

JOHNSON ®

Electronic Digital Theodolite with Laser Model No. 40-6936



Instruction Manual

Congratulations on your choice of this Electronic Digital Theodolite with laser. We suggest you read this instruction manual thoroughly before using the instrument. Save this instruction manual for future use.

This is a Class IIIa laser tool and is manufactured to comply with CFR 21, parts 1040.10 and 1040.11 as well as international safety rule IEC 285.

WARNING:

This product contains one or more chemicals, including lead, known to the State of California to cause cancer and birth defects and other reproductive harm.

Wash hands after handling. 

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1. Kit Contents

Description for Model 40-6936

Qty.

Electronic Digital Theodolite with Laser	1
Alkaline Battery Compartment (batteries not included)	1
NiMH Rechargeable Battery Pack	1
3-7.5V Battery Adapter	1
Rain Hood	1
Adjustment Tools	1
Instruction Manual with Warranty Card	1
Hard-Shell Carrying Case	1



2. Features and Functions

- Electronic Thodolite with dual-axis compensator and laser beam integrated in the telescope. Beam is focussable.
- 5" angular accuracy - accurate enough for any construction job
- Vertical axis compensation - tilt sensor provides the highest level of accuracy and can be turned on or off depending on job requirements
- Dual LCD with large characters - easy to see angle readings eliminate errors and reduces eye fatigue
- Backlit LCD screen and telescope reticle - allows work in low light conditions including indoors and extended hours near dawn and dusk
- Simple six button keypad - quick setups and simple operation with low operator learning curve
- Large suite of programmable settings - provide multiple options for various users and job requirements including zero position of vertical angle
- Measurement units in degrees, gon, or mils
- 90 degree angle audible notification - for quick turning and set out of right angles
- Instant conversion of vertical angles to percent of grade - convenient for slope work
- Ni-MH rechargeable battery pack and charger - lower operating cost with reusable batteries
- Alkaline battery pack standard - provides backup and eliminates downtime if the charge is lost in the middle of a job
- Battery status indicator - no power surprises and allows for better planning
- Automatic shutoff - conserves battery life when not in use - can be disabled if desired
- Laser Plummet



3. Safety Instructions

Please read and understand all of the following instructions, prior to using this tool. Failure to do so, may void the warranty.

DANGER!

Class IIIa Laser Product
Max. Power Output: $\leq 5\text{mW}$
Wavelength: 625-645nm

**THIS TOOL EMITS LASER RADIATION.
DO NOT STARE INTO BEAM.
AVOID DIRECT EYE EXPOSURE.**



ATTENTION



IMPORTANT

- Read all instructions prior to operating this laser tool. Do not remove any labels from tool.
- Do not stare directly at the laser beam.
- Do not project the laser beam directly into the eyes of others.
- Do not set up laser tool at eye level or operate the tool near a reflective surface as the laser beam could be projected into your eyes or into the eyes of others.
- Do not place the laser tool in a manner that may cause someone to unintentionally look into the laser beam. Serious eye injury may result.
- Do not operate the tool in explosive environments, i.e. in the presence of gases or flammable liquids.
- Keep the laser tool out of the reach of children and other untrained persons.
- Do not attempt to view the laser beam through optical tools such as telescopes as serious eye injury may result.
- Always turn the laser tool off when not in use or left unattended for a period of time.
- Remove the batteries when storing the tool for an extended time (more than 3 months) to avoid damage to the tool should the batteries deteriorate.
- Do not attempt to repair or disassemble the laser tool. If unqualified persons attempt to repair this tool, warranty will be void.
- Use only original Johnson® parts and accessories purchased from your Johnson® authorized dealer. Use of non-Johnson® parts and accessories will void warranty.

4. Location/Content of Warning Labels



DANGER

**LASER RADIATION
AVOID DIRECT EYE
EXPOSURE.**

MAXIMUM OUTPUT POWER
< 5mW @ 625-645nm

CLASS IIIa LASER PRODUCT.
THIS PRODUCT COMPLES
WITH THE APPLICABLE
REQUIREMENTS OF 21CFR
PARTS 1040.10 & 1040.11.

