

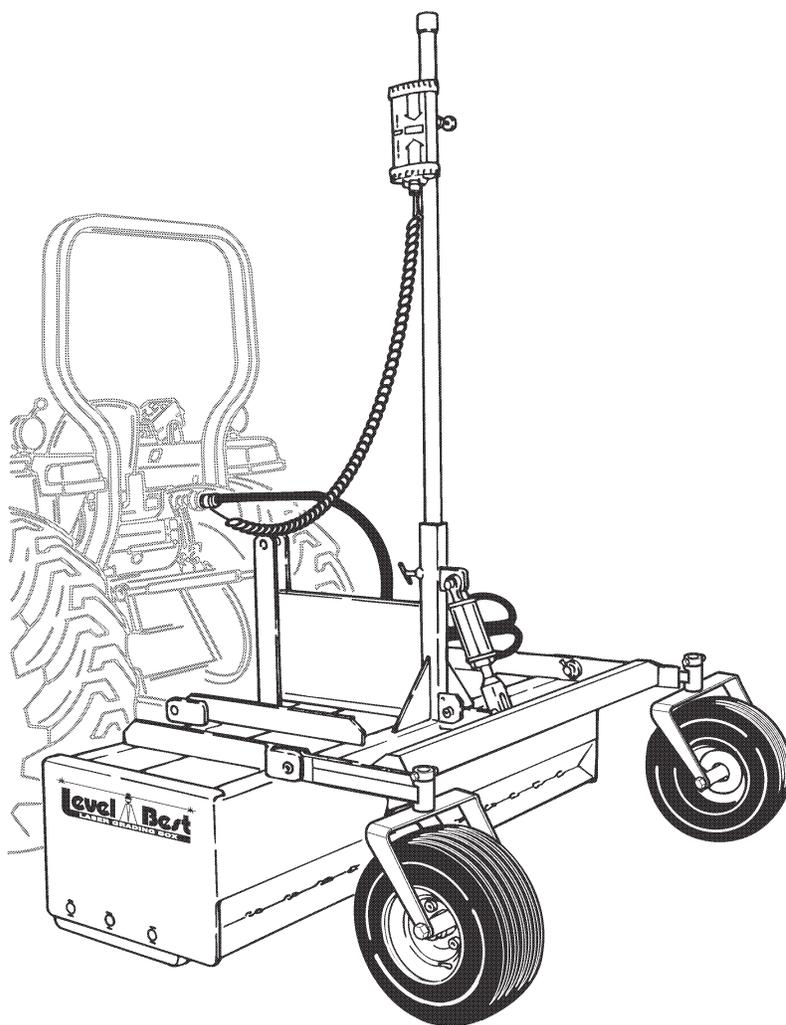
Level Best

LASER GRADING BOX

OPERATORS MANUAL

FOR

TRACTOR BOX - SINGLE LASER ALIGNMENT



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New Holland, PA 17557 U.S.A.**

DISCLAIMER

THE INFORMATION IN THIS MANUAL IS PROVIDED TO PROMOTE THE SAFE USE OF, AND ASSIST THE OPERATOR IN ACHIEVING THE BEST PERFORMANCE FROM, THE PRODUCTS DESCRIBED HEREIN WHEN USED FOR THE INTENDED APPLICATION.

MODELS

Part Number	Model Number	Description
315-003-000	LBS5	Box, Grader, Tractor, Single, 5', Cylinder Only
315-004-000	LBS6	Box, Grader, Tractor, Single, 6', Cylinder Only
315-005-000	LBS7	Box, Grader, Tractor, Single, 7', Cylinder Only
315-006-000	LBS8	Box, Grader, Tractor, Single, 8', Cylinder Only
000-166-241		Kit, Hydraulic, Single, Laser Alignment, Includes Valve Assembly, Hoses, Fittings & Solenoid Cable
000-200-041		Kit, Laser Controls, Single Tractor, Includes Single Panel, 360 Degree Sensor & Cables (Power, Sensor & Solenoid)

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NOTE: Optional accessories, Scarifier Assembly, Drawbar Kit with Wheel Locks and Back Blade Assembly - Hinge, installation and parts manual can be obtained from ATI Corporation or download from web site, www.level-best.com.

SAFETY INFORMATION

This manual is furnished to you, the owner/operator, as a guide to get the greatest benefit from your Grading Box. ATI Corporation wants you to be able to get the most use out of your Grading Box through safe and efficient operation.

Before attempting to operate the Grading Box, carefully read all sections of this manual. Be sure that you thoroughly understand all of the safety information and operating procedures.

SAFETY PRECAUTION DEFINITIONS

Dangers, Warnings, Cautions, and Notes are strategically placed throughout this manual to further emphasize the importance of personal safety, qualifications of operating personnel, and proper use of the grading box in its intended application. These precautions supplement and/or complement the safety information decals affixed to the unit and include headings that are defined as follows:

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation or practice which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation or practice which, if not avoided, will result in damage to equipment and/or minor injury.

NOTE: Indicates an operating procedure, practice, etc., or portion thereof, which is essential to highlight.

- Always use caution and safe operating practices when operating this equipment.
- Always set the Automatic/Manual Switch on the Control Panel to MANUAL before leaving the operator's seat or whenever the machine is not moving.

- Always allow for clearance under the cutting edge of the machine when tuning the system or when switching to automatic control. Insufficient clearance could cause the machine to lift itself off the ground as its cutting edge attempts to achieve the programmed slope.
- Never adjust the position of the Laser Sensor when the system is in automatic control.
- Never perform service work on your machine or the Automatic Control System when the system is in automatic control.
- Install all safety panels and guards before operating your equipment.
- Stay clear of all moving parts when the machine is in operation.
- Keep all people clear of the machine when it is running.
- Keep feet and other body parts from under the cutting edges of the machine at all times.
- Read and comply with all safety recommendations of your Tractor/Skid Steer manufacturer, as outlined in its operator and service manuals.

NOTE: References made to left, right, front, and rear are those directions viewed from behind the power unit and grading box.

NOTE: Some equipment depicted in illustrations may not reflect exact production model configurations.

NOTE: All safety, operating, and servicing information reflects current production models at the time of publication of this manual.

NOTE: ATI Corporation reserves the right to discontinue models at any time, change specifications, and improve design without notice and without incurring obligation on goods previously purchased and to discontinue supplying any part listed, when the demand does not warrant production.

WARRANTY

This Laser Grading Box is designed and manufactured to high quality standards. ATI Corporation, therefore, guarantees this Laser Grading Box to be free from defect in workmanship and materials for three (3) years from purchase date. If the machine is used for rental purposes, the warranty is limited to ninety (90) days.

Laser Controls, Vended Components and Control Valve Parts are warranted separately by their respective manufacturers.

Does not cover normal wear or failure due to hydraulic oil contamination.

Misuse, abuse, misapplication, and unauthorized alterations will void this warranty.

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SYSTEMS FEATURES AND BASIC OPERATION

PURPOSE

The Level Best Laser Grading Box is a cost-efficient method for fine grading. Various capacities sized to fit your tractor with a choice of Automatic Control Systems are available. This manual is for tractor-mounted, single cylinder systems equipped with machine control system from Laser Alignment, Inc.

Laser-guided depth control provides unmatched measurement of plane from a single Rotating Laser. Grade information from the Rotating Laser is processed and automatically directs the grading box's hydraulics to maintain the elevation of the cutting edge.

The Grade Position LEDs on the Laser Sensor indicate the location of the box's cutting edge relative to the required finished grade (The Control Panel has a set of LEDs that mimic the Laser Sensor's LEDs).

- In manual control, the operator watches the Grade Position LEDs and uses the box's controls to keep the center LEDs lit, thereby keeping the box "On Grade".
- In automatic control, the Automatic Control System controls the box's hydraulic cylinder to keep the center LEDs lit, thereby keeping the box "On Grade".

COMPONENTS

The control system consists of 4 components:

Rotating Laser – Provides a reference Plane of Laser Light over the entire job site (refer to Figure 1). The Laser Light plane may be level, single-slope, or dual slope to match the slope of the ground.

Laser Sensor – Mounted at a specific height on a mast on the Laser Grading Box, it determines the difference in depth based on the Plane of Laser Light.

NOTE: Laser Alignment has available other Laser Sensors that function with the Control Panel.

Control Panel – Mounted on the tractor within easy reach of the operator, the Control Panel processes data received from the Laser Sensor and from the operator. LEDs indicate the location of the box's cutting edge relative to the desired finish grade. If set to Automatic, it provides a signal to the Valve Assembly to either raise or lower the Laser Grading Box.

Valve Assembly – Wired to the Control Panel, the valve meters hydraulic oil to the hydraulic cylinder for depth control.

In addition, wires and cabling to connect the components are included with the unit.

