

56122705 LEFT SAFETY SENSOR KIT

For Liberty SC50 Models: ALL

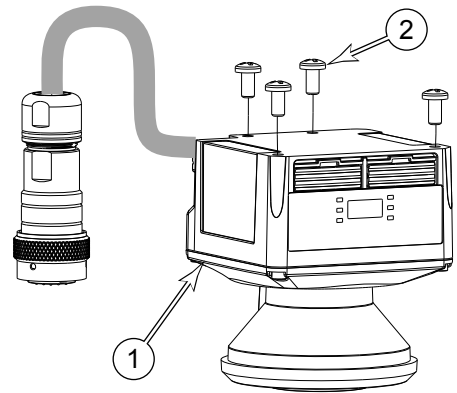
CONTENTS OF KIT

Item	Part Number	Qty	Description
[]	56090376	1	Instruction Sheet
1		1	2D Safety Laser, Configured, Left/Master
2		4	Scr-Pan Phil M5-0.8 X 10mm

[] = Not Shown

REQUIRED TOOLS

Laser Alignment Kit p/n 56122718



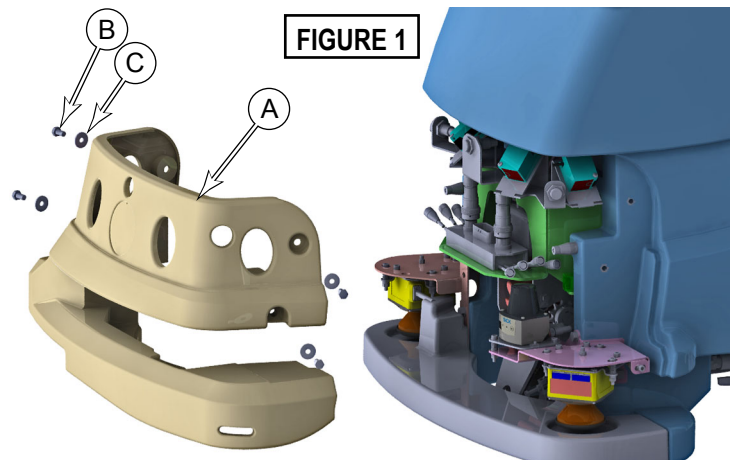
INSTALLATION INSTRUCTIONS

⚠ CAUTION!

When working on an SC50 and a battery disconnect is needed, ensure that the Autonomy Module is completely powered off before the power is pulled from the system. To verify that the Autonomy Module is completely powered down simply wait for both the safety LiDAR's and Dropoff lasers to power off, plus an additional 15 seconds after that. If this procedure is not followed when disconnecting the battery, there is a chance that the Autonomy Module could be permanently damaged and would need replacement.

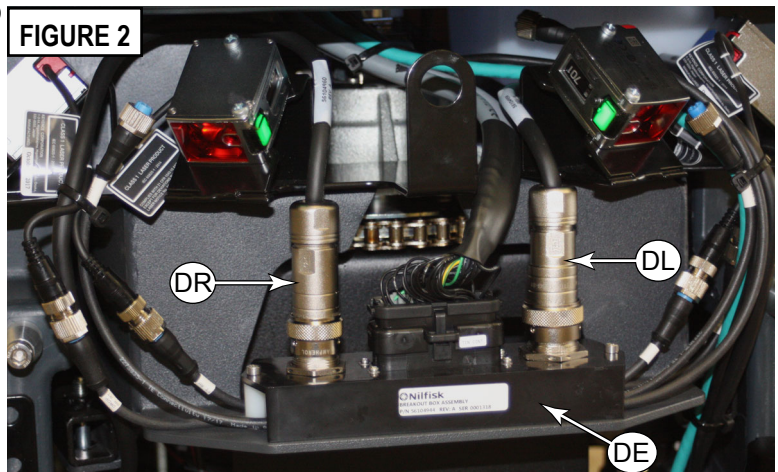
⚠ WARNING! Disconnect battery before servicing.

