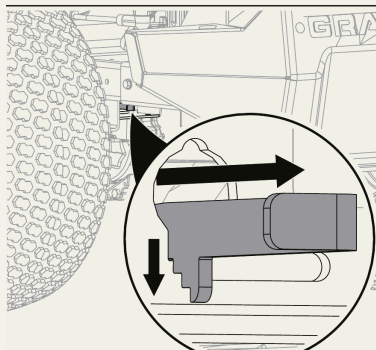
Discharge into cut ground. Throw clippings into the area you have already mown, and change your cutting pattern each time you mow.

Never engage a packed deck. If the deck is plugged with grass, clear it before engaging the PTO or you will damage the electric clutch.

Dry grass, sharp blades. Cut when the grass is dry. Do not travel too fast and do not set the height too low.

Clear the deck afterwards. Grass packed inside the deck ruins the next cut and holds heat. There is no cleaning fee — this is about your result, not ours.

MOVING IT WITH THE ENGINE OFF



TRANSAXLE BYPASS LEVER — ONE EACH SIDE

- 1. Levers in neutral, parking brake engaged.
- 2. Engine off, key out; wait for parts to stop and cool.
- 3. Pull both bypass levers out into bypass and move them down slightly to secure.
- 4. Release the parking brake and push the mower where you need it.
- 5. Engage the parking brake again.
- 6. Lift both levers slightly and push them back into the operating position before you start the engine.

The bypass is for pushing the machine a short distance on level ground. If the mower will not drive under its own power, check the bypass levers are back in the operating position.

TRANSPORT AND THE ROPS

Transport lock. Push the deck lift pedal fully forward to lock the deck up. To release, push the pedal forward, lift the transport lock release lever and let the pedal return slowly.

Before it moves. Engine off, parking brake engaged, key out, fuel valve off. Secure by the frame only — never by rods or linkages.

ROPS up, belt on. Keep the centre bar raised and wear the seatbelt. Lower it only to drive under an obstacle — that means pulling the hairpins and lock pins. No seatbelt while it is down; raise it again once clear.

Clearances. 172.7 cm high with the bar up, 121.9 cm folded. 199.6 cm long, 157.5 cm wide (127.0 cm with the chute up). Mass 481.7 kg.

We deliver and collect the mower. If you need to move it between sites yourself, check your hire agreement first — self-transport is not automatically permitted.

IF SOMETHING GOES WRONG

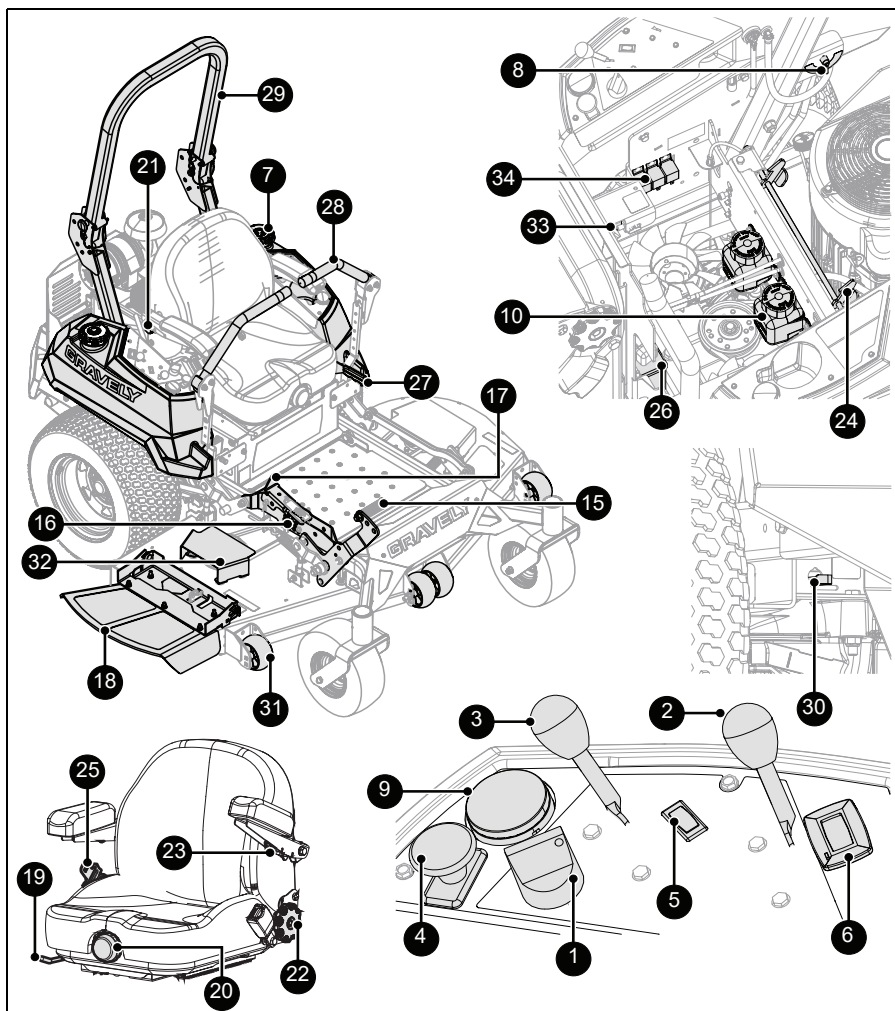
SYMPTOM	FIRST CHECK	THEN
Engine will not crank	PTO switch off and parking brake engaged — both are start interlocks.	RECHECK
Cranks but will not fire	Fuel valve turned to a tank with fuel in it; choke on if cold, off if warm.	RECHECK
Oil pressure light on	Nothing. Stop the engine immediately.	STOP · CONTACT US
Runs rough or overheats	Choke fully off, fuel level, grass packed against the engine and cooling fins.	RECHECK
Will not drive	Parking brake released and both transaxle bypass levers in the operating position.	RECHECK
Blades will not turn	You are seated and the PTO is switched on at full throttle.	RECHECK
Creeps with levers in neutral	Nothing you can adjust — this is a transaxle or brake interlock setting.	STOP · CONTACT US

LEAVE THESE TO US

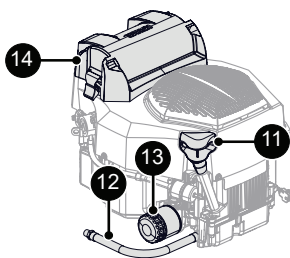
- Blade sharpening, balancing and replacement · deck levelling and pitch · anti-scalp wheel positions.
- PTO, mower drive and transaxle belts · belt covers and access panels · clutch, parking brake, steering lever and transaxle adjustment · hydraulic oil and filters · battery, fuses and relays.
- Do not attempt repairs, adjustments or modifications. Stop, park the machine safely and tell us what has happened.

This quick reference condenses the operation section of the Gravely operator's manual for the Pro-Turn 148 and is provided for convenience only. It does not replace the operator's manual, its safety section, the engine manual or the decals fitted to the machine, all of which must be read and followed before operating the machine. Where this summary and the manufacturer's manual differ, the manual governs. Use of the machine is subject to your hire agreement with Timech Hire Pty Ltd. Questions, faults and damage: contact@timech.com.au.

CONTROLS & FEATURES



Models
991132
991133



Models
991128
991129
991130

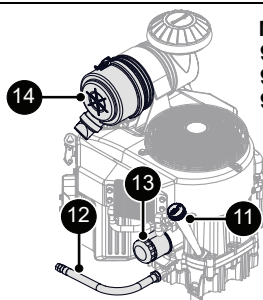


Figure 8

1. Ignition Key
2. Choke Control Lever
3. Throttle Control Lever
4. Power Take-off (PTO) Switch
5. Oil Pressure Warning Light
6. Hour Meter
7. Fuel Tank and Cap (2)
8. Fuel Valve
9. Fuel Gauge (2)
10. Hydraulic Oil Expansion Tank (2)
11. Oil Fill / Dipstick
12. Oil Drain
13. Engine Oil Filter
14. Air Filter
15. Deck Lift Pedal
16. Height-of-Cut Adjustment System
17. Transport Lock Release Lever
18. Flip-up Discharge Chute
19. Seat Adjustment Lever
20. Seat Height Adjustment Dial
21. Lumbar Support Adjustment Lever
22. Backrest Adjustment Dial
23. Armrest Angle Adjustment Knob (2)
24. Seat Latch
25. Seatbelt
26. Battery (under seat)
27. Parking Brake Lever
28. Steering Lever (2)
29. Rollover Protection Structure (ROPS)
30. Transaxle Bypass Lever (2)
31. Anti-Scalp Wheel (6)
32. Tool-less Belt Cover (2)
33. Fuse Box
34. Relay (3)



WARNING: AVOID INJURY.
Read and understand the *Safety* section before proceeding.

See Figure 8 for all controls and features locations.

IGNITION KEY

See Figure 9.

Controls power to the engine. The key cannot be removed when in on position.

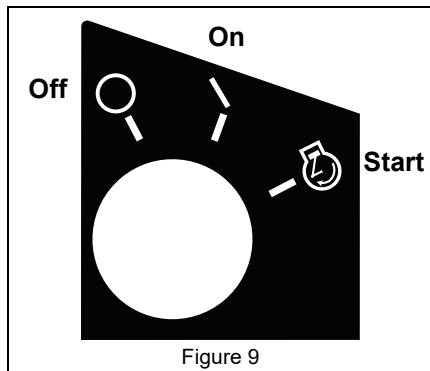


Figure 9

CHOKE CONTROL LEVER

See Figure 10.

Controls air intake to the engine.

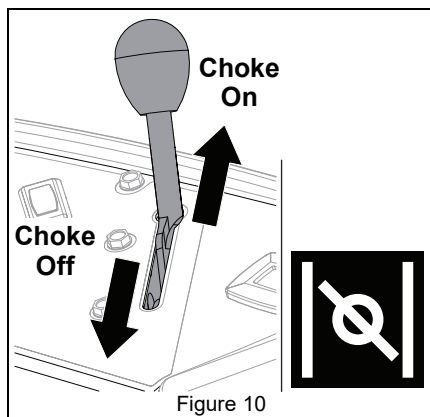


Figure 10

THROTTLE CONTROL LEVER

See Figure 11.

Controls engine speed.

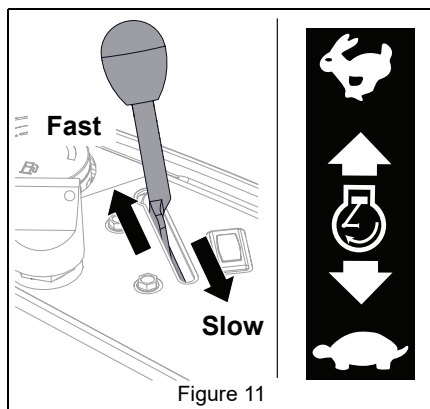


Figure 11

POWER TAKE-OFF (PTO) SWITCH

See Figure 12.

Controls power to mower blades. The engine will not start with the PTO switch in the on position.

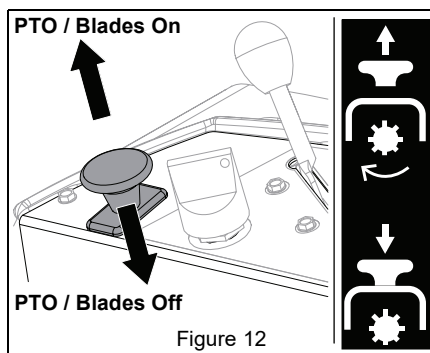


Figure 12

FUEL VALVE

See Figure 13.

Controls fuel flow to the engine. Directs fuel from left or right fuel tank or stops all fuel flow.

