



40-6515 Automatic Rotating Laser

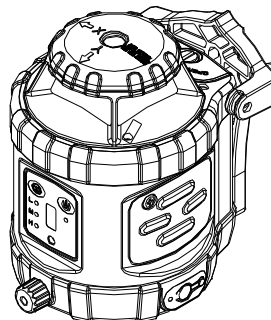
Service Manual

Contents

<i>Item</i>	<i>Description</i>	<i>Pages</i>
1.0	Overall Instrument Assembly	2
1.1	Mounting Bracket/Trivot Assembly	2
1.2	Main Housing Assembly	3
1.3	Core Module Assembly	4-7
1.3.1	Compensator/Gimbal Assembly	5
1.3.2	Rotating Head/Laser Assembly	6
1.4	Base Assembly	8-9
1.4.1	Compensator Lock/Magnetic Dampening	9
1.5	Circuit Board Assemblies	7-12
1.5.1	Main Control Board Assembly	10
1.5.2	Key Pad Assembly	10
1.5.3	Alarm Board Assembly	11
1.5.4	Charging/Connecting Board Assembly	11
1.5.5	Power Adapter Board Assembly	11
1.5.6	Gimbal Assembly Connecting Board	12
1.5.7	Power Board Assembly	12
2.0	Calibration	13-15
2.1	Reference Setting	13
2.2	Accuracy Check	13
2.3	Accuracy Adjustment	13
2.4	Alarm Board Adjustment	15
3.0	Schematic Diagram	16
4.0	Troubleshooting Guide	17

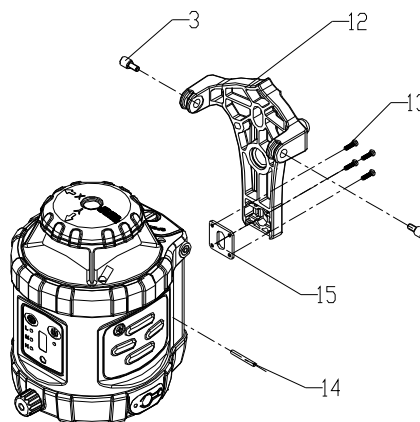
1. Overall Instrument Assembly

40-6515 rotating laser is a highly accurate instrument. Out side of a few customer adjustments (outline in the owners manual), all adjustments/service operations are internal to the instrument and to be perform only by authorized service personnel. Authorized personnel should adhere to the guidelines described within this service manual for all repairs and/or service work.



1.1 Mounting Bracket/Trivot Assembly (AP1569)

1. Using a flat blade screwdriver, remove the 2 screws (3#)
2. Using a Phillips screwdriver, remove the 4 crosshead plate screws (13#).
M2.5×10(13#).
3. Remove the press plate (15#), the bracket board (12#), and pull out pin (14#) as shown.



Item	JLT Part #	Description	Qty
3	AP1624	Trivot Retaining Screws	2
12	AP1625	Bracket Board	1
13	AP1572	Crosshead Plate Screws (M2.5 x 10)	4
14	AP1626	Pull Out Pin	1
15	AP1627	Press Plate	1

1.2 Main Housing Assembly

1. Remove battery cover (2#) by using a flat head screwdriver to loosen the battery-cover screw. Reference Figure 1. Remove the AA battery or battery pack.
2. Remove compensator locking knob by loosening crosshead plate screw M2.5× 8 (18#) using a Phillips screwdriver. Reference Figure 2. To remove locking knob (20#), pull in an outward direction.
3. Remove cover module by loosening 4 crosshead plate screws M3×14(1#) using a Phillips screwdriver.
4. Pull out the battery connector plug and disassemble the cover module (4#). Reference Figure 3.
5. Gently disconnect the keypad and audible alarm connectors and remove the housing (5#) as shown in figure 3 . Due to gasket material used for hermetically sealing the housing, some force may be required to break this seal in order to remove housing components.

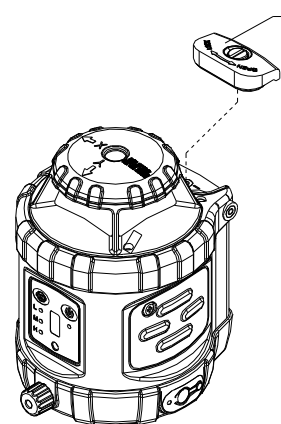


Figure 1

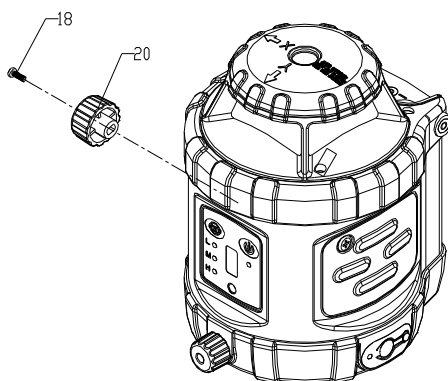


Figure 2

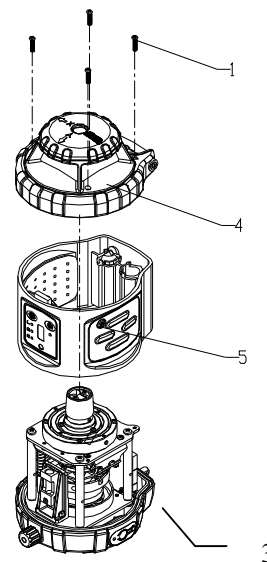


Figure 3

Item	JLT Part #	Description	Qty
1	AP1565	Crosshead Plate Screws M 3 x 14	4
2	AP1566	Battery Cover	1
4	AP1567	Cover Module	1
5	AP1568	Housing	1
18	AP1493	Crosshead Plate Screw M 2.5 x 8	1
20	AP1570	Locking Knob	1
3	AP1571	Core Module	1

