



# 40-6670/40-6675 Multi-Point Laser Level

## Service Manual



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# 1. Overall Instrument Assembly

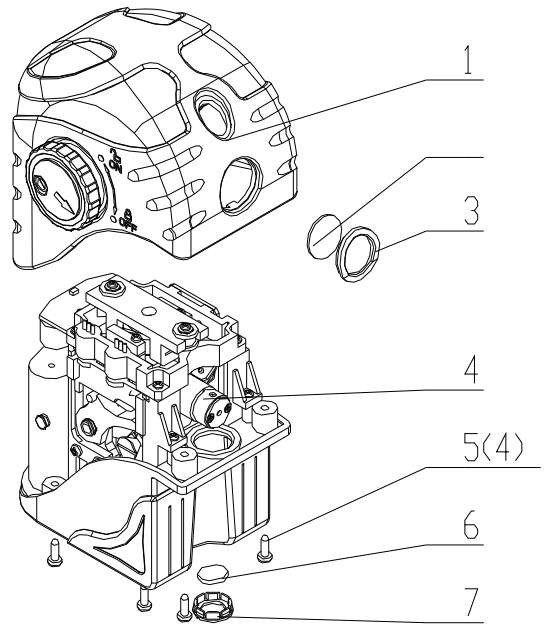
This Multi-Point Laser level is a highly accurate instrument. Out side of a few customer adjustments (outlined in the owners manual), all adjustments/service operations are internal to the instrument and to be performed only by authorized service personnel. Authorized personnel should adhere to the guidelines described within this service manual for all repairs and/or service work. It should be note that procedures in this manual should be referred to based on the specific situation.



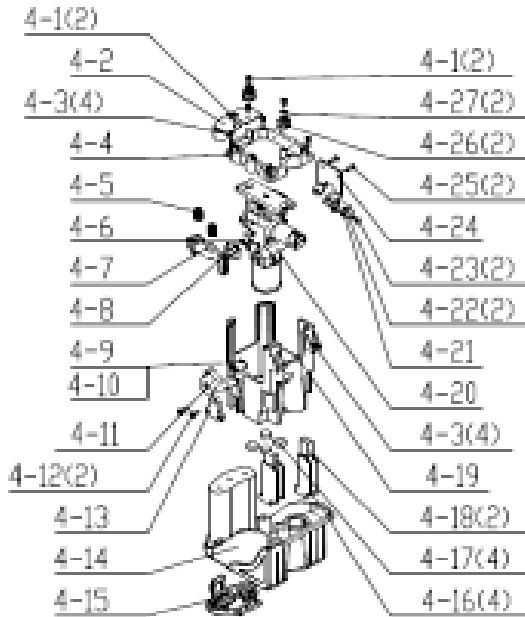
## 1.1 Main Assembly (40-6670/75)

Item	JLT Part	Description	Qty
1	AP2044	Housing Assembly	1
2	AP2045	2-1 lens (40-6675)	1
	AP2052	2.2 Cover Plate (40-6670)	1
3	AP2046	Lens Frame	1
4	AP2047	40-6670 Instrument Body Assembly	1
4	AP2047-1	40-6675 Instrument Body Assembly	1
5	AP2053	ST2.2x9.5 Crosshead Self-Taping Screw	4
6	AP2048	Optical Wedge	1
7	AP2049	Optical Wedge base	1

1. Remove Housing Assembly (1) by loosening 4 retaining screws.
2. Lense frame (3) and Lense/Cover Plate (2) are pressed/glued in place and normally would not have to be replaced.
3. Optical Wedge (6) and Optical Wedge base (7) is pressed in place and calibrated/glued as described in section 2.2 of this document



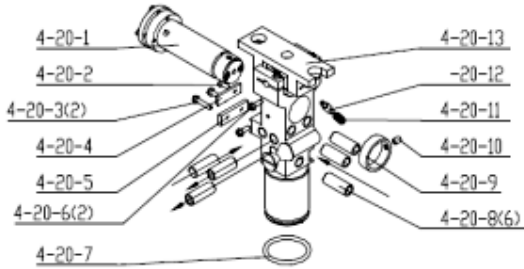
## 1.2 Instrument Body Assembly (AP2047)



