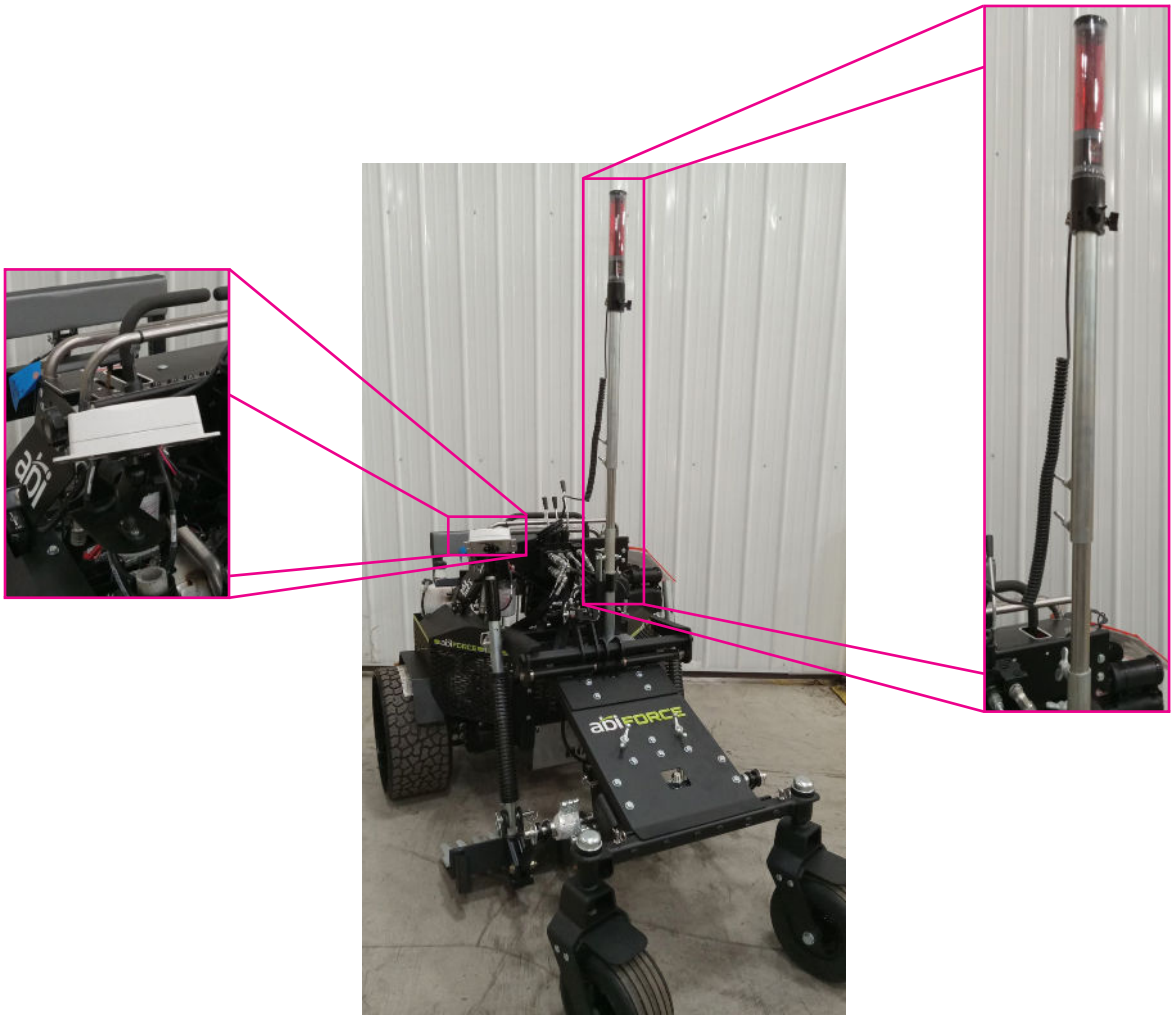
Form No. 10-11326| Rev A | 6/23/2023

ABI FORCE Z-23

Laser Installation Instructions



NOTE: This installation manual covers several models. Features may vary by model. Not all features in this manual are applicable to all models and the model depicted may differ from yours.