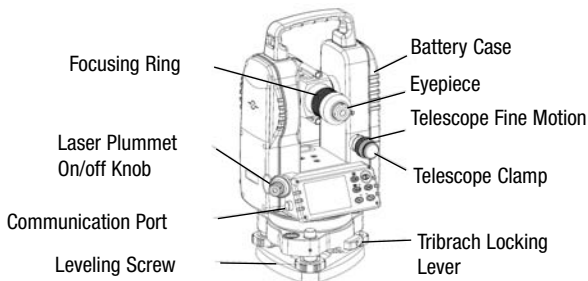
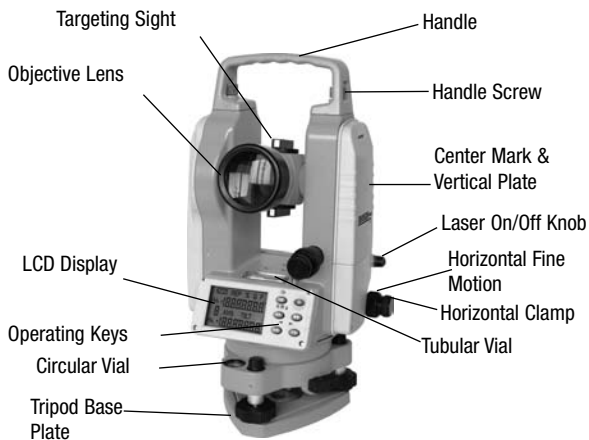
Mfg. for Johnson Level & Tool Mfg. Co., Inc.
6033 W. Orange Bay Rd., Mequon, WI 53092
Manufactured in China by JLT05
Date (m/y): _____



**Laser radiation is
emitted from this aperture.**

AVOID EXPOSURE

5. Location of Part/Components



6. Operating Instructions

IMPORTANT: It is the responsibility of the user to verify the calibration of the instrument before each use.

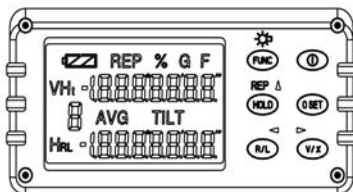












Display and Display Explanation

1. Ht - Total value of repeated angles measured
2. V - Vertical angle
3. Number of repeated measurements
4. AVG - Value of repeated angle measurements
5. HR - Angle increases with clockwise turning
6. HL - Angle increases with counterclockwise turning
7. TILT - Tilt sensor
8. F - Function mode
9. G - Angle unit GON
10. % - Vertical slope in percent
11. REP - Repeated angle measurement mode
12. Battery power indication

Note: If the display shows “b” after activating the tilt sensor, the instrument exceeds its compensation range and the instrument should be leveled.

Operating Panel and Operating Keys



-  Function key selection
-  Hold horizontal angle reading
-  Set horizontal-angle rotation direction
-  Illuminating the display
-  Moving the cursor to the left
-  Moving the cursor to the right
-  Change the number indicated by the cursor
-  Power key
-  Zero the horizontal angle reading
-  Change vertical angle to percent of grade
- REP** Repeated angle measurement



Preparation Before Measurement

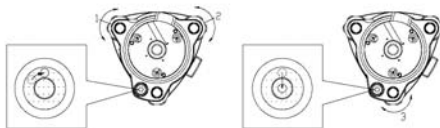
Centering and Leveling with Laser Plummet

- Level and center the instrument precisely to ensure its best performance.
- Extend the tripod legs to a suitable working height with equal length legs. Spread the tripod legs and make the tripod head as level as possible while at the same time placing the center of the tripod head directly over the ground point. Press the leg feet firmly into the ground and make sure the tripod legs are locked.
- Set the instrument carefully on the center of the tripod head orientating the leveling screws centered with each tripod leg. Attach the instrument to the tripod. Make sure the center mark is visible on all three leveling screws (this ensures a complete leveling range).
- With the instrument turned on, turn on the laser plummet by turning the laser plummet on/off knob clockwise. Adjust the Laser Plummet so the laser dot hits the ground clearly. If you cannot see the laser dot hit the ground, carefully lift two of the tripod legs, then pivot on the third leg, carefully moving the tripod until the ground point is within one inch of the laser dot. Press the two tripod feet back into the ground and recheck the laser plummet alignment. Repeat if necessary until the ground point is being hit by the laser dot.
- Now center the instrument's Circular Vial by carefully extending or shortening the tripod leg closest to the bubble. Note: Use only two legs. Repeat until alignment is within 6mm (1/4 inch) or less.