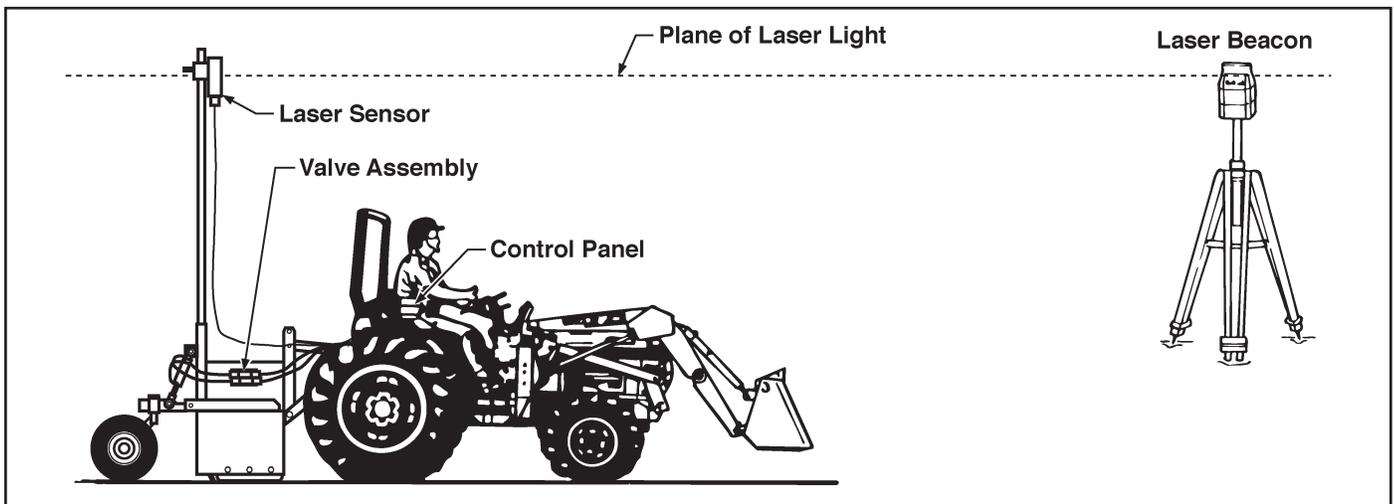


Figure 1. Plane of Laser Light with Components of the Automatic Control System

SYSTEMS FEATURES AND BASIC OPERATION

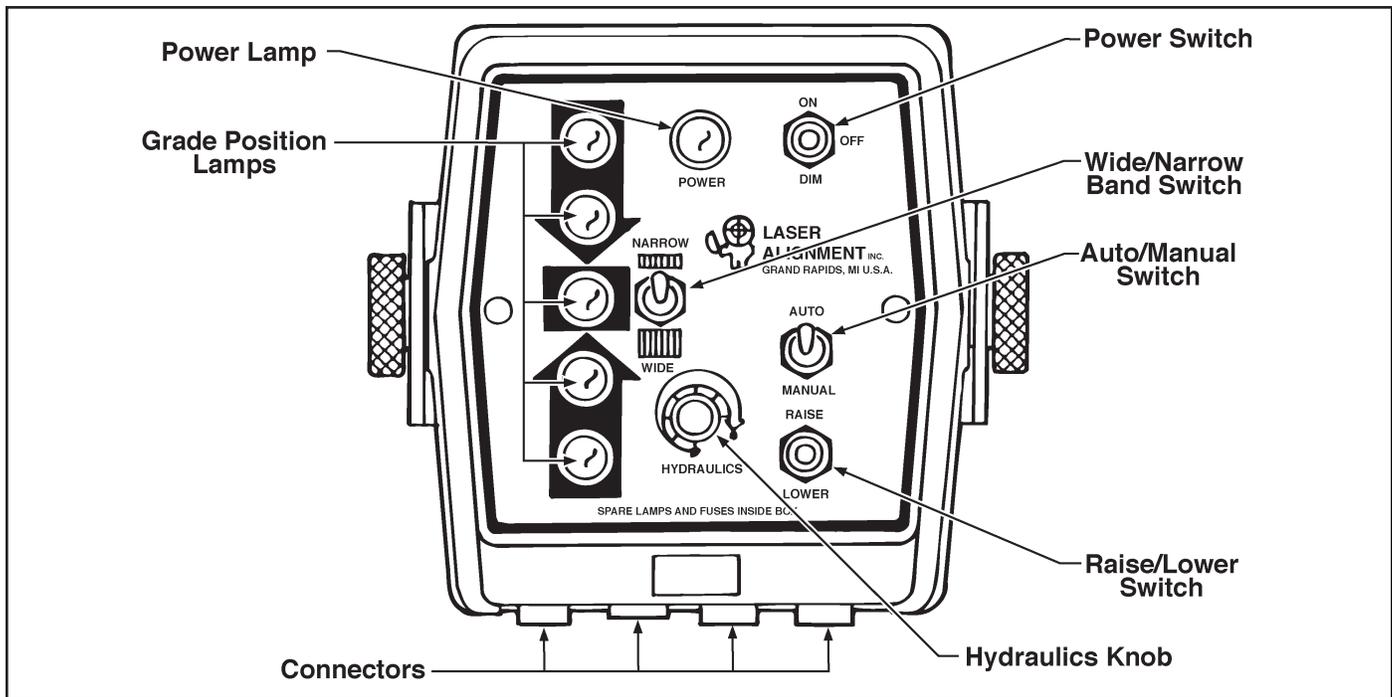


Figure 2. Control Panel Features

Control Panel

The Control Panel should be mounted where the operator can easily access the switches and view the indicator lamps. The Control Panel is the main control unit for the Automatic Control System. It shows information and accepts input from operators.

The Control Panel has indicator lamps to show power and grade position information. The panel also has switches that allows the operator to set up and use the box quickly and easily.

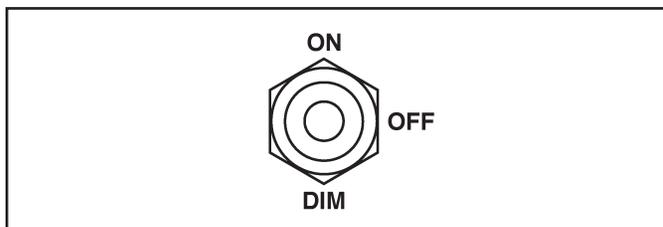


Figure 3. Power Switch

Power Switch. Allows operator to control power to the system. It has three positions:

ON. Power is applied to the system and the Control Panel lamps are lit at full brightness.

OFF. Power is removed from the system.

DIM. Power is applied to the system and the Control Panel lamps are dimmed for night visibility.

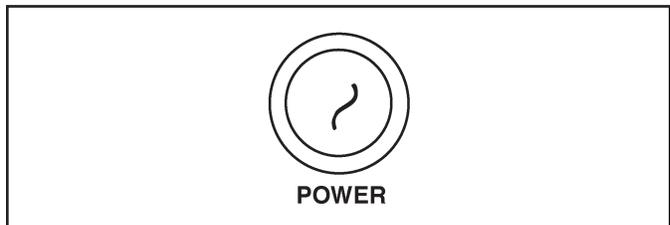


Figure 4. Power Lamp

Power Lamp. Indicates power is applied to the system. Illuminated when the Power Switch is in the ON or DIM position.

Grade Position Lamps. Indicates the position of the box's cutting edge relative to the plane of laser light emitting from the Rotating Laser. These lamps mimic the function of the Grade Position LEDs on the Laser Sensor.

Off Grade, High. Steady illumination indicates the Laser Sensor is detecting the plane of laser light, but the cutting edge is above "On Grade". Flashing illumination indicates the plane of laser light is no longer detected but went out of range in the "high" direction.

SYSTEMS FEATURES AND BASIC OPERATION

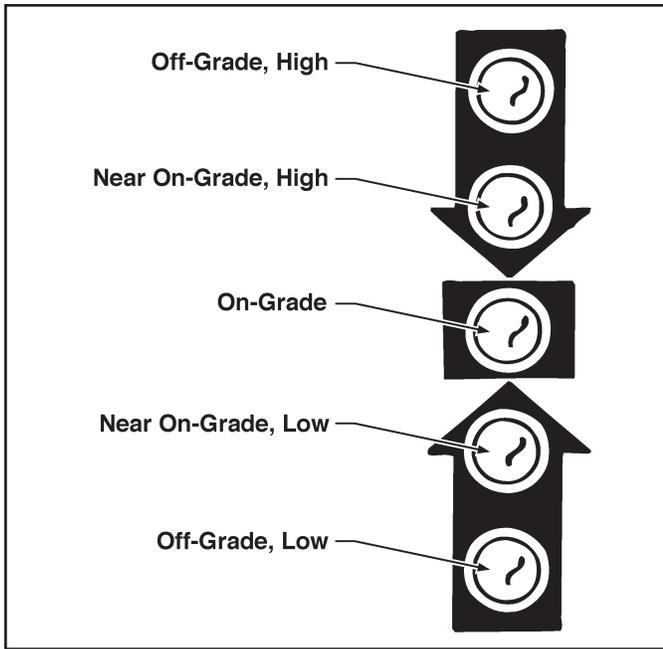


Figure 5. Grade Position Lamps

Near On Grade, High. Indicates the cutting edge is slightly above “On Grade”.

On Grade. Indicates the cutting edge is within the selected “On Grade” deadband.

Near On Grade, Low. Indicates the cutting edge is slightly below “On Grade”.

Off Grade, Low. Steady illumination indicates the Laser Sensor is detecting the plane of laser light, but the cutting edge is below “On Grade”. Flashing illumination indicates the plane of laser light is no longer detected but went out of range in the “low” direction.

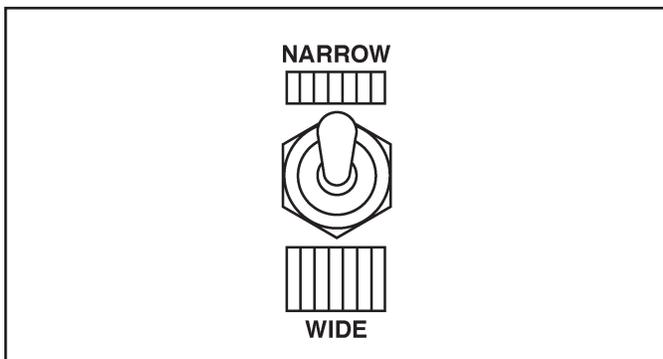


Figure 6. Narrow/Wide Switch

Narrow/Wide Switch. Allows operator to select the size of the “On Grade” range.

NARROW. Use this band for fine or finished grading. A ± 0.25 in. tolerance from dead center creates a 0.50 in. deadband.

WIDE. Use this band for rough grading. A ± 0.60 in. tolerance from dead center creates a 1.20 in. deadband.

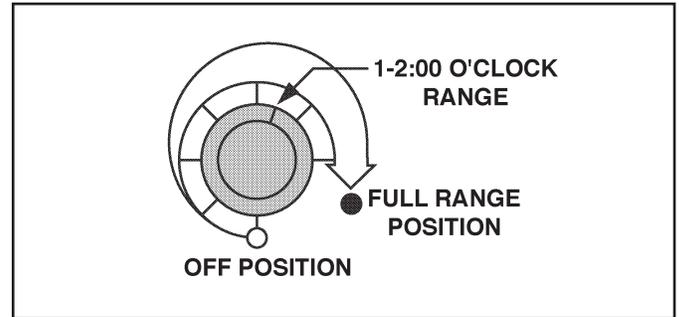


Figure 7. Hydraulics Knob

Hydraulics Knob. This adjustment allows the operator to adjust the duration of the hydraulic’s pulses when the cutting blade is near “On Grade”. The knob is normally set in the 1-2:00 o’clock range.