Laser Kit Components

ITEM	DESCRIPTION
1	10-10633 CONTROL: EG1 LASER SYSTEM: LASER FORCE
2	10-20256 WING BOLT: 1/2"-13 X 1.5:ZINC GR5
3	10-30960 POLE: 30": LASER FORCE
4	10-40239 WLDMT: TELESCOPING TOP:FORCE SHOCK

Laser Pole Installation

1. The laser pole will mount to the existing pole extension mounted on the left mid-section of the Force (**Fig 1 & 2**). **(LEFT AND RIGHT SIDE OF THE FORCE IS DETERMINED BY THE OPERATOR STANDING ON THE FLOOR BOARD FACING THE CONTROLS ON THE DASHBOARD)**

2. Unscrew both wing bolts in existing pole extension so 10-30960 Pole can slide into existing pole extension until 10-30960 is seated on bolt at bottom of existing pole extension. Re-tighten both wing nuts firmly (**Fig 3**).

3. Slide 10-40239 Telescoping Pole Weldment onto the top of 10-30960 with the threaded weldments ports at the bottom. Thread both 10-20256 Wing Bolts into each threaded port on 10-40239 hand tight only at this time (**Fig 4**). Pole assembly is complete (**Fig 5**).

4. Carefully remove the receiver from the case. Remove the wire lock pin and discard (**Fig 6**). Loosen both thumb screws (**Fig 6**) and slide the receiver onto the top of 10-40239 pole weldment from step 3 (**Fig 7**).

5. Rotate the receiver on the pole so that the lights on the receiver are facing the operator to make it easier for the operator to see the lights. Tighten both thumb screws on the receiver (**Fig 8, 9 & 10**).

Fig 1.

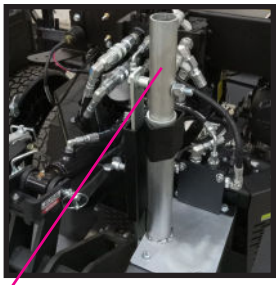


Fig 2.

Existing laser pole extension mounted on mid-section of the Force.

Fig 3.

10-30690

Bolt at bottom of existing pole extension.

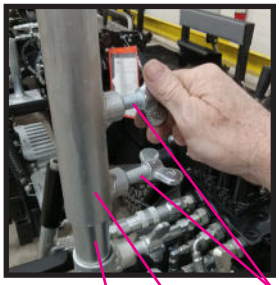


Fig 4.

10-20256

10-40239

10-30690

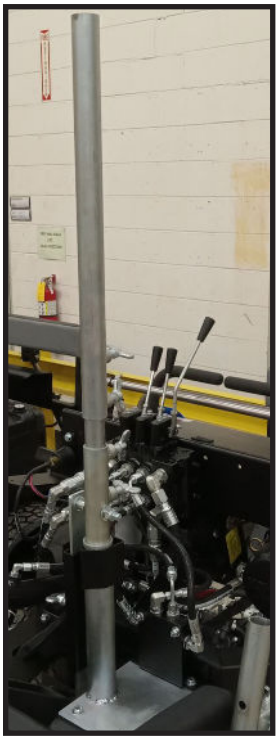


Fig 5.

Fig 6.

Wire lock pin

Thumb screws

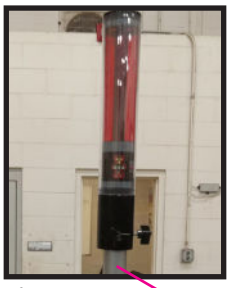


Fig 7.

10-40239

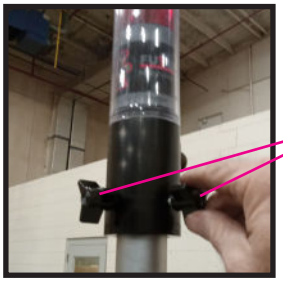


Fig 8.

Thumb screws.

Fig 9.