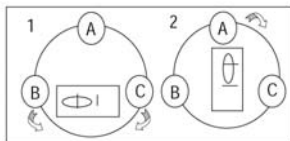
- Rotate the leveling screw 1, 2 to move the bubble to the center line of circular level which is perpendicular to the connection line 1, 2.
- Rotate the leveling screw 3 to move the bubble to the center of the circular level.



- Next use the Tubular Vial to accurately level the instrument. Unlock and turn the instrument so that the tubular vial is parallel to BC, any two leveling screws. Note the direction to turn the leveling screws in the graphic. When turning the two screws, adjust them equally. The bubble will move in the direction that your left thumb turns. To move the bubble to the right, turn the B leveling screw in and simultaneously turn the C leveling screw in. To move the bubble left, move both screws out simultaneously. Once centered turn the instrument 90° over A leveling screw and turn screw A in or out until bubble is centered. Go back to the first position BC, and repeat until the bubble is centered in both positions. Then from position BC turn 180° to check the adjustment. If the bubble stays centered or within 1/4 division, you are level.



- Now check the ground point centering. If you are not directly on the point, carefully loosen the tripod fastener and move the instrument on the tripod head in an x - y direction. Do not rotate the instrument. Recheck leveling and repeat until instrument is level and over the ground point at the same time. With practice, this becomes easier.

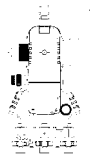




7. Using the Product

Turning on the Instrument

Press the power key on the instrument for 2 seconds and all the symbols will be displayed on the LCD. The buzzer will sound twice and the horizontal angle value and “0-set” will be displayed. When “0-set” is displayed none of the key pads operate except for the power key. Rotate the telescope 360° to activate the vertical measuring mode and to activate the keypad.



Battery Strength Indicator

The battery symbol on the LCD window displays the current battery strength.



Full power



Effective battery



Effective battery



Weak voltage but still effective, suggest changing battery packs

Powers off automatically after symbol blinks. Replace the battery pack or recharge it.

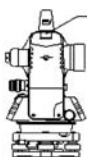
Battery Strength





Battery Replacement

Remove Battery Box



Battery Box Button

Push down to remove the battery box

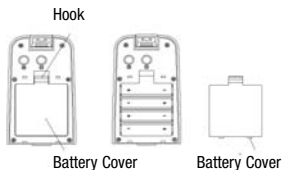


Replace Alkaline Batteries

- Push down the battery cover tab and pull the battery cover away from the battery box.
- Take the old batteries out and put the new batteries in paying attention to the “+” and “-” pole.
- Snap the battery cover back into place.

Placing the Battery Box on the Instrument

Place the projection on the bottom of the battery box into the slot on the instrument. Push the top of the battery box until it clicks into place.





Rechargeable Batteries

- Connect the charger to the AC outlet. Remove the battery box from the instrument and insert plug of charger into the recharge socket of battery box. A red indicator light on the charger means the instrument is recharging. A green light means the instrument is fully recharged.
- The plug should be pulled out from the rechargeable battery box after the unit is recharged, the charger is equipped with an over-charge protective circuit.

Before Using Your Laser

When you charge the new battery or one which has not been used for long periods of time, it may not reach full charge until after you have discharged it fully in use and recharge it several times.

Measurement of Angle

Observing in the “Normal” and “Reverse” positions of the telescope.

The normal, or direct, position of the telescope refers to observation with the vertical circle opposite the battery door being on the left. The reverse position refers to observation with the vertical circle being on the right. The mechanical errors can be offset by averaging the values measured in the normal and reverse positions.





Using the Telescope

- Point the telescope at the target and focus the eyepiece until the crosshair can be seen clearly.
- Aim the telescope coarsely using the targeting sight. Keep a slight distance between the targeting sight and your eye when aiming coarsely.
- Focus the telescope by turning the focusing knob on the telescope.