NOTE: This knob controls the sampling rate, not the speed of the hydraulics. Fewer samples reduce the amount of hydraulic adjustments the Control Panel. Too many samples, more evident in lighter material, may cause a “ripple” effect.

Turn the knob clockwise to increase the samples. Turn the counter-clockwise to reduce the number of samples.

Example: The knob turned fully clockwise would make 10 corrections for 10 pulses. The knob turned 3/4 fully clockwise would make 7 corrections for 10 pulses.

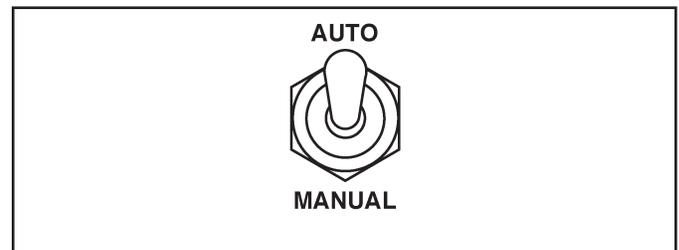


Figure 8. Auto/Manual Switch

Auto/Manual Switch. Allows operator to select between automatic and manual control.

SYSTEMS FEATURES AND BASIC OPERATION

AUTO. The Automatic Control System controls the hydraulics based on the position of the Plane of Laser Light.

MANUAL. The operator views the Grade Position Lamps and uses the Raise/Lower Switch to control the hydraulics.

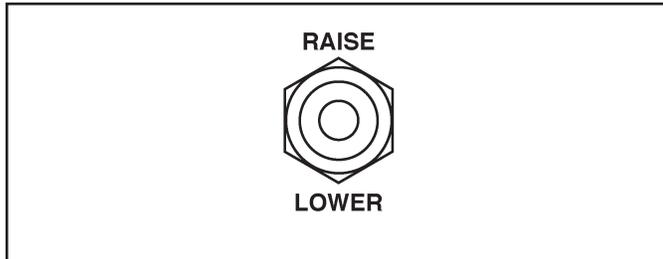


Figure 9. Raise/Lower Switch

Raise/Lower Switch. Allows operator to control the height of the blade (this switch functions regardless of the Auto/Manual switch position).

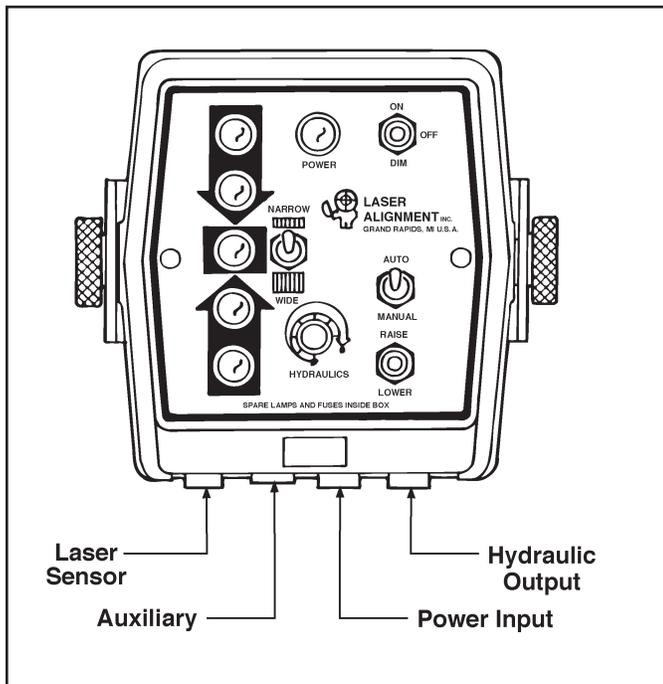


Figure 10. Cable Connectors

Connectors. The Control Panel has four electrical connection points: Each connector has a specific cable with a unique connector to prevent incorrect cabling.

Laser Sensor. Provides a connection for the sensor cable leading to the Laser Sensor.

Auxiliary. Provides a connection for the Remote Auxiliary Switch (only used on skid steer applications).

Power Input. Provides a connection for the power cable leading to the machine's battery (can operate on 12 or 24 Volt machines).

Hydraulic Output. Provides a connection for the solenoid cable leading to the valve assembly.

Rotating Laser

The Automatic Control System can operate with many models of Laser Beacons. The beacon must have a 360° rotating head with invisible or red beam and a speed of 8-40 RPS (revolutions per second). The faster the beacon's speed the more optimally the system will perform.

The Rotating Laser is mounted on a tripod, which is located on the job site near where the box is operating. The Rotating Laser is the unit that creates the plane of laser light detected by the Laser Sensor.

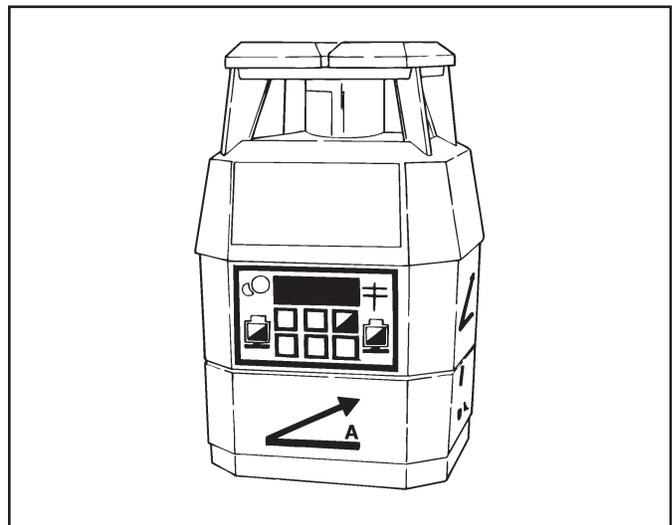


Figure 11. Rotating Laser

The Rotating Laser transmits a focused plane of laser light approximately 1000 feet (300 meters), optimal range for most Laser Beacons, as it rotates.

Rotating Lasers are available in single grade, dual grade, and steep slope versions. They can be quickly and easily aligned to job site requirements without complicated calculation of angles.

A dual slope Rotating Laser can be configured for level, single slope, or dual slope applications.

SYSTEMS FEATURES AND BASIC OPERATION

Simply enter the required percent of grade and align the Rotating Laser to the axis (direction) to be graded.

- Percent of Grade. The change in elevation for every 100 feet (30 meters) graded.
- Slope. The change in elevation per foot (meter).

WARNING

Never look directly into a laser light or serious injury to the eye may occur. In general, incidental exposure of the laser to the eye will not do damage. However, avoid looking into the beam whenever possible. Use a target for viewing the laser spot.

WARNING

Use of any laser on a worksite is controlled by OSHA regulations found at 29 CFR 1926.54. Be familiar with these regulations before using any Rotating Laser used in conjunction with this system. Review and understand all literature provided with the Laser System before operating.

WARNING

Laser protection devices must be provided to all workers in the area if the laser system exceeds five (5) milliwatts. Refer to the literature provided with the system to determine the power output. If unsure of the strength of the laser system, anti-laser eye protection should be provided to all workers.

Laser Sensor

Laser Alignment's 360° Laser Sensor is mounted on the mast pole attached to the cutting edge of the box. The sensor detects the plane of laser light produced by a Rotating Laser. The Laser Sensor provides a reference between the Plane of Laser Light and the actual cutting edge height. The Control Panel then adjusts the cutting edge height accordingly.

The Laser Sensor is a 360°, Five Channel Sensor. It receives (senses) the plane of laser light on all sides. The Laser Sensor from Laser Alignment works with most common rotating laser beacons and detects both visible and invisible beams.

The sensor has five LED clusters that show distinctly where the sensor is receiving the plane.

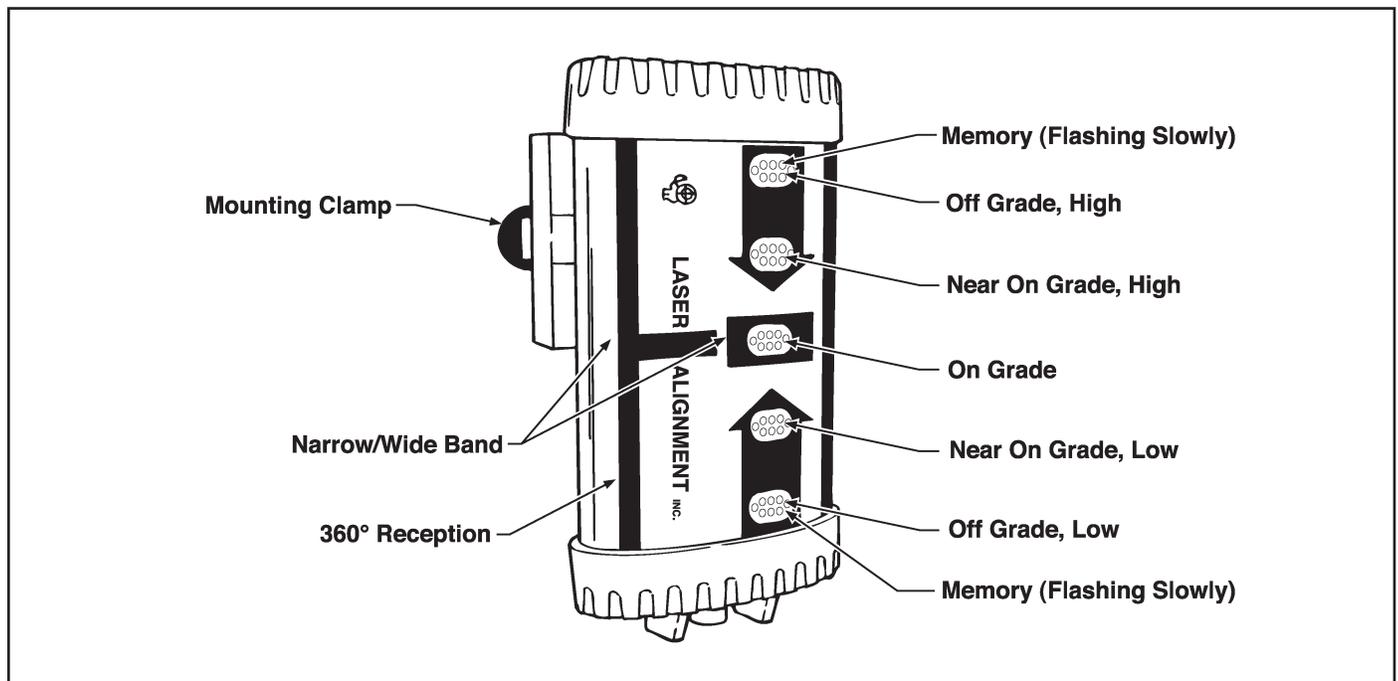


Figure 12. Laser Sensor Features

SYSTEMS FEATURES AND BASIC OPERATION

Grade Position LEDs. Indicate the position of the box's cutting edge relative to the plane of laser light from the Rotating Laser. These LEDs function in the same way as the Grade Position Lamps on the Control Panel except they flash rapidly instead of steady illumination (this makes the LEDs easy to see, even in the brightest sunlight).

