



**40-6900 22x Builders Level**  
**Service Manual**



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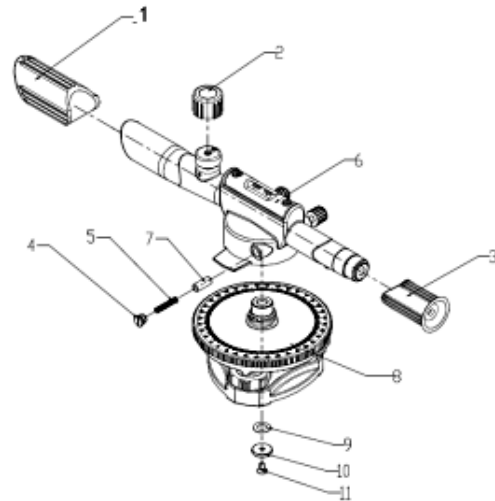
# 1. Overall Instrument Assembly

This optical 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.



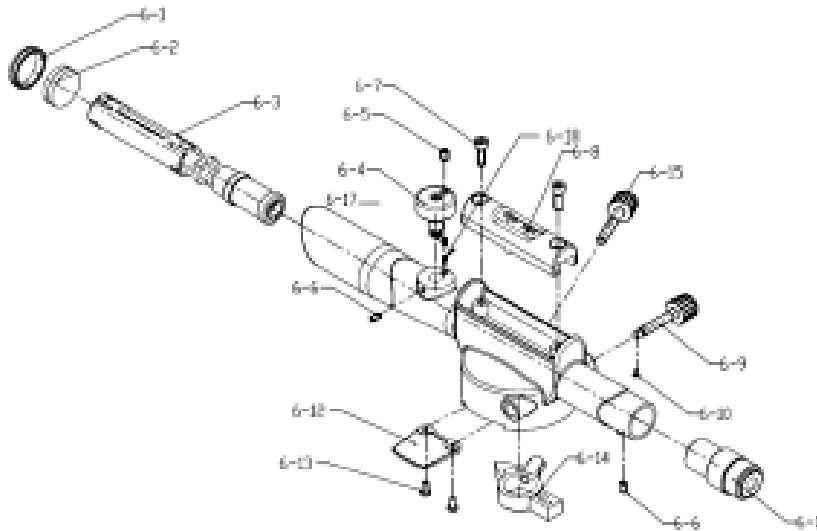
## 1.1 Main Assembly (40-6900)

Item	JLT Part	Description	Qty
1	AP1990	Rubber Cover 1	1
2	AP1991	Rubber Cover 2	1
3	AP1992	Rubber Cover 3	1
4	AP1993	Compression Spring Screw	1
5	AP1994	Horizontal Compression Spring	1
6	AP1995	Telescope Assembly	1
7	AP1996	Horizontal Compression Spring Base	1
8	AP1997	Base Assembly	1
9	AP1998	Wave Ring	1
10	AP1999	Retainer	1
11	AP2000	M4x8 Cross Sunk Screw	1



1. Remove Rubber 1 (#1), rubber cover 2 (#2), and rubber cover 3 (#3) by hand.
2. Remove horizontal compression spring base (#7) and horizontal compression spring (#5) by loosing horizontal compression spring screw (#4).
3. Remove telescope assembly (#6) from Base Assembly (#8) by removing Retaining screw (#11), Retainer (#10), and Wave Ring (#9).

## 1.2 Telescope Assembly (AP1995)

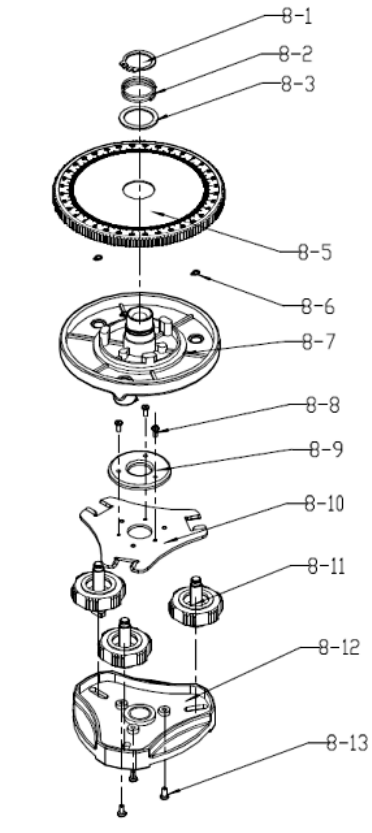


Item	JLT Part	Description	Qty	Item	JLT Part	Description	Qty
6-1	AP2001	Objective Press Loop	1	6-10	AP2010	M1.6x3 Cross Plate Screw	1
6-2	AP2002	Objective glued lens	1	6-11	AP2011	Eye Piece Assembly	1
6-3	AP2003	Focus Lens assembly	1	6-12	AP2012	Horizontal vernier	1
6-4	AP2004	Focus knob assembly	1	6-13	AP1449	M2.5 x 6 Cross-slot Plate Screw	2
6-5	AP2005	M4 x 6 Inner Hexagon Notched Tightening Screw	1	6-14	AP2013	Horizontal micro motion loop	1
6-6	AP2006	M3 x 6 Inner Hexagon Notched Tightening Screw	2	6-15	AP2014	Horizontal Micro-motion Locking Knob	1
6-7	AP2007	M4x12 Inner Hexagon Column head screw	2	6-16	N/A	N/A	0
6-8	AP2008	Vial Seat Assembly	1	6-17	AP2015	Compression Spring	1
6-9	AP2009	Horizontal Micro Motion knob	1	6-18	AP2016	Ejector Rod	1

