



40-6680 5 Beam Laser Pointer

Service Manual

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1.0 Introduction

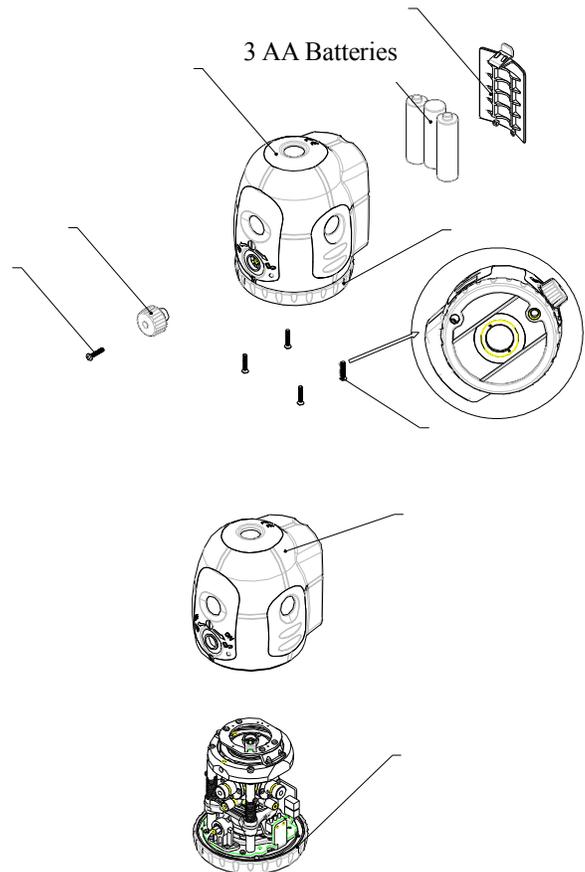
40-6680 5 beam laser pointer is a highly accurate instrument. Outside of a few customer adjustments (outlined in the owners manual), all adjustments/service operations are internal to the instrument and to be performed only by authorized service personnel. Authorized personnel should adhere to the guidelines described within this service manual for all repairs and/or service work. This manual is written with the assumption that a unit is disassembled or assembled from start to finish. In reality, only component parts or modules would be replaced during a repair. Given this, procedures discussed in this manual should be adjusted according to the repair being made.



2.0 Overall Unit Disassembly

Item	JLT Part #	Description	Qty
1	AP1572	M2.5 x 10 Cross Plate Screw	1
2	AP1820	On/Off Knob	1
3	AP1821	Housing Part	1
4	AP1822	Battery Cover	1
5	AP1823	Body Module	1
6	AP1824	M2.5 x 12 Cross Sunk Screw	4

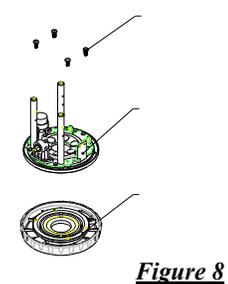
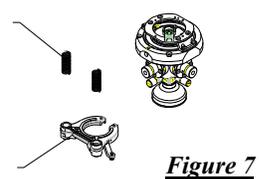
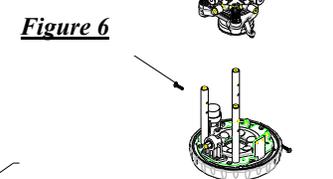
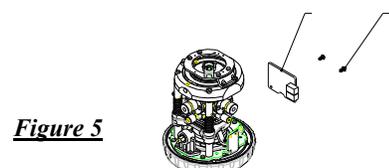
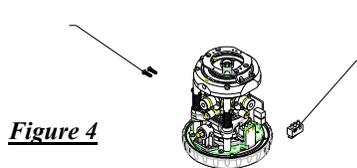
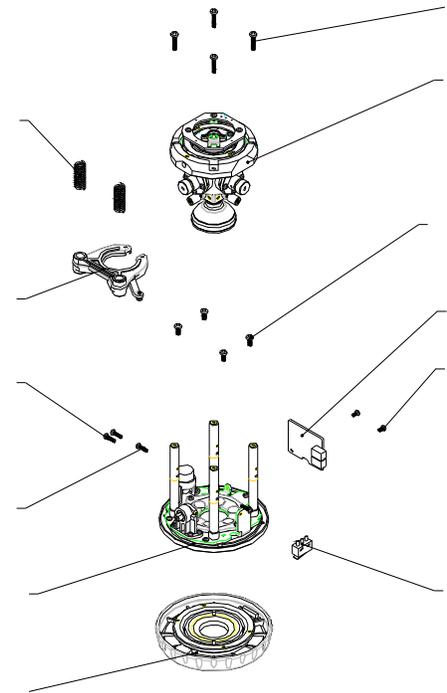
1. Open the battery cover (4#) and remove 3*AA battery;
2. Using a Phillips screwdriver, remove M2.5×10(1#) screw, and remove on/off knob (2#).
3. Using a Phillips screwdriver, remove 4 cross-slot sunk screws M2.5×12(6#) through the bottom aperture (as shown in the to the right).
 - Note that rotating the base at 90 intervals exposes each of the 4 screws.
 - Once all 4 screws have been removed carefully lift housing part (3) off of body module (5) taking care not to damage the battery and power indicator wires.
4. Disconnect the power plug and indicator light plug connecting to the main circuit board module and housing part (3#).