Horizontal Angle “0-set”

1. Aim at target “A” using crosshair in the telescope.
2. Press 0-Set key once to set reading of horizontal angle 0°00’00”.



- 0-set key is only available for the horizontal angle.
- Horizontal angle can be set to “0” at any time except when the horizontal angle is in the hold status.



Measuring Horizontal and Vertical Angle (HR, V or HL, V)

Horizontal angle right rotation increment and Vertical angle measurement (HR, V)

1. Aim at the first “A” using the center crosshair.
2. Press 0-set key once to set the reading of horizontal angle of target “A” at 0°00’00”.
3. Rotate the instrument clockwise and aim at the second target “B” to get the horizontal and vertical angle of target “B”.





Conversion between horizontal angle right (HR) and left (HL) rotation

1. Aim at a target "A" using the center of crosshair in the telescope.
2. Press the R/L key to change horizontal angle mode from HR to mode HL.
3. Measure in mode HL.



- The R/L button has no effect to the vertical angle.
- Press the R/L button again, and the horizontal angle is transformed back from HL to HR again.

Holding the Horizontal Angle

Press the HOLD button to hold the horizontal angle. The reading will blink while being held. The reading of the horizontal angle will remain unchanged even if the direction of telescope is changed. Press HOLD button again, the hold of horizontal angle is released.

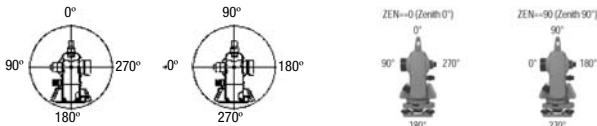
1. Rotate the instrument to the target.
 2. Press the HOLD key once to lock the value of the horizontal angle, the reading will flash.
 3. Press the HOLD key again to unlock the reading.
- The HOLD key has no effect to the vertical angle.





Measurement of Vertical Angle

The angle position can be set as required in the initial setting.



Display of Slope

1. Press the V/% key to switch the vertical measurement shown from degrees to percent of grade.
2. Press the V/% key again to switch from grade percent back to the vertical measurement shown in degrees.



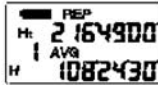
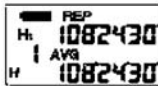
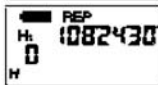
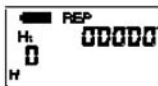
Note: When vertical angle is converted to slope, the precision of the slope reading is two digits after the decimal. The value of slope is displayed only within a 45° (100%). When measure angle exceeds 100%, the percent will be shown as “----”.





Repeat Angle Measurement

1. Press the FUNC key.
2. Press the REP key to put the instrument in repeat mode.
3. Aim at the first target "A" and press the 0-set key once to set the first target reading 0°00'00".
4. Rotate the instrument and aim at the second target "B".
5. Press the HOLD key to hold the horizontal angle and store it in the instrument.
6. Rotate the instrument to aim at the target "A" again. Press R/L key to release the angle hold status.
7. Rotate the instrument to aim at the target "B" again.
8. Press the HOLD key to hold the horizontal angle and store it in the instrument. Double and average angle-value will be shown on the display.
9. Repeat the last three steps according to measuring requirements.
10. If needed return back to normal angle measurement, press FUNC key, and then press the HOLD key.





- The reading of horizontal angle can accumulate to reach +1999°59'59" when in repeat angle measurement mode.
- Repeat measurement does not function if the angle between two targets is less than 30".
- The repeat measurement should be limited to 15 times when the instrument is in the repeat measuring mode, otherwise the error Err-04 will be shown. Start again from step 1.
- Err-04 will show on the display when measuring $>+30''$ during the repeat measurement, then go back to step 1.
- Press the FUNC key, and then press the HOLD key to withdraw from repeat measurement and back to the original status.

Switching Between Measuring Units

This instrument has three types of angle measurement units to choose from: DEG, GON and MIL and can be chosen in the preliminary setting, or by following this procedure. Simultaneously press R/L and V/%, the angle measurement units will switch between DEG, GON and MIL.