The safety lasers are pre-configured with the applicable scanning maps for the left and right side of the machine, as well as whether the laser functions as master or slave for inter-laser communication. As a result, the left and right lasers are not interchangeable, nor are the electrical connectors.

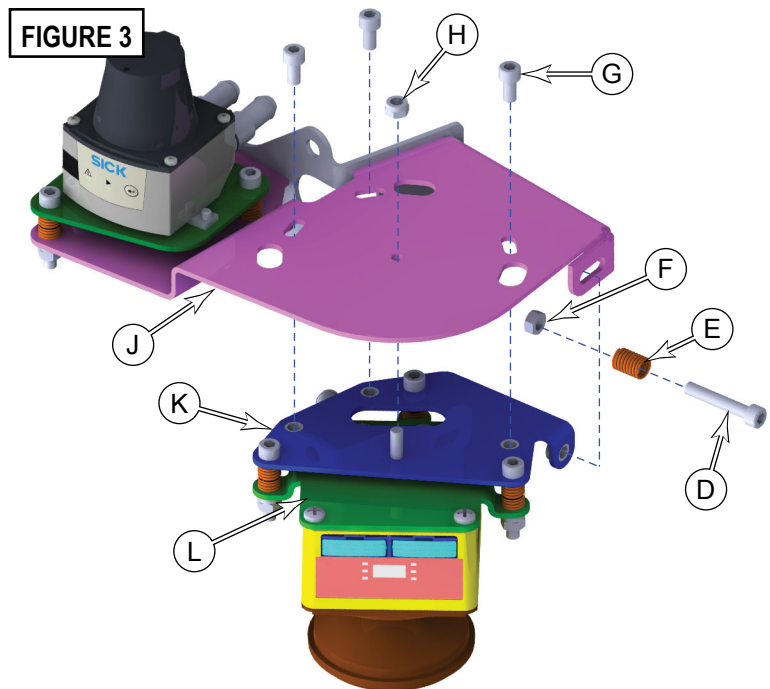


REMOVE THE EXISTING SAFETY LASER

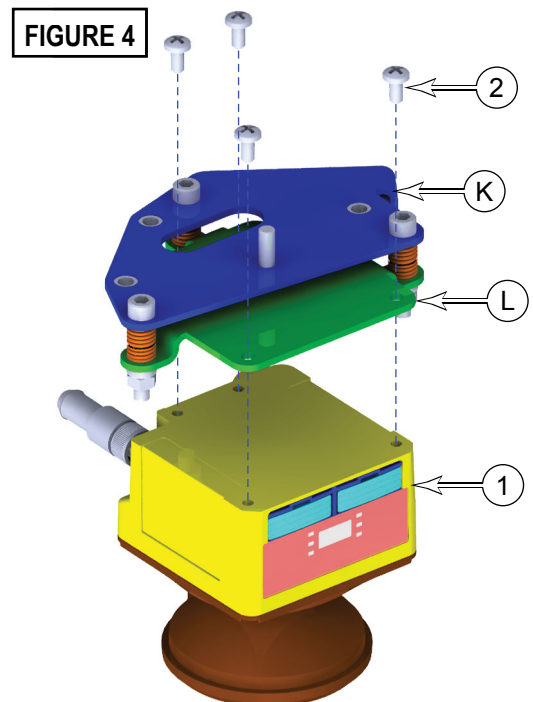
1. Disconnect the main battery connector for safety, any time you are working near the drive system. Disconnecting the batteries also prevents an electrical short that would damage the device.
2. **See Figure 1.** Remove the 4 screws (B) and washers (C) that secure the front nose (A) to the recovery tank, and remove the front nose.
3. **See Figure 2.** Disconnect the left safety laser electrical connector (DL) from the breakout box (DE) and free the cable from any cable ties.
 - The right safety laser connector (DR) is also shown for reference.



4. **See Figure 3.** Remove the adjusting screw (D), jam nut (F), and spring (E) from the leveling plate (J).
5. Remove the center pivot nut (H).
6. Remove the 3 mounting screws (G) that secure the leveling plate (K) to the laser platform bracket (J).
7. Remove the leveling plate and laser module assembly from the machine.