Item	JLT Part	Description	Qty
4.1	AP1843	ST2.2x 6.5 Cross Plate Self Tapping Screw	4
4.2	AP2054	1# Control PCB	1
4.3	AP2053	ST2.2x 9.5 Cross Plate Self Tapping Screw	7
4.4	AP2055	Connecting Seat	1
4.5	AP2056	Press Spring	2
4.6	AP1491	M2x8 Cross Plate Screw	1
4.7	AP2057	Slip Bracket	1
4.8	AP2058	On/Off Switch	1
4.9	AP2059	Moving Shaft	1
4.10	AP2060	C-ring	1
4.11	AP2061	Block	1
4.12	AP1493	M2.5x8 Cross Plate Screw	2
4.13	AP2062	Supporting Board	1
4.14	AP2063	Bottom Seat Assembly	1
4.15	AP2064	Battery Cover	1
4.16	AP2065	Magnet Plate	4
4.17	AP2066	Magnetic Dampening Magnets	4
4.18	AP2067	Magnet	2
4.19	AP2068	Bracket	1
4.20	AP2050	40-6670 Core Module	1
4.20	AP2050-1	40-6675 Core Module	1
4.21	AP2069	2# Alarm PCB	1
4.22	AP2070	Brass Retaining washers	2
4.23	AP1464	M2x6 Cross Plate Screw	2
4.24	AP2071	Bracket	1
4.25	AP2072	ST2.2x 6.5 "Sunk" Cross Plate Self Tapping Screw	2
4.26	AP2073	Sleevelets	2
4.27	AP2074	Rubber Gasket	3

- Remove 1# Control PCB (4.2) from Connecting Seat (4.4) using electric soldering iron. Detach 2 hair spring wires that connect 1# Control PCB (4.2) to Core Module (4.20) and 2 wires that connect 1# Control PCB (4.2) to ON/OFF switch (4.8), then remove 2 retaining screws (4.1).
- Remove Alarm Bracket (4.24) from Connecting Seat (4.4) by loosening 2 retaining screws (4.25).
- Remove 2# Alarm PCB (4.21) from Alarm Bracket (4.24) by loosening 2 retaining screws (4.23) with Brass retaining washers (4.22).
- Remove Core Module (4.20) by removing 4 retaining screws (4.3) from Connecting Seat (4.4). Gently lift core module out, taking care not to damage any of the locking components within the Bottom Seat Assembly (4.14).
- After removing Core Module (4.20), remove 2 Press Springs (4.5), and Slip Bracket (4.7)/ON/OFF Switch (4.8).
- Remove Bottom Seat Assembly (4.14) by removing 3 retaining screws (4.3).
- Remove Battery Cover (4.15), 2 Magnets (4.18), 4 magnet Plate (4.16), and 4 Magnetic Dampening Magnets (4.17).
- Remove Compensator Lock Assembly from Bottom Seat assembly (4.14) by loosening 2 retaining screws (4.12). The Compensator Lock Assembly is made up of the following components: Support Board (4.13), C-ring (4.10), Block (4.11), and Moving Shaft (4.9).

### 1.3 Core Module Assembly (AP2050)

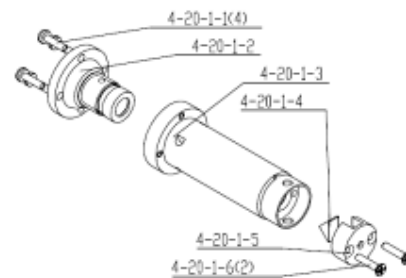


Item	JLT Part	Description	Qty
4.20.1	AP2051	40-6670 Laser Assembly	1
4.20.1	AP2051-1	40-6675 Laser Assembly	1
4.20.2	AP1475	M2x5 Cross Plate Screw	1
4.20.3	AP1696	M2x10 Cross Plate Screw	2
4.20.4	AP2075	3# Switch PCB	1
4.20.5	AP2076	Compensator Weight (qty varies with need)	1
4.20.6	AP2077	Special Screw 1	2
4.20.7	AP2078	Rubber O-ring	1
4.20.8	AP2079	M6x16 Inner Hexagon Set Screw	6
4.20.9	AP2080	Weight Ring (qty varies with need)	1
4.20.10	AP2081	M3x4 Inner Hexagon Set Screw	1
4.20.11	AP2082	Alarm Spring	1
4.20.12	AP2083	Connecting Shaft	1
4.20.13	AP2084	Gimbal Assembly	1