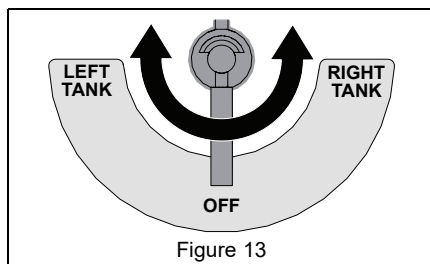
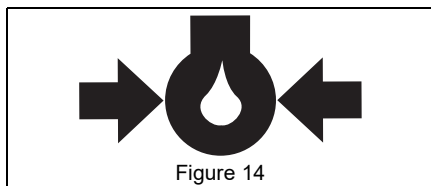


Figure 13

OIL PRESSURE WARNING LIGHT

See Figure 14.

Illuminates when oil pressure is low. Stop engine immediately and refer to engine manual.



DECK LIFT PEDAL

Raises mower deck to change height-of-cut setting.

HEIGHT-OF-CUT ADJUSTMENT SYSTEM

Sets the height of cut.

TRANSPORT LOCK

Locks mower deck in the highest position for transporting or moving unit from one work area to another. See *Transport Unit* on page 23.

TRANSAXLE BYPASS LEVERS

Engage and disengage transaxles so unit can be moved with the engine off.

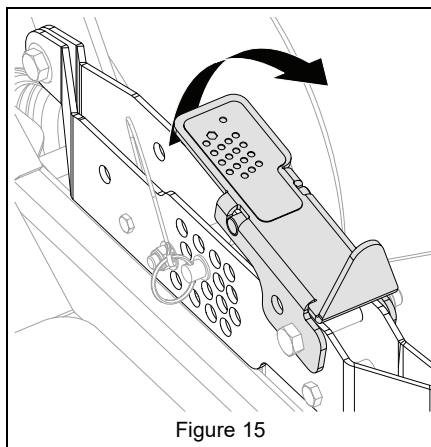
ANTI-SCALP WHEELS

Help prevent the deck from contacting the ground and scalping the lawn when mowing over high spots.

TRANSPORT LOCK RELEASE LEVER

See Figure 15.

Releases deck from transport lock position.



SEAT ADJUSTMENT LEVER

Unlocks seat to allow operator to move seat forward or backward and then lock in desired position.

SEAT HEIGHT ADJUSTMENT DIAL

Raises and lowers seat height for operator comfort.

LUMBAR SUPPORT ADJUSTMENT LEVER

Controls the lumbar support in the backrest for operator comfort.

BACKREST ADJUSTMENT DIAL

Controls backrest angle for operator comfort.

ARMREST ANGLE ADJUSTMENT KNOBS

Set armrest angle for operator comfort.

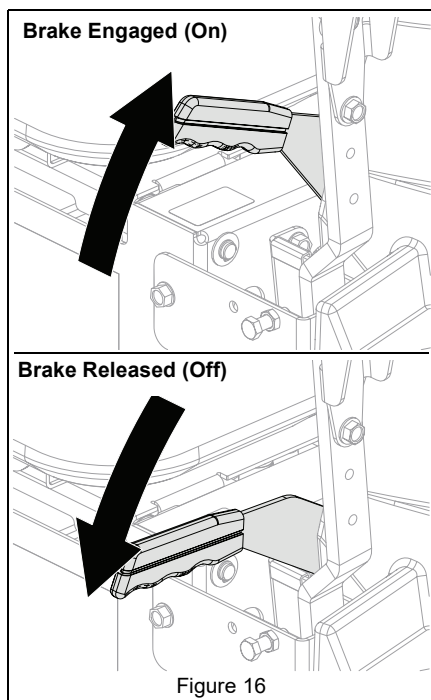
HOUR METER

Measures and displays engine runtime.

PARKING BRAKE LEVER

See Figure 16.

Engages the parking brake. The engine will not start when brake is released.



STEERING LEVERS

Control the direction and speed of unit. To stop unit, return both steering levers to neutral.

ROLLOVER PROTECTION STRUCTURE (ROPS)

Help protect operator that is wearing their seatbelt in the event of a rollover. **DO NOT** wear seatbelt when operating with ROPS in the lowered position.

SAFETY INTERLOCK SYSTEM

Monitors the interaction of various unit features for operator safety.

BEFORE OPERATION



WARNING: AVOID INJURY.
Read and understand the *Safety* section before proceeding.

1. Know how to stop in an emergency. See *Emergency Stopping* on page 21.
2. Check fuel level and add fuel if needed.

IMPORTANT: Use fresh unleaded fuel with an octane rating of at least 87. **DO NOT** use E85 blended fuels; the engine is not E20 / E30 / E85 compatible. The maximum recommended ethanol content is 10%. Gravely recommends using a quality fuel stabilizer in all fuel. See *Short-Term Storage* on page 42.

3. Check engine oil level and add oil if needed. Refer to engine manual.
4. Check hydraulic oil level. See *Check Hydraulic System* on page 25.
5. Check condition of air cleaner. Refer to engine manual.
6. Check function of all controls.
7. Check function of the Safety Interlock System by performing the tests below. Contact your Gravely dealer for repair if any of the tests fail.



WARNING: AVOID INJURY.
Failure of Safety Interlock System together with improper operation can result in severe personal injury.

Test	Steering Levers	PTO	Parking Brake	Result
Starting Interlock				
1	Neutral	Off	Engaged	Engine starts.
2	Forward, Neutral, Reverse	On	Engaged or Disengaged	Engine does not start.
3	Forward, Neutral, Reverse	On or Off	Disengaged	Engine does not start.
Operating Interlock (Engine On)				
4 *	Forward, Neutral, Reverse	On	Engaged or Disengaged	Engine shuts off.
5 *	Forward, Neutral, Reverse	On or Off	Disengaged	Engine shuts off.

* When operator lifts off seat.

POSITION ROPS

IMPORTANT: Inspect ROPS and seatbelt for damage and loose or missing hardware.

Raise Center Bar

See Figure 17.

1. Remove hairpins from lock pins and remove lock pins from hinge plate.
2. Raise center bar and secure with lock pins and hairpins.

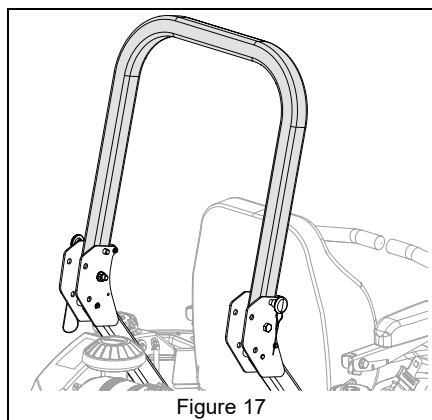
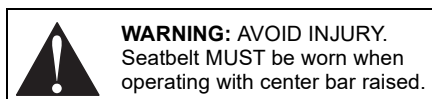
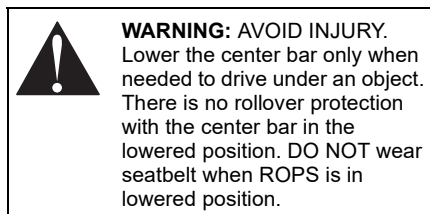


Figure 17

Lower Center Bar

See Figure 18.



1. Remove hairpins from lock pins and remove lock pins from hinge plate.
2. Lower center bar and secure with lock pins and hairpins.

IMPORTANT: Return center bar to the raised position when clear of obstacles.

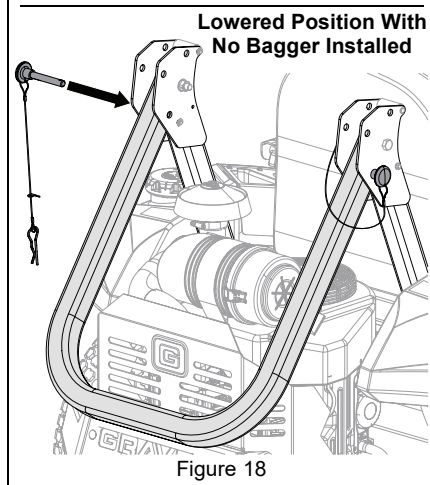
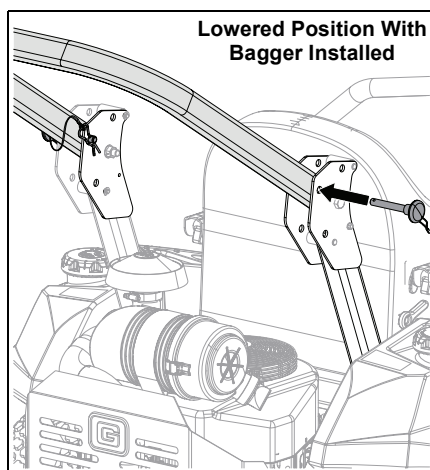


Figure 18

ADJUST SEAT



WARNING: AVOID INJURY.
Make all seat adjustments with the unit stopped, parking brake engaged and engine off.

See Figure 19.

Set Seat Height

Rotate seat height adjustment dial on front of seat to match the approximate weight of the operator.

Set Seat Position

1. While seated, pull seat adjustment lever inward and slide seat forward or backward to desired position.
2. Release lever and slide seat slightly forward or backward to lock position.

Set Lumbar Support

- Lift lever to increase lumbar support.
- Lower lever to decrease lumbar support.

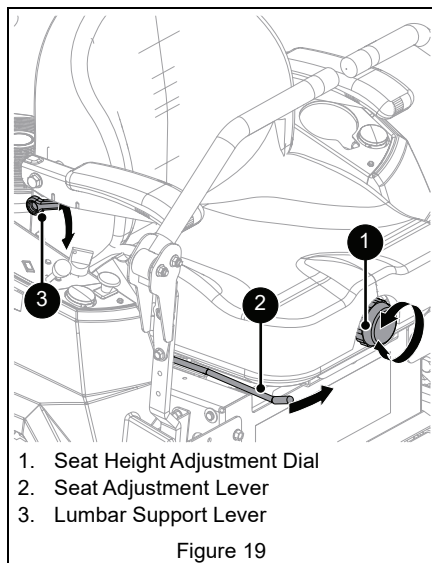


Figure 19

See Figure 20.

Set Backrest Angle

Rotate dial on left side of seat to adjust backrest angle.

Set Armrest Angle

Turn angle adjustment knob clockwise to raise the front of armrest or counterclockwise to lower front of armrest.

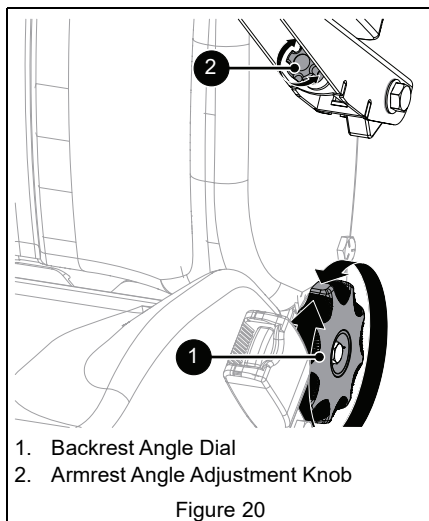


Figure 20

SET CUTTING HEIGHT

See Figure 21.

1. Push mower lift pedal forward until transport lock engages.
2. Insert adjustment pin through desired setting in height-of-cut adjustment system.
3. Push mower lift pedal slightly forward, release transport lock and slowly release mower lift pedal until it contacts adjustment pin and stops.

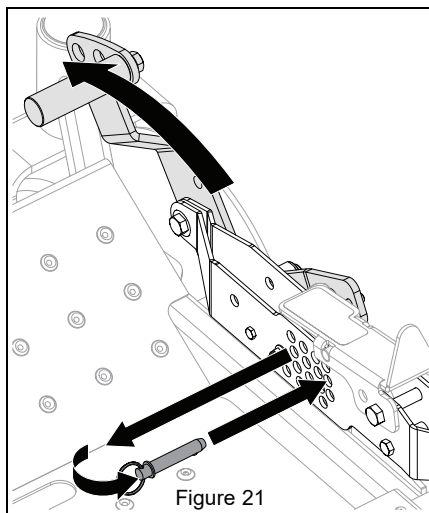


Figure 21

OPEN FUEL VALVE

See Figure 22.