Triangle lights on front of receiver facing operator.

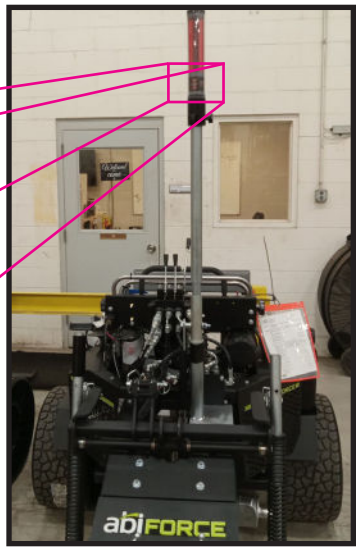


Fig 10.

Laser Control Box Installation

8. Remove the Ball Mount Pedestal from hardware bag that came in the laser kit (**Fig 11 & 12**). Close hardware bag and replace it back into the Laser Control case.

9. Inside the Force manual canister, located in the lower left rear corner of the Force (**Fig 13**), is a bag of hardware (**Fig 14**). Remove the 2 small 1/4-20 x 7/8" long bolts and 1/4-20 Nylock nuts. Close hardware bag and replace it back into the Force canister and screw the canister lid back on.

10. On the right side of the Force, just in front of the dashboard, is the Control Box mounting bracket to mount the Ball Mount Pedestal (from step 8) onto using the 2 small 1/4-20 x 7/8" long bolts and 1/4-20 Nylock nuts (from step 9). insert both bolts thru the Ball Mount Pedestal and on thru the holes in the Control Box mounting bracket. Thread (1) 1/4-20 Nylock nut onto each bolt and tighten using (2) 7/16" wrenches or socket set (**Fig 15 & 16**).

11. Remove Control Box from Laser case. On the underside of the control box is the pivoting extension post. Loosen the thumb screw and remove the Ball Mount Pedestal attached to it (the one used from the hardware bag in step 8 is taller allowing more pivoting ability) and discard (**Fig 17**).

12. Holding the underside of the control box and pivoting extension post, slide the end of the extension post onto the Ball Mount Pedestal mounted on the control box mounting bracket and tighten thumb screw tight enough to allow the control box to stand upright by itself but loose enough to be able to pivot the control box back and forth. The three ports on the bottom of the control box must be facing toward the dashboard (**Fig 18 & 19**).

NOTE: middle port on the control box will not be used (**Fig 23**)**.**

13. Next to the control box mounting bracket is the power cable pressed into a rubber boot. Pull the power cable out of the rubber boot. (**Fig 20 & 21**).

14. This plug has 7 pin holes in the end of it and a slot in the plug (**Fig 22**) to only allow it to plug onto the matching port (with 7 pins) on the bottom of the control box (**Fig 23**). Push the plug onto the matching port (aligning the slot in the plug with the tab on the port) while screwing it on **(BE CAREFUL NOT TO CROSS THREAD THE THREADS)** (**Fig 24**). Hand tight only.

15. Remove the accordion style receiver cable with an elbow plug on one end and a straight plug on the other end from the laser case and carefully cut off the zip-ties (**Fig 25 & 26**).

Fig 11.

Fig 12.

Control Box mounting bracket

Ball Mount Pedestal

Fig 13.

Fig 14.

Manual canister

Fig 15.

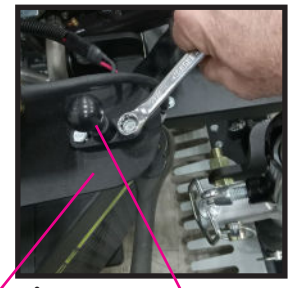


Fig 16.

Control Box mounting bracket

Ball Mount Pedestal

Fig 17.

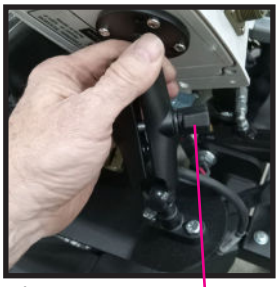


Fig 18.