1.3 Core Module Assembly (AP1571)

1. Using a Phillips screwdriver to screw off the 2 crosshead plate screws M2.5×8(18#) shown in figure 4
2. Remove the front semi press-loop (19#)
3. Using a Phillips screwdriver, loosen the 4 crosshead plate screws M4×10(6#).
4. Gently pull out all over the connector plugs making sure not to damage any of the cabling.
5. Unlock compensator lock and remove core module assembly as shown.
6. Using an electric soldering iron, de-solder all of the lead wires connecting to the compensator/gimbal assembly(8#).

Item	JLT Part #	Description	Qty
6	AP1572	Cross Plate Screws (M 2.5 x 10)	4
7	AP1573	Lock Washers (M2.5)	4
8	AP1574	Compensator / Gimbal Assembly	1
18	AP1493	Cross Plate Screws (M 2.5 x 8)	2
19	AP1576	Front Semi Press-loop	1
20	AP1577	Base Assembly	1

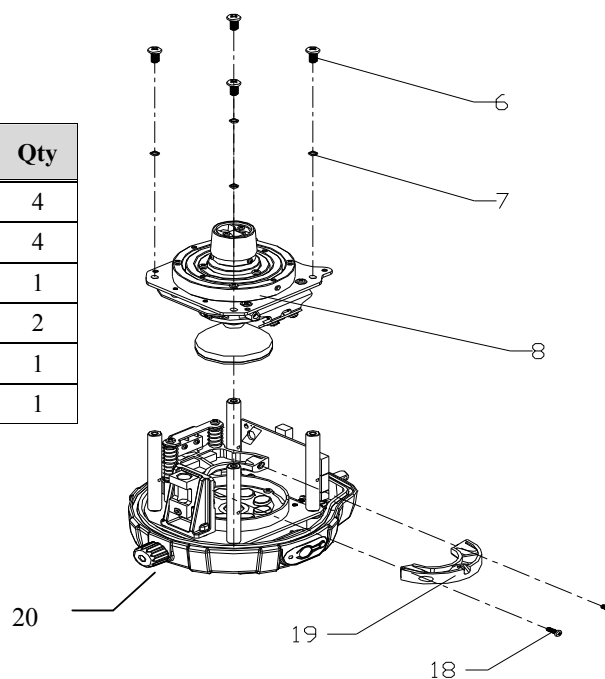


Figure 4

1.3.1 Compensator/Gimbal Assembly (AP1574)

1. Using a Phillips screwdriver to screw off the 2 crosshead plate screws M2.5×8(8-7#), and take off the 3# alarm circuit board parts (8-9#) shown in figure 5.
2. Using an electric soldering iron, de-solder the 4 hairsprings (8-17#), as shown in figure 6.

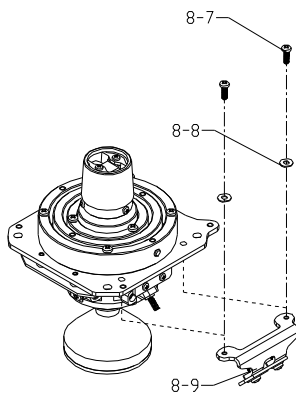


Figure 5

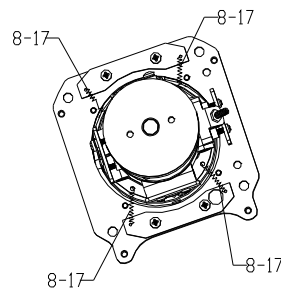


Figure 6

3. Remove gimbal assembly (8-5#) from circuit board #8 (8-6#) by using a Phillips screwdriver to loosen the 7 crosshead plate screws M2.5×16(8-3#), as shown in figure 7.

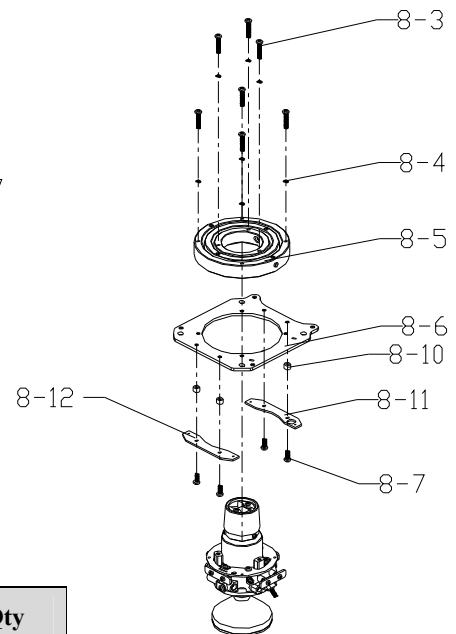


Figure 7

Item	JLT Part #	Description	Qty
8-3	AP1580	Crosshead Plate Screws (M2.5 x 16)	7
8-4	AP1579	Lock Washer (M2.5)	7
8-5	AP1578	Gimbal Assembly	1
8-6	AP1581	Circuit board #8	1
8-7	AP1493	Crosshead Plate Screws (M2.5 x 8)	2
8-8	AP1582	Washer (M2.5)	2
8-9	AP1583	3# Alarm Circuit Board Parts	1
8-10	AP1584	Spacer (M2.5 x 4)	4
8-11	AP1585	Circuit board #7	1
8-12	AP1586	Circuit board #6	1
8-17	AP1587	Hairsprings	4

1.3.2 Rotating Head/Laser Assembly

1. Using a Phillips screwdriver, loosen the 2 crosshead plate screws M2×6 (8-18#). Remove the rotating head (8-1#) from the prism components (8-2#).
2. Use an inner hexagon spanner to screw off the Allen notched tightening screw M3×4 (8-16#), take off prism seat parts (8-2#).
3. Using a Phillips screwdriver to screw off the 3 crosshead plate screws M2.5×10 (8-15#), and disassemble the pendulum parts (8-14#) as shown in figure 8.