- Turn fuel valve forward to use fuel from left tank.
- Turn fuel valve rearward to use fuel from right tank.
- Move valve to the off position when storing or transporting unit.

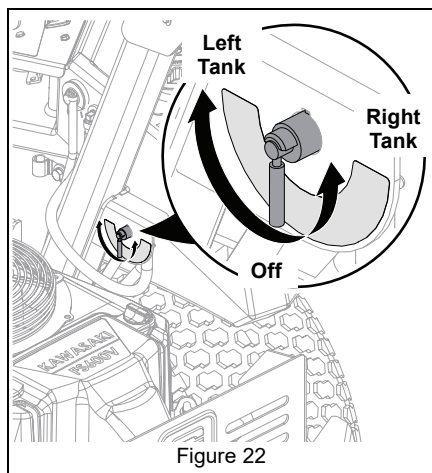


Figure 22

OPERATION



WARNING: AVOID INJURY.
Read and understand the *Safety* section before proceeding.

IMPORTANT: All references to left, right, front or rear are given from the perspective of operator in operator's position, facing the direction of forward travel.

EMERGENCY STOPPING



WARNING: AVOID INJURY.
Operating on slopes may lead to loss of steering control. Be prepared to react.

1. Place steering levers in neutral position and rotate outward.
2. Engage parking brake.
3. Push PTO switch down to off position.
4. Turn key to off position and remove from ignition.

START THE ENGINE

1. Move steering levers to neutral position.
2. Engage parking brake.
3. Push PTO switch down to off position.
4. Turn fuel valve to use fuel from desired tank.
5. If engine is cold, move choke control lever to on position. DO NOT use choke on a warm engine.
6. Move throttle control lever to 3/4 fast position.
7. Insert ignition key and turn to the start position. Release key when engine starts.

NOTICE: Do not operate the starter for more than 10 seconds per starting attempt. If the engine does not start, allow a 60-second cool down period between starting attempts.

8. Gradually move choke control lever to the off position after engine starts.

OPERATE UNIT

1. Release parking brake.
2. Set throttle control lever to fast position.
- IMPORTANT:** Engaging the PTO knob with the throttle lever set lower than fast position can cause excessive belt wear. ALWAYS use fast position when engaging the PTO.
3. Pull PTO knob up to on position.

IMPORTANT: Never engage the PTO if the mower is plugged with grass or other material. This may cause damage to the electric clutch.



WARNING: AVOID INJURY.
Move the steering levers slowly and keep the throttle at slow speed until you learn how to operate the unit.

4. Move steering levers to begin mowing.

Direction of Travel	Lever Position
Forward	Push both levers forward from neutral position. 
Reverse	Pull both levers backward from neutral position. 
Right Turn	Push left lever farther forward than the right lever. 
Left Turn	Push right lever farther forward than the left lever. 
Stop	Return both levers to neutral position. 

IMPORTANT: Aggressive turning can scuff or damage lawns. Always keep both wheels rotating when making sharp turns. **DO NOT** make turns with inside wheel completely stopped. For minimum turning radius, slowly reverse inside wheel while moving outside wheel slowly forward.

For Best Mowing Results

- Cut grass when it is dry.
- Keep mower blades sharp.
- Keep mower deck properly leveled.
- Adjust anti-scalp wheels to prevent scalping.
- Do not set height of cut too low. For very tall grass, mow twice.
- Do not travel too fast.
- Mow with engine at full throttle.
- When mulching, only remove 1/3 of grass length per cutting. Do not cut more than 2.5 cm (1") at a time.
- Discharge clippings into areas already cut.
- Change cutting pattern with each mowing.
- Do not allow grass or debris to collect inside mower deck. Clean after each use.

STOP THE ENGINE



WARNING: AVOID INJURY.
Wait for all moving parts to stop before leaving operator's position.

1. Move steering levers to the neutral position.
2. Engage parking brake.
3. Reduce throttle to 3/4 fast position.
4. Push PTO switch down to off position.
5. Move throttle control lever to slow position.
6. Turn key to off position and remove from ignition.

MOVE UNIT MANUALLY

Bypass the transaxles to move the unit with the engine off.

1. Place steering levers in neutral position and engage parking brake.
2. Stop engine, remove key and wait for moving parts to stop and for hot parts to cool.
3. Pull both transaxle bypass levers out into bypass position. Move levers down slightly to secure position. See Figure 23.

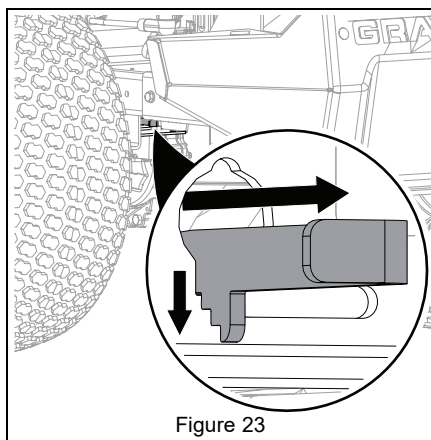


Figure 23

4. Release parking brake and push unit to desired location.
5. Engage parking brake.

6. Lift bypass levers up slightly and push into operating position. See Figure 24.

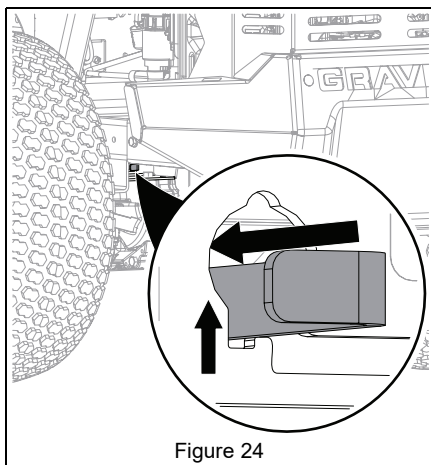


Figure 24

TRANSPORT UNIT

1. Push deck lift pedal completely forward to engage transport lock. Release pedal.
2. Move unit to transport vehicle.
3. Stop engine, engage parking brake, remove key from ignition and turn fuel valve to off position.
4. Secure mower frame to transport vehicle.

NOTICE: NEVER secure unit to vehicle from rods or linkages that could be damaged.

RELEASE TRANSPORT LOCK

1. Push deck lift pedal forward and lift transport lock release lever.
2. Slowly return mower lift pedal to resting position.

MAINTENANCE



WARNING: AVOID INJURY.
Read and understand the *Safety* section before proceeding.

Proper maintenance can prolong the life of unit. The *Maintenance Schedule* on Page 24 shows the recommended service schedule.

Your Gravely dealer can provide service and adjustments to keep your unit operating at peak efficiency. Contact an authorized engine manufacturer's service center for engine service.

More frequent service may be required due to working conditions (heavy loads, high

ambient temperatures, dusty conditions, or airborne debris).

See the maintenance instructions in the Engine Manual for additional information.

SERVICE POSITION

1. Park unit on a flat, level surface.
2. Engage parking brake and rotate steering levers outward.
3. Stop engine, remove key and wait for moving parts to stop and for hot parts to cool.
4. Disengage seat latch from seat plate and rotate seat forward. See Figure 25.
5. Chock wheels. Strap and clamp unit onto lift, if used.



CAUTION: AVOID INJURY.
Seat assembly is heavy. Secure your footing to accommodate weight shift when rotating seat forward.

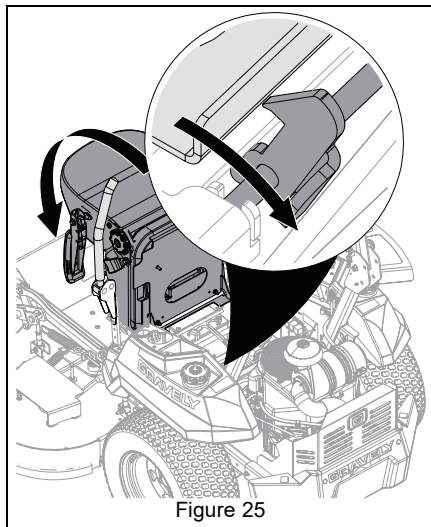


Figure 25

MAINTENANCE SCHEDULE

Service Performed	Each Use	Every 25 hrs.	Every 50 hrs.	Every 100 hrs.	Every 400 hrs.	Every 500 hrs.
Check Engine Oil *	•					
Change Engine Oil *						
Clean Engine of any Grass and Debris	•					
Check Air Filter *			•			
Change Air Filter *						
Clean Engine * Cooling System						
Check Safety Interlock System	•					
Check Hydraulic System	•					
Check Tire Pressure	•					
Check Mower Blades		•				
Lubricate Unit			•			
Check Parking Brake			•			
Clean Battery				•		
Check Fasteners				•		
Check Belts				•		
Change Hydraulic Oil and Filter **					•	
Lubricate Caster Fork Bearings						•
Lubricate Caster Wheel Bearings						•
Adjust Clutch‡						•
* Refer to engine manual for instructions.						
** Change after first 75 hours of operation.						
‡ Adjust clutch every 500 hours or once per season if used less than 500 hours.						

SERVICE PARTS

See your Gravely dealer to purchase service parts for your unit.

Description	Qty.	Part No.
Air Filter (Outer) (Models 991128, 991129, 991130)	1	21548800
Air Filter (Inner) (Models 991128, 991129, 991130)	1	21548700
Air Filter (Models 991132, 991133)	1	21500010
Engine Oil Filter (Models 991128, 991129, 991130)	1	21535800
Engine Oil Filter (Models 991132, 991133)	1	20715100
Spark Plug (Models 991128, 991129, 991130)	2	21536100
Spark Plug (Models 991132, 991133)	2	21500009
Fuel Filter (Models 991128, 991129, 991130)	1	21573800
Fuel Filter (Models 991132, 991133)	1	21539500
PTO Belt (Engine to Deck) – 48"	1	07200809
Mower Drive Belt – 48"	1	07200035
Mower Blade – 48"	3	00450200
Mulching Blade – 48"	3	00273000
PTO Belt (Engine to Deck) – 52"	1	07200706
Mower Drive Belt – 52"	1	07200036
Mower Blade – 52"	3	00450300
Mulching Blade – 52"	3	04887600
PTO Belt (Engine to Deck) – 60"	1	07200712
Mower Drive Belt – 60"	1	07200038
Mower Blade – 60"	3	09081200
Mulching Blade – 60"	3	04887700
23 x 10.5-12 Tire	1	07101043
Transaxle Drive Belt	1	07226400
Fuel Stabilizer – 118 ml (4 oz)	A/R	04730300
Hydraulic Oil Filter	2	21545100
Hydraulic Oil and Filter Kit	1	59402700
Relay	A/R	04438400

CHECK SAFETY INTERLOCK SYSTEM

See *Before Operation* on page 18. If system does not operate correctly, see your dealer for repair. DO NOT operate until repairs are made.

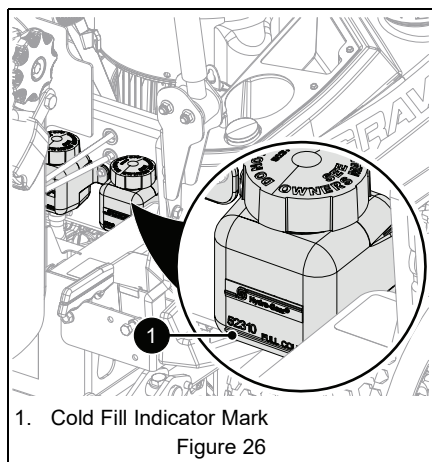
CHECK HYDRAULIC SYSTEM

Check Hydraulic Oil Level

See Figure 26.