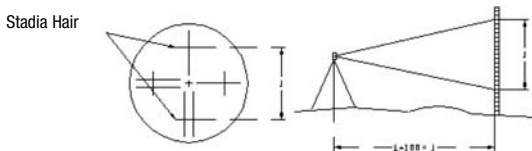




Other Functions

Measuring Distance Using the Stadia Method

Read the leveling rod using the stadia hair on the reticule of the telescope. Multiply the reading by 100 to obtain the actual distance L from the target to the measured point. (100 is the multiplication constant error of the instrument, i.e. $1 = 1 \times 100$)



Tilt Sensor

This theodolite is equipped with a tilt sensor. The inclined angle of the instrument will be compensated automatically by the tilt sensor. If the instrument is inclined too much, a symbol “b” will be shown on the display, this means the instrument exceeds the compensated range. Level the instrument by hand.

To turn on the tilt sensor and hold the R/L button in for 3 seconds after moving the telescope to get into vertical measuring mode. The word “Tilt” will appear on the display. If the instrument is inclined within $+3^\circ$ the tilt sensor can compensate the vertical angle. If the inclination is greater than $+3^\circ$ the instrument will display “b”.





Sound Function

When the sound function is activated and the instrument is rotated, the instrument will sound when the horizontal angle passes 0°, 90°, 180°, & 270°. Please refer to “initial setting” chapter to set horizontal angle sound function.

Backlight LCD Telescope Reticle and Timing Power-Off

The display and telescope’s reticle on this theodolite are equipped with a lighting device. Press the FUNC key twice to turn on the light. Press the key twice again to turn it off. The instrument will automatically turn off to save power if it has not received an operation within 10 minutes, 20 minutes or 30 minutes. Please refer to the “initial setting” section.

Laser (Telescope)

With the instrument turned on, turn on the laser on/off/adjustment knob. Turning the knob all the way to the right will increase the beams visibility. The laser dot can be focused using the focusing ring. The beam is emitted from the objective lens and does not impede viewing. The laser dot will not be seen when sighting through the eyepiece lens.

Laser (Plummet)

With the instrument turned on, turn on the laser plummet on/off knob turning it all the way clockwise. The laser plummet will turn off when the instrument is turned off.



INITIAL SETTING

Initial Setting Instruction

The instrument has several settings for your option to meet different requirements of measuring. After your purchase and before your operation, do the initial setting for the instrument.

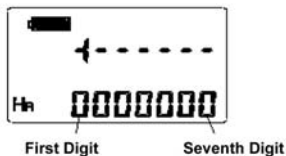
Item Setting

No.	Item	Description	Parameter Setting			
1	Reading resolution (minimal reading display unit)	40-6936	Setting 0 1"	Setting 1 2"	Setting 2 5"	
2	Sound function	Confirming sound every 90°	Setting 0 OFF		Setting 1 ON	
3	Angle unit	Selecting angle display unit DEG, GON, MIL	Setting 0 DEG	Setting 1 GON	Setting 2 MIL	
4	Automatic Shut-off	Setting interval for automatic shut-off without an operation	Setting 0 OFF	Setting 1 10 min	Setting 2 20 min	Setting 3 30 min
5	Measuring mode for Vertical Angle	Setting measuring mode for vertical angle	Setting 0 vertical angle	Setting 1 zenith angle	Setting 2 height angle	
6	Tilt sensor	Set tilt function	Setting 0 OFF		Setting 1 ON	
7	Data transmission	Set data transmission function	Setting 0 OFF		Setting 1 ON	



Settings

Power on the instrument, press the FUNC key once, then press the power key once. The instrument will enter the initial setting mode and will display as follows:



Move to the digit required by using the Left ◀ or Right ▶ keys. Change the digit value using the up ▲ key. After changing the various settings, press the FUNC key once, and then press Power key once to exit the setting status and return back to the angle-measuring function. The new settings will be saved.

Factory Settings

- Minimal Resolution Reading: 5" (40-6936)
- Sound Function: OFF
- Angle Display Unit: 360°
- Automatic Shut Off: OFF
- Measuring-Mode for Vertical Angle: Vertical Angle
- Tilt Sensor: OFF
- Data Transmission Function: OFF





Error Display

Display	Error Display & Explanation & Action
b	Instrument exceeds its self-leveling range, level the instrument again.
Err-04	Difference between every measuring value exceeds 30° during the repeated angle measurement. Press "0-SET" key and measure again. Measuring times of repeated angle measurement is more than 15. Press "0-SET" to measure again.
Err-06	Errors during the process of the vertical angle 0-set or adjusting 0-set when the inclination to the horizontal angle exceeds 45° the instrument needs adjusting.