2.1 Body Module Disassembly (AP1823)

Item	JLT Part #	Description	Qty
5-1	AP1491	M2 x 8 Cross Plate Screw	2
5-2	AP1825	Power Switch	1
5-3	AP1826	Main PCB	1
5-4	AP1475	M2 x 5 Cross Plate Screw	2
5-5	AP1682	M2.5 x 14 Cross Plate Screw	2
5-6	AP1827	Core Module	1
5-7	AP1491	M2 x 8 Cross Plate Screw	2
5-8	AP1828	Compensator Lock Springs	2
5-9	AP1829	Compensator Lock	1
5-10	AP1449	M2.5 x 6 Cross Plate Screw	4
5-11	AP1830	Baseboard Part	1
5-12	AP1831	Bottom Part	1

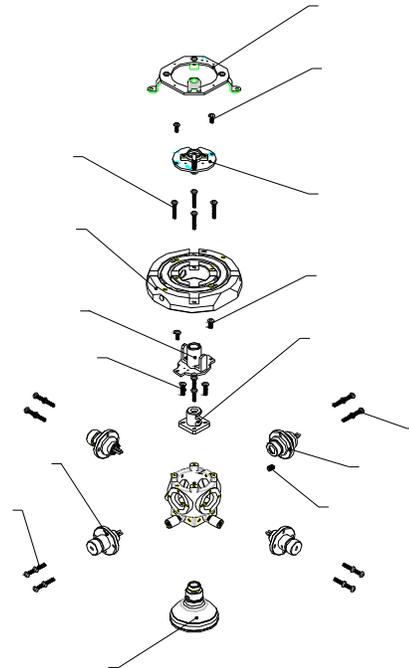
- Using a soldering iron, de-solder the wires that connect the power switch (5-2) and the main circuit board module (5-3).
- Using a Phillips screwdriver, remove 2 cross plate screws M2×8(5-1) and remove the power switch (see figure 4)
- Using a soldering iron, de-solder the wires that connect core module (5.6) and the main circuit board (5-3).
- Using a Phillips screwdriver, remove 2 cross-slot plate screws M2×4(5-4), then remove the main circuit board module (see figure 5).
- Using a Phillips screwdriver, remove 2 cross-slot plate screws M2×8(5-7) and 4 cross-slot plate screws M2.5×14(5-5), then remove the core module (see figure 6)
- Meanwhile, remove the press ring (5-9) and two press springs (5-8). Reference figure 7.
- Using a Phillips screwdriver, remove 4 cross cross-slot plate screws M2.5×6 (5-10), then remove the baseboard part (5-11) and base part (5-12). Reference figure 8.



2.2 Core Module Disassembly (AP1827)

Item	JLT Part #	Description	Qty
5-6-1	AP1832	Hair Spring Module 1	1
5-6-2	AP1475	M2 x 5 Cross Plate Screw	2
5-6-3	AP1833	Hair Spring Module 2	1
5-6-4	AP1834	M2 x 12 Cross Plate Screw	4
5-6-5	AP1835	Gimbal Module	1
5-6-6	AP1836	Compensator Module	1
5-6-7	AP1837	M3 x 4 Inner Hex Tightening Screw	1
5-6-8	AP1838	M2 x 4 Cross Plate Screw	2
5-6-9	AP1839	Connecting Board	1
5-6-10	AP1491	M2 x 8 Cross Plate Screw	4
5-6-11	AP1840	Prism Modules	1
5-6-12	AP1491	M2 x 8 Cross Plate Screw	4
5-6-13	AP1841	Laser Module 1	3
5-6-14	AP1491	M2 x 8 Cross Plate Screw	4
5-6-15	AP1842	Laser Module 2	2
5-6-16	AP1843	ST2.2×6.5 Cross Self Tapping Screw	4
5-6-17	AP1475	M2 x 5 Cross Plate Screw	4
5-6-18	AP1844	Support Bracket	2

5-6-16, 5-6-17, and 5-6-18 are not shown. Reference figure 9 for detail



- Using a soldering iron, de-solder one end of four hairsprings between the hairspring board module 1 (5-6-1) and 2 (5-6-3).
- Using a Phillips screwdriver, remove 4 cross-slot plate tapping screws ST2.2×6.5 (5-6-16), and remove hairspring board module 1 (5-6-1).
- Using a Phillips screwdriver, remove 2 cross-slot plate screws M2×5 (5-6-2), then remove hairspring board module 2 (5-6-3).
- Using a Phillips screwdriver, remove 4 cross-slot plate screws M2×5 (5-6-17) and disassemble 2 brackets 2 (5-6-18). Reference see figure 9.

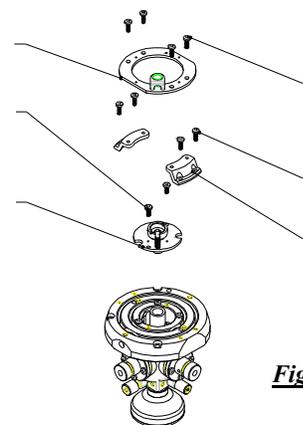


Figure 9

5. Using a Phillips screwdriver, remove 3 cross-slot plate screws M2×12 (5-6-4#) and remove gimbal module (5-6-5).
6. Using a 3M Hex Wrench, remove the inner hexagon tightening screw M3×3 (5-6-7)
7. Using a 3/32" steel rod, remove off the pendulum module (5-6-6#) by turning it counterclockwise (while looking at it from the bottom). Reference see figure 10.
8. Using a soldering iron, de-solder all connection lines between the laser modules and the connecting board (eight pieces in all). Screw off two cross-slot plate screws M2×4(5-6-8#) by a cross screwdriver. Take off the connecting board module (5-6-9#);
9. Using a Phillips screwdriver, remove 4 cross-slot plate screws M2×8(5-6-10), and remove the prism module (5-6-11).
10. Using a Phillips screwdriver, remove 4 cross-slot plate screws M2×8(5-6-12), then remove 3 laser source modules 1 respectively (5-6-13);
11. Using a Phillips screwdriver, remove 4 cross-slot plate screws M2×8(5-6-14), then remove laser source module2 (5-6-15). Reference see figure 11.