- Remove 3# switch PCB (4.20.4) from Gimbal Assembly (4.20.13) by loosening retaining screw (4.20.2) and de-soldering wire that connects 3# switch PCB (4.20.4) to Alarm Spring (4.20.11).
- Remove Weight Pieces (4.20.5) from Gimbal Assembly (4.20.13) by loosening 2 retaining screw (4.20.3).
- Remove Weight Loops (4.20.9) from Laser Assembly (4.20.1) by loosening retaining set screws (4.20.10).
- Remove Laser Assembly (4.20.1) by loosening 2 retaining screws (4.20.6).
- Remove Alarm Spring (4.20.11) by rotating the connecting shaft (4.20.12) counter-clockwise until it comes out.
- Remove 6 Counter Balance set screws (4.20.8) from Gimbal Assembly (4.20.13) by loosening counter-clockwise until they come out. These screws have a special lock-tight applied to prevent movement through shipment. We sure to reapply this after calibration adjustment are made.

### 1.4 Laser Assembly (AP2051)

Item	JLT Part	Description	Qty
4.20.1.1	AP1491	M2x8 Cross Plate Screw	4
4.20.1.2	AP2085	Laser Module	1
4.20.1.3	AP2086	Adjusting Base	1
4.20.1.4	AP2087	4.20.1.4.1 Trapezoidal Prism (40-6675)	1
	AP2088	4.20.1.4.2 Trapezoidal Prism (40-6670)	1
4.20.1.5	AP2089	Prism Seat	1
4.20.1.6	AP2090	M2x12 Cross Plate "Sunk" Screw	2



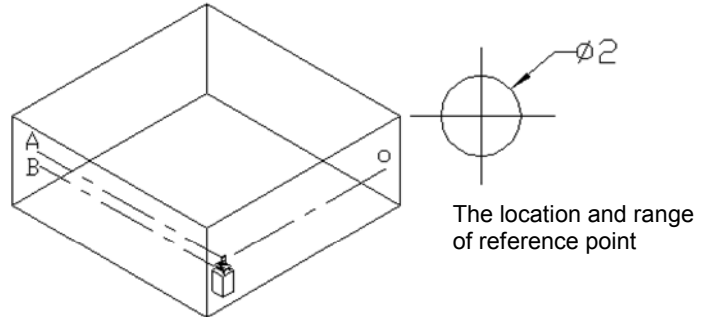
- Remove the Prism (4.20.1.4.1 or 4.20.1.4.2) and Prism Seat (4.20.1.5) from Adjusting Base (4.20.1.3) by loosening 2 retaining screws (4.20.1.6).
- Remove Laser Module (4.20.1.2) from Adjusting Base (4.20.1.3) by loosening 4 retaining screws (4.20.1.1)

## 2.0 Calibration

Calibration is a process that is used to correct for accuracy and/or functional errors above and beyond those stated in published specifications. This product is fairly easy to verify and calibrate as there are only a few adjustments that can be made. Each item discussed is shown below.

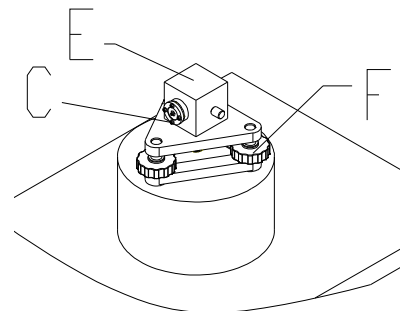
### 2.1 Laser Assembly Calibration:

The Laser Assembly (4.20.1) must be calibrated external to the unit on a customized test stand. The test stand is shown to the right. Note that the center of the stand is 10m from the furthest reference point. In the illustration points “A and B” are reflected plumb up and plumb down beams. Point “O” is the front beam. Horizontal error of the test stand should be less than 5’. Accuracy of reference heights (for points A, B, and O) should be no less than 0.05mm/m.