1. Place unit in service position. See *Service Position* on page 23.
2. Check oil level in expansion tanks. Oil should reach the cold fill indicator mark.

IMPORTANT: Engine should be cold when checking initial oil level.



3. Operate engine for 1 minute and recheck oil levels.
4. Add hydraulic oil, if needed. See *Add Hydraulic Oil* on page 25.

Add Hydraulic Oil

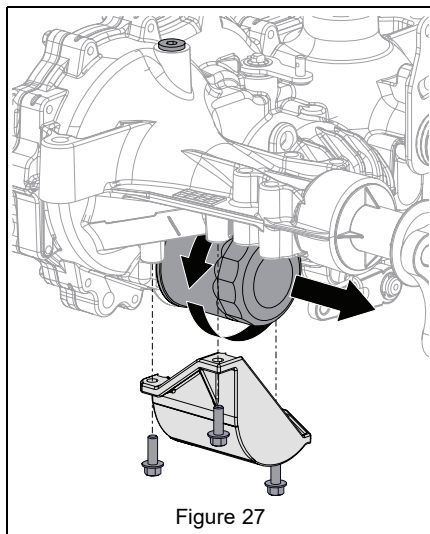
1. Place unit in service position. See *Service Position* on page 23.
2. Remove hydraulic oil expansion tank caps.
3. Fill expansion tanks with 15W-50 Full-Synthetic Hydraulic Fluid (Gravely p/n 00057100) or equivalent until oil reaches the cold fill indicator mark. See Figure 26.
4. Reinstall expansion tank caps.

Change Hydraulic Oil and Filter

1. Operate unit for a few minutes to warm hydraulic oil.
2. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
3. Position container under oil filter to catch used oil.

See Figure 27.

4. Remove filter guard and oil filter from transaxle.
5. Remove vent / fill plug from the fill port and allow transaxle to drain completely.



6. Wipe filter-mounting surface clean.
7. Lubricate rubber gasket on new oil filter with clean hydraulic oil.
8. Spin filter onto filter housing until it makes contact, and then turn filter 3/4 turn to tighten.
9. Reinstall filter guard and torque to 7.3 N•m (65 lb-in). DO NOT overtighten.
10. Add 15W-50 Full-Synthetic Hydraulic Fluid (Gravely p/n 00057100) or equivalent until oil appears at the bottom of the fill port (1892.7 mL (64 fl. ounces) per transaxle).
11. Reinstall the vent / fill plug and torque to 20.3 N•m (180 lb-in).
12. Add hydraulic oil to expansion tank until oil reaches cold fill indicator mark. See *Check Hydraulic Oil Level*, step 4.
13. Repeat steps 3 – 12 for other transaxle.
14. Purge hydraulic system. See *Purge Hydraulic System* on page 26.

Purge Hydraulic System

Purge air from hydraulic system after draining oil or changing the filter.



WARNING: AVOID INJURY. This adjustment requires operating the engine. Use extreme care to avoid contact with moving parts and hot surfaces. Be sure rear of unit is well supported and secure before starting engine.

1. Park unit facing a wall or chock wheels.
2. Release parking brake.
3. Support unit so drive wheels are off the ground.
4. Bypass transaxles. See *Move Unit Manually* on page 22.
5. Start the engine and slowly move steering levers forward and backward 5 or 6 times.
6. Stop engine.
7. Return transaxle bypass levers to operating position. See *Move Unit Manually* on page 22.
8. Start engine.
9. Slowly move steering levers forward and backward 5 or 6 times.
10. Stop engine, lower unit to ground and check oil level. Add oil if needed.
11. Repeat steps 1 – 10 until transaxles operate smoothly in forward and reverse at normal speed without excessive noise.

CHECK TIRE PRESSURE

Check and adjust tire pressure. See *Specifications* on page 43.



WARNING: AVOID INJURY. Explosive separation of tire and rim parts is possible.

- DO NOT inflate tires above maximum pressure listed on tire sidewalls.
- DO NOT inflate tires with a compressor; use a hand pump.
- DO NOT stand in front of tire assembly when inflating. Use a clip-on chuck and extension hose long enough to allow you to stand to one side.
- DO NOT mount a tire without proper equipment and experience.

CHECK MOWER BLADES

Check blades for wear. Replace or sharpen as needed.



CAUTION: AVOID INJURY. Use sturdy gloves or padding to protect hands when working with mower blades.

Rotation of one blade rotates the other blades.

Remove Blades

1. Place unit in service position. See *Service Position* on page 23.
2. Disconnect spark plug wires.
3. Remove and retain hardware securing blades to spindles and remove blades. See Figure 28.

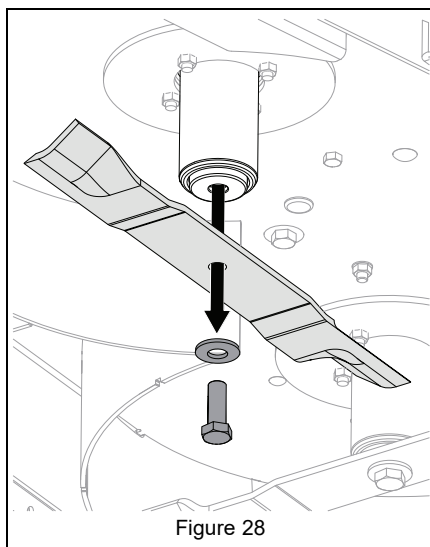


Figure 28

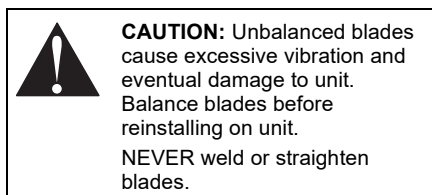
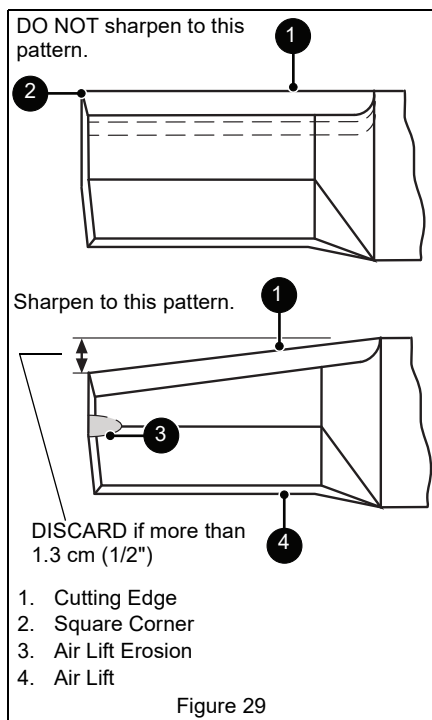
Sharpen Blades



CAUTION: DO NOT sharpen blades while attached to unit.

1. Remove blades. Discard blades if:
 - More than 1.3 cm (1/2") of metal is removed.
 - Air lifts are eroded.
 - Blades are bent or broken.

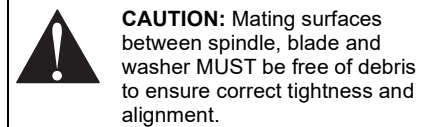
2. File or grind an equal amount of metal from each cutting edge of the blade until sharp. DO NOT change angle of cutting edge or round the corner of the blade. See Figure 29.



3. Check blade balance by sliding an unthreaded bolt through center hole. Hold the bolt level. If blade does not remain horizontal, sharpen the heavy end until blade is balanced.

Install Blades

See Figure 28.



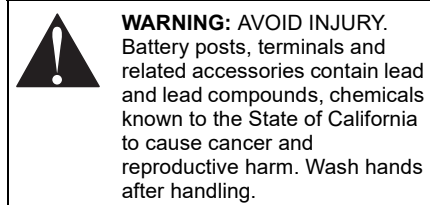
1. Secure blades to spindles with hardware removed earlier. Torque to 156 N•m – 217 N•m (115 lb-ft – 160 lb-ft).
2. Reconnect spark plug wires.

CHECK PARKING BRAKE

IMPORTANT: Parking brake lever engages drive wheels with two independent cables. It is possible for parking brake to engage one drive wheel only, indicating parking brake cable on opposite side is out of adjustment.

1. Place unit in service position. See *Service Position* on page 23.
2. Bypass transaxles. See *Move Unit Manually* on page 22.
3. Push unit forward.
 - If unit does not move forward, parking brake is functioning correctly. Advance to step 4.
 - If unit moves forward easily or if just one side of unit moves easily, adjust parking brake. See *Adjust Parking Brake* on page 32.
4. Return transaxle bypass levers to operating position. See *Move Unit Manually* on page 22.
5. Return seat to operating position.

CLEAN BATTERY



Remove Battery

See Figure 30.

1. Place unit in service position. See *Service Position* on page 23.
2. Disconnect the negative cable and then the positive cable from battery.
3. Remove wing knobs securing hold-down bracket to battery and remove bracket.

4. Remove battery.

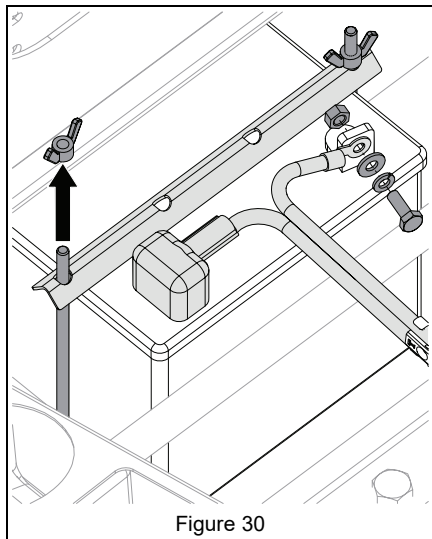


Figure 30

Clean Battery

1. Clean terminals and battery cable ends with a wire brush.
2. Coat terminals with dielectric grease or petroleum jelly.

Install Battery

1. Install battery and secure with hold-down bracket and wing knobs.
2. Reconnect positive cable and then the negative cable.
3. Place boot over positive terminal.
4. Return seat to operating position.

CHARGE BATTERY

Check battery with a voltmeter. If battery is less than 11 volts, charge battery.

NOTICE: DO NOT fast charge. Charging at a higher rate damages or destroys battery. ONLY use an automatic charger designed for use with your battery.

NOTICE: Always follow information provided on battery by battery manufacturer. Contact battery manufacturer for details regarding charging.

1. Remove battery from unit. See *Remove Battery* on page 27.
2. Place battery on bench in a well-ventilated area.
3. Connect positive lead of charger to positive terminal.
4. Connect negative lead of charger to negative terminal.

5. Charge battery following battery manufacturer's instructions.
6. Reinstall battery. See *Install Battery* on page 28.

Jump Starting

Gravely does not recommend jump starting your unit. Jump-starting can damage engine and system components. Refer to engine manual for details.

CHECK FASTENERS

Check for loose hardware and tighten if necessary.

LUBRICATE UNIT

1. Apply oil to all pivot points and pin connections.
2. Pump grease into grease fittings.

Lubricate Caster Fork Bearings

See Figure 31.

1. Place steering levers in neutral position and engage parking brake.
2. Stop engine, remove key and wait for moving parts to stop and for hot parts to cool.
3. Remove dust cap.
4. Pump grease into the fitting until grease appears at the top of the upper bearing.