Item	JLT Part #	Description	Qty
8-1	AP1588	Rotating Head	1
8-2	AP1589	Prism Components	1
8-13	AP1590	Motor Assembly	1
8-14	AP1591	Pendulum Parts	1
8-15	AP1572	Crosshead Plate Screws (M2.5 x 10)	3
8-16	AP1592	Tightening Screw (M3 x 4)	1
8-18	AP1464	Crosshead Plate Screws (M2 x 6)	2

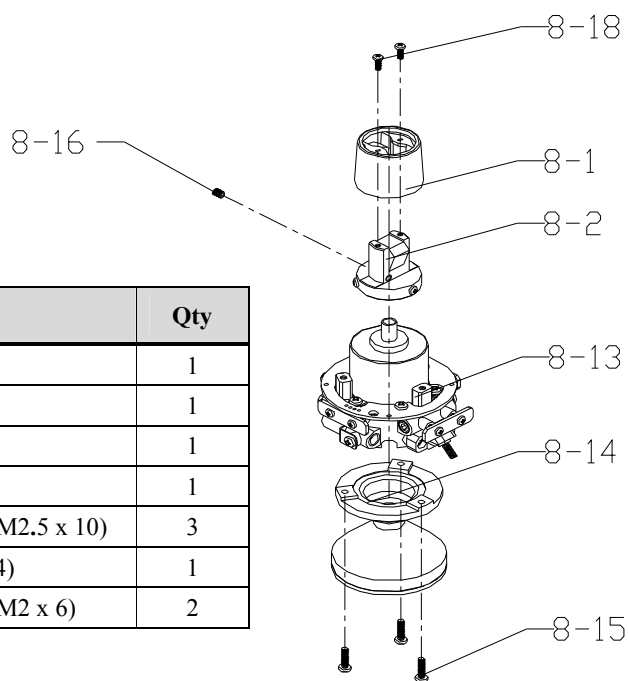


Figure 8

4. Remove the motor assembly by loosening the 3 crosshead plate screws M2.5×4 (8-13-1#) using a Phillips screwdriver.
5. Using an electric soldering iron, de-solder the lead wires of the motor (8-13-2#).
6. Using a Phillips screwdriver, remove the 4 crosshead plate screws M2.5×8 (8-13-8#).
7. Remove the laser (8-13-9#). Using an electric soldering iron, de-solder the lead wires of the laser.
8. Remove the alarm seat parts (8-13-6#) using a Phillips screwdriver remove the 2 crosshead plate screws M2.5×6 (8-13-7#).

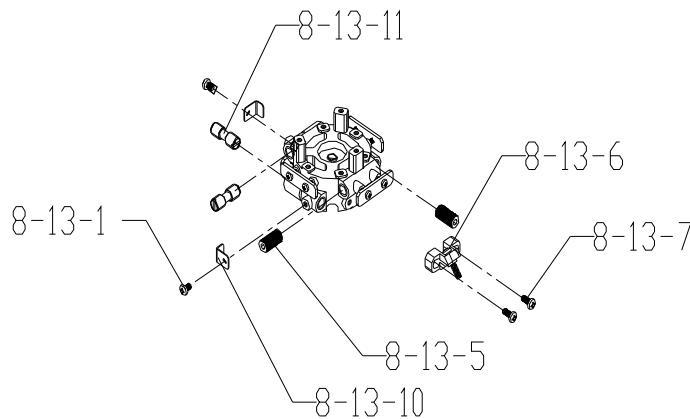


Figure 10

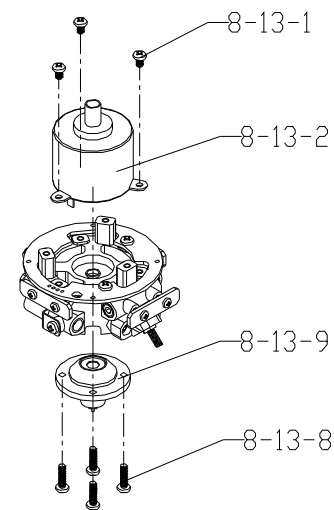


Figure 9

Item	JLT Part #	Description	Qty
8-13-1	AP1488	Cross Plate Screws (M2.5 x 4)	4
8-13-2	AP1593	Motor	1
8-13-5	AP1594	Hex Head Balancing weight	2
8-13-6	AP1595	Alarm Seat Assembly	1
8-13-7	AP1449	Cross Plate Screws (M 2.5 x 6)	2
8-13-8	AP1493	Cross Plate Screws M2.5 x 8)	4
8-13-9	AP1596	Laser Assembly	1
8-13-10	AP1597	Retainer Clip	2
8-13-11	AP1598	Flat Head Balancing weight	2