See the "Grade Position Lamps" under the Control Panel description for information on how the LEDs function.

Memory. When the Laser Sensor moves from within the plane of laser light to out of the plane, the top or bottom Grade Position LED blinks slowly. This indicates the Laser Sensor is presently above or below the plane of laser light.

Narrow/Wide Band Selection. The Laser Sensor allows for either a narrow or wide "On Grade" band. Operators can also make the selection using the Narrow/Wide Switch on the Control Panel.

360° Reception. The Laser Sensor has four rows of photo cells, two on each side. These photo cells can sense a plane of laser light from any direction.

Mounting Clamp. The mounting clamp holds the Laser Sensor body to the mast pole.

Cables

The cables are provided to connect the various components together into a system. Each connector uses a different number of pins, allowing the components to only be connected in the proper way. At the Control Panel, each cable uses a press-and-twist style of connector. After the cable is pressed into the socket, twist the ring clockwise 1/4 turn to secure it.

CAUTION

Never force a connector into a socket.

CAUTION

All cables must be secured with adequate cable length to avoid pinching, stretching and tight bending. Do not clamp cables to pipes or hoses that may generate high heat.

Sensor Cable. Powers the sensor and communicates grade information between the Laser Sensor and Control Panel. The Control Panel end uses a 90° connector to differentiate it from the Laser Sensor end. This is a coiled cable that can hang freely between the Control Panel and the Laser Sensor mounted on the mast.

Battery Cable. Supplies power to the system. The Control Panel supports both 12 and 24 volt machine systems.

NOTE: The Control Panel supports both 12 and 24 volt machine systems. However, the valve is 12 volt only. Contact ATI Corporation for additional information when using a 24 volt system.

Solenoid Cable. Communicates grade information between the Control Panel and Hydraulic Valve.

EQUIPMENT SET-UP

1. Connect the Battery Cable to the battery power supply. Two (2) crimp-on ends must be obtained locally for the cable in order to securely attach to the battery posts. Place connector end of cable near the driver's seat for later connection to the Control Panel.

NOTE: White wire is positive and black wire is negative.

2. The Laser Grading Box should be positioned on a level area for attaching to the tractor. Start the tractor and back up to the Laser Grading Box. Attach the unit with the hitch pins supplied.