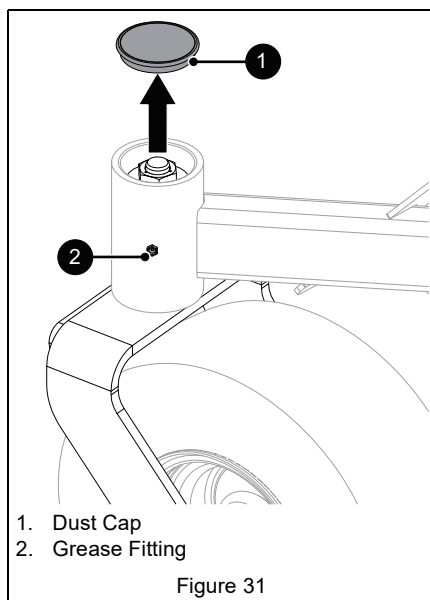


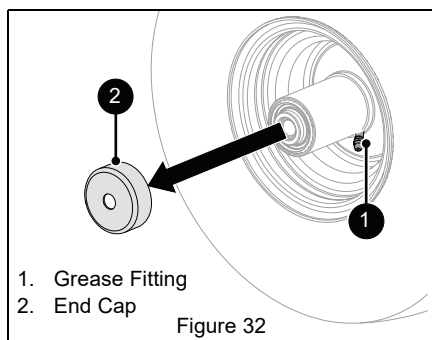
Figure 31

5. Reinstall dust cap.

Lubricate Caster Wheel Bearings

1. Place unit in service position. See *Service Position* on page 23.
2. Support unit so front wheels are off the ground.
3. Remove wheel from fork.
See Figure 32.
4. Remove end caps from wheel hub.
5. Pump grease into fitting until grease squeezes through the seal in the wheel hub.
6. Wipe away excess grease.
7. Reinstall end caps onto wheel hub.
8. Reinstall wheel into fork and lower unit to ground.

IMPORTANT: After tightening bolt, tire should not have any side-to-side play. Tighten bolt until there is a slight amount of drag on the wheel bearing. The wheel should not spin freely.

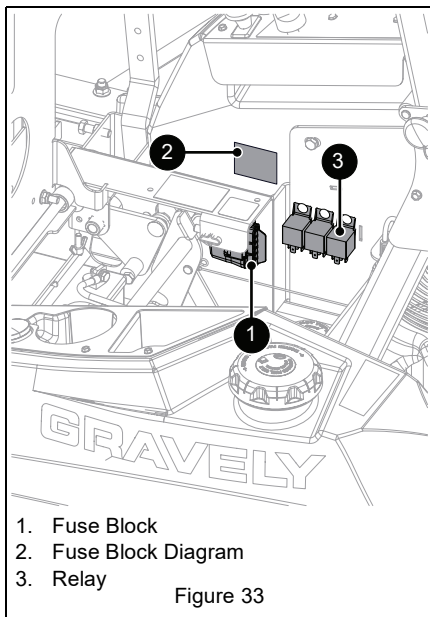


3. Install new fuse.

Replace Relay

NOTICE: Relays are interchangeable. Use only quality replacement parts. See *Service Parts* on page 24.

1. Remove defective relay.
2. Determine cause of relay failure and repair condition.
3. Install new relay.



SERVICE & ADJUSTMENTS



WARNING: AVOID INJURY.
Read and understand the *Safety* section before proceeding.

ELECTRICAL SERVICE

See Figure 33.

Replace Fuse

NOTICE: To avoid damaging the circuit, replace fuses with fuses of the same amperage rating. Determine the cause of electrical failure and repair before replacing failed electrical components.

1. Remove defective fuse.
2. Determine cause of fuse failure and repair condition.

ADJUST TRANSAXLES

Check For Excessive Creep



WARNING: AVOID INJURY.
This adjustment requires operating the engine. Use extreme care to avoid contact with moving parts and hot surfaces. Be sure rear of unit is well supported and secure before starting engine.

1. Operate unit for a minimum of 5 minutes to warm hydraulic system.
2. Stop engine and engage parking brake.
3. Chock front wheels and support unit so both drive wheels are off the ground.
4. Remove drive wheels.
5. Start engine, move throttle lever to fast position and release parking brake.

6. Move steering levers forward and backward 5 or 6 times and then return levers to neutral position.
7. Check wheel hubs for rotation.
 - If there is only slight rotation, stop engine, reinstall wheels and lower unit to ground.
 - If there is excessive rotation, adjust neutral position as directed below.

IMPORTANT: Torque wheel lug nuts to 81.3 N•m – 122.0 N•m (60 lb-ft – 90 lb-ft).

Adjust Neutral Position

If wheel hub has excessive rotation after checking for excessive creep, adjust neutral position.

1. Loosen the return-to-neutral screw on the transaxle. See Figure 34.

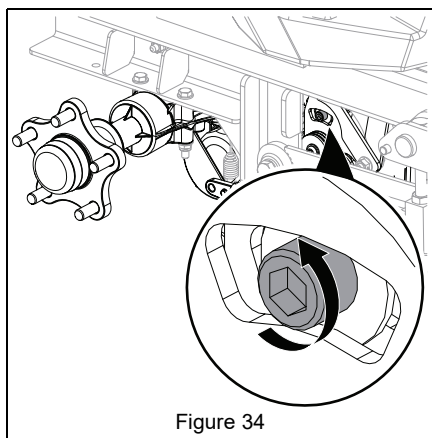
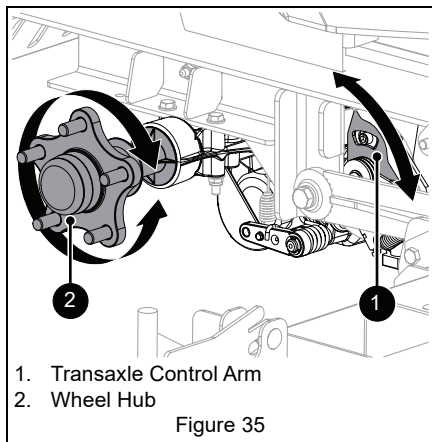


Figure 34

2. Slowly turn transaxle control arm in the opposite direction of hub rotation until hub stops. See Figure 35.



1. Transaxle Control Arm
2. Wheel Hub

Figure 35

3. Hold the transaxle control arm in position and tighten the return-to-neutral screw.
4. Start engine, move throttle lever to fast position and release parking brake.
5. Move steering levers forward and backward 5 or 6 times and then return levers to neutral position.
6. Check wheel hubs for rotation.
 - If there is only slight rotation, stop engine, reinstall wheels, return unit to operating position and advance to *Adjust Parking Brake Interlock* on Page 30.
 - If there is excessive rotation, repeat steps 1 – 6.

IMPORTANT: Torque wheel lug nuts to 81.3 N•m – 122.0 N•m (60 lb-ft – 90 lb-ft).

ADJUST PARKING BRAKE INTERLOCK



WARNING: AVOID INJURY.

This adjustment requires operating the engine. Use extreme care to avoid contact with moving parts and hot surfaces. Be sure unit is secure and will not move.

If the parking brake interferes with the neutral position of the steering levers and the transaxles, the brake interlock may need adjustment.

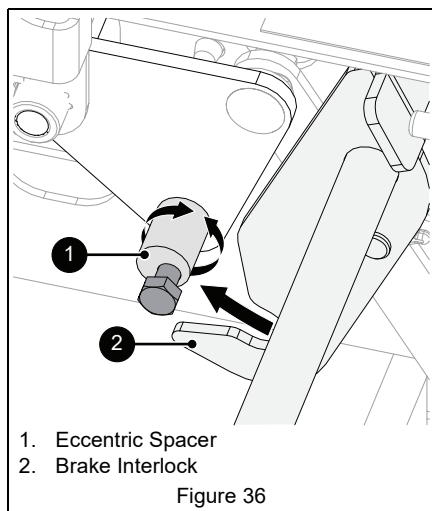
Check Parking Brake Interlock

1. Place unit in service position, but DO NOT engage parking brake. Chock or block wheels instead. See *Service Position* on page 23.
2. Make sure steering levers are in neutral position.
3. Watch the steering levers and engage parking brake.
 - If one or both steering levers move from the neutral position, set parking brake neutral. See *Set Parking Brake Neutral* on page 31.
 - If there is little to no steering lever movement, advance to step 4.

4. Start the engine and move the throttle lever to fast position.
 - If the unit creeps or the transaxles make a whining sound, set parking brake neutral. See *Set Parking Brake Neutral* on page 31.
 - If the unit doesn't move and the transaxles are quiet, no adjustment is needed.
5. Stop engine, return unit to operating position and adjust steering levers. See *Adjust Steering Levers* on page 31.

Set Parking Brake Neutral

1. Adjust transaxles. See *Adjust Transaxles* on page 29.
2. Stop engine, remove key and wait for moving parts to stop and for hot parts to cool.
3. Release parking brake.
4. Loosen hardware retaining eccentric spacer on the affected side(s).
5. Engage parking brake and rotate eccentric spacer so it aligns in brake interlock. See Figure 36.



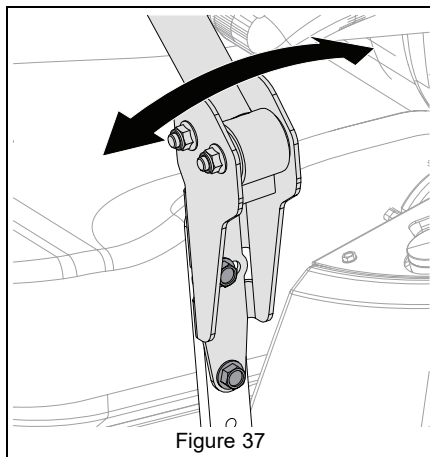
3. Tighten eccentric spacer hardware.
4. Stop engine, return unit to operating position and adjust steering levers. See *Adjust Steering Levers* on page 31.

ADJUST STEERING LEVERS

Align Steering Levers

If there is more than 3.2 mm (1/8") between the horizontal alignment of the steering levers, align the levers.

1. Place steering levers in neutral position and engage parking brake.
2. Stop engine, remove key and wait for all moving parts to stop and for hot parts to cool.
3. Loosen mounting hardware, align levers and tighten hardware. See Figure 37.



Adjust Forward Position

The steering lever forward position may be adjusted for operator comfort.

See Figure 37.

1. Place steering levers in neutral position and engage parking brake.
2. Stop engine, remove key and wait for moving parts to stop and for hot parts to cool.
3. Loosen mounting hardware on steering lever assemblies.
4. Place steering levers in desired position:
 - Gently push levers forward for greater distance from operator.
 - Gently pull levers back for closer distance to operator.
5. Tighten hardware.

IMPORTANT: The steering levers should not touch each other. There should be no more than 3.2 mm (1/8") difference between the horizontal and vertical alignment of the levers.

Adjust Height

See Figure 38.

The steering lever height may be adjusted for operator comfort.

1. Place steering levers in neutral position and engage parking brake.
2. Stop engine, remove key and wait for moving parts to stop and for hot parts to cool.
3. Remove steering lever hardware and remove steering lever from lower control arm.
4. Position steering lever at desired height and align with lower control arm. Secure with original hardware.

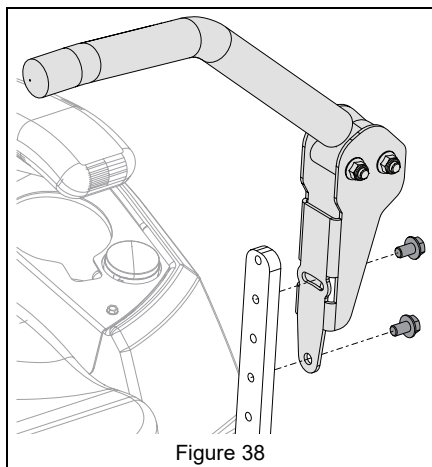


Figure 38

5. Adjust steering lever position. See *Adjust Forward Position* on page 31.
6. Turn eccentric spacer so levers are at the same height and have a 1.3 cm – 2.5 cm (1/2" – 1") gap between lever ends. See Figure 39.