1.4 Base Assembly (AP1577)

1. Using a Phillips screwdriver, remove the 2 crosshead plate tapping screws ST2.5×6.5 (16-8#), and disassemble the Power Adapter Board 5# (16-11#).
2. Gently disconnect plug-in connectors for the power switch (17-3#) (see Figure 15 below), the power board (16-9#), (see Figure 21 below) and the Power Adapter Board 5# (16-11#)
3. Remove the 4 connecting staffs (9#) by turning them in a counter clockwise rotation.
4. Disconnect base plate (17#) and bottom parts (16#).
5. Using a Phillips screwdriver, remove the 1 crosshead plate screw M2.5×8 (16-1#) and take off the vertical leveling screw adjustment knob (16-2#).
6. Remove the 2 C-rings (16-5#), and disassemble the connecting staff (16-10#), screw bolt (16-3#) and slipper block (16-6#);

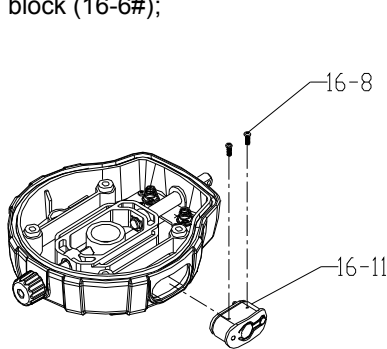


Figure 12

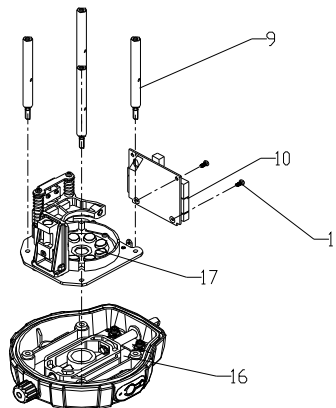


Figure 11

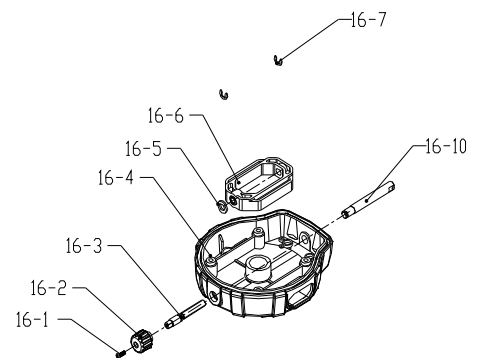


Figure 13

Item	JLT Part #	Description	Qty
9	AP1599	Connecting Staffs	4
10	AP1600	Circuit Board #1 (Main control board)	1
11	AP1616	Cross Plate Screw (M2.5 X5)	2
16	AP1601	Bottom Assembly	1
16-1	AP1493	Cross Plate Screw (M2.5 x 8)	1
16-2	AP1602	Adjustment Knob	1
16-3	AP1603	Vertical Trivot Adjustment Screw	1
16-4	AP1604	Bottom	1
16-5	AP1605	C-rings	2
16-6	AP1606	Slipper Block	1
16-7	AP1607	Spacer	1
16-8	AP1548	Cross Plate Self Tapping Screws (ST2.5 x 6.5)	2
16-10	AP1608	Vertical Leveling Trivot Rod	1
16-11	AP1609	Power Adapter Board 5#	1
17	AP1610	Compensator Lock/Magnetic Dampening	1

1.4.1 Comp Lock/Magnetic Dampening (AP1610)

1. As per figure 14, remove 3 crosshead plate screws M3×8(17-1#) and remove bracket/level vial parts (17-13#).
2. As per figure 15, remove the 2 crosshead plate screw M3×8(17-1#), and take out the power switch (17-3#) and compression springs (17-4#).
3. Disassemble the back semi press-loop (17-5#) and crankshaft (17-7#);
4. Remove the 4 crosshead plate screws M2.5×5 (17-8#), and take off the limit-position cover (17-10#).
5. Disconnect connecting staff (17-6#) and base plate module (17-11#).

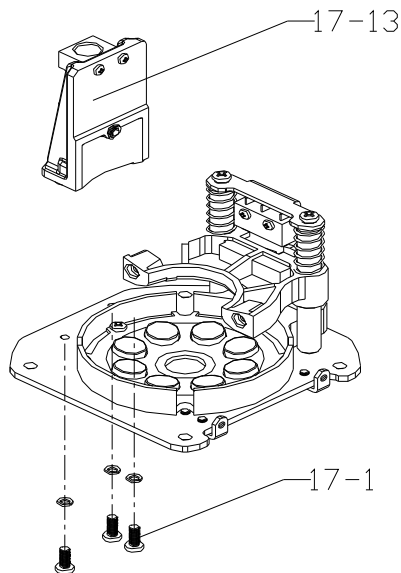


Figure 14

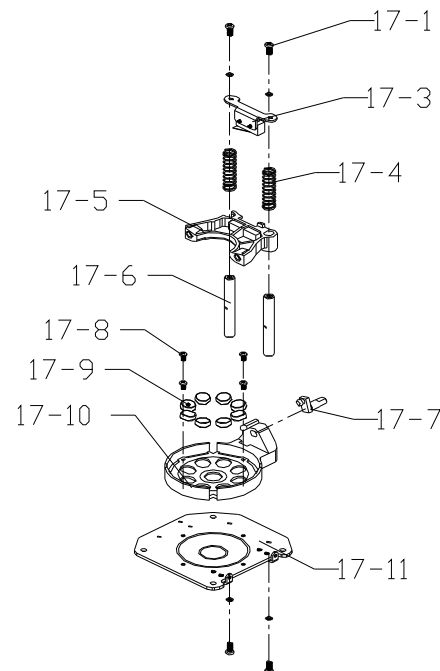


Figure 15

Item	JLT Part #	Description	Qty
17-1	AP1513	Cross Plate Screws (M3 x 8)	5
17-3	AP1611	Power Switch	1
17-4	AP1612	Compression Springs	2
17-5	AP1613	Back Semi Press-loop	1
17-6	AP1614	Connecting Staff	2
17-7	AP1615	Crankshaft	1
17-8	AP1616	Cross Plate Screws M2.5 x 5)	4
17-9	AP1617	Dampening magnets	8
17-10	AP1618	Limit-Position Cover	1
17-11	AP1619	Base Plate Module	1
17-13	AP1620	Bracket/Level Vial Parts	1