Pivoting extension post

Thumb screw on pivoting extension post

Laser Control Box Installation (cont'd)

16. The elbow plug (**Fig 27**) has 4 pin holes in the end of it and a slot in the plug (**Fig 28**) to only allow it to plug onto the matching port (with 4 pins) on the back side of the receiver mentioned in step 4 (**Fig 29**).

17. Push the elbow plug (with the cable coming out of the plug hanging toward the floor) onto the matching port on the receiver (aligning the slot in the plug with the tab on the port) while screwing it on **(BE CAREFUL NOT TO CROSS THREAD THE THREADS)** (**Fig 30**). Hand tight only.

18. The straight plug on the other end of the receiver cable has 4 pin holes in the end of it and a slot in the plug (**Fig 31**) to only allow it to plug onto the matching port (with 4 pins) on the back side of the control box (**Fig 32**).

19. Push the plug onto the matching port (aligning the slot in the plug with the tab on the port) while screwing it on **(BE CAREFUL NOT TO CROSS THREAD THE THREADS)** (**Fig 32**). Hand tight only.

20. Coil up the excess receiver cable and loop it over the hydraulic levers located in front of the dashboard. Leave some slack in the cable to raise and lower the telescoping receiver pole. (**Fig 33**).

21. Tilt the control box that gives the operator the best view of the screen while standing on the floorboard facing the dashboard and fully hand tighten the thumb screw on the pivoting extension post under the control box. The Laser control box is now ready to turn on to test (**Fig 34**).

Fig 19.

Thumb screw on pivoting extension post

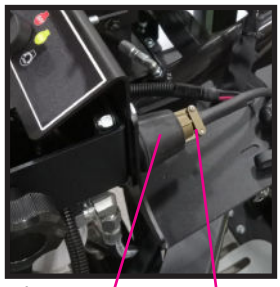


Fig 20.

Rubber boot

Power cable

Fig 21.

Fig 22.

Middle port not used.

Slot on cable plug

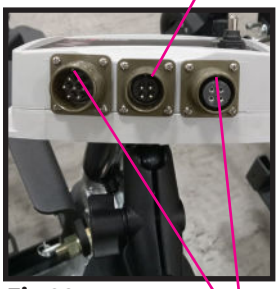


Fig 23.

Fig 24.

Tab on ports to line up with slots on cable plugs

Fig 25.

Fig 26.

Cut zip-ties

Laser Control Box Installation (cont'd)

Fig 27.

Fig 28.

Slot on cable plug

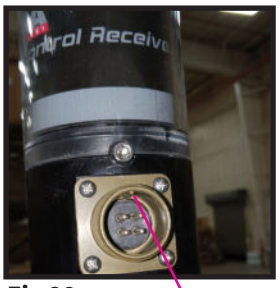


Fig 29.

Tab on port to line up with slot on cable plug

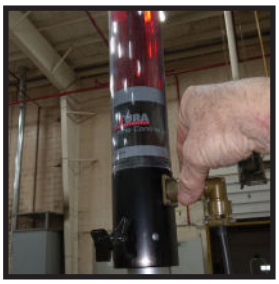


Fig 30.

Fig 31.

Slot on cable plug

Fig 32.

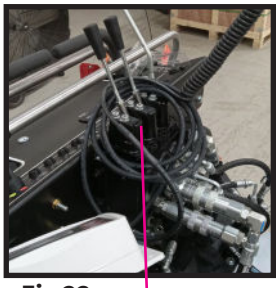


Fig 33.

Coil excess cable around hydraulic levers

Fig 34.

Laser Control Box Start-up

There are 2 different types of hydraulic valves on the Force depending on when the Force was ordered. The old valve (**Fig 35**) and the newer valve (**Fig 36**).

To tell which valve is installed on your Force, the old valve (**Fig 35**) will have a recessed face on the valve where the ports are. The new valve (**Fig 36**) will have a protruding face on the valve where the ports are.

The Laser Control box will require slightly different programming depending on which valve is installed on the Force. Consult authorized dealer or ABI customer support for programming instructions.