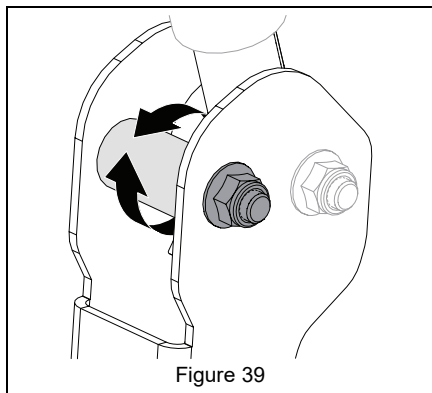


Figure 39

ADJUST UNIT TO DRIVE STRAIGHT

Adjust Tire Pressure

1. Place unit in service position. See *Service Position* on page 23.
2. Check tire pressures. If needed, adjust to recommended pressures. See *Specifications* on page 43.

IMPORTANT: DO NOT inflate tires outside recommended range.

3. Check tracking. If unit does not drive in straight line, adjust limiter bolts. See *Adjust Limiter Bolts* on page 32.

Adjust Limiter Bolts

See Figure 40.

Limiter bolts can be adjusted to increase or decrease drive wheel speeds. To adjust:

1. Loosen jam nut.
 - Turn limiter bolt counterclockwise to increase maximum drive wheel speed on that side.
 - Turn limiter bolt clockwise to reduce maximum drive wheel speed on that side.
2. Tighten jam nut.

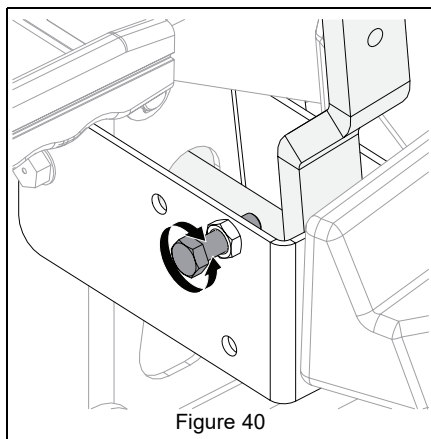


Figure 40

3. Adjust steering lever position. See *Adjust Forward Position* on page 31.

ADJUST PARKING BRAKE

Unit is equipped with two parking brake cables that independently control parking brake on each drive wheel.

1. Place unit in service position. See *Service Position* on page 23.
2. Check parking brake. See *Check Parking Brake* on page 27.

See Figure 41.

3. Loosen jam nuts on cable adjustment barrel.
4. Adjust parking brake cable(s).
 - To increase brake response on one or both sides, loosen front jam nut(s) and tighten rear jam nut(s).
 - To decrease brake sensitivity on one or both sides, loosen rear jam nut(s) and tighten front jam nut(s).
5. Check parking brake and readjust if necessary.

IMPORTANT: Make sure both parking brake cables are within adjustment range.

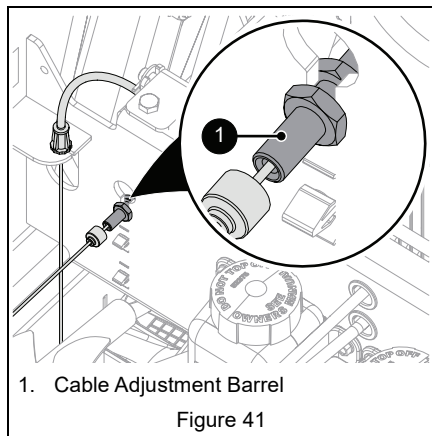


Figure 41

REPLACE MOWER BELTS



CAUTION: Damaged or worn belts may result in injury and / or damage to the unit. Check belts for excessive wear or cracks often.

Remove PTO Belt

See Figure 42.

1. Place steering levers in neutral position and engage parking brake.
2. Stop engine, remove key and wait for moving parts to stop and for hot parts to cool.
3. Position mower deck at lowest cutting height.
4. Move seat to rearmost position.
5. Remove belt cover.
6. Open access panel.

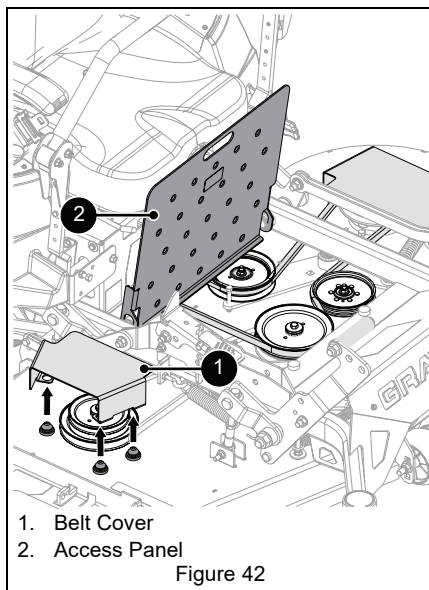


Figure 42



CAUTION: Use care when releasing idler spring tension. Keep body parts away from idlers when performing this operation.

See Figure 43.

3. Slowly remove spring hook from anchor bolt to release tension from belt idler.
4. Remove PTO belt.

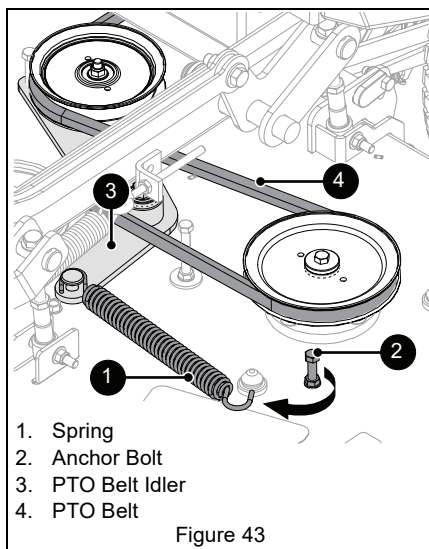
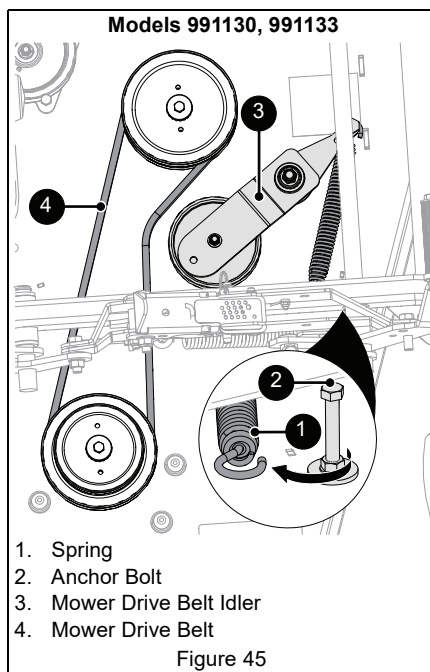
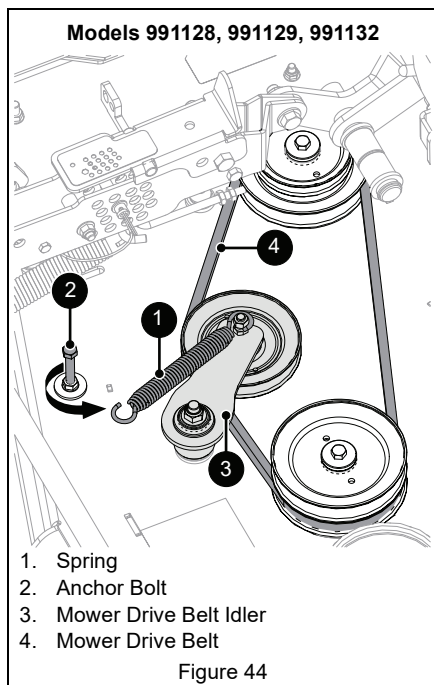


Figure 43

Remove Mower Drive Belt

See Figure 44 and Figure 45.

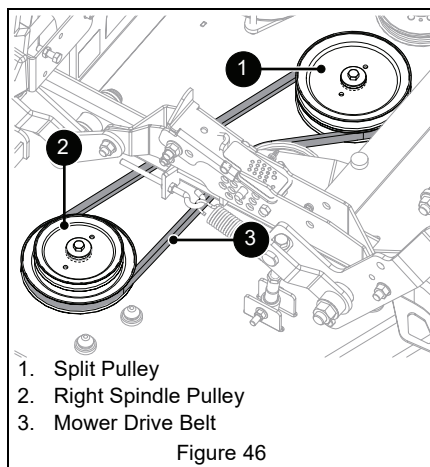
1. Slowly remove spring hook from anchor bolt to release tension from belt idler.
2. Remove mower drive belt.



Install Mower Drive Belt

See Figure 46.

1. Install mower drive belt around bottom groove of split pulley at deck center and around bottom groove of right spindle pulley.
2. Reinstall idler spring hook around anchor bolt to apply tension to belt.



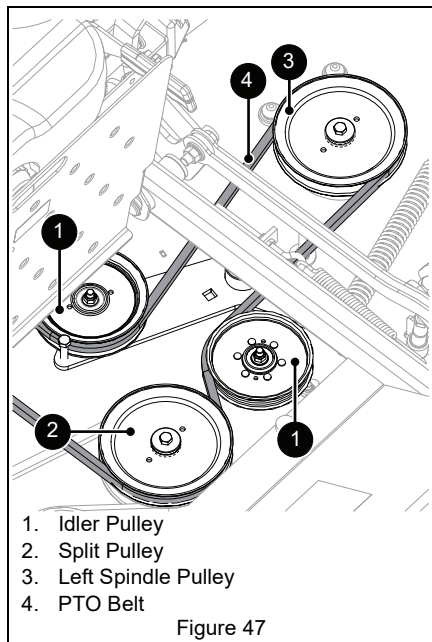
Install PTO Belt

IMPORTANT: Mower drive belt **MUST** be installed before PTO belt. See *Install Mower Drive Belt* on page 34.

1. Install PTO belt around clutch sheave at rear of unit.

See Figure 47.

2. Install PTO belt around top groove of split pulley at deck center and around left spindle pulley.
3. Align belt with idler pulleys.
4. Reinstall idler spring hook around anchor bolt to apply tension to belt.



IMPORTANT: Make sure belts are correctly aligned in pulleys.

5. Reinstall belt covers.
6. Close footboard.

REPLACE TRANSAXLE DRIVE BELT

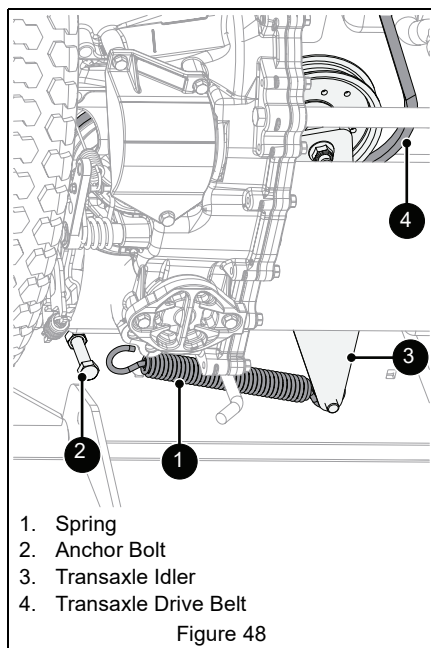
Remove Transaxle Drive Belt

1. Place unit in service position. See *Service Position* on page 23.
2. Remove PTO belt from clutch. See *Remove PTO Belt* on page 33.



CAUTION: Use care when releasing idler spring tension. Keep body parts away from idlers when performing this operation.

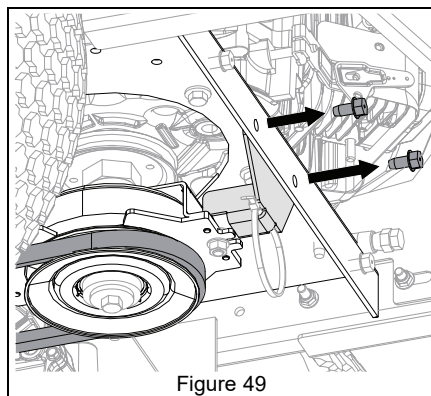
3. Under unit, slowly remove spring hook from anchor bolt to release transaxle idler tension. See Figure 48.