SYSTEMS FEATURES AND BASIC OPERATION

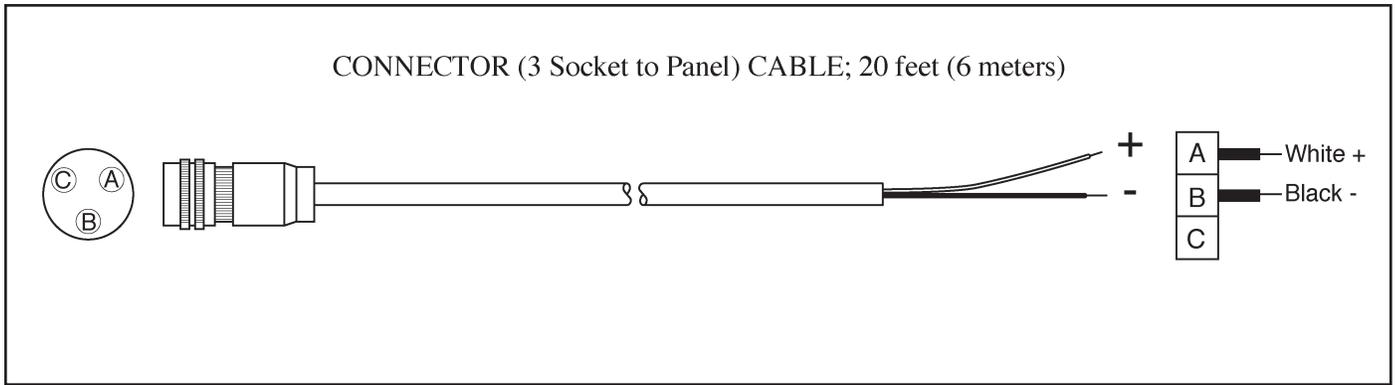


Figure 13. Panel to Battery Cable

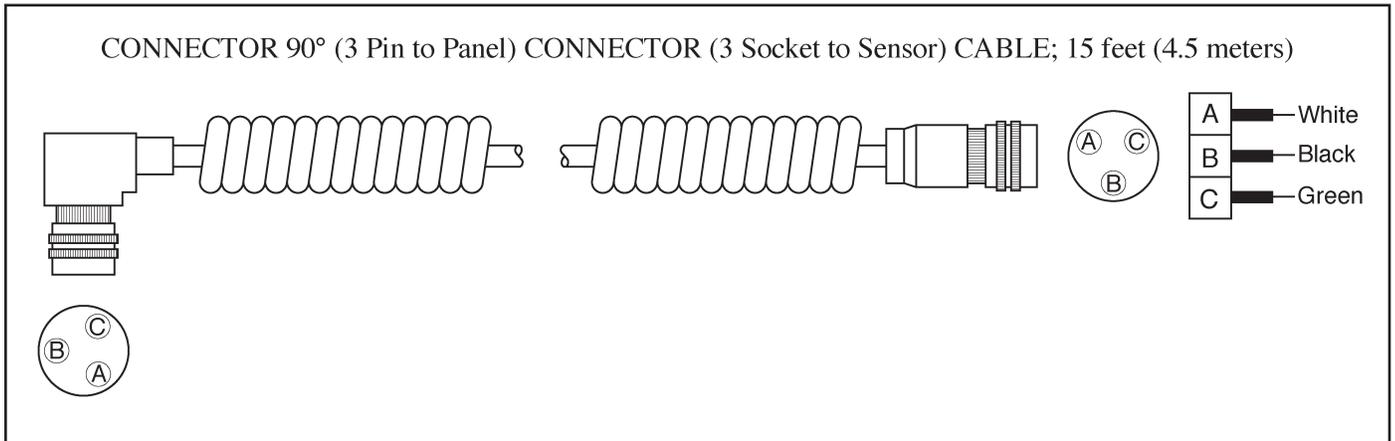


Figure 14. Coiled Sensor Cable

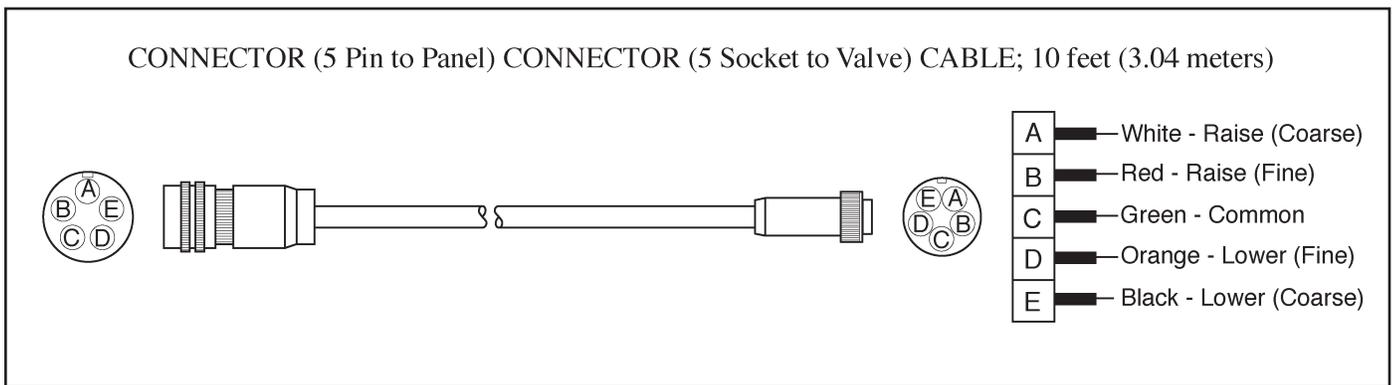


Figure 15. Solenoid Cable

SYSTEMS FEATURES AND BASIC OPERATION

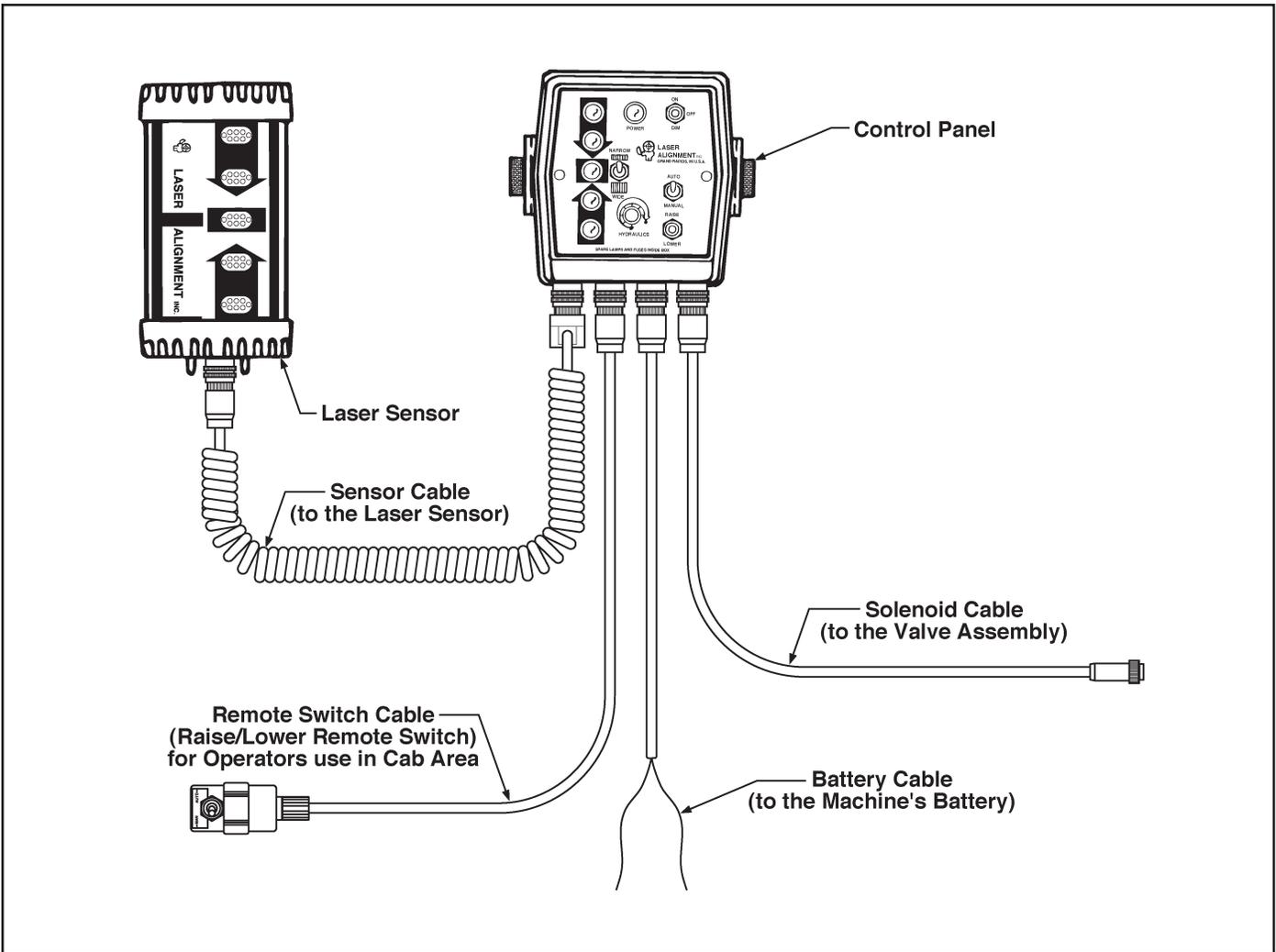


Figure 16. Single Automatic Control System

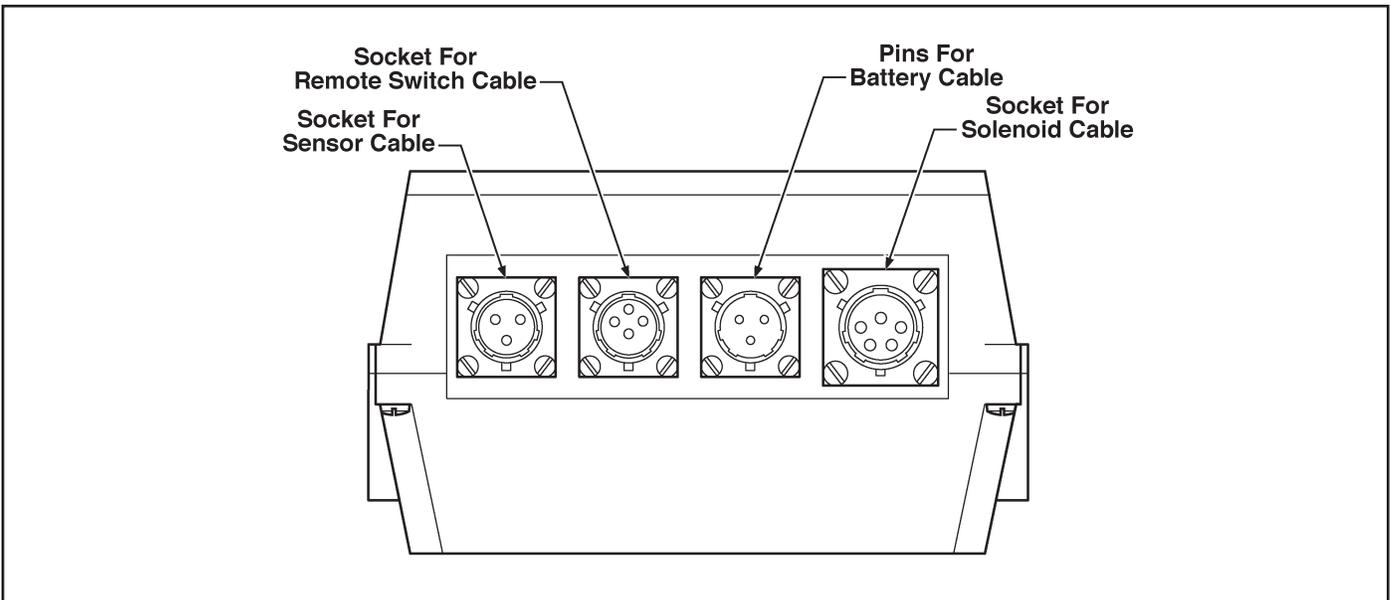


Figure 17. Bottom View of Control Panel

SYSTEMS FEATURES AND BASIC OPERATION

- After installation, ensure that the Grading Box is level. Set the pitch of the Laser Grading Box by adjusting the top and lower links.

Verify that the Laser Grading Box is level by observing that the main frame is horizontal to the ground. Turn the tractor engine OFF when connected.

- Mount the Control Panel bracket on the right rear fender of the tractor using necessary hardware. Install the Control Panel on the bracket using the side knobs to secure the unit.

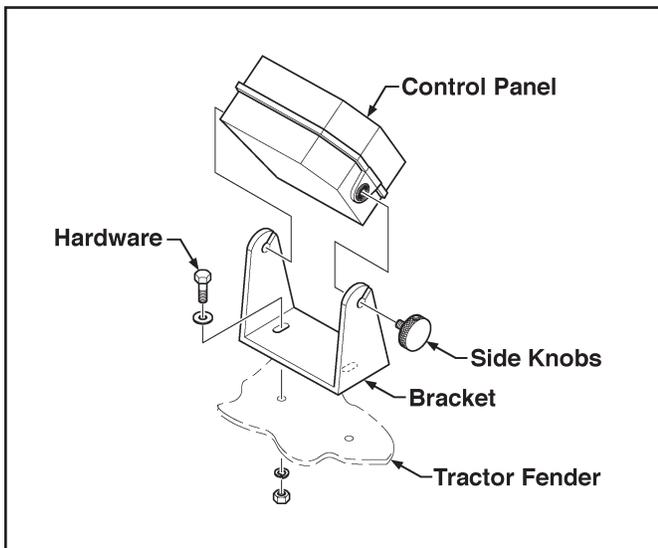


Figure 18. Control Panel Mounting

- Connect the Laser Grading Box's hydraulic hoses with quick couplers to the tractor quick couplers. The Laser Grading Box's hydraulic manifold is marked "P" and "T" where the pressure and return (tank) hoses connect.

NOTE: "P" means pressure (supply) and "T" means tank (return). Refer to the tractor Owner's Manual for identifying the "P" and "T" Auxiliary Hydraulic Ports.

- Insert the Mast Pole in the holder until it rests at the bottom of the tube. Tighten the tee handle to secure the Mast. Clamp the Laser Sensor near the top of the Mast so it is higher than any local obstruction including the tractor cab or fall protection devices. (Refer to Figure 19).

CAUTION

Cables must be securely fastened and pinch/rub-points eliminated. Do not fasten to hydraulic lines which may operate at high temperatures. Ensure sufficient cable length to allow movement of the machine.

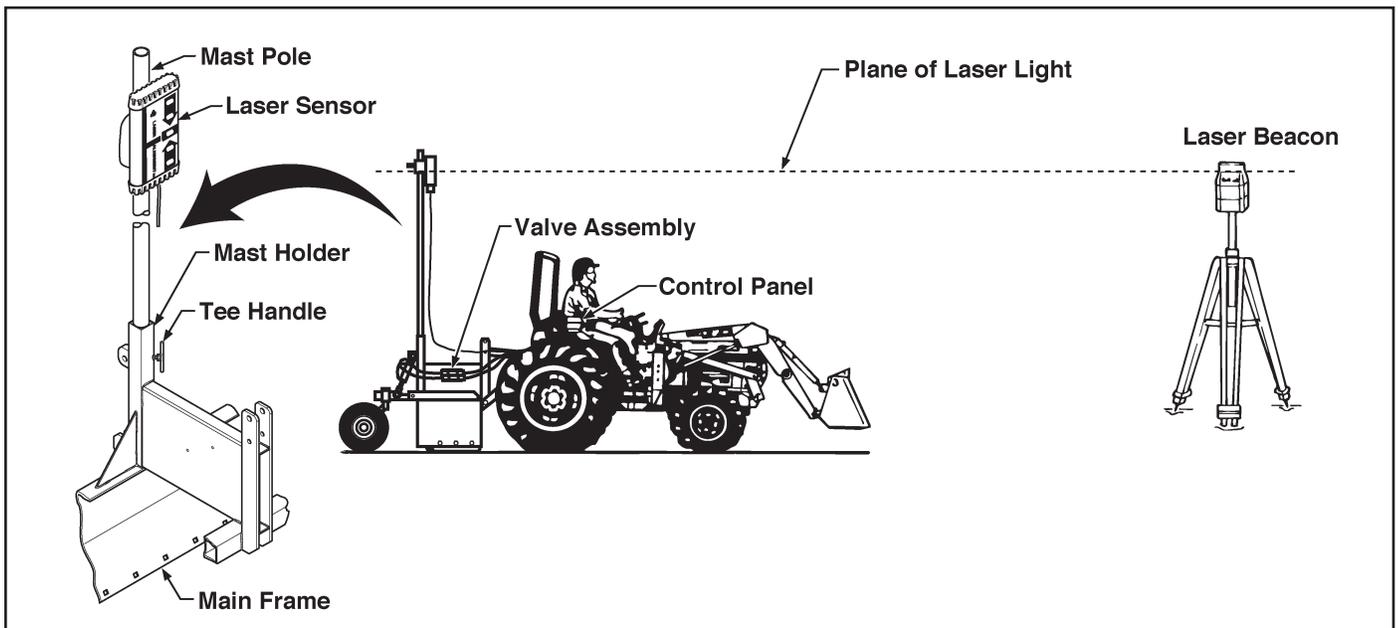


Figure 19. Components of the Automatic Control System

SYSTEMS FEATURES AND BASIC OPERATION

7. Connect the straight end of the Sensor Cable to the base of the Laser Sensor and the 90° end to the Control Panel. All cables only attach to the proper connectors. (Refer to Figures 16 and 17.)
8. Connect the Solenoid Cable from the Laser Grading Box's hydraulic manifold to the Control Panel.
9. Connect the Battery Cable, previously wired to the battery, to the Control Panel.
10. Set the Hydraulics Knob on the Control Panel between 1 and 2 o'clock. This knob adjusts the response speed of the hydraulics in relation to the laser signal. Level Best recommends these settings for optimum operation speeds. Set the Narrow/Wide Switch to WIDE and the Automatic/Manual Switch to MANUAL.