8. **See Figure 4.** Remove the 4 screws (2) that secure the laser module (1) to the laser mounting plate (L), and remove the laser. Discard the screws.



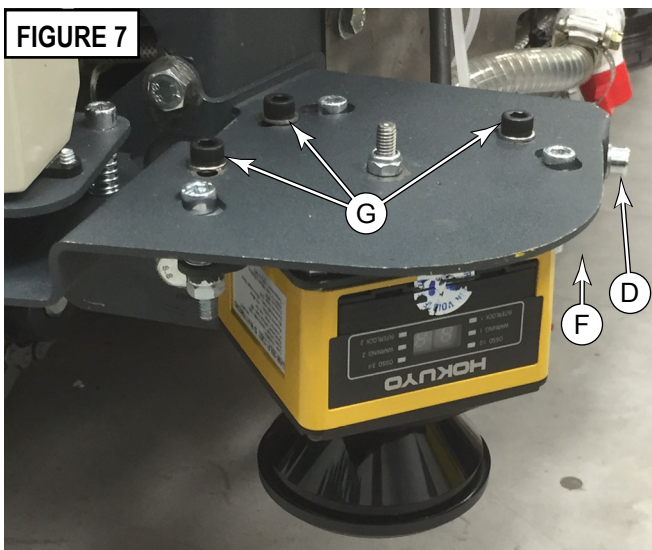
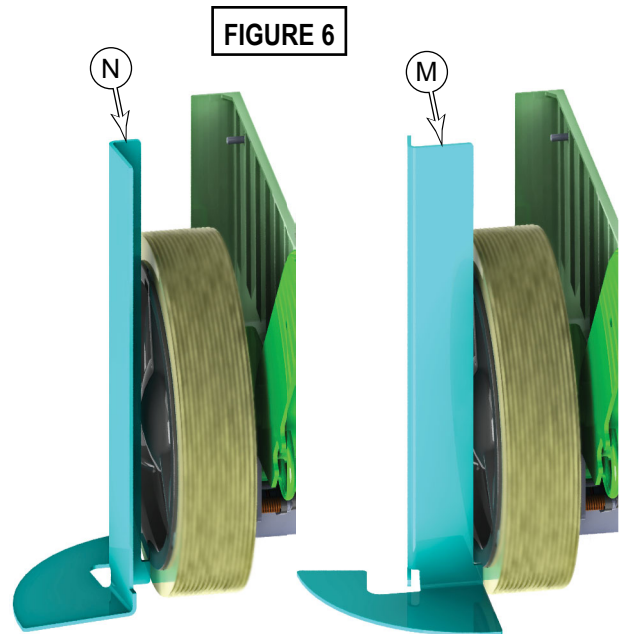
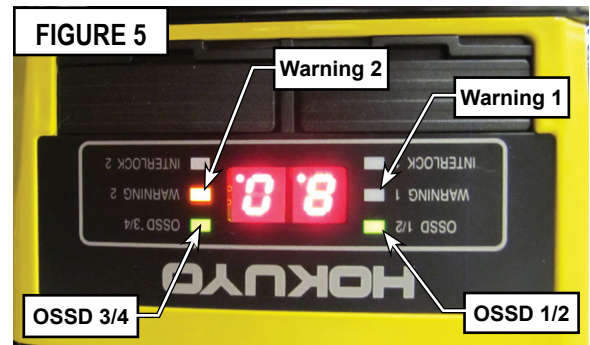
INSTALL THE NEW LASER

9. Route the laser module connector through the opening in the machine as it cannot be done once the laser module is installed.
10. Install the laser module (1) to the laser mounting plate (L) using 4 new screws (2). Torque screws (2) to 36 in/lb (4Nm).
11. Position the leveling plate and laser assembly under the laser platform bracket (J), and loosely secure it in place with the center pivot nut (H). Tighten the nut enough to secure the assembly, but not so tight that it cannot rotate.
12. Install the 3 mounting screws (G) to the leveling plate (K). Snug the screws, but do not tighten them.
13. Loosely install the adjusting screw (D) through the laser platform bracket (J), through the compression spring (E), and into the leveling plate (J). (Leave the jam nut loose or off.)
14. Route the cable up through the machine and connect the safety laser electrical connector (DL) to the breakout box (E) and secure the cable as necessary with cable ties.
15. Do Not finish reassembling the machine at this time.