Note: If above errors appear, act according to corresponding actions mentioned above. If errors still exist, then the instrument needs repair.

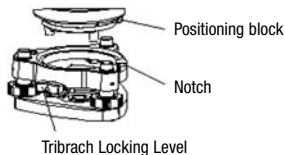
Installation and Removal of the Base

Base Removal

- Rotate the Tribrach locking lever 180° counterclockwise.
- Hold the base plate with one hand, and with the other hand lift up the instrument by the handle.

Base Installation

- Lift the instrument by hand, and aim the positioning block to the notch on the base plate. Mount the instrument on the base plate carefully.
- Tighten the clamp knob on the base plate.





8. Self-Check & Fine Calibration

IMPORTANT: It is the responsibility of the user to verify the calibration of the instrument before each use.

- Calibration should be carried out according to the following steps because each step's calibration is based on its former one's result. Disorder of the steps will default the calibration.
- Tighten the screw after calibration. Be careful not to over tighten because excessive tightening will damage the thread.
- After calibration, repeat the inspection to make sure that the calibration has been successful.

Check and Calibrate The Tubular Vial

Checking

- Attach the instrument to a tripod and rough level. Position the tubular vial parallel to a line connecting any two of the three leveling screws on the base. Adjust the two leveling screws so that the tubular bubble is centered.
- Turn the instrument 180° and check if the bubble remains at center.

Calibrating

- If the bubble remains at the center, no adjustment is required. Otherwise, perform adjustment as follows:
- Using the bubble adjustment screws and adjustment pin, move the bubble towards the tube center for half of the error.
- Turn the leveling screw to correct the other half of the error so that the bubble is centered.



- Rotate the instrument 180 degrees and check if the bubble remains centered. If the bubble is centered, the adjustment is complete. If not, repeat the steps until the bubble is centered when the instrument is at any position.



Check and Calibrate The Circular Vial Checking

If the circular vial is centered correctly after leveling the instrument by the tubular vial, then no further calibration is necessary. If not, proceed with the following calibration.

Calibrating

There are three adjusting screws on the bottom of the circular vial. When calibrating, loosen the screw opposite to the bubble's moving direction (one or two), and then tighten the screws along the bubble's moving direction to center the bubble. The tightening of these three screws should be consistent.

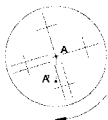
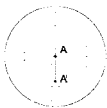


Circular Vial

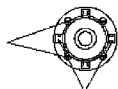
Perpendicularity of Vertical Crosshair Reticle of Telescope Checking

- Mount the instrument on the tripod and level it carefully.
- Set a target point, A, 50 meters away from the instrument, aim the telescope at point A .

- Move the telescope using the vertical fine movement and observe whether point A moves along the vertical hair.
- If point A moves along the vertical hair of the reticle, no adjustment is necessary.
- Adjustment is necessary if the point A strays from the vertical crosshair.



Clamp Screws
of Reticle Base



Reticle Adjusting Screw

Calibrating

- Turn counterclockwise and remove the reticle cover between the eyepiece and focusing handwheel. This will expose four reticle set screws.
- Loosen these four set screws equally with a screwdriver. Turn the Assembly so that point A coincides with the vertical crosshair.
- Tighten these four set screws equally and observe whether any transversal deviation appears when point A moves along the vertical hair. If not, the adjustment is over.
- Assemble back the protective cover to its original position.



Perpendicular Degree of The Visual Axis and The Horizontal Axis Checking

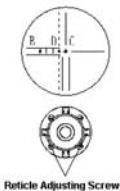
- Set two targets as high as the instrument, one in front of and the other behind the instrument, each about 50 meters away from the instrument. Level the instrument precisely and power it on.
- Aim at target A with crosshair of the telescope in plate-leftward position.
- Rotate the telescope around the horizontal axis 180° to aim it in the opposite direction.
- Aim at target B which is the same distance to target A.
- Rotate the instrument 180° . Aim at the target A, then lock the horizontal clamp.
- Rotate the telescope 180° around the horizontal axis again. Aim at the target C. Target C should be the same with target B.
- If not coincident, adjustment is necessary.