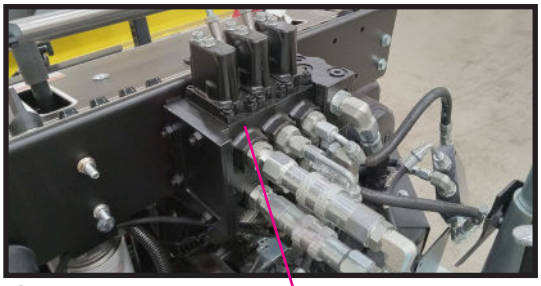


Fig 35.

Recessed face on old valve.

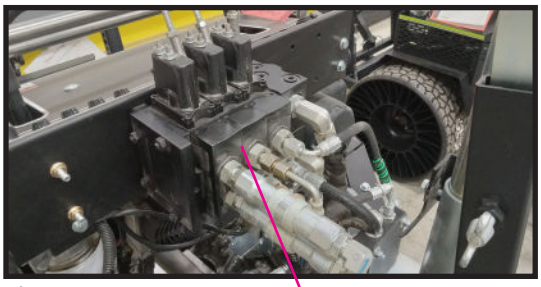


Fig 36.

Protruding face on new valve.

Quick Check of Laser system after installation

22. Turn on the Control box by pushing the power button (**Fig 37**). The "Menu" screen should be showing on the control box (**Fig 38**).

23. During the quick check, if the control box screen reads "Laser Recver Bad" (**Fig 39**) and the amber arrow lights are flashing (**Fig 40**), recheck your cable connections to make sure they are fully pressed into the ports and threaded on tightly. If connections are all good, check each cable for damage (cuts, tears. etc.). If cables appear to be in good condition, call ABI customer support (contact information on last page of this manual).

23. When Laser system is installed correctly, the green lights on the receiver and control box will be flashing green (**Fig 41 & 42**).

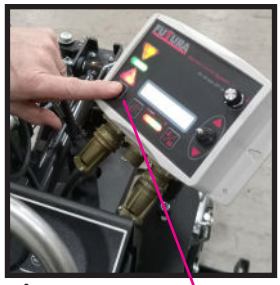


Fig 37.

Power button.

Fig 38.

Fig 39.

Fig 40.

Control box code and amber lights flashing when there is a cable/control box issue.

Fig 41.

Flashing green lights.

Fig 42.

Setting Up to Laser Grade

Confirming the Force is ready

24. Once you arrive at the property you want to Laser Grade, set the transmitter up somewhere in a place that will not be bumped or moved during laser grading (If at a baseball field, ABI suggests somewhere between the pitchers mound and second base) (**Fig 43 & 44**).

25. On the ledge of the tripod, just above where the legs mount to the base is a leveling bubble (**Fig 45**). Adjust the legs as necessary to get the bubble within the circle (does not have to be perfectly in the center of the circle - the transmitter is also self-leveling (**Fig 46 &47**).

26. Screw transmitter onto the tripod. To mount the transmitter to the tripod, align the threaded hole in the bottom of the transmitter with the threaded post on the top of the tripod and screw transmitter firmly onto the tripod (**be sure not to cross thread**) (**Fig 48 & 49**).

27. Push power button (**Fig 50**). The top of transmitter will start spinning (the transmitter is broadcasting a beam while the top part of the transmitter is spinning). Rotate the tripod crank handle to raise or lower the transmitter as needed to get a clear signal throughout the entire area being laser graded (the lower the transmitter is set the more accurate the beam) (**Fig 51**).

28. If the optional Laser Grade Rod and the Laser Sensor were ordered, attach the Laser Sensor to the Laser Grade Rod (**Fig 52**). To attach the Level Sensor to the Laser Grade Rod, unscrew the thumb screw at the end of the Level Sensor to retract the locking clamp. Slide the back of the laser sensor up against the same side of the grade rod as the black buttons are on then screw the thumb screw until the locking clamp is tight against the side of the grade rod (**Fig 53 & 54**).