Circuit Board Assemblies

The 40-6515 is provided with 9 circuit board components and parts in total, their disassembling methods are described as follows:

1.5.1 Main Control Board

1. As shown in figure 11, remove main control board (10#) by removing the 2 crosshead plate screws M2.5×6 (11#).
2. Gently pull out all the connector plugs assuring that no wires are damaged during removal.
3. Using an electric soldering iron, de-solder all the lead wires.

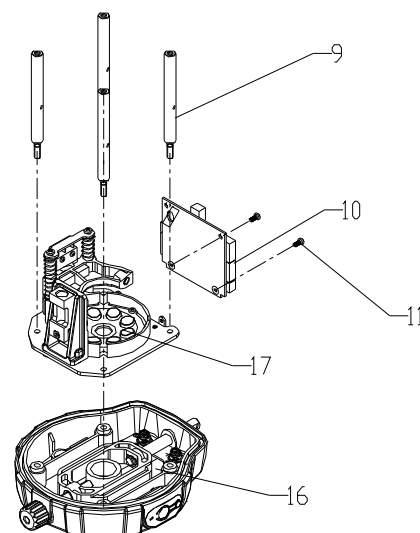


Figure 11

1.5.2 Housing/Key Pad Assembly (AP1568)

1. As shown in figure 16, the key pad is removed by loosening plastic screw (5-1#).
2. Tear out the membrane (5-2#).
[Note: Typically the keypad is not reusable once removed.]
3. Remove the 3 crosshead sunk screws M2.5×8 (5-3#), disconnect the connector plug, and then remove the keypad circuit board (5-4#).

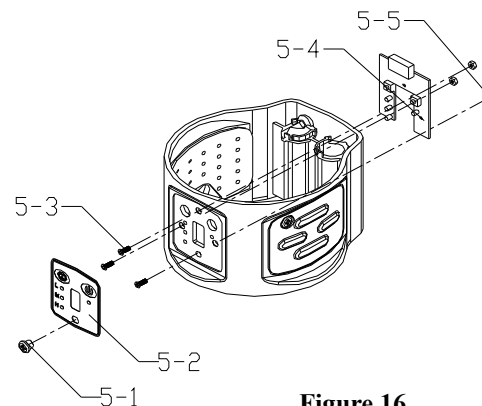


Figure 16

Item	JLT Part #	Description	Qty
5-1	AP1621	Plastic Screw	1
5-2	AP1622	Membrane	1
5-3	AP1493	Crosshead Sunk Screws (M2.5 x 8)	3
5-4	AP1623	Keypad Circuit Board	1
5-5	AP1538	Hexagon Nut (M2.5)	3

1.5.3 Alarm Board Assembly

1. Figure 17 illustrates assembly of the alarm board. Remove the 2 crosshead plate screws M2.5×6 (8-9-4#).
2. Disassemble the alarm circuit board (8-9-2#) as shown.

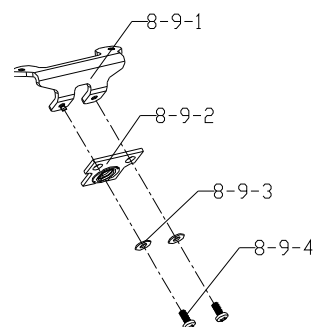


Figure 17

1.5.4 Charging/Connecting Board Assembly

1. Figure 18 illustrate the charging/connecting board assembly. Remove 2 crosshead plate screws M2.5×6 (4-1#).
2. Gently disconnect the connector plug.
3. Disassemble the charging connecting circuit board (4-2#) as shown.

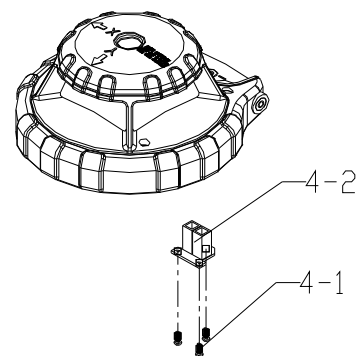


Figure 18

1.5.5 Power Adapter Board Assembly

1. Figure 19, illustrate the power adapter board assembly. Remove the 2 crosshead plate tapping screws ST2.2×6.5 (16-11-1#).
2. Disassemble the power adapter board as shown.

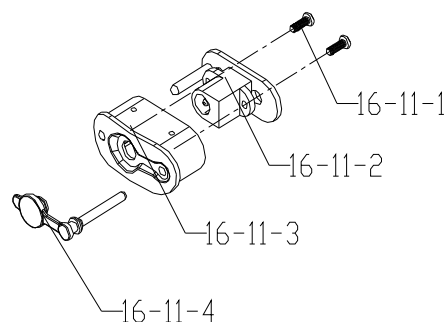


Figure 19

1.5.6 Gimbal Assembly Connecting Board

1. Reference section 1.3.1, figures 6 and 7 of this document to remove gimbal assembly, motor laser, etc. See Figure 20.
2. Once complete, remove the 3 crosshead plate screws M2.5×4 (8-13-1#).
3. The circuit board is removed as shown.