ADJUST THE LASER ROTATIONAL POSITION

To ensure that the internal scanning maps align with the physical machine, each laser looks back toward the rear corner of the machine. If the rear wheel of the machine is seen, OSSD (1/2 & 3/4) are triggered as a confirmation for the Autonomous controller to see.

1. Power the machine and make sure the safety lasers are active.
2. Turn the steering wheel toward the left. (This ensures the safety laser is looking toward that side of the machine.)
3. Be sure to rotate squeegee to avoid interference with the sensor being adjusted.
4. **See Figure 6.** Place the laser detector stand (from laser kit 56122718) against the left rear wheel with the stand in the narrow direction (**N**).
5. **See Figures 5 & 7.** Loosen the adjustment screw (**D**) until both LEDs OSSD 1/2 & OSSD 3/4 turn on RED. Give the screw at least 1-full turn more to ensure it's past the transition.
6. Slowly tighten the adjustment screw (**D**) until both LEDs OSSD 1/2 & OSSD 3/4 turn off, and then another 1/2-turn.
7. Rotate the laser detector stand to the wide position (**M**), and verify that both LEDs OSSD 1/2 & OSSD 3/4 turn on RED. LED Warning 1 will also turn on.
8. Remove the laser detector stand, and verify that both LEDs OSSD 1/2 & OSSD 3/4 turn from Red to Green. The Warning 2 LED will remain on.
9. Retighten the 3 mounting screws (**G**) and torque to 62 in/lb (7Nm).
10. Install the jam nut (**F**) and torque to 62 in/lb (7Nm)



LASER LEVEL ADJUSTMENT (SETUP)

For proper operation, the laser must be accurately leveled with respect to the machine. This is accomplished by placing the machine on a flat floor surface, and measuring the height of the laser beam at 3 positions around the machine.

11. Park the machine in an open area with a level floor at least 7 feet (2 meters) out from the left, front, and right sides of the machine.
12. Setup the laser detector on the stand, as **shown in Figure 8**. Best results occur when the laser beam strikes the detector in the red window on the right side somewhere near the center.
13. Press the power button on the detector to turn the detector on. Make sure the detector cannot see any laser beam when first turned on, or it will display an error message.
14. Press the units button as necessary to set the units to "mm" (millimeter).
15. Press the accuracy button as necessary to set the accuracy to the 1-mm range. (3 bars are displayed between the accuracy arrows.)
16. Cover the right safety laser and mapping laser to avoid interference with the laser detector. **NOTE:** The kit includes laser covers.

See Figure 9. To make the adjustments easier, the height measurement locations should be in-line with the adjustment screws, as shown below. In this manner, for example, if measurement location **(PP)** is low, then it directly translates to raising adjustment screw **(P)**.

17. Mark the measurement positions **(PP)**, **(QQ)**, **(RR)** on the floor, at approximately 7-feet (2 m) or more from the laser.
18. Move the detector stand to each of the three positions, and observe the height of the laser beam.
19. If the laser heights at all 3 positions are within $\pm 7\text{mm}$ of each other, then no adjustment is necessary.