29. The 13' Laser Grade Rod has 4 locking tiers within itself. Each tier has a black button (**Fig 55**) that will snap into a slot to lock it in place. To extend each tier, pull each tier out until the black button snaps into the slot, then push the black button in and continue pulling out that tier (**Fig 56**).

30. A quick check to confirm the transmitter beam is funtioning properly, push the power button on the Laser Sensor (**Fig 57**) and raise the Laser Grade Rod in the air. Once the Laser Sensor is in line with the transmitter beam, there will be a steady beep and the light on the laser sensor unit will be green (**Fig 58**).

Fig 43.

Fig 44.

Fig 45.

Location of tripod leveling bubble.

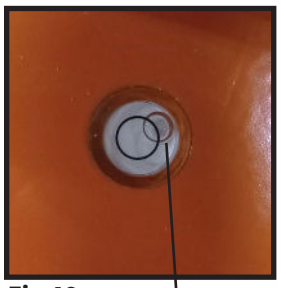


Fig 46.

Leveling bubble off center.

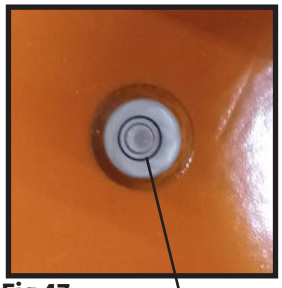


Fig 47.

Leveling bubble on center.

Fig 48.

Screw Transmitter to threaded post on top of Tripod.

Fig 49.

Setting Up to Laser Grade (cont'd)

31. Start the Force and lower the mini box blade until it's lightly touching the ground (**Fig 59**).

32. With the receiver facing the operator, control box turned on and functioning properly (**Fig 60**) and the transmitter turned on (top of transmitter spinning), find the transmitter beam by raising or lowering the receiver on top of the telescoping pole on the Force by loosening the top 2 wing bolts and slide the pole up or down until the receiver syncs with the transmitter beam. The green set of lights between the amber arrow lights on the receiver and control box will be flashing green (**Fig 61 & 62**).

33. Firmly tighten all wing bolts to prevent loosening due to vibration while operating the Force (**Fig 63**).

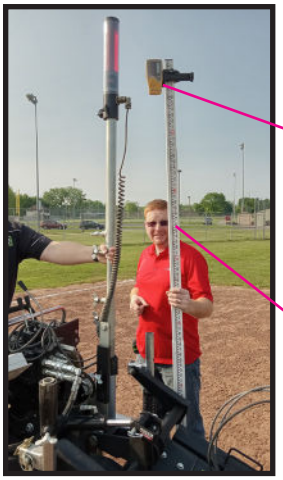
34. The Force is now ready to laser grade. If Laser grading training is desired, please contact the ABI customer support team. See contact information on last page.

Transmitter power button.

Fig 50.

Tripod crank handle to raise or lower the transmitter.

Fig 51.



Laser Sensor.

Laser Grade Rod.

Fig 52.

Setting Up to Laser Grade (cont'd)

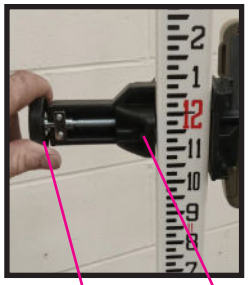


Fig 53.

Thumb screw.

Locking clamp.

Fig 54.

Level Sensor

Fig 55.

Black button.

Fig 56.

Press black button in to unlock tiers.

Fig 57.

Laser Sensor power button.

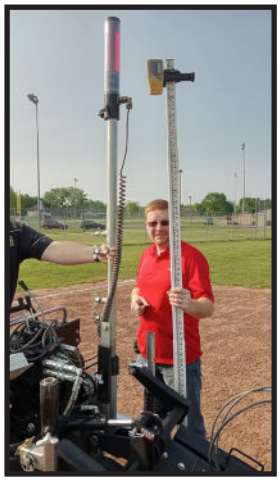
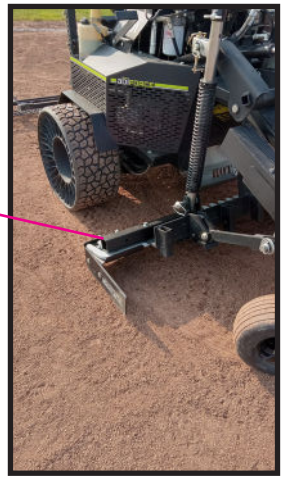


Fig 58.