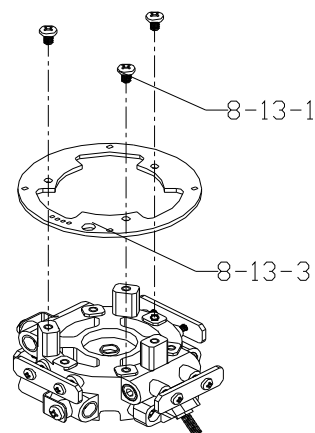


Figure 20

1.5.7 Power Board Assembly

1. Remove the 4 crosshead plate tapping screws ST2.2×6.5(16-8#)
2. Remove the power board (16-9#). See Figure 21.

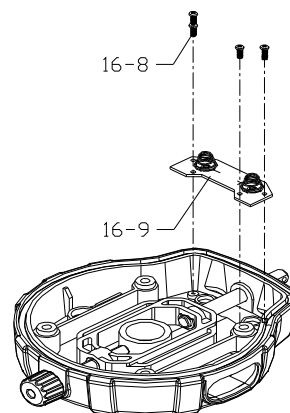


Figure 21

**Note: All the above describes general disassembly of the 40-6515.
The instrument can be assembled using the reverse order described above.**

2.0 Calibration

2.1. Reference setting

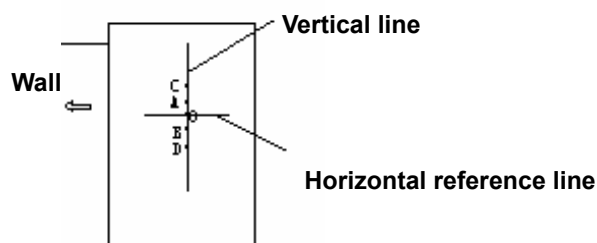
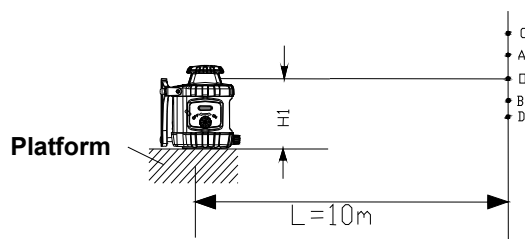


Figure 24

- (1) As shown in figure 24, set up a platform 10m away from a wall. The platform should be stable and flat, and level within 6'.
- (2) Using a water level to mark a horizontal reference line, and also draw a vertical line on the wall. Then take their cross point on the wall as point O.

2.2 Accuracy check

- (1) As shown in figure 24, make one side with X direction marked on the top cover of the instrument face to the wall. Power on and take the cross point of rotating laser line and the vertical line on the wall as point A.
- (2) Turn the unit 180 degree, i.e. make X-direction face to the wall. Take the cross point of rotating laser line and the vertical line on the wall as point B.
- (3) Make the Y direction of the instrument face to the wall, and take the cross point of rotating laser line and the vertical line on the wall as point C.
- (4) Turn the unit 180 degree again, i.e. make the Y direction face to the wall. Take the cross point of the rotating laser line and the vertical line on the wall as point D.
- (5) Measure the vertical distance between point O and one point among points A, B, C, D. If the vertical distance is more than 3mm, it means the accuracy is beyond tolerance and it needs to make some adjustment.

2.3 Accuracy adjustment

● Horizontal accuracy adjustment

- (1) Place the instrument on the platform, and the distance between the platform and ceiling should not be less than 2m. Power on and adjust the rotating speed of the instrument to the lowest. The adjusting method is as follows:

Press  key repeatedly until the L indicator on the keypad light.

L ●

M ○

H ○

Observe if the plumb-up point is shaking obviously. If it is shaking obviously, it needs to make some adjustment to the adjustment screw until it is nearly stable, as shown in figure 26. (Note: After adjustment, all the screws should be screwed tightly)

The moving track of the
laser on the ceiling

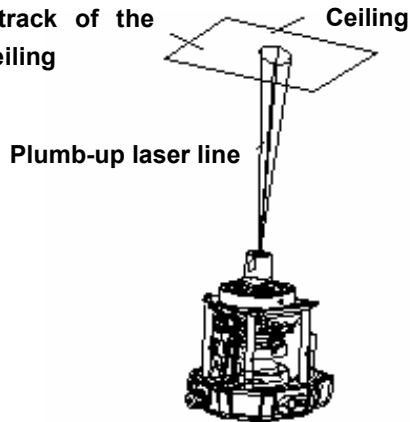


Figure 25

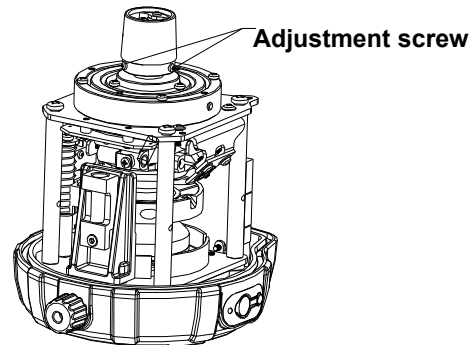


Figure 26

(2) As shown in figure 27, take the middle point between point A and point B as point F, and the middle point between point C and point D as point G. Then adjust the cross point of rotating laser line and vertical line to point F and point G with the adjustment screw (The instrument is provided with 4 adjustment screws in total, as shown in figure 28, and they could be adjusted a Flat blade screwdriver and the inner hexagon spanner)