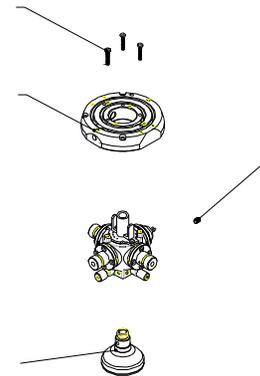


Figure 10

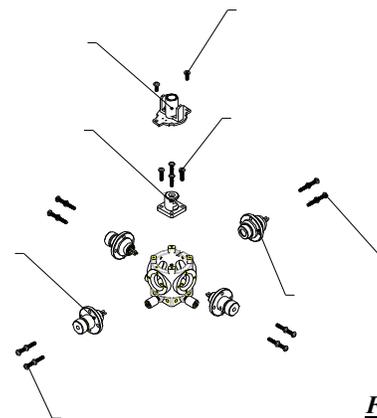
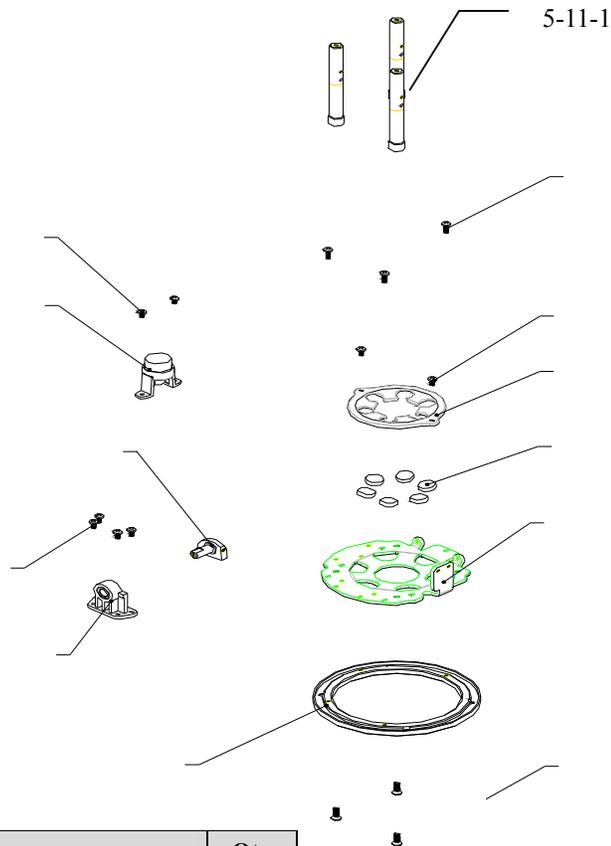


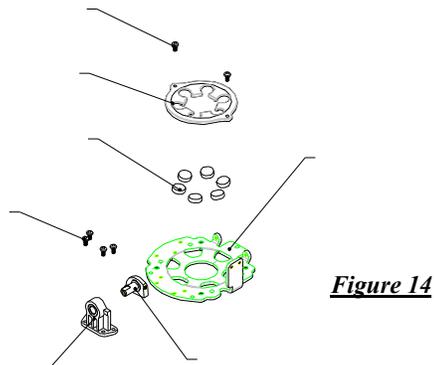
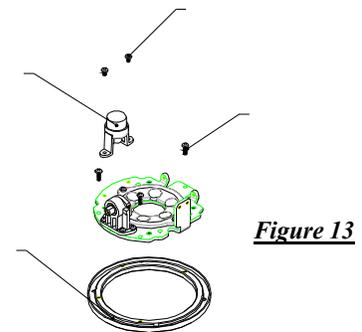
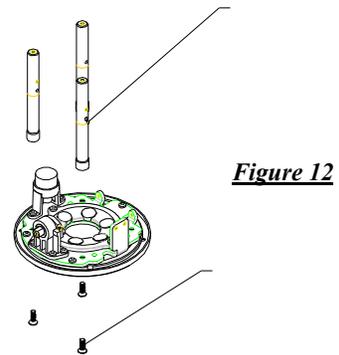
Figure 11

2.3 Baseboard Disassembly (AP1830)



Item	JLT Part #	Description	Qty
5-11-1	AP1845	Support Rod	3
5-11-2	AP1475	M2 x 5 Cross Sunk Screw	3
5-11-3	AP1653	M2 x 3 Cross Plate Screw	2
5-11-4	AP1846	Buzzer Module	1
5-11-5	AP1464	M2 x 6 Cross Plate Screw	3
5-11-6	AP1847	Ring	1
5-11-7	AP1838	M2 x 4 Cross Plate Screw	2
5-11-8	AP1848	Limit Position Cover	1
5-11-9	AP1849	Magnets	6
5-11-10	AP1850	Base Board	1
5-11-11	AP1851	Spindle Module	1
5-11-12	AP1852	Spindle Seat	1
5-11-13	AP1838	M2 x 4 Cross Plate Screw	4