See Figure 49.

5. Remove hardware securing clutch stop bracket to frame and remove bracket.

NOTICE: DO NOT cut cable tie.



6. Remove transaxle drive belt from drive system in the following order:
 - a. From right transaxle sheave.
 - b. From left transaxle sheave.
 - c. From engine sheave.

Install Transaxle Drive Belt

See Figure 50.

1. Install transaxle drive belt to drive system in the following order:
 - a. Around left transaxle sheave.
 - b. Around engine sheave.
 - c. Around right transaxle sheave.
2. Align belt with idler pulley.

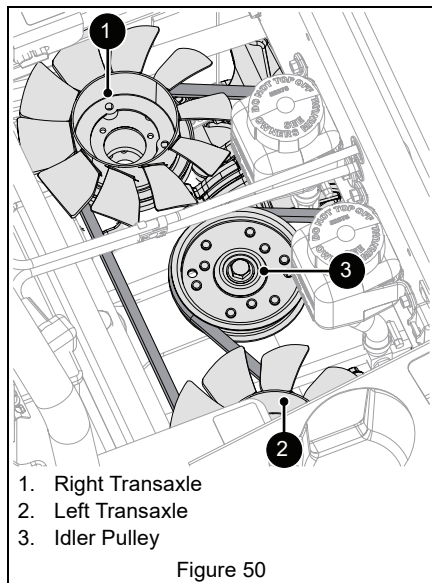


Figure 50

3. Reinstall idler spring hook onto anchor bolt. Make sure belt has tension and is aligned in all pulleys.
4. Reinstall clutch stop bracket and secure with original hardware.
5. Return seat to operating position.
6. Reinstall PTO belt. See *Install PTO Belt* on page 35.

ADJUST ANTI-SCALP WHEELS

See Figure 51.

The anti-scalp wheels are set at the factory for typical mowing height, but can be adjusted for high or low cutting conditions.

1. Place steering levers in neutral position and engage parking brake.
2. Stop engine, remove key and wait for moving parts to stop and for hot parts to cool.
3. Remove hardware securing anti-scalp wheels to deck and remove wheels.
4. Position wheels as necessary:
 - For a very high cutting height, set the anti-scalp wheels in the lowest position on the bracket.
 - For a very low cutting height, set the anti-scalp wheels in the highest position on the bracket.
5. Secure with original hardware.

IMPORTANT: All anti-scalp wheels **MUST** be set to the same height.

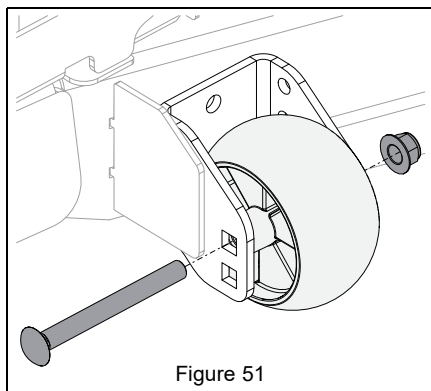


Figure 51

ADJUST DECK LIFT PEDAL

See Figure 52.

1. Place steering levers in neutral position and engage parking brake.
2. Stop engine, remove key and wait for moving parts to stop and for hot parts to cool.
3. Remove hardware securing deck lift pedal to deck lift arm.
4. Place pedal in desired position.
5. Reinstall hardware and torque to 71 N•m – 95 N•m (52 lb-ft – 70 lb-ft).

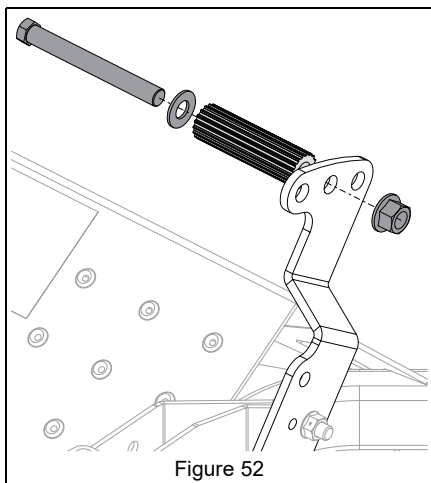


Figure 52

REMOVE / INSTALL MOWER DECK

Remove Deck

1. Place unit in service position. See *Service Position* on page 23.



WARNING: AVOID INJURY. Springs store energy. Keep body parts away from pinch points when removing the deck.

2. Remove PTO belt from clutch. See *Remove PTO Belt* on page 33.



WARNING: AVOID INJURY. Mower lift arms and lift pedal could cause severe injury if the lift-assist springs are not disconnected before the lift links.

3. Push deck lift pedal completely forward to engage transport lock.
4. Position supports such as blocks or jack stands under each side of the deck.
5. Release transport lock and slowly lower deck until it rests on supports.

6. Slowly disconnect lift-assist springs from spring peg on each side of deck. See Figure 53.

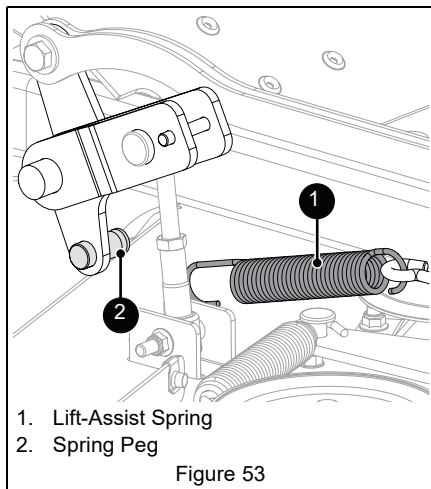


Figure 53

See Figure 54.

7. Remove hardware retaining deck lift links to deck lift brackets.
8. Remove rear mounting pins securing mounting arms to deck.

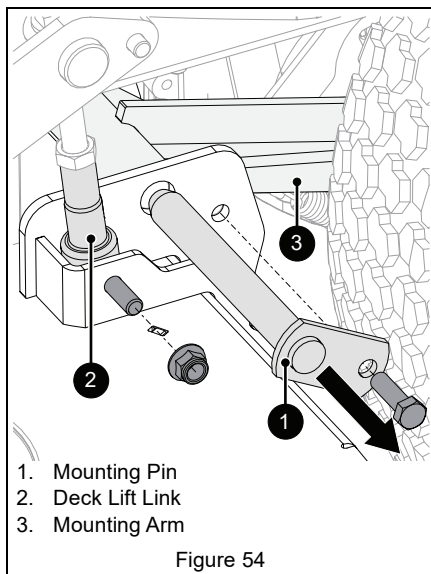


Figure 54

9. Slide deck out from under unit.

Install Deck

See Figure 54.

1. Position deck under unit.
2. Connect rear mounting arms to deck with mounting pins. Secure with original hardware.
3. Secure deck lift links to deck lift brackets with original hardware.
4. Reinstall PTO belt around clutch. See *Install PTO Belt* on page 35.
5. Push deck lift pedal completely forward to engage transport lock.
6. Reconnect lift-assist springs to spring pegs.
7. Level the deck. See *Level and Pitch Mower Deck* on page 38.

LEVEL AND PITCH MOWER DECK

IMPORTANT: Make sure unit is on a flat, level surface and that tires are inflated to the recommended pressures.

Check Blade Level and Pitch

1. Place steering levers in neutral position and engage parking brake.
2. Stop engine, remove key and wait for moving parts to stop and for hot parts to cool.
3. Raise deck to 3 1/2" (8.9 cm) cutting height.

See Figure 55.

4. Position mower blades so ends point left to right across the width of the deck.
5. Measure the distance between the ground and the cutting edge of the left and right blades. If the measurements are not within 4.7 mm (3/16") of each other, level the deck. See *Level Mower Deck* on page 38.

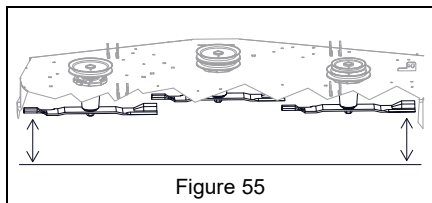


Figure 55

See Figure 56.

6. Position mower blades so ends point front to back and measure the following:
 - At the front of the deck, measure the distance between the ground and the cutting edge of the middle blade.
 - At the rear of the deck, measure the distance between the ground and the cutting edge of the left and the right blades.

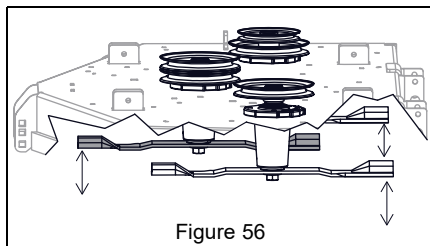


Figure 56

If the front measurement is not 3.2 mm (1/8") lower than the rear measurements, adjust the blade pitch. See *Adjust Blade Pitch* on page 39.

Level Mower Deck

See Figure 57.

1. Lower the high side of deck:
 - a. Loosen jam nuts against deck-leveling links.
 - b. Turn adjustment bolts counterclockwise.
 - c. Measure distance between the ground and cutting edges of left and right blades. Continue adjustment if necessary.
 - d. Tighten jam nuts against deck-leveling links.
2. Raise the low side of deck:
 - a. Loosen jam nuts against deck-leveling links.
 - b. Turn adjustment bolts clockwise.
 - c. Measure distance between the ground and cutting edges of left and right blades. Continue adjustment if necessary.
 - d. Tighten jam nuts against deck-leveling links.

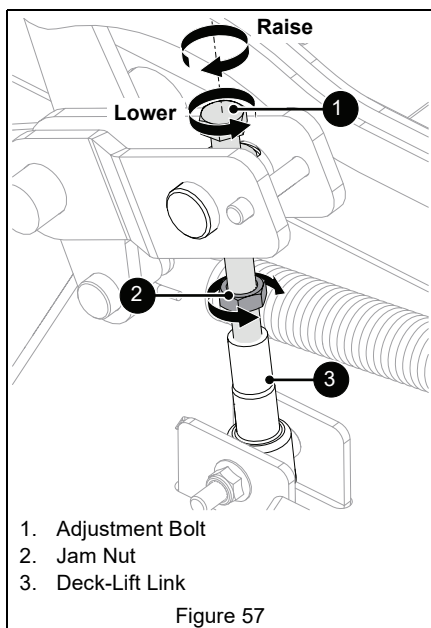


Figure 57

Adjust Blade Pitch

IMPORTANT: Side-to-side deck heights **MUST** remain level even after completing pitch adjustment.

IMPORTANT: Pitching the front of the blades lower than the rear provides a balance between cut quality and the power needed to cut grass. Certain cutting conditions require the deck rear to be pitched lower than the front. Positioning the deck this way requires more engine power but can provide better cut quality.

1. Increase forward pitch:
 - a. Loosen jam nuts against all deck-leveling links.
 - b. Turn front adjustment bolts counterclockwise to lower deck front.
 - c. Turn rear adjustment bolts clockwise to raise deck rear.
 - d. Check adjustment. See *Check Blade Level and Pitch* on page 38.
 - e. Tighten jam nuts against deck-leveling links.
2. Decrease forward pitch:
 - a. Loosen jam nuts against all deck-leveling links.
 - b. Turn front adjustment bolts clockwise to raise deck front.
 - c. Turn rear adjustment bolts counterclockwise to lower deck rear.

- d. Check adjustment. See *Check Blade Level and Pitch* on page 38.
- e. Tighten jam nuts against deck-leveling links.

REVERSE CLUTCH BRAKE PLATES

See Figure 58.

1. Remove hardware securing brake plates to clutch bracket. Retain for reinstallation.
2. Reverse the brake plates so unworn side faces up and secure to clutch bracket using original hardware.
3. Torque hardware to 20 N•m (14.8 lb-ft).