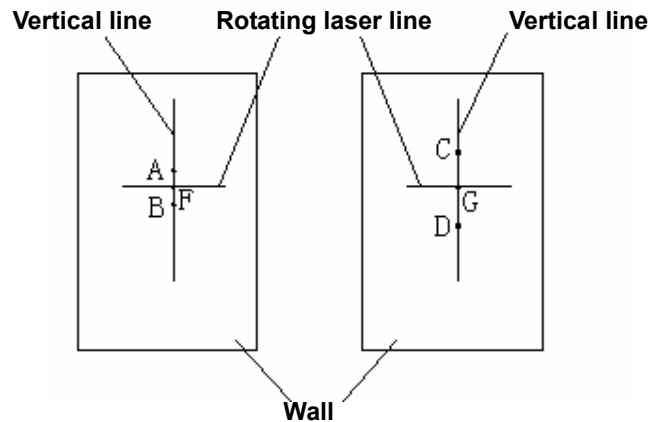


Figure 27

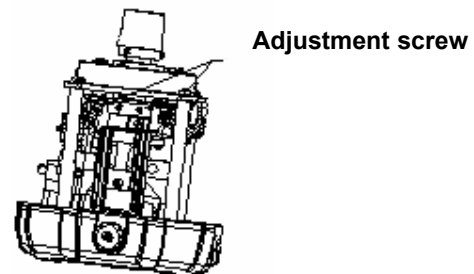


Figure 28

(3) If point F and point G are within 3mm range above or below the point O, it means the accuracy is qualified. Otherwise, it needs to adjust the optical wedge in the rotator head until the cross point of rotating laser line and the vertical line is within 3mm range above or below the point O, as shown in figure 29.

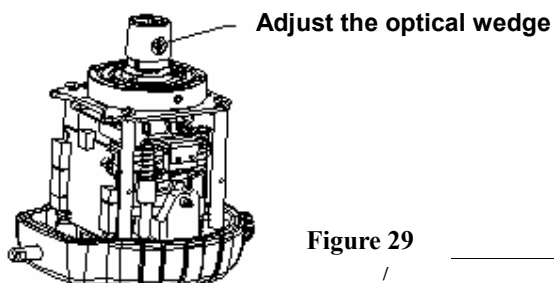


Figure 29

- Vertical accuracy adjustment

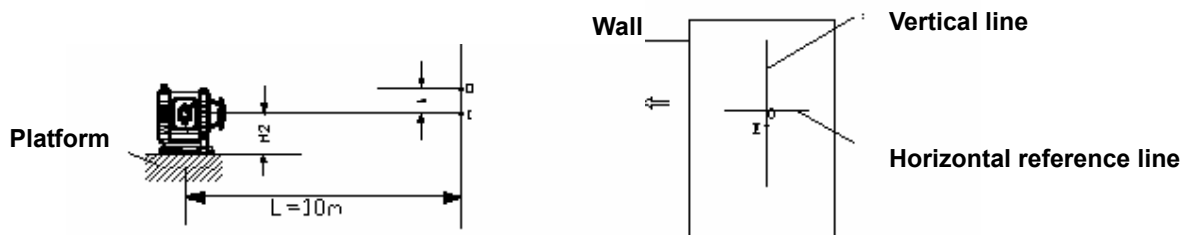


Figure 30

As shown in figure 30, after mounting the accessories, place the instrument on the platform laterally to make the instrument under vertical-working state. Power on, measure the height H2 of the laser horizontal line with the light-adjacence ruler, and mark point E on the wall under point O (The distance between point E and point O is $h=H1-H2$). After leveling the bubble vial, if the point projected by the horizontal laser line on the wall is not within 3mm range above or below the point E, please make some adjustment according to the adjusting method as shown in figure 31, i.e. adjust the point projected by the horizontal laser line on the wall to point E, using a Phillips screwdriver to screw off the plastic screw, and then using a inner hexagon spanner to adjust the screw in the adjustment hole until the bubble vial is level.