Mini Bix Blade.

Fig 59.

Fig 60.

Power button.

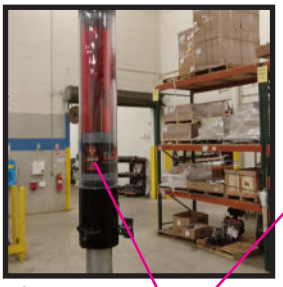


Fig 61.

Fig 62.

Flashing green lights.

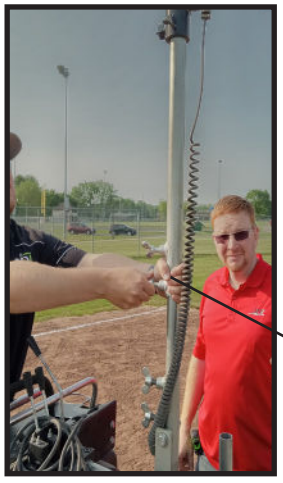


Fig 63.

Tighten the top 2 wing bolts to secure the Laser pole in place once the receiver is in line with the transmitter beam.

Trouble Shooting

- Control Box does not turn on when power button is pushed:
  Check fuse on top of battery (**Fig 64**). Replace if bad.
  Confirm harness plug on power cord is fully plugged together (**Fig 65**).
- Control box screen reads "Laser Recver Bad" and the amber arrow lights are flashing:
  Recheck your cable connections to make sure they are fully pressed into the ports and threaded on tightly. If connections are all good, check each cable for damage (cuts, tears, etc). If cables appear to be in good condition, call ABI customer support (contact information on last page of this manual).
- Toggle up on the control box toggle switch (**Fig 66**) and the mini box blade moves down:
  Reverse the plugs on the underside of the valve (**Fig 67**).
- Receiver loses laser beam (transmitter quits spinning and amber arrows flash):
  Check tripod leg latches are properly locked.
  Check batteries in transmitter.
  Check transmitter for error codes and reset if necessary.
  Check to see if all 4 wing bolts on receiver pole connected to the Force are fully tighten to prevent the pole from wobbling around.
- Losing beam signal while laser grading (Unit acts erratically or jumps up and down randomly):
  Shiny bleachers or Scoreboards can sometimes interfere with the beam signal.

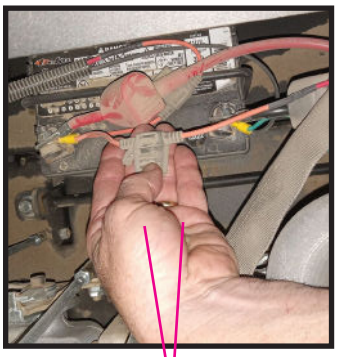


Fig 64.

Fuse on top of battery.

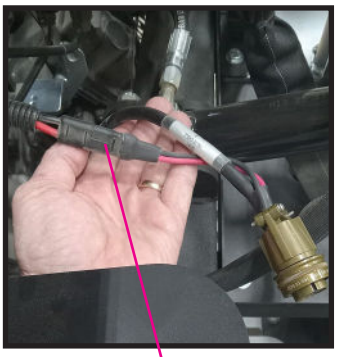


Fig 65.

Harness plug on power cord.

Fig 66.

Toggle Switch.

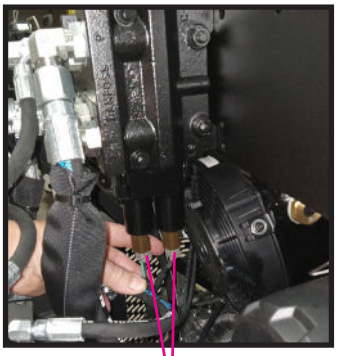


Fig 67.