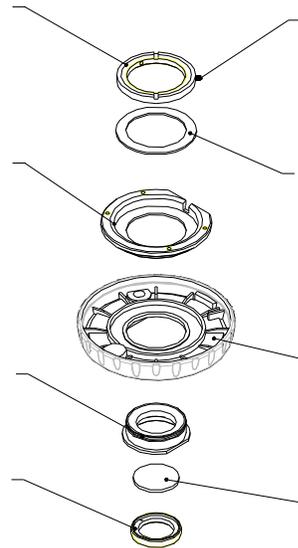
1. Using a Phillips screwdriver, remove 4 cross-slot sunk screws M2.5×5(5-11-2), then remove three support rods (5-11-1).
2. Note: there are two kinds of these three connecting poles. Two poles with M2 screw holes are in the front (see figure 12).
3. Using a Phillips screwdriver, remove 2 cross-slot plate screws M2×3(5-11-3), then remove off the buzzer module (5-11-4).
4. Using a Phillips screwdriver, remove 3 cross plate screws M2×6 (5-11-5), then remove partition ring (5-11-6). Reference figure 13.
5. Using a Phillips screwdriver, remove 2 cross plate screws M2×4(5-11-7), then remove limit-position cover (5-11-8).
6. Take out 6 magnets (5-11-9)
 - Note: Polarities of two adjacent magnets are reverse
7. Using a Phillips screwdriver, remove 4 cross plate screws M2×4(5-11-13), then remove the axis base (5-11-12) and axis module (5-11-11).



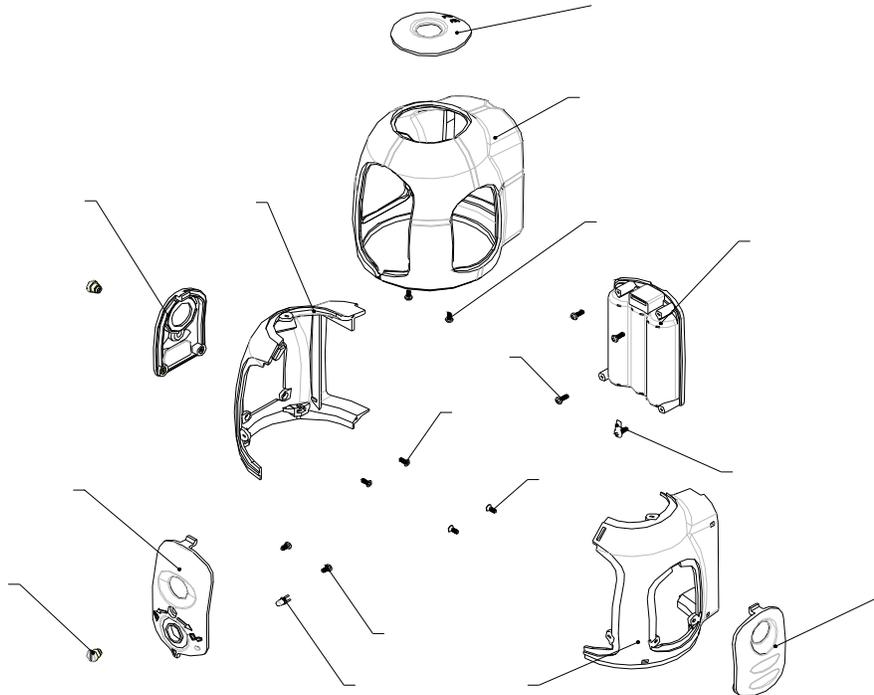
2.4 Bottom Part Disassembly (AP1831)

Item	JLT Part #	Description	Qty
5-11-1	AP1853	Notch Tightening Screws	1
5-11-2	AP1854	Press Ring 1	1
5-11-3	AP1855	Gasket	1
5-11-4	AP1856	Base Plate	1
5-11-5	AP1857	Base	1
5-11-6	AP1858	Bottom Spindle	1
5-11-7	AP1859	Round Glass	1
5-11-8	AP1860	Press Ring 2	1

1. Use a minus screwdriver to loosen two notch tightening screws (5-12-1). Screw off the press ring (5-12-2)
2. Take out the Poly-four-fluorin spacer (5-12-3)
3. Take out the base plate (5-12-4)
4. Take out the bottom axis (5-12-6)
5. Screw off the press ring2 (5-12-8)
6. Take out the glass (5-12-7)