Calibrating

- Remove the reticle cover between the eyepiece of the telescope and the focusing handwheel.
- Set up point D between point B and C. The distance of DC should be a quarter of BC. Adjust the two adjusting screws to move the reticle to have its cross aim at point D.
- Repeat above inspection steps until B and C are coincident.
- Assemble the reticle cover back to its original position.
- Loosen one screw if the vertical hair of the crosshair should be moved, then tighten the adjusting screw on the other side about the same number of turns. Loosen the screw counterclockwise and tighten in the clockwise direction. The turn should be as little as possible for both loosening and tightening.
- After above calibration, the zero reset of the upright angle should be carried out, to reset the zero point of the upright angle.



Automatic Compensation of the Vertical Axis Incline

The instrument is equipped with the electronic incline sensor device (tilt sensor), which can automatically compensate the vertical axis incline.

Checking

- After mounting and leveling the instrument, position the direction of the telescope with a line between the center of the instrument and any of its foot screws. Then tighten the horizontal braking handwheel.





- Position the telescope to zero after power-on. Tighten the vertical clamp and the instrument will display the current value in the upright position.
- Slowly turn the foot screw in one direction about 1/2" or so (circle distance), the value of upright angle changes correspondingly until it disappears and the symbol "b" is shown, this means the incline of the instrument's axis has exceeded the compensation range. When turning the foot screw in reverse, the instrument goes back to display the upright angle (repeat testing and observe the changes on the critical point), this means the compensation device is working.

Calibrating








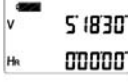
When the compensation doesn't work well or works abnormally, send the instrument to an authorized repair facility for repairs.

Vertical Plate Angle Specification ("i" angle) and its Zero Setting

- After mounting and leveling, power on the instrument. Aim the telescope at any clear target A to get the reading L, which is the upright angle plate left reading.
- Turn the telescope to the reverse position and aim at target A again to get the reading R, which is the upright angle plate right reading.
- If upright angle is in the zenith angle mode, then $i=(L+R-360^\circ)/2$.
If upright angle is in the vertical angle mode, then $i=(L+R-180^\circ)/2$ or $i=(L+R-540^\circ)/2$
- If the specification errors $lil^\circ \leq 10''$, 0 reset of the upright plate specification is necessary.



Calibrating

Operating Procedures	Operation	Display
<ol style="list-style-type: none"> Level the instrument accurately with the long vial. Power on the instrument, the vertical angle and horizontal angle are displayed after the telescope passes zero position. Press the FUNC key once, and then press the V/% key. Rotate the instrument and precisely aim at the clear and stable target A as high as the instrument in the distance. Press the 0-Set key once. Turn the instrument and aim the right of the vertical plate at the same target A. Press the 0-Set key and the measured values are set. The instrument goes back to the angle measurement mode, and the calibration is finished. 	<p> Rotate the telescope</p> <p> Aim at the plate left position of A</p> <p> Aim at the plate right position of A</p> <p></p>	   
<ul style="list-style-type: none"> Send the instrument to an authorized repair facility for repairs after operations are repeated many times without any effect. 		



Communication Format

All data is sent in ASCII. When communication is on, vertical angle and horizontal angle are sent in turns with 4Hz frequency.

All angle data sent begins with the letter “A” (angle), and finish with the enter key (OXOD). Their form is as follows:

A + Angle Type Character + Display Mode Character + Angle Value + OXOD

Angle Type Character

“P” – Vertical Angle

“H” – Horizontal Angle

Display Mode Character

“D” – Angle In Degree (360°)

“G” – Angle In Gon (400 Gon)

“M” – Angle In Mil (6400 Mil)

“%” – Slope Angle (-100% ~ +100%)

The transmission angle value keeps consistent with the display value on the LCD.