Plugs on underside of valve.

Trouble Shooting (cont'd)

- Adjusting the percent DC:
  Unit must be running and hot before adjusting the Percent DC. Press thru the menu buttons on the control box until you get to the screen that shows Minimum DC and PulseDC. Use the toggle switch to adjust the precent value to desired setting (**Fig 68, 69, 70, 71 & 72**).
- Mini Box Blade is bouncing up and down while laser grading:
  1. Reset control box to ABI default settings (Consult authorized dealer or ABI customer support for programming instructions).
  2. Adjust Pecent DC on Control Box settings.
- Mini Box Blade is not responsive enough while laser grading:
  1. Reset control box to ABI default settings (Consult authorized dealer or ABI customer support for programming instructions).
  2. Adjust Pecent DC on Control Box settings.
- Mini Box Blade stops moving while laser grading:
  1. Reset control box to ABI default settings (Consult authorized dealer or ABI customer support for programming instructions).
  2. Adjust Pecent DC on Control Box settings.

CAUTION: ADJUSTING THE PRECENT DC WHILE UNIT IS RUNNING WILL MAKE THE HYDRAULICS MOVE! DO NOT HAVE YOUR FOOT UNDER THE MINI BOX BLADE WHEN ADJUSTING!

Fig 68.

In order to get to the menu section concerning "Percent DC", press thru the options on the control box until "LATEC Instr. Inc 5192354585" appears on the screen. Press both buttons at the same time to get to the sub-menu to adjust the Percent DC.

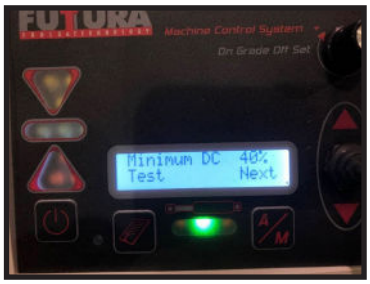


Fig 69.

To set the Minimum DC to 40% - press TEST

Fig 70.

Press the “test” button. Use toggle switch to set to up to 37%.

Fig 71.

Press “Chg Dir” to change between Down and Up and set down % to make it move slowly and smoothly both directions (34%-40% typically).

Fig 72.

Press Next (A/M) until box exits menu.

Laser Options

10-10422 Laser Transmitter Tripod

19. Remove cardboard packing (**Fig 73**) and spread the three legs out as needed. Read instructions that comes with the tripod to make any necessary adjustments depending on the terrain (**Fig 74**).

10-10424 Dual Slope Transmitter for Laser

19. Remove the Transmitter and Level Sensor from the case (**Fig 75 & 76**).

10-10425 13' Fiberglass Grade Rod for Laser

19. The 13' Laser Grade Rod has 4 locking tiers within itself (**Fig 77**).

Fig 73.

Fig 74.

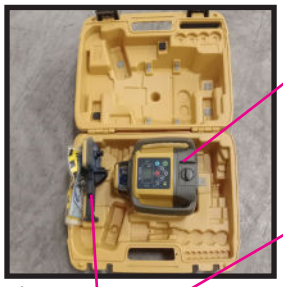


Fig 75.

Transmitter

Level Sensor

Fig 76.

4 tier grade rod.

Fig 77.

Foot Notes

Contact Information

ABI Attachments, Inc
520 S. Byrkit Ave.
Mishawaka, IN 46544

Customer Support

Email: support@abiattachments.com
Phone: 877-788-7253
Website: www.abisupport.com

To order parts or to speak to one of ABI's Customer Service Representatives contact us Monday to Friday 9am to 5pm EST.

For additional information on the use or setup of the Force Z-23 Laser System, please contact the ABI customer support team at 855.211.0598.

Additional support videos are available at the ABI support page (abisupport.com) under each tool.

Warranty Information and Return Policy - Warranty and return policy information can also be found on the ABI support page under each tool. For additional questions regarding warranty or return policy, contact the ABI customer support team at 855.211.0598.

abi ATTACHMENTS®