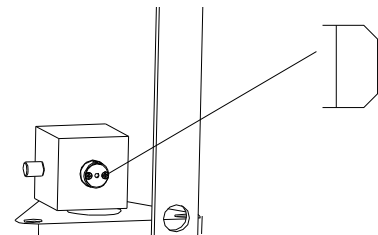
The calibration method describe below is the same for both the 40-6670 and 40-6675, just omit the front point for the 40-6670.

1. Install the Laser Assembly to be calibrated in the test stand fixture.
2. Adjust plane E to be horizontal to the test stand using the 3 adjustment wheels located on clamping fixture F. An auto level can be used to add in leveling the stand.
3. Apply power (4.5Vdc) to the Laser Assembly.
4. Using adjustment screws 4.20.1.1 (qty 4) and 4.20.1.6 (qty2), adjust output laser spots A, B and O to coincide with their respective reference points. Note that point O is the reference point. Points A and B should be in the range defined above (within 1mm from center).



### 2.2 Overall Instrument Calibration:

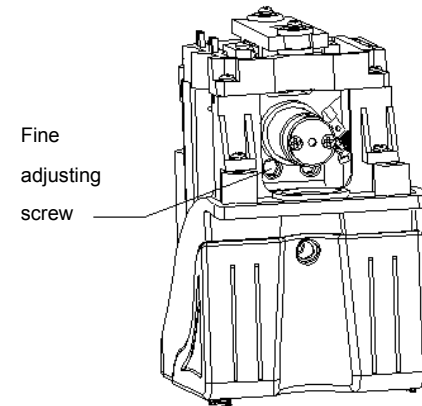
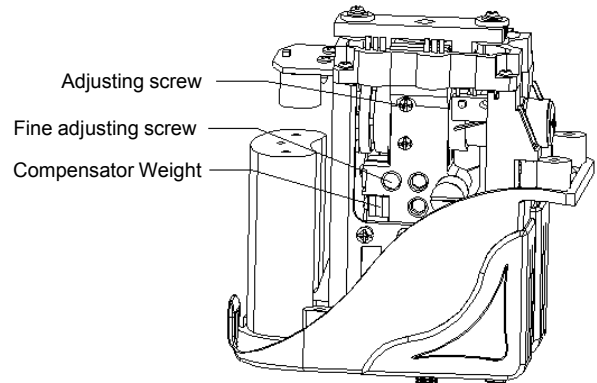
Now that the laser assembly has been calibrated and reinstalled in the overall assembly, the compensator and optics must be calibrated. Note that the calibration method is the same for the 40-6670 and 40-6675. The only difference is that there is no front point to calibrate on the 40-6670. The calibration method is described below.



1. Place instrument to be calibrated on test stand.
2. Power laser and aim dot at reference (Point "O" as described above)
3. Observe the offset between the three points and their respective references. If the offset is less than 20mm (which is the diameter of the circle, while the reference point is in the center of the circle), adjust as defined in step 4. Otherwise adjust as defined in step 5.

- Note: observe whether there is offset between front point and reference point on adjacent light ruler. If there is, the offset between further reference point and the corresponding reference line will be the same distance. Please note this problem during the following adjustment.

4. Adjust 6 Counter Balance screws (4.20.8) to adjust plumb up accordingly. Adjusting the three screws on the side of the instrument will cause the plumb up to move left or right, respectively. Adjusting the three screws on the front will cause it to move down to move up or down, respectively. Finally, the optical wedge (7) is adjusted for final plumb down calibration. The wedge is tapered, so rotating will cause the plumb down to rotating in an elliptical pattern. Adjust it accordingly.
5. If the offset between the three points and their reference is greater than 20mm, compensator weights (4.20.5) or weight rings (4.20.9) need to be added or subtracted based on the need. If the up point is on the position of horizontal direction of front point, the offset need not to be adjusted. The adjustment can be made by re-aligning the laser assembly, i.e. adjustment screws 4.20.6 (remembering to loosen one while tightening the other). A similar adjustment could be made by adjusting adjustment screws 4.20.3. Proceed to step 4 as needed.