2.5 Housing Disassembly (AP1821)

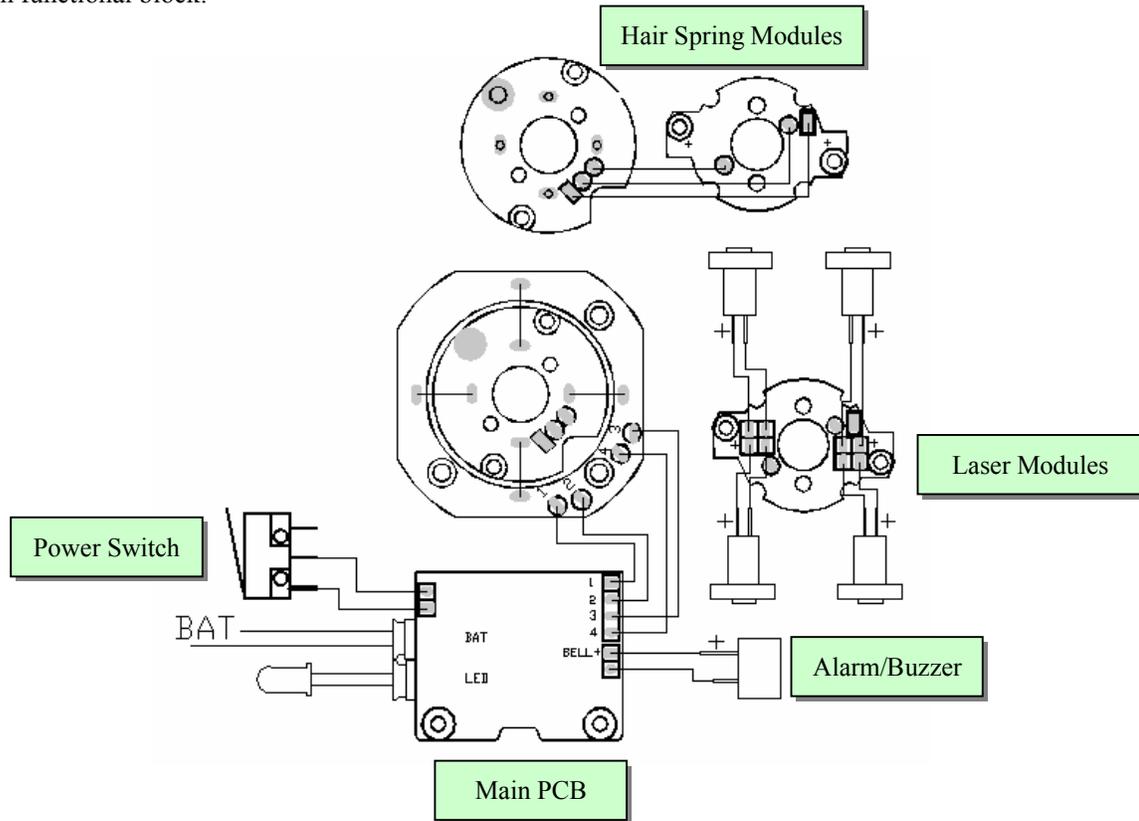


Item	JLT Part #	Description	Qty	Item	JLT Part #	Description	Qty
3-1	AP1861	Top Cover Module	1	3-10	AP1866	M2 x 4 Cross Sunk Screws	2
3-2	AP1838	M2 x 4 Cross Plate Screws	2	3-11	AP1843	ST2.2×6.5 Cross Self Tapping Screw	4
3-3	AP1862	Plastic Screws	2	3-12	AP1873	Fixing Lead Piece	1
3-4	AP1863	Front Cover module	1	3-13	AP1868	Battery case	1
3-5	AP1864	Indicator Light	1	3-14	AP1869	Left Housing	1
3-6	AP1838	M2 x 4 Cross Plate Screws	2	3-15	AP1870	Right Housing	1
3-7	AP1865	Right Cover Module	1	3-16	AP1871	Body Housing	1
3-8	AP1866	M2 x 4 Cross Sunk Screws	2	3-17	AP1872	Rubber Jacket	1
3-9	AP1867	Left Cover Module	1				

1. Using a Phillips screwdriver, remove 2 cross-slot plate screws M2×4(3-2), then remove the top cover module (3-1)
2. Using a Phillips screwdriver, remove 2 cross-slot plate screws M2×4(3-6) , then remove the front cover module (3-4#)
3. Remove out indicator light (3-5)
4. Remove the plastic screw (3-3)
5. Using a Phillips screwdriver, remove 2 cross-slot sunk screws M2×4(3-8), then remove the right cover module (3-7).
6. Using a Phillips screwdriver, remove 2 cross-slot sunk screw M2×4(3-10), then remove the left cover module (3-9).
7. Using a Phillips screwdriver, remove 4 cross-slot plate tapping screws ST2.2×6.5(3-11), then remove battery case (3-13).
8. Remove the piece fixing the lead (3-12)
9. Remove the body housing(3-16)
10. Remove the left shell (3-14) and right shell (3-15)

3.0 Schematic Diagram

The schematic diagram shows function blocks and general wire connections. It does not detail operation of each functional block.



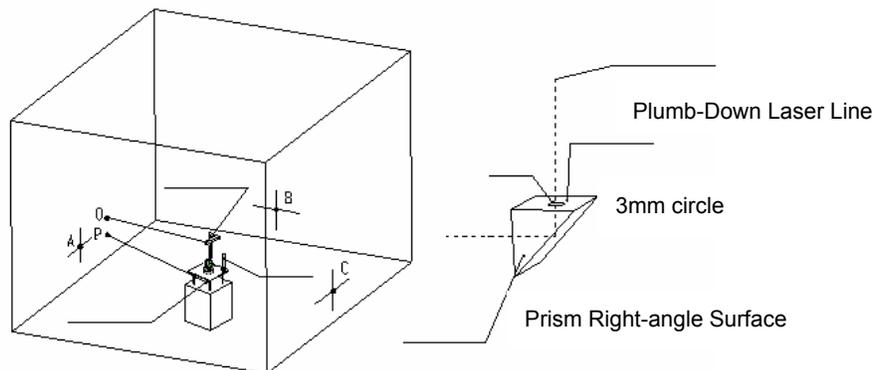
4.0 Calibration

Calibration is a process that is used to correct for accuracy and/or functional errors above and beyond those stated in published specifications. While Manual-leveling, Self-leveling, and Automatic-leveling (motor driven) devices have different mechanisms that require calibration, there are similarities with optics that is consistent regardless of the leveling mechanism. This section of the service manual discusses calibrations specific to the 40-6680. Each item discussed is shown below.