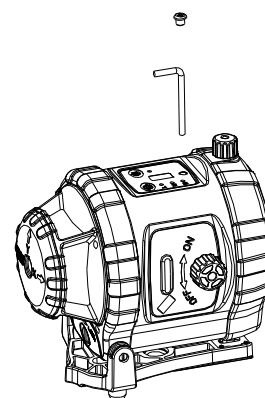


Figure 31

2.4 Alarm adjustment

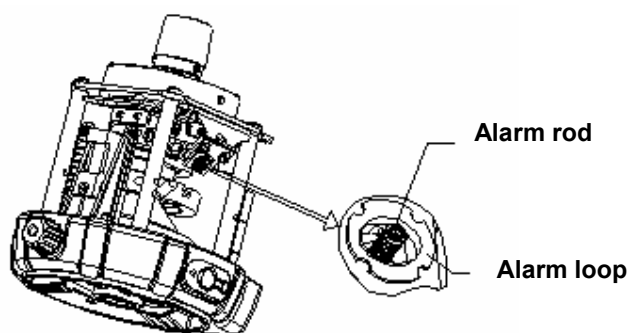
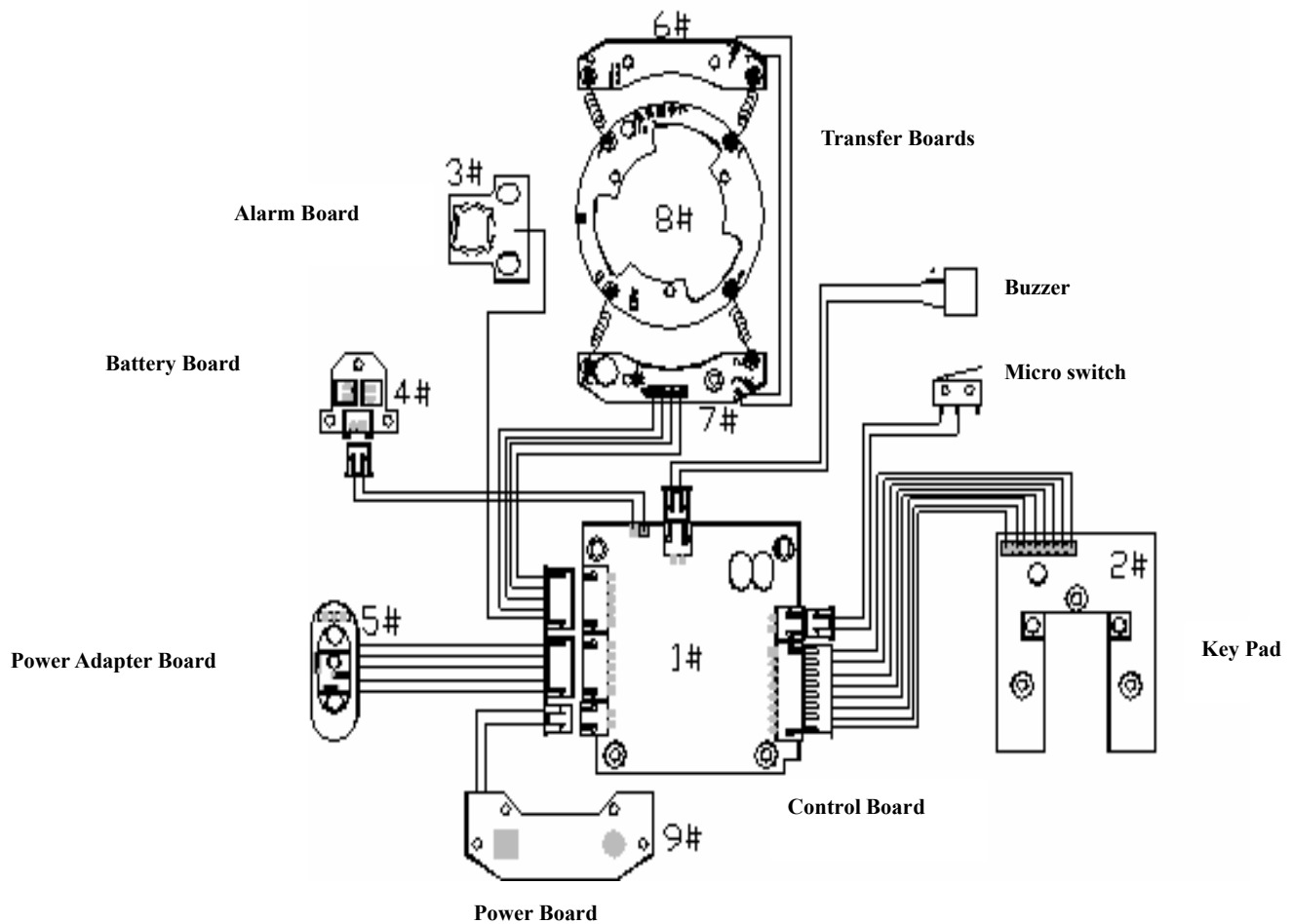


Figure 32

As shown in figure 32, place the instrument on the platform, turn on the lock handwheel, and adjust the alarm loop to the center of the alarm rod.

Schematic Diagram



4.0 Troubleshooting Guide

No.	Symptom	Cause	Repair method
1	Failure to power on	The batteries are dead	Replace with the new batteries
2		Defective micro switch	Replace the micro switch/ adjust the position of the micro switch
3		The power adapter is defective	Solder the leading wire
4		The connector to the keypad is loose.	Inspect connector to keypad
5		Main control board is defective	Replace the 1# main control board
6	Failure to power on when connecting with the adapter	The external power line is loose or cut off.	Reinsert the power line tightly
7		The power adapter board is defective	Replace the power adapter board
8	After power on, the indicator is not lighted.	The connector to the keypad is loose.	Inspect connector to keypad
9		The laser is defective	Replace the laser
10		1# main control board is defective	Replace the 1# main control board
11	The indicator of the external power is not lighted	The plug of external power is loose	Reinsert the power line tightly
12		The power indicator is defective	Replace the power indicator
13		1# main control board is defective	Replace the 1# main control board
14	No laser is output	The hairspring is broken	Replace the hairspring
15		The core connection line is cut off	Re-weld the connection line
16		1# main control board is defective	Replace the 1# main control board
17		The light source is defective	Replace the light source
18	The motor is unable to rotate.	The hairspring is broken	Replace the hairspring
19		1# main control board is defective	Replace the 1# main control board
20		The motor is defective	Replace the motor
21	No buzzer if tilted beyond tolerance.	The beeper is defective	Replace the beeper
22		1# main control board is defective	Replace the 1# main control board
23	No alarm if tilted beyond tolerance	The alarm board is defective	Re-adjust the alarm board
24		The hairspring is cut off	Replace the hairspring
25		The connection line of the alarm board is loose	Re-weld or replace the connection line
26		1# main circuit board is defective	Replace 1# main circuit board