WARNING

Always have system in MANUAL when not operating the tractor.

11. While watching the Laser Sensor, test the power by moving the Power Switch on the Control Panel to ON. The Laser Sensor will perform a diagnostic check by blinking in each of the 5 settings. If any light remains lit, a cell is not operational. Contact your dealer for replacement. The Control Panel's Red Power Lamp should be illuminated indicating that power is "on". Turn Power Switch "off".

JOB SITE SET-UP

The following are guidelines for setting up the Rotating Laser for both level job sites and sloped job sites:

- Choose a location for the Rotating Laser where obstructions, such as trees and buildings, can not block the plane of laser light. The Laser Sensor needs to be able to sense the plane of laser light at all times.
- Whenever possible, set up the Rotating Laser and the Laser Sensor at a height above the machine's cab. This prevents the cab or roll-

over structure from blocking the plane of laser light as the machine moves around the job sites.

- The recommended head speed for the Automatic Control System is 20 RPS (Revolutions per Second). At 20 RPS, the Rotating Laser updates the Laser Sensor 20 times per second.

Set-Up for Level Grading

If the job site is to be level, the set-up of the Rotating Laser is simple. Since no slope is required in either axis, the Rotating Laser does not need to be aligned. The Rotating Laser will provide a level plane of laser light in all directions.

1. Locate the Rotating Laser following the previously stated guidelines.
2. Apply power to the Rotating Laser. Level the Rotating Laser (some Rotating Lasers will automatically level, others will need manual adjustment).
3. Set the counters for both axis at 0.000% (If needed, see the Rotating Laser Operation Manual).
4. Bench the machine. See the "Benching and Operating" procedure in this section.

Set-Up for Sloped Grading

If the job site is to be graded for a single or dual slope, the Rotating Laser requires its axis to be aligned for the job site. The Rotating Laser will then provide a plane of laser light at the required slope(s).

The following procedures are for two typical examples of job sites requiring sloped grades. Remember, each job site is unique, so consider the following methods as guidelines and not as the only methods possible.

Method One:

1. Set a minimum of two grade stakes exactly in line with one of the axis to be graded.
2. Place the Rotating Laser in line with the two grade stakes.

SYSTEMS FEATURES AND BASIC OPERATION

3. Switch on the Rotating Laser. Level the Rotating Laser (some Rotating Lasers will automatically level, others will need manual adjustment).

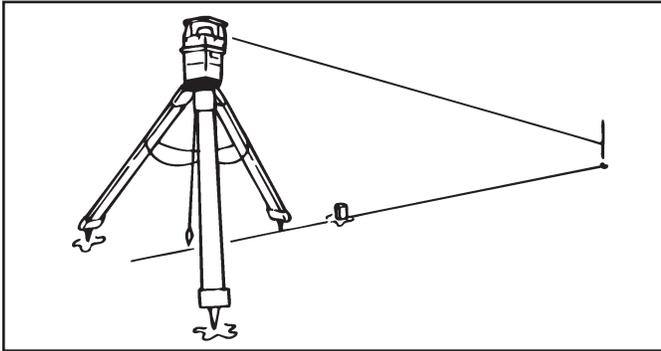


Figure 20. Method One: Align Rotating Laser with Grade Stakes

4. Set the counter on the Rotating Laser for both axis to 0.0000% (If needed, see the Rotating Laser Operation Manual).
5. Roughly align one of the axis to the grade stakes by sighting over the top of the Rotating Laser (Refer to Figure 21).
6. Align the plane of laser light.
 - a. Set a grade Rod with Rod Eye Receiver on the far grade stake and adjust the rod until the Rod Eye Receiver indicates “On Grade.”
 - b. On the axis not aligned with the stakes, enter on the Rotating Laser: 5.000%. Allow the Rotating Laser to level itself to this new position, if needed.

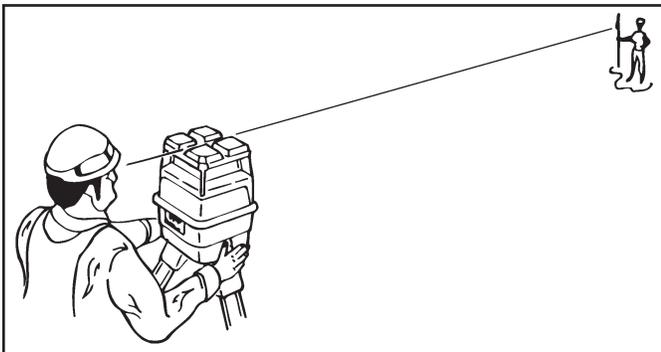


Figure 21. Sight over Rotating Laser

- c. Check the Rod Eye Receiver again.
 - If the Rod Eye Receiver indicates “On Grade”, the plane of laser light is aligned correctly.

- If the Rod Eye Receiver indicates the plane of laser light is too high or too low, have a second person rotate the Rotating Laser on the tripod in small steps until the Rod Eye Receiver indicates “On Grade.”

7. Enter on the Rotating Laser the required percent of grade for each axis and allow the Rotating Laser to level itself again.
8. Bench the machine. See the “Benching and Operating” procedure in this section.

Method Two:

1. Set a minimum of two surveyed grade stakes. The stakes must have elevation information.

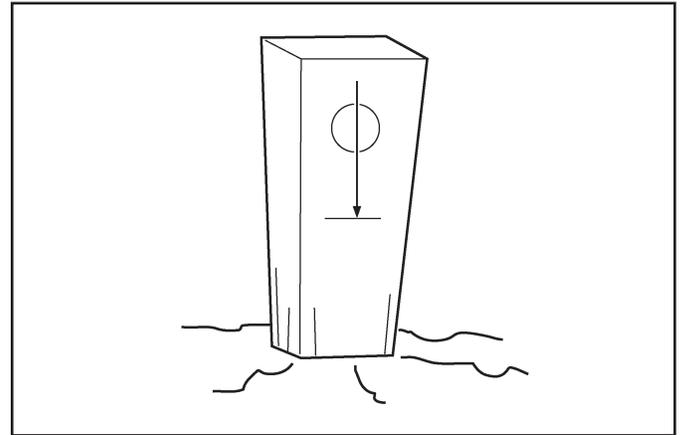


Figure 22. Grade Stake with Elevation Mark

NOTE: This procedure requires that the elevation of the grade stakes are correct and aligned to the slope or percent of grade required.

2. Place the Rotating Laser a few feet (meters) behind the first grade stake and in line with one of the far grade stakes (It is not critical to align the Rotating Laser exactly) (Refer to Figure 23).

NOTE: Follow the guidelines at the beginning of this section when placing the Rotating Laser.

3. Switch on the Rotating Laser. Level the Rotating Laser.

SYSTEMS FEATURES AND BASIC OPERATION

4. Roughly align one of the axis to the grade stakes by sighting over the top of the Rotating Laser (Refer to Figure 21).
5. Set both the counters on the Rotating Laser to the required percent of grade (If needed, see the Rotating Laser Operation Manual).
7. Align the plane of laser light.
 - a. Align the bottom of a Grade Rod to the mark on the far grade stake.
 - b. Check the Rod Eye Receiver.
 - If the Rod Eye Receiver indicates “On Grade,” the plane of laser light is aligned at the correct slope.
 - If the Rod Eye Receiver indicates the plane of laser light is too high or too low, have a second person rotate the Rotating Laser on the tripod in small steps until the Rod Eye Receiver indicates “On Grade.”

NOTE: The Grade Rod must be held plumb for each of the readings taken in the following steps.

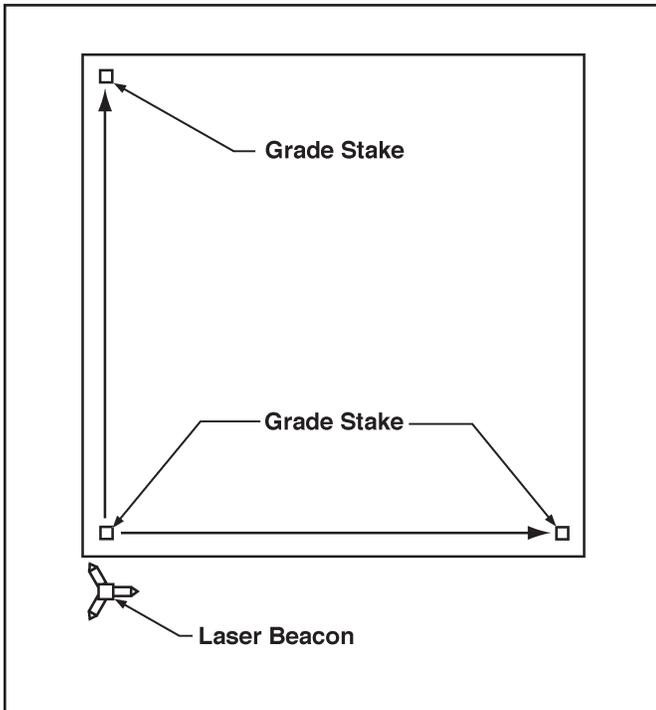


Figure 23. Method Two: Align Rotating Laser with Grade Stakes

6. Establish the H.I. (height of the instrument) for the plane of laser light.
 - a. Align the bottom of the Grade Rod to the mark on the near grade stake.
 - b. Adjust the Rod Eye Receiver up and down until it indicates “On Grade.”
 - c. Adjust the Rod Eye Receiver for any cut or fill amount indicated by the grade stake.
 - If the grade stake shows a cut, extend the Grade Rod and Rod Eye by the amount shown as a cut.
 - If the grade stake shows a fill, lower the Rod Eye by the amount shown as fill.