- 4.1 Initial Set up
- 4.2 Quantifying Accuracy Error
- 4.3 Plumb up and Plumb Down Calibration
- 4.4 Front, Left, and Right Laser Calibration
- 4.5 Alarm Adjustment

4.1. Initial Set-up

Establish the set up shown in the following drawing referring to the instructions below.



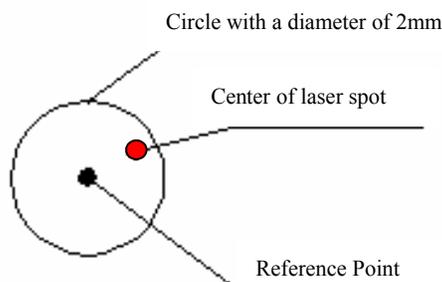
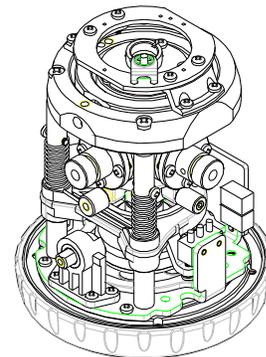
1. As shown above, construct an indoor platform, which is 5m away from the three sides of the wall respectively. The platform is about 1m high.
2. Put a bracket with a hole in the center on the platform.
3. Drill a 3mm hole on any one right-angle surface of the prism. Put the prism below the bracket and on the platform. The hole on the right-angle surface must be on one line with the bracket center hole. Adjust the angle to make the plumb-down point emitted by the instrument be reflected near the position P on the wall;
4. Set the theodolite above the bracket using a tripod. The plumb-down point of the theodolite must be on one line with the center of the 3mm circle on the prism (under-mentioned as down adjacent light point)

5. Use the theodolite to mark three vertical lines on the three walls, respectively. All angles between the three vertical lines are right angles.
6. Use the theodolite to mark 3 horizontal lines at the intersection of the vertical lines, assuring that they are all at the same height on the wall.
7. Mark the three cross points of the three vertical lines and the three horizontal lines as A,B,C, which are the reference points for the left, face and right laser spot respectively.
8. Take a high-accuracy instrument and make its plumb-down point be on one line with the down adjacent light point.
9. Then put a right-angle prism on the bracket. Adjust the angle to make the up laser point emitted by the instrument be reflected on the wall near the position O;
10. Make the front laser point face the wall. Mark the up and down laser spot reflected through the prism on the wall as O1 and P1. Then rotate the instrument by 90°, 180° and 270° clockwise, and mark O2, O3, O4 and P2, P3, P4.
11. Take the center point of O1, O2, O3, O4, This center point just is the reference point for the up laser point. Take the center point of P1, P2, P3, P4, This center point just is the reference point for the down laser point. See the illustration to the right.

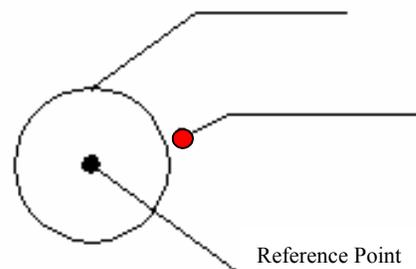


4.2. Quantifying Accuracy Error

1. As shown in the figure to the right, put the instrument on the test platform. Connect with the power, and turn on the Power switch.
2. Make the plumb-down point be on one line with the down adjacent light point. The front point faces the vertical line, which B is on.
3. Observe whether the five centers of the five laser spots are within the five circles respectively, of which the diameter is 2mm and the centers are the reference point A, B, C, O and P respectively. If not, the instrument needs adjusting. (See figure below)