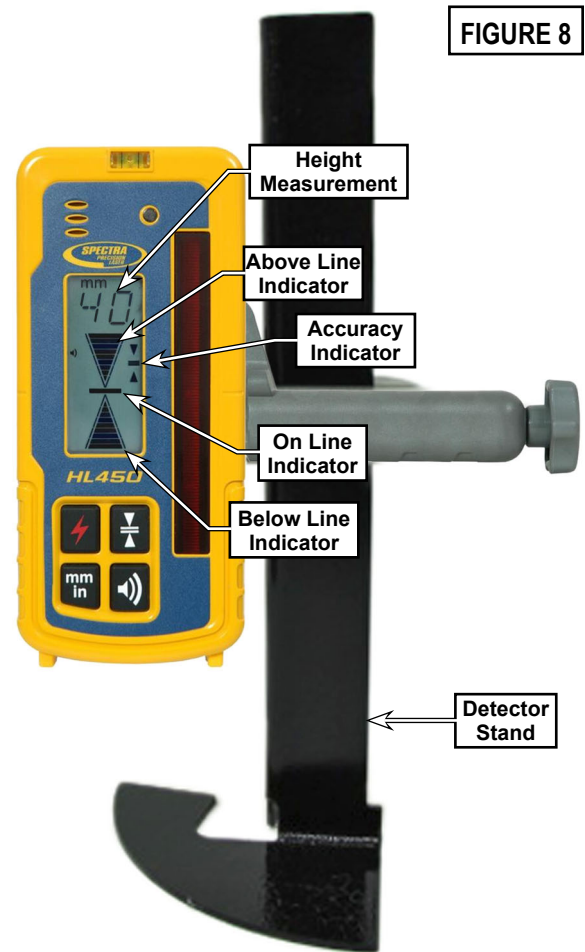


FIGURE 8

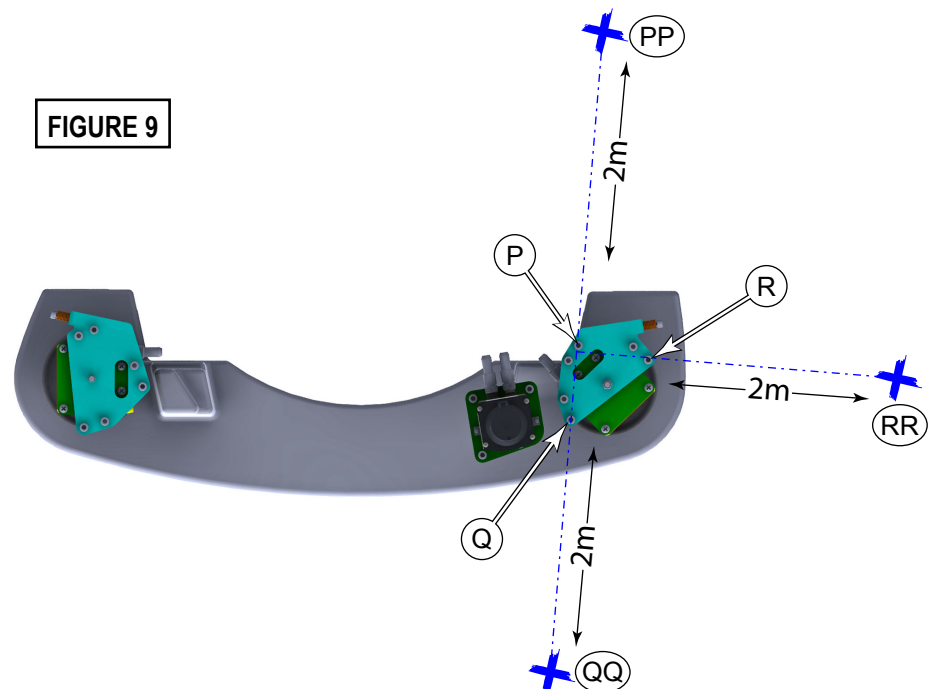
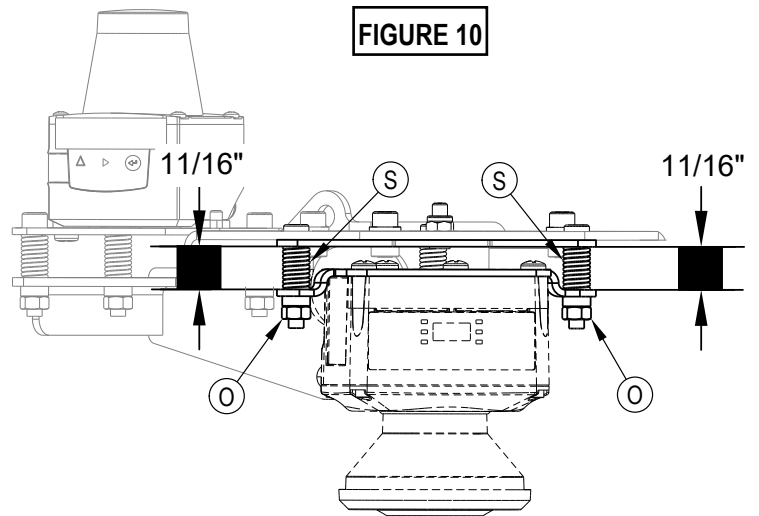