1. Remove horizontal micro motion loop (6-14) from Telescope Assembly (6) by continuously turning the horizontal micro motion locking knob (6-15) counter-clockwise until it comes out.
2. Remove Vial Seat Assembly (6-8) by removing the 2 retainer screws (6-7).
3. Remove horizontal micro motion loop (6-9) from Telescope Assembly (6) by removing retaining screw (6-10) then continuously turning the horizontal micro motion loop (6-9) counter-clockwise until it comes out.
4. Remove horizontal veneer (6-12) from Telescope Assembly (6) by removing 2 retaining screws (6-13).
5. Remove Eye Piece Assembly (6-11) by loosening set screw (6-6) with 1.5 mm Allen wrench.
6. Remove objective glued lens (6-2) from Telescope Assembly (6) by removing objective press loop 6-1). Be very careful not to damage the lens as 6-1 is unscrewed.
7. Remove Focus Lens Assembly (6-3) by loosening set screw (6-6) with 1.5mm Allen wrench and remove lens focus knob assembly (6-4). Once removed Lens focus assembly (6-3) is removed by pushing it from the front towards the back until it freely slides out.

### 1.3 Base Assembly (AP1997)

Item	JLT Part	Description	Qty
8-1	AP2017	C-ring	1
8-2	AP2018	Compression Spring	1
8-3	AP2019	Spacer	1
8-4	N/A	N/A	0
8-5	AP2020	Horizontal Graduated Circle	1
8-6	AP1579	2.5M Split Washer	3
8-7	AP2021	Base Module	1
8-8	AP1449	M2.5 x 6 Cross-slot Plate Screw	3
8-9	AP2022	Press Board	1
8-10	AP2023	Bottom Plate	1
8-11	AP2024	Foot Screw	3
8-12	AP2025	Bottom Module	1
8-13	AP1022	M3 x 6 Cross-slot Plate Screw	3



1. Remove Horizontal graduated circle (8-5) from Based Module (8-7) by removing C-ring retainer (8-1), compression spring (8-2), and spacer (8-3) respectively. A ring pliers is a very useful tool in removing the C-ring
2. Remove the 3 foot screws (8-11) from Base Module (8-7) by removing 3 split washers (8-6) located at the top each foot screw (8-11). Once the 3 split washers (8-6) have been removed, rotate each foot screw counter clock-wise to unscrew them from the Based module (8-7).
3. Remove Press Board (8-9) from Bottom plate (8-10) by removing 3 retaining screws (8-8).
4. Remove the Bottom module (8-12) from the Bottom plate (8-10) by removing the 3 retaining screws (8-13).

## 2.0 Calibration

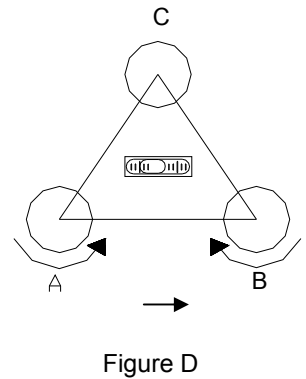
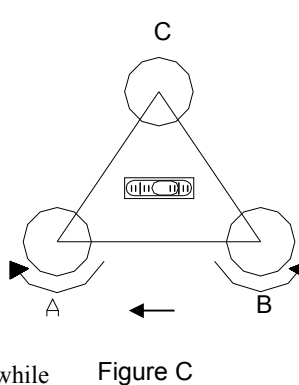
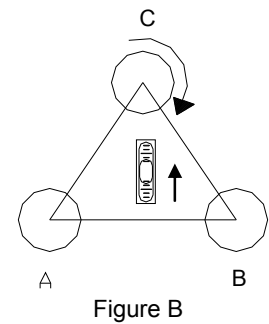
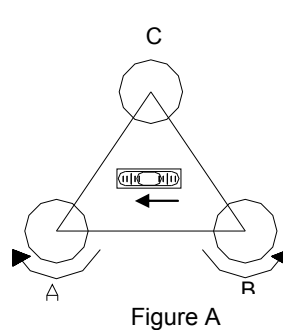
Calibration is a process that is used to correct for accuracy and/or functional errors above and beyond those stated in published specifications. This product is fairly easy to verify and calibrate as there are only two adjustments that can be made. Each item discussed is shown below.