9. Technical Specifications

Telescope

Image	Erect
Magnification	30x
Aperture	1.7in (45mm)
Resolution	3"
Angle of view	1°30'
Shortest Distance	5ft (1.4m)
Stadia Constant	100
Overall Length	6.18in (157mm)

Angle Measuring System

Angle Measurement	Incremental
Minimal Reading	1", 2", 5", optional
Angle Measurement Unit	360°, 400gon, 6400mil, optional
Accuracy	5"

Vial

Tubular Vial	30"/2mm
Circular Vial	8'/2mm

Compensator

Tilt Sensor	Upright Angle Automatic Compensation
Compensation Range	±3'

Laser

Laser Wavelength	635nm±10
Laser Classification	Class IIIa
Interior Range	600' (200m)
Exterior Range	100' (40m)



**Laser Plummet**

Laser Wavelength	635nm \pm 10
Laser Classification	Class IIIa

Display

Type	LCD with Double Side
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Data Input and Output

Joint (one)	RS232
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Power

Battery	5 "AA" Alkaline Batteries (not included) or Rechargeable NiMH Battery Pack (included)
Operating Voltage	6V DC
Operating Time	16 hours

Working Environment

Temperature Range	-4°F to +104°F (-20°C to +40°C)
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Size and Weight

Outside Dimension	6.29" x 5.90" x 12.99" (160x150x330mm)
Weight	10.14 lbs (4.6kg)
Center Screw Thread	5/8" - 11





10. Care and Handling

- Care must be taken to maintain the accuracy of the instrument.
- Do not aim the instrument's telescope directly at the sun.
- When mounting or removing the instrument from the tripod, hold the instrument with one hand, turn the central screw on the tripod with the other hand to prevent the instrument from falling. If the instrument must be carried on the tripod, hold the instrument as vertically as possible. Never carry the instrument on the tripod in a horizontal position over your shoulder. Any long distance transportation should be done with the instrument in its carrying case.
- Put the instrument in its carrying case to avoid possible damage during transportation.
- After each use, the instrument should be wiped clean and kept in its carrying case.
- Remove dust from the lenses with a soft brush or a nonabrasive wipe. Never touch the lenses with your fingers.
- Store the instrument in a dust-free area with low humidity.
- A bag of silica gel dryer is included with each instrument.
- Always remove the batteries when the instrument is not being used for a long time.





11. Product Warranty

Johnson Level & Tool offers a three year limited warranty on each of its products. You can obtain a copy of the limited warranty for a Johnson Level & Tool product by contacting Johnson Level & Tool's Customer Service Department, as provided below, or by visiting our web site at www.johnsonlevel.com. The limited warranty for each product contains various limitations and exclusions.

Do not return this product to the store/retailer or place of purchase. Non-warranty repairs and course calibration must be done by an authorized Johnson® service center or Johnson Level & Tool's limited warranty, if applicable, will be void and there will be NO WARRANTY. Contact one of our service centers for all non-warranty repairs. A list of service centers can be found on our web site at www.johnsonlevel.com or by calling our Customer Service Department. Contact our Customer Service Department for Return Material Authorization (RMA) for warranty repairs (manufacturing defects only). Proof of purchase is required.

NOTE: The user is responsible for the proper use and care of the product. It is the responsibility of the user to verify the calibration of the instrument before each use.

For further assistance, or if you experience problems with this product that are not addressed in this instruction manual, please contact our Customer Service Dept.

In the U.S., contact Johnson Level & Tool's Customer Service Department at 888-9-LEVELS.

In Canada, contact Johnson Level & Tool's Customer Service Department at 800-346-6682.





12. Warranty Registration

Enclosed with this instruction manual you will find a warranty registration card to be completed for your product. You will need to locate the serial number for your product that is located on the bottom of the unit. **PLEASE NOTE THAT IN ADDITION TO ANY OTHER LIMITATIONS OR CONDITIONS OF JOHNSON LEVEL & TOOL'S LIMITED WARRANTY, JOHNSON LEVEL & TOOL MUST HAVE RECEIVED YOUR PROPERLY COMPLETED WARRANTY CARD AND PROOF OF PURCHASE WITHIN 30 DAYS OF YOUR PURCHASE OF THE PRODUCT OR ANY LIMITED WARRANTY THAT MAY APPLY SHALL NOT APPLY AND THERE SHALL BE NO WARRANTY