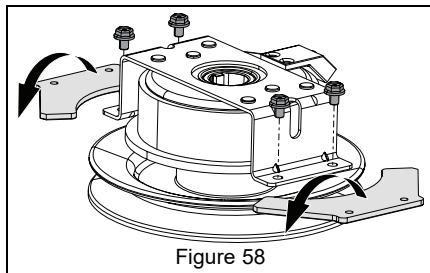


Figure 58

TROUBLESHOOTING

Problem	Probable Cause	Correction
Engine does not start.	PTO switch is in the on position.	Push PTO switch down to off position. See <i>Power Take-off (PTO) Switch</i> on page 16.
	Parking brake is released.	Engage parking brake. See <i>Parking Brake Lever</i> on page 18.
	Fuel tank is empty.	Fill fuel tank. See <i>Before Operation</i> on page 18.
	Fuel supply is contaminated.	Replace with clean fuel.
	Battery is not charged.	Charge battery. See <i>Charge Battery</i> on page 28.
	Battery cables are loose or corroded.	Clean and tighten cables. See <i>Clean Battery</i> on page 27.
	Spark plug wire(s) are loose or spark plug(s) are faulty.	Connect spark plug wire(s) or replace spark plug(s). Refer to engine manual.
	Safety Interlock System is not engaged or is faulty.	Check Safety Interlock System. See <i>Before Operation</i> on page 18.
	Electrical system is faulty.	Contact your Gravely dealer.
	Engine is faulty.	Contact your Gravely dealer.
Engine runs rough.	Choke control lever is engaged.	Move lever to off position. See <i>Choke Control Lever</i> on page 16.
	Fuel tank is empty.	Fill fuel tank. See <i>Before Operation</i> on page 18.
	Spark plug is faulty.	Replace spark plug. Refer to engine manual.
	Fuel filter is dirty.	Clean or replace filter. Refer to engine manual.
	Air filter cartridge is plugged.	Clean or replace air filter cartridge. Refer to engine manual.
	Engine is faulty.	Contact your Gravely dealer.
Engine overheats.	Engine oil level is low.	Add engine oil. Refer to engine manual.
	Cooling fins are plugged.	Clean engine. Refer to engine manual.
	Engine is faulty.	Contact your Gravely dealer.
Engine runs when ignition key is in the off position.	Ignition ground wire is disconnected.	Connect ground wire to clean, metal surface.
	Ignition switch is faulty.	See your Gravely dealer.

TROUBLESHOOTING

Problem	Probable Cause	Correction
Unit does not drive.	Parking brake is engaged.	Release parking brake. See <i>Parking Brake Lever</i> on page 18.
	Transaxles are bypassed.	Return transaxle bypass levers to operating position. See <i>Move Unit Manually</i> on page 22.
	Transaxle drive belt is faulty.	Replace transaxle drive belt. See <i>Replace Transaxle Drive Belt</i> on page 35.
	Transaxles are faulty.	Contact your Gravelly dealer.
	Transaxle drive system is faulty.	Contact your Gravelly dealer.
	Hydraulic oil level is low.	Add hydraulic oil. See <i>Check Hydraulic System</i> on page 25.
PTO does not work.	Operator presence switch is not engaged.	Activate switch by sitting on seat.
	Operator presence switch is faulty.	Contact your Gravelly dealer.
	PTO belt is faulty.	Replace PTO belt. See <i>Replace Mower Belts</i> on page 33.
	PTO switch, wiring, connectors or clutch are faulty.	Contact your Gravelly dealer.
Unit moves with engine off and parking brake engaged.	Parking brake is faulty.	Contact your Gravelly dealer.
Unit does not drive straight.	Tire pressure is incorrect.	Check tire pressure. See <i>Specifications</i> on page 43.
	Steering levers need adjustment.	See <i>Adjust Unit to Drive Straight</i> on page 32.
Unit creeps when steering levers are in neutral position.	Transaxles need adjustment.	See <i>Adjust Transaxles</i> on page 29.
	Parking brake interlock needs adjustment.	See <i>Adjust Parking Brake Interlock</i> on page 30.
Unit has poor cutting quality.	Mower blades not level or mower deck pitch is incorrect.	Level and adjust pitch of mower deck. See <i>Level and Pitch Mower Deck</i> on page 38.
	Mower blades are dull or faulty.	Sharpen or replace mower blades. See <i>Sharpen Blades</i> on page 26.
	Mowing speed is too fast.	Drive slower when cutting grass.
	Belt tension or condition is poor.	Replace PTO belt or mower drive belt. See <i>Replace Mower Belts</i> on page 33.
	Cutting height is too low.	Do not set height of cut too low. For very tall grass, mow twice.
Oil pressure light is illuminated.	Oil pressure is low.	Stop engine immediately and refer to engine manual.

STORAGE



WARNING: AVOID INJURY.
Read and understand the *Safety* section before proceeding.

SHORT-TERM STORAGE

IMPORTANT: NEVER wash unit with high-pressure water or store outdoors.

1. Allow unit to cool and clean with mild soap and water.
2. Tighten all hardware to correct specifications.
3. Inspect unit for visible signs of wear or damage. Repair as needed.
4. Prepare fuel system for storage.

NOTICE: Gravely recommends using a quality fuel stabilizer in all fuel. Gasoline left in the fuel system without a stabilizer, even for short periods of time, deteriorates and leaves gummy deposits in the system that may cause damage. For the best effectiveness, add stabilizer to all fuel containers whenever purchasing fuel. Add the stabilizer to the container before adding fuel.

- a. Add Gravely fuel stabilizer (see *Service Parts* on page 24) or equivalent according to manufacturer's instructions to the fuel tank and any fuel containers with remaining fuel.
 - b. Operate engine outdoors for at least 5 minutes to allow stabilizer to reach the carburetor.
5. Close fuel valve and allow engine to stop on its own.
 6. Turn key to off position and remove from ignition.
 7. Store unit in a cool, dry, protected area. DO NOT store unit outdoors.

LONG TERM STORAGE

1. Perform short-term storage procedures.
2. Lubricate as directed in *Maintenance* on page 23.
3. Touch-up all scratched painted surfaces.
4. Remove and charge battery as directed in *Charge Battery* on page 28. Store battery in a cool, dry, protected area.
5. Store unit in a cool, dry, protected area. DO NOT store unit outdoors.

START-OF-SEASON PREPARATION

1. Before adding fuel for the first time after long-term storage, add fresh, stabilizer-treated fuel to fuel tank and any fuel containers with remaining fuel.
2. Charge and install the battery.

ACCESSORIES

See your Gravely dealer for a complete list of compatible accessories and attachments for your unit.

Description	Part No.
Operator Controlled Discharge Baffle Kit	79222200
12" Gravely Hub Cap Kit (Set of 2)	79102100
13" Semi-Pneumatic Tire Kit	79105200
Hitch Kit	79215800
Work Light Kit	79216200
Mulching Kit 48" Decks	79105700
Mulching Kit 52" Decks	79105800
Mulching Kit 60" Decks	79105900
Lawn Striper Kit	79206700
6" Wheel Covers (Set of 2)	79210600
Sun Shade Kit	79212600

Bagger Kits*

Base Kit	89100700
• Kit for 48" Decks	79106000
• Kit for 52" Decks	79106100
• Kit for 60" Decks	79106200

*Bagger kits are ordered in two parts. Complete baggers require Base Kit 89100700 *plus* the kit matching the deck size of the unit.

SPECIFICATIONS

Model Number	991128	991129	991130
Description	Pro-Turn 148	Pro-Turn 152	Pro-Turn 160
Engine	Kawasaki FX691		Kawasaki FX730
Displacement – cm ³ (in ³)	726 (44.3)		
Maximum RPM – No Load	3600 ± 100		
Oil Capacity	Refer to engine manual.		
Liquid or Air Cooled	Air		
Electrical			
Starter	Electric		
Battery	12-Volt Maintenance-Free, 300 CCA 10U1L		
PTO (Power Take-off)	Electric PTO Clutch / Brake		
Fuel			
Tank Capacity – liter (gal)	37.9 (10)		
Type	Refer to engine manual.		
Transmission			
Type	Hydrostatic Drive		
Oil	Use 15W-50 Full-Synthetic Hydraulic Fluid (Gravely p/n 00057100) or equivalent		
Hydraulic Oil Filter	Yes		
Drive Speed			
Forward Maximum – km/h (mph)	16.1 (10.0)		
Reverse Maximum – km/h (mph)	8.0 (5.0)		
Turning Radius	Zero		
Brakes	Parking		
Mower Deck			
Cutting Height – cm (in)	3.8 – 14.0 (1.5 – 5.5)		
Cutting Height Increments – cm (in)	0.635 (0.25)		
Cutting Width – cm (in)	122.0 (48.0)	132.0 (52.0)	152.4 (60.0)
Deck Lift	Mechanical Pin Lock		
Size and Weight			
Length – cm (in)	199.6 (78.6)		
Width – cm (in) • Discharge Chute Down • Discharge Chute Up	157.5 (62.0) 127.0 (50.0)	171.5 (67.5) 141.0 (55.5)	190.5 (75.0) 160.0 (63.0)
Height – cm (in) • with ROPS extended • with ROPS folded	172.7 (68.0) 121.9 (48.0)		
Weight – kg (lb)	481.7 (1062.0)	489.4 (1079.0)	508.5 (1121.0)
Tires			
Front Tire Size – in	13 x 6.5-6		
Rear Tire Size – in	23 x 10.5-12		
Recommended Front Tire Pressure – kPa (psi)	83 – 103 (12 – 15)		
Recommended Rear Tire Pressure – kPa (psi)	83 – 103 (12 – 15)		

SPECIFICATIONS

Model Number	991132	991133
Description	Pro-Turn 152	Pro-Turn 160
Engine	Kohler ZT730	Kohler ZT740
Displacement – cm ³ (in ³)	747.0 (46.0)	
Maximum RPM – No Load	3600 ± 75	
Oil Capacity	Refer to engine manual.	
Liquid or Air Cooled	Air	
Electrical		
Starter	Electric	
Battery	12-Volt Maintenance-Free, 300 CCA 10U1L	
PTO (Power Take-off)	Electric PTO Clutch / Brake	
Fuel		
Tank Capacity – liter (gal)	37.9 (10)	
Type	Refer to engine manual.	
Transmission		
Type	Hydrostatic Drive	
Oil	Use 15W-50 Full-Synthetic Hydraulic Fluid (Gravely p/n 00057100) or equivalent	
Hydraulic Oil Filter	Yes	
Drive Speed		
Forward Maximum – km/h (mph)	16.1 (10.0)	
Reverse Maximum – km/h (mph)	8.0 (5.0)	
Turning Radius	Zero	
Brakes	Parking	
Mower Deck		
Cutting Height – cm (in)	3.8 – 14.0 (1.5 – 5.5)	
Cutting Height Increments – cm (in)	0.635 (0.25)	
Cutting Width – cm (in)	132.0 (52.0)	152.4 (60.0)
Deck Lift	Mechanical Pin Lock	
Size and Weight		
Length – cm (in)	199.6 (78.6)	
Width – cm (in) • Discharge Chute Down • Discharge Chute Up	171.5 (67.5) 141.0 (55.5)	190.5 (75.0) 160.0 (63.0)
Height – cm (in) • with ROPS extended • with ROPS folded	172.7 (68.0) 121.9 (48.0)	
Weight – kg (lb)	484.4 (1068.0)	503.5 (1110.0)
Tires		
Front Tire Size – in	13 x 6.5-6	
Rear Tire Size – in	23 x 10.5-12	
Recommended Front Tire Pressure – kPa (psi)	83 – 103 (12 – 15)	
Recommended Rear Tire Pressure – kPa (psi)	83 – 103 (12 – 15)	