The accuracy of the laser point is qualified

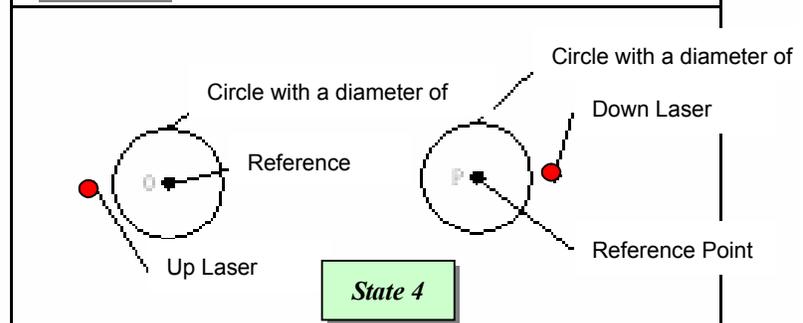
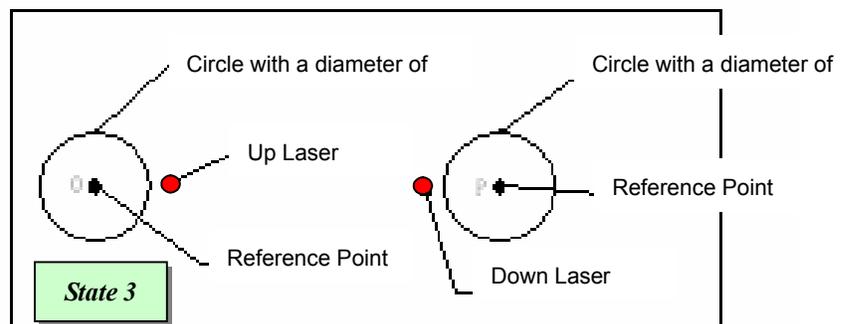
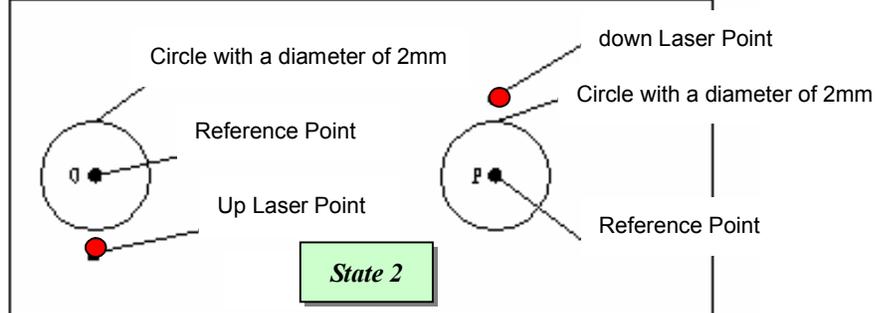
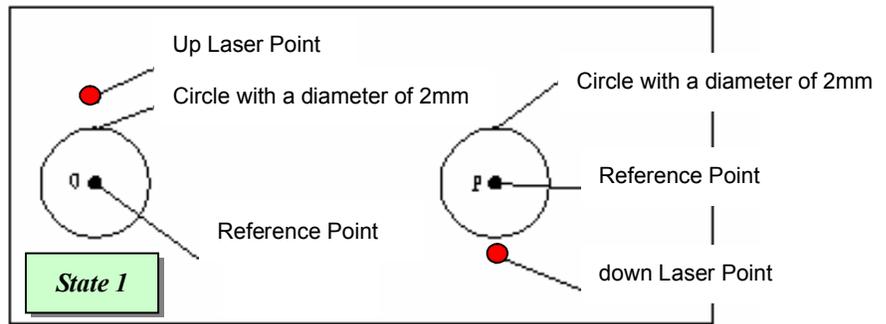
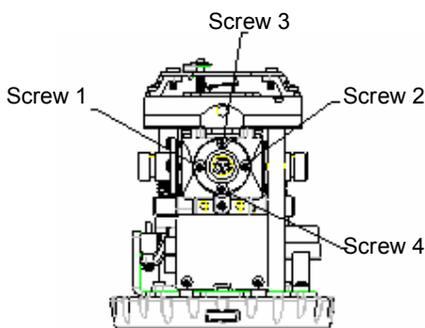


Need adjustment

4.3. Plumb Up and Plumb Down Calibration

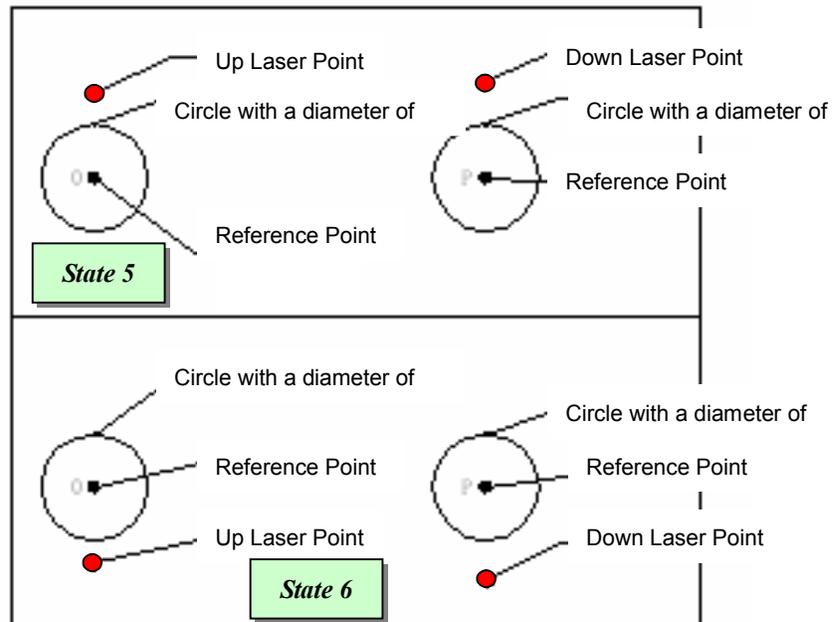
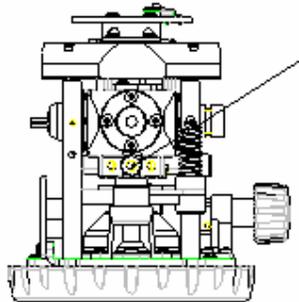
1. When the up and down laser points are beyond tolerance as shown in the figure to the right, they can be adjusted using the power adjusting screw (see below). ‘