FIGURE 9

LASER LEVEL ADJUSTMENT (CONTINUED)

20. **See Figures 10 & 11.** Before making adjustments, use the 11/16" gauge block to verify/set each of the 3 adjustment screws to their neutral position.

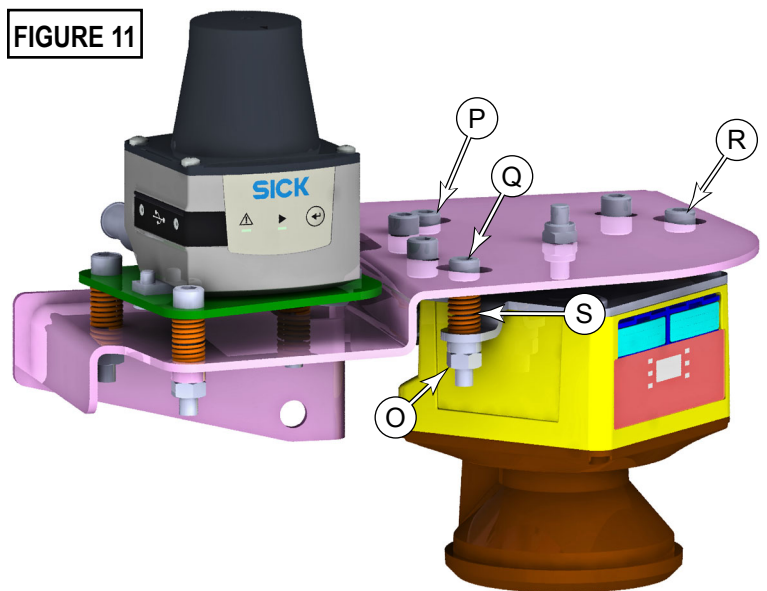
- Loosen the 3 jam nuts (**O**) at the bottom of the laser adjustment screws.
- Loosen the adjustment screw as needed and place the gauge block adjacent to each of the 3 tension springs (**S**).
- Temporarily tighten the adjustment screw until the gauge block is slightly snug between the brackets.



21. Adjust the P-to-Q level first. Changes should only be made with screw (**Q**) in this step.

- Compare the height readings from the (**PP**) and (**QQ**) locations of the laser detector.
- If the (**PP**) position is higher than the (**QQ**) position, loosen screw (**Q**). If screw (**Q**) runs out of thread engagement then turn screw (**P**) one turn in.
- If the (**PP**) position is lower than the (**QQ**) position, tighten screw (**Q**). If screw (**Q**) is tightened to the point that the spring is flattened then readjust (**P**) one turn out.

FIGURE 11



22. Adjust the (**RR**) position to match the (**PP**) and (**QQ**) heights.

- If the (**RR**) position is lower than (and not between) the (**PP/QQ**) positions, loosen screw (**R**). If screw (**R**) runs out of thread engagement then turn screw (**P**) one turn in.
- If the (**RR**) position is higher than (and not between) the (**PP/QQ**) positions, tighten screw (**R**). If screw (**R**) is tightened to the point that the spring is flattened then readjust (**P**) one turn out.

23. **See Figure 12.** Confirm height of the laser at rear wheel is less than or equal to 190 mm.

24. While holding each respective adjustment screw from turning, re-tighten the 3 jam nuts and torque to 62 in/lbs. Confirm the level did not change.

25. Finish reassembling the machine. Torque Screws (**B**) to 91 in/lb [10.3 N-m] $\pm 5\%$ (shown in Figure 1).

FIGURE 12