### 2.1 Vial Verification/Calibration

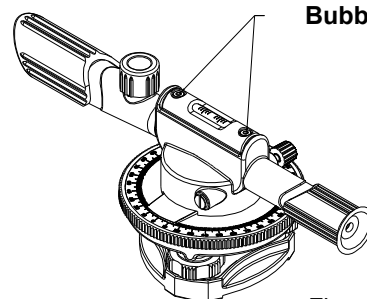
Mount the instrument on the tripod. Turn the telescope to the position as shown in figure A, and line up the telescope bubble in alignment with foot screws A & B. Note that the bubble moves always in the same direction as your left thumb.

If the bubble is not centered, first grasp screws A & B so that both thumbs are moving in opposite directions, either toward each other or away from each other, in order to make the bubble centered. Then turn the telescope to the position as shown in figure B, turn the foot screw C to make bubble centered. Now, the instrument should be leveled up, but to be certain, double-check. Rotate the instrument by any angle, and the bubble should always be centered. Otherwise, please make calibration for the bubble.

If the bubble leans to the right side, adjust screws A & B as figure C shows, in order to remove one half the error. Remove the other half of the error by adjusting the two bubble level screws as shown in figure E, i.e. loose one screw while tightening the other screw. The instrument is calibrated when the is rotated throughout a 360° rotation. If the bubble leans to the left side, turn screws A & B as shown in figure D, and repeat the steps as described above.



bubble remains center as the telescope



## 2.2 Line of Site Verification/Calibration

Once Vial calibration has been verify/achieved, it is necessary to verify/calibrate the line of site. Essentially this assures that the stadia lines with in the telescope (cross hairs) are on the same plane as your reference. This can be done a number of ways:

- By purchasing an automatic level/collimator.
- By comparing the test instrument to a ***known good*** reference laser, theolite, etc.
- Using the long shot, short shot method.

Regardless of the method, calibration adjustments are the same. This manual only discusses verification using an automatic level.

Setup the instrument as shown in figure F, level the bubble, and focus the lens until you can clearly see the stadia lines inside the collimator tube. If the center horizontal hair on the stadia lines of the instrument is not coincident with the horizontal reference line on the of the collimator tube, the instrument should be calibrate using the method below.

**Leveling accuracy using an automatic level**

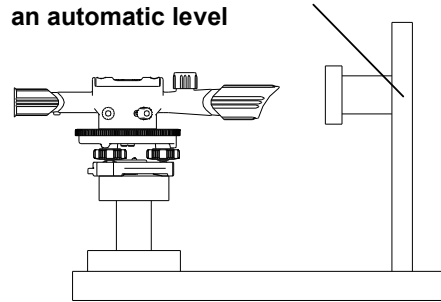


Figure F

1. Remove rubber cover 3 (3) to expose calibration set screws 6-6 and 6-16.
2. Using a 1.5mm Allen wrench, loosen calibration set screws 6-6 and 6-16.
3. Rotate the eyepiece seat to make the crosshair center on the reticle of instrument on the same level with crosshair center on the reticle of collimator tube. Then rotate the eyepiece tube to make the horizontal hair on the reticle of intrument level. Now the middle horizontal hair on the reticle of the instrument coincide with the horizontal line on the reticle of the collimator tube.
4. Tighten the two set screws 6-6 and 6-16 and restore rubber cover 3 (3) to its original position.

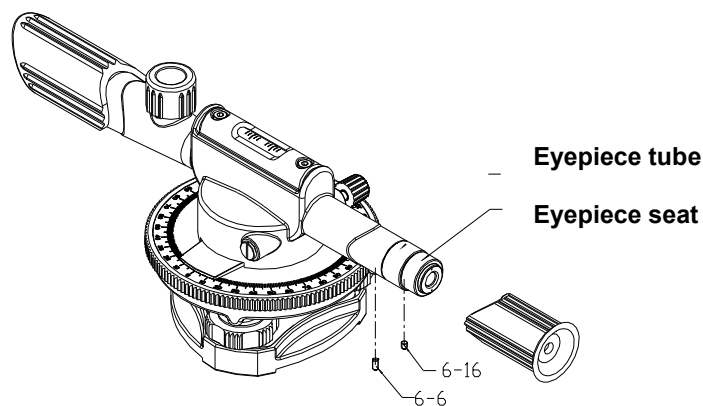


Figure G

### 3.0 Trouble Shooting Guide

No.	Symptom	Cause	Corrective Action
1	The horizontal micro-motion knob doesn't work	The horizontal locking mechanism is damaged or defective	Replace the horizontal locking mechanism
2	The focus knob doesn't work	The upper gear on the focus tube has a lot of wear	Replace the focus tube
3	Fail to level the bubble	The bubble is broken	Replace the bubble
4	The cross hair is obscure	The position of the eyepiece is not correct	Adjust the position of the eyepiece
5	There is something on the reticle	The reticle is dirty	Clean the reticle
6	Bubble is not centered in any direction	The bubble level screw is loose	Recalibrate according to the above method