- When the instrument is in the state1, you can loosen the screw 2 and tighten screw 1.
- When the instrument is in the state2, you can loosen the screw 1 and tighten screw 2.
- When the instrument is in the state3, you can loosen the screw 4 and tighten screw 3.
- When the instrument is in the state4, you can loosen the screw 3 and tighten screw 4



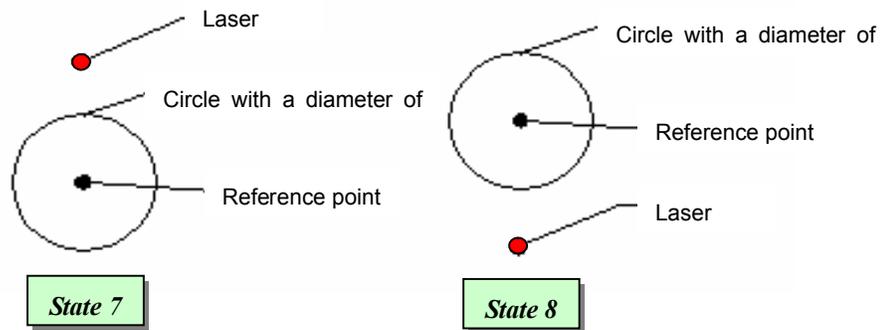
2. When the up and down laser points are beyond tolerance as shown in the figure to the right, you can adjust the pendulum adjusting screw to calibrate (see below).

- When the instrument is in the state 5, you need to twist the pendulum adjusting screw clockwise using an inner hexagon spanner.
- If in the state 6, you need to twist the pendulum adjusting screw count-clockwise.

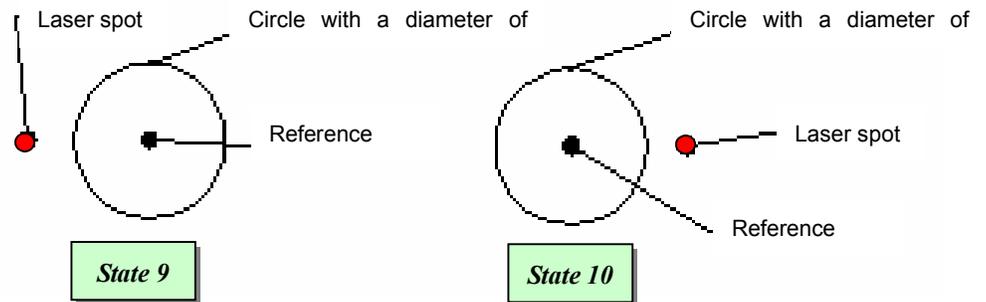


4.4. Front, Left, and Right Laser Calibration

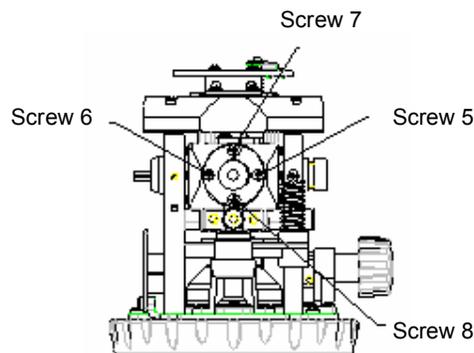
3. When the front, left and right laser points are beyond tolerance as shown in the figure to the right, you need to adjust the screws shown in the figure below.



- When the instrument is in the state 7, you can loosen screw 7 and tighten screw 8.
- When the instrument is in the state 8, you can loosen screw 8 and tighten 7.
- When the instrument is in the state 9, you can loosen screw 6 and tighten 5.
- When the instrument is in the state 10, you can loosen screw 5 and tighten 6.

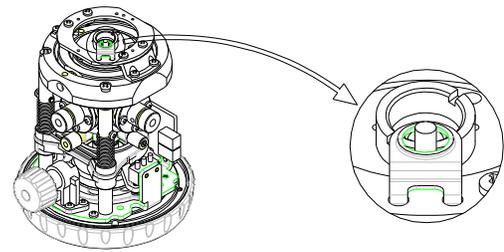


4. After the above adjusting is completed, double check accuracy of the entire instrument as described in 4.1. If there still is error, repeat respective calibrations until the unit is qualified.



4.5. Calibration for sound alarming range

As shown in the illustration to the right, place the unit on a level platform and observe the position of the alarm rod. For equal alarming angles in all directions, the rod should be centered between the contact ring. The ring can be adjusted by reheating the solder to a molten state and repositioning the ring accordingly.



5.0. Troubleshooting Guide

No.	Symptom	Cause	Repair method
1	Unable to power on (no laser is emitting, extinguished power indicator light, no sound alarm if tilted beyond tolerance)	Dead batteries	Replace with new battery (3*AA)
2		Disconnected power line	Weld the leading wire or replace the battery case
3		Switch is broken.	Replace the switch
4		Main circuit board is broken.	Replace the main circuit board
5	After power on, the indicator is not lighted	The indicator is broken	Replace the indicator
6		Main circuit board is broken	Replace the main circuit board
7	No laser is emitting	Hairspring is cut off	Replace the hairspring
8		Laser source is broken	Replace the laser source
9		Main circuit board is broken	Replace the main circuit board
10	No sound if tilted beyond tolerance	Beeper is broken	Replace the beeper
11		Main circuit board is broken	Replace the main circuit board
12	No alarm if tilted beyond tolerance	Main circuit board is broken	Replace the main circuit board