NOTE: If it was necessary to rotate the Rotating Laser a significant amount at the far stake, then the original reading at the near stake may be out of tolerance. Check the setting again and make minor adjustments as required.

8. Bench the machine.

NOTE: If needed, check the elevations on both the plane of laser light and the grade stake elevations by setting the bottom of the Grade Rod at any stake's grade mark and checking the Rod Eye Receiver for the “On Grade” indication.

BENCHING AND OPERATING

Before benching, the plane of laser light must be set at its proper slope. Benchng is the process of setting the relationship between the Laser Sensor and Rotating Laser, or benchmark. Failure to properly bench the system before grading will result in an unacceptable grade.

The goal is to have the Laser Grading Box approximately 1/2 full during operation. If, during rough grading, a lot of material needs to be removed from a site, the Laser Sensor should be set several inches higher than finished grade. As material is removed, the Laser Sensor can be lowered and the site regraded. This may need to be repeated several times until finished grade is achieved.

SYSTEMS FEATURES AND BASIC OPERATION

Benching

1. Move the machine to an area which is close to finish grade or, using the manual controls on the control system, grade a small area close to finish grade.

NOTE: Finish grade can be checked several times during the grade process to “zero” in on final grade.

WARNING

Do not turn the Control Panel ON with the Auto/Manual Switch set to AUTO. Unintended movement may occur. Failure to follow these instructions may result in serious personal injury to the operator or a bystander.

2. Set the Auto/Manual Switch to MANUAL.
3. Set the Power Switch to ON.
4. Use the Narrow/Wide Switch to select the narrow band for the “On Grade” tolerance.
 - Narrow. The band for fine or finished grading (± 0.25 " tolerance).
 - Wide. The band for rough grading (± 0.60 " tolerance).

NOTE: Use narrow band for benching.

5. Adjust the height of the Laser Sensor until the center (On Grade) Grade Position LED cluster is lit. Loosen the tee handle and raise or lower the Laser Sensor on the mast. Tighten the tee handle when correct.

NOTE: Most materials graded must later be compacted. To compensate for the compacting distance, lower the Laser Sensor. This raises the cutting edge by the same distance. The distance the Laser Sensor is lowered depends on the material.

Benching with a Rod Eye

To bench the Laser Sensor follow the process listed below:

1. Turn on the Rotating Laser. Attach a Rod Eye to a measuring pole and turn on. Set the base of the measuring pole on the benchmark

and adjust the measuring pole so the Rod Eye emits a solid “On Grade” tone (compensate for slab thickness and compaction if needed).

2. Find an area to be graded that is close to specified grade. Making sure the Control Panel’s Automatic/Manual Switch is on Manual, start the skid steer or tractor, engage the auxiliary hydraulics and move the unit to that location. Manually raise or lower the Laser Grading Box’s cutting edge until it is even with the bottom of the measuring pole when the Rod Eye is emitting the “On Grade” tone or resting on the ground if already at grade.
3. Making sure the Control Panel’s Automatic/Manual Switch is on Manual and the Narrow/Wide Switch is set to narrow band, move the Laser Sensor to a height on the Mast Pole where it indicates the beam in the “On Grade” position and is unobstructed by any object

NOTE: Operator may prefer to turn the face of the Laser Sensor towards the operator for easy viewing.

The Laser Grading Box Automatic Control System is now calibrated.

Operation

WARNING

Do not turn the Control Panel ON with the Auto/Manual Switch set to AUTO. Unintended movement may occur. Failure to follow these instructions may result in serious personal injury to the operator or a bystander.

After the Laser Grading Box is connected and the Automatic Control System is calibrated, operation can begin.

The operational goal is to drive over the area to be graded with the box 1/2 full of material and the Control Panel’s “On Grade” lamp always illuminated.

SYSTEMS FEATURES AND BASIC OPERATION

1. When seated in the Operator's seat, start the tractor and move the Auto/Manual Switch to AUTO.
2. Turn the Hydraulics Knob clockwise until it is in the 1 to 2 o'clock position.
3. Set the Narrow/Wide Switch to WIDE to begin the grading of large or medium sub base material.

NOTE: Most materials graded must later be compacted. To compensate for the compacting distance, lower the Laser Sensor. This raises the box's cutting edge by the same distance. The distance the Laser Sensor is lowered will depend on the material.

4. Drive the machine forward. The Automatic Control System constantly senses the plane of laser light to maintain the cutting edge of the box at the required elevation. Note the following during operation:
 - In some situations, the Automatic Control System may require a cut deeper than the machine can handle. The machine may lose traction, stall the engine, or the wheel frame will be lifted off the ground to the maximum stroke of the cylinder as the cutting edge tries to reach finished grade. If this occurs, set the Auto/Manual Switch to MANUAL and use the Raise/Lower Switch to raise the cutting edge until the machine can push the material. Make multiple passes to cut the area to closer to finished grade and then go back to AUTO control. This allows the high spots to be gradually removed.
 - If one of the Control Panel or Laser Sensor grade lights are blinking, it indicates the direction of the last elevation prior to passing out of the laser beam. Readjust the height of the Grading Box until signal is found. The Laser Sensor or Rotating Laser height may need to be adjusted if this

situation continues to occur or switch to MANUAL operation until you get closer to grade.

NOTE: In rough grading situations, use the Automatic Control System as an "Indicate Only" system and operate the machine under manual control. After the area has been rough graded, switch to automatic control.

5. After several passes with the Laser Grading Box, stop and turn off the tractor. Place the base of the measuring pole on the graded area and check grade elevation.
6. After a rough grade is achieved, set the Control Panel's Narrow/Wide Switch to NARROW to begin the grading of fine sub base material, i.e., sand. When grading in a Narrow Band, the speed of the skid steer or tractor needs to be decreased for optimum finish.

TROUBLESHOOTING

SYMPTOM	POTENTIAL CAUSE	REMEDY
Control Panel lamps do not light.	Control Panel not turned on.	Make sure the Power Switch is in the ON or DIM position.
	Power Cable not connected to Control Panel.	Connect power cable to Control Panel.
	Power Cable not providing power to the Control Panel.	Check that the Power Cable is connected to the battery. The white wire connects to the positive (+) post and the black wire connects to the negative (-) post.
	Fuse blown.	Remove the Power Cable from the Control Panel and use a volt meter to check for 12 volts DC. Remove the face plate and check the fuses on the circuit board. F1 (5 Amp) powers the lamps and hydraulics. F2 (2 Amp) powers the circuit board and Laser Sensor.
	Bulbs blown.	Remove lamp covers and check bulbs.
	Electrical short.	Disconnect all cables except the Power Cable. If the lamps still do not cycle when the Control Panel is turned on, contact the local Laser Alignment dealer.
Laser Sensor does not display grade.	No Rotating Laser in range.	Ensure Laser Sensor is within operating range of Rotating Laser. Ensure beam is striking middle of the Laser Sensor
	Laser beam blocked.	Check and clean glass covering the Laser Sensor's photo cells. Check for obstructions keeping Laser Sensor from seeing the Rotating Laser.

TROUBLESHOOTING

SYMPTOM	POTENTIAL CAUSE	REMEDY
Laser Sensor does not display grade (cont'd).	Laser Sensor not receiving power. Electrical short.	Check Fuse F2 in the control Panel. Check Sensor Cable for damage. Use an Ohm meter to check continuity. If LEDs do not cycle when Control Panel is turned On, contact the local Laser Alignment dealer.
Laser Grading Box does not raise or lower.	Control Panel not turned on. No hydraulic flow to Laser Grading Box. Cables not connected correctly. Electrical Problems	Make sure the Power switch is in the ON or DIM position. Ensure hydraulic control handle of tractor is in correct position. Ensure skid steer auxiliary hydraulics are ON or in continuous flow mode. Move directional valve spool manually using the overrides on the end of the directional valve. <div style="border: 1px solid black; padding: 5px; text-align: center;"> WARNING</div> Be sure to stay clear of any moving parts of the Laser Grading Box. If the Laser Grading Box moves, refer to Electrical problems. If the Laser Grading Box does not move, refer to Hydraulic problems. Check Solenoid Cable and directional valve for visible damage. Check the Solenoid Cable and directional valve for visible damage.