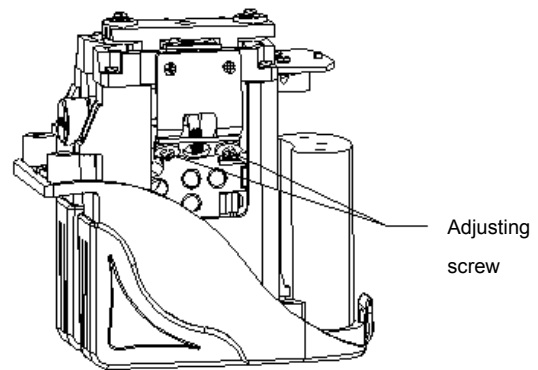


**2.3 Alarm Calibration:**

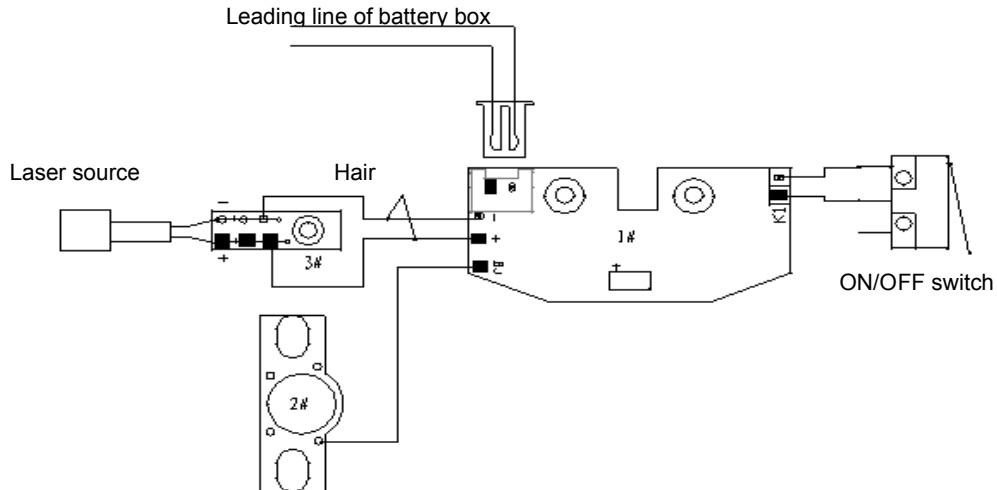
This is accomplished by centering the alarm spring (4.20.11) with in the alarm ring on the alarm PCB (4.21).

1. With the instrument on a level test stand, loosen 2 adjustment screws (4.23) and center the Alarm PCB (4.23) around the Alarm Spring (4.20.11).
2. Tighten the adjustment 2 screws (4.23).

- Note: The instrument should alarm 2.3° and any direction from level



### 3.0 Electrical Connections



### 4.0 Trouble Shooting Guide

No.	Symptom	Cause	Corrective Action
1	No Power	Battery is low	Replace batteries 3XAA
2		Broken battery wire	Repair/Replace wiring
3		ON/OFF switch is broken/connected line is cut off	Repair/Replace ON/OFF switch
4		1# main circuit board is defective	Repair/ Replace 1# main circuit board
5	Indicator doesn't light when power is on	Indicator is defective	Replace indicator
6		1# main circuit board is defective	Replace 1# main circuit board
7	No laser output	Hair spring is damaged	Replace hair spring
8		Connected line of 3# circuit board is damaged/devfective	Repair connected line
9		1# main circuit board is defective	Replace 1# main circuit board
10	No sound if tilt beyond range	Laser indicator is damaged or defective	Replace laser source
11		Buzzer is damaged or defective	Replace buzzer
12		Connected line of 1# & 2# circuit board is damaged/defective	Repair connected line
13	No alarming if tilt beyond range	1# main circuit board is damaged/defective	Replace 1# main circuit board
14		1# main circuit board is damaged/defective	Replace 1# main circuit board
15	No alarming if tilt beyond range	Connected line of 1# & 2# circuit board is damaged/defective	Repair connected line
15		1# main circuit board is damaged/defective	Replace 1# main circuit board