TROUBLESHOOTING

SYMPTOM	POTENTIAL CAUSE	REMEDY
Laser Grading Box does not raise or lower. (cont'd)	Hydraulic problems.	<p>Confirm hydraulic flow through the manifold and returning to the power source through the "T" hose.</p> <p>Contact ATI Corporation for help troubleshooting the hydraulic manifold.</p>
Laser Grading Box moves in opposite direction.	Hydraulic flow reversed.	<p>Confirm the pressure is going in the "P" port.</p> <p>Verify control handle is moving in desired direction.</p>
Box has trouble staying on grade.	<p>Rotating Laser out of range.</p> <p>Laser beam being reflected.</p> <p>Multiple laser beams.</p> <p>Laser deadband set too narrow.</p> <p>Hydraulic response too quick.</p> <p>Hydraulic flow reversed.</p>	<p>Ensure Laser Sensor is within specified operating range of Rotating Laser.</p> <p>Ensure Rotating Laser's light is not reflecting off other surfaces (windows, windshields, mirrors, etc.) causing multiple readings by the Laser Sensor.</p> <p>Ensure that there are no other lasers operating on the job site or nearby.</p> <p>Ensure the Wide/Narrow Band switch is in Wide for rough grading.</p> <p>Turn the Hydraulics knob counter clockwise slightly.</p> <p>Confirm the pressure is going in the "P" port.</p>

SPECIFICATIONS AND MAINTENANCE

SPECIFICATIONS

Dimensions

Model	LBS5	LBS6	LBS7	LBS8
Box Width	60 in. (152 cm)	72 in. (183 cm)	84 in. (213 cm)	96 in. (244 cm)
Overall Width	61.8 in. (157 cm)	73.8 in. (187 cm)	85.8 in. (218 cm)	97.8 in. (248 cm)
Total Length	55 in. (140 cm) 118 in. (300 cm) with optional drawbar			
Box Capacity	14.2 ft ³ (0.40 m ³)	17.0 ft ³ (0.48 m ³)	19.9 ft ³ (0.56 m ³)	22.8 ft ³ (0.62 m ³)
Weight	1000 lbs. (454 kg)	1060 lbs. (481 kg)	1120 lbs. (508 kg)	1180 lbs. (535 kg)

Automatic Control System

Operating Temperatures	0° to 115° F (-18° to 46° C)
Storage Temperatures.....	-10° to 150° F (-23° to 65° C)
Input Voltage	12/24 volts DC (Reverse Voltage Protected)
Current Requirements	1 Amp (Manual Control) 2 Amp (Automatic Hydraulic Control)
Output to Solenoids.....	12/24 volts (Dependent on Input)
Fuses (On Circuit Board)	5 Amp – Lamps and Hydraulic Outputs 2 Amp – Electronics and Laser Sensor

Control Panel

Dimensions	7.4 x 7.8 x 4.5 in. (18.7 x 19.8 x 14.4 cm)
Weight	4.5 lbs. (2.0 kg)
Seal.....	Water Resistant

Laser Sensor

Band Widths	
Narrow	0.3 - 0.4 in. (0.8 - 1.0 cm) “On Grade” 0.25 in. (0.60 cm) “Near On Grade”
Wide	0.6 - 0.8 in. (1.5 - 2.0 cm) “On Grade” 0.6 in. (1.5 cm) “Near On Grade”
Sensor Pick-Up Range	8 in. (20 cm)
Laser Requirement	All Rotating Lasers (HeNe or Infrared)
Input Voltage	12/24 volts DC
Input Current.....	Less Than 1 Amp
Pulsed Display	10 Pulses Per Second
Operating Range	1000 ft. (300 m) Radius
Weight.....	7.5 lbs. (3.5 kg)

SPECIFICATIONS AND MAINTENANCE

MAINTENANCE

The rugged and durable Automatic Control System is built to last, but as with all equipment, a few minutes of routine care, maintenance, and cleaning can extend the life of the system.

Storage and Transport

Most often the grading box and its hydraulic controls remain on your machine. However, you should store the Control Panel, Laser Sensor, Coiled Sensor Cable and Solenoid Cable in a safe place when not in use. Protect the cable connections by installing the covers supplied.

Cleaning

The Laser Sensor is completely sealed and purged with dry nitrogen. It requires no maintenance other than periodic checking to be sure its mounting structure is tight and secure.

The Control Panel is water resistant. It can be cleaned with mild soap and water, and a soft cloth. Do not submerge the Control Panel or direct high pressure spray at it. Do not use a dry cloth to wipe the Laser Sensor or Control Panel as scratching may occur.

Cables and Hoses

Check all cables and hoses regularly for signs of wear and damage. Keep cable connections clean and free from dirt and corrosion. If a cable has been damaged, do not attempt to repair. Incorrect or poor connections can cause damage to your Automatic Control System.

When applicable, check the hydraulic hoses. Look for areas where the hoses could rub against each other or another object as they expand and contract under pressure. Check the hydraulic fittings for tightness.

Machine

Check areas that affect the Automatic Control system function and accuracy, such as looseness or play in the cylinders or wear on the box's cutting edge. Looseness in the connection to the tractor, such as in the 3-point hitch, will cause inaccurate depth positioning.

Also check the tractor routinely for wear to its components, such as the 3-point linkage, ensuring it is operating properly.

Calibration

Perform periodic calibration checks of the Rotating Laser System, as outlined in its Operation Manual, to ensure accurate performance.

SERVICE

If the Automatic Control System is not functioning properly, the first step is to determine the problem component. Use the Troubleshooting Chart to determine possible causes and remedies. The following test equipment is needed:

- Voltage/Ohm Meter
- Rotating Laser or Laser Simulator

Use the Cable Wiring Diagrams on Page 7 to troubleshoot electrical problems.

CAUTION

To prevent serious damage to the Automatic Control System, never replace a fuse with a fuse that has a higher amperage value.

CAUTION

The Automatic Control System is a highly sophisticated electronic system. Do not attempt repairs to the components. Contact Laser Alignments or your local dealer if you have any problems.

SPECIFICATIONS AND MAINTENANCE

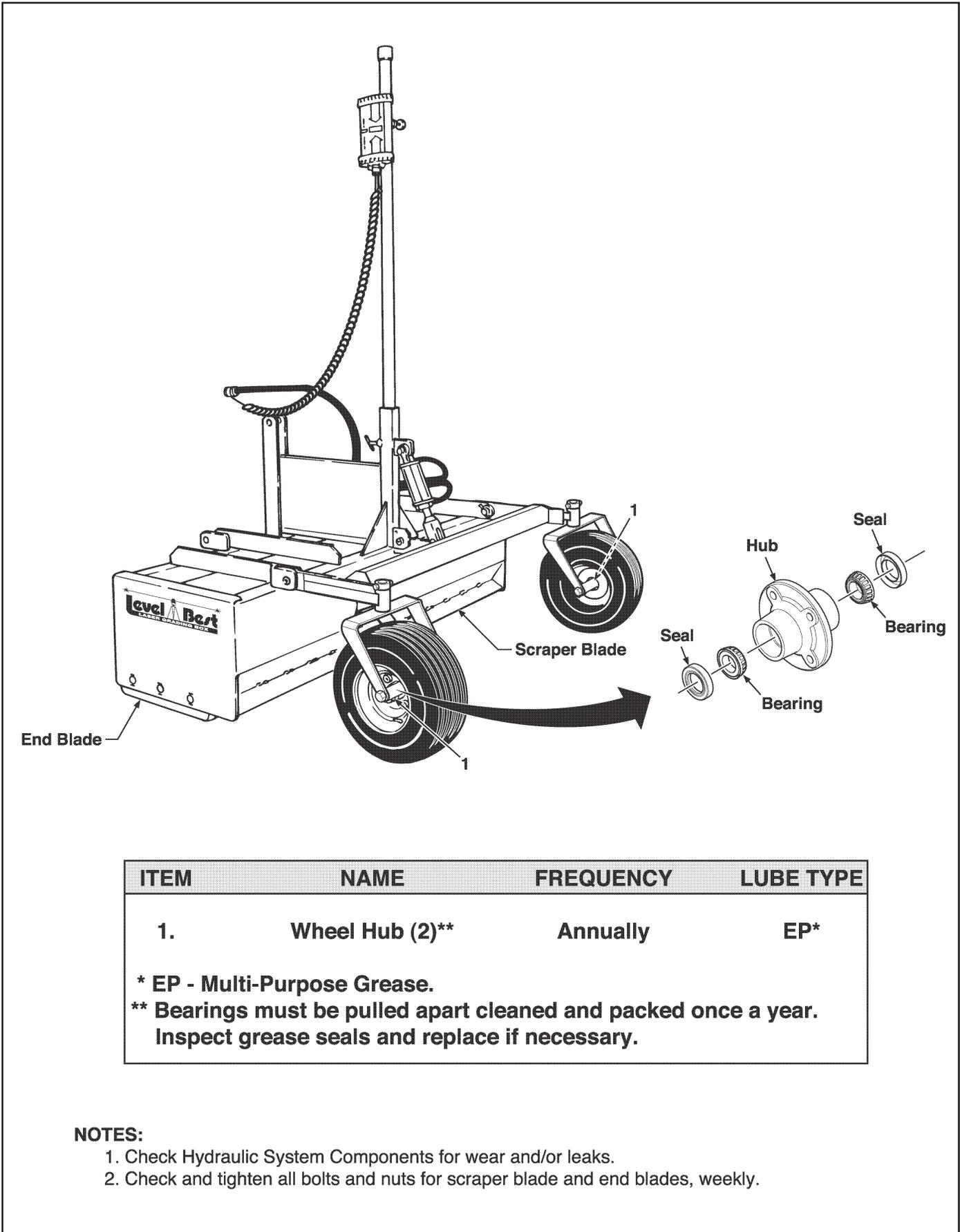


Figure 24. Lube and Maintenance Chart

REGISTRATION CARD

By buying this product, you, the purchaser of this product, agree to the following:

To the fullest extent permitted by law, the purchaser of this product shall indemnify and hold harmless ATI Corporation and its authorized dealer from and against claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of or resulting from the use of the product, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, but only to the extent caused by the negligent acts or omissions (Including but not limited to misuse or alteration of the product) of the purchaser, anyone directly or indirectly employed by the purchaser or anyone for whose acts the purchaser may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder.

In claims against any person or entity indemnified under this agreement by an employee of the purchaser, anyone directly or indirectly employed by the purchaser or anyone for whose acts the purchaser may be liable, the indemnification obligations shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the purchaser under worker's compensation acts, disability benefit acts or other employee benefit acts.

CUSTOMER COPY

Dealer _____ Date Installed _____
Grading Box Model # _____ Serial # _____
Control Panel Model # _____ Serial # _____
Laser Sensor Model # _____ Serial # _____
Dealer Name _____
Street _____
City, State, Zip _____
Telephone _____ Fax _____
Signature _____

DETACH AND MAIL TO ATI CORPORATION • 250 EARLAND DRIVE • NEW HOLLAND, PA 17557
or FAX to (717) 354-2162



MANUFACTURER'S COPY

Dealer _____ Date Installed _____
Grading Box Model # _____ Serial # _____
Control Panel Model # _____ Serial # _____
Laser Sensor Model # _____ Serial # _____
Customer Name _____
Street _____
City, State, Zip _____
Telephone _____ Fax _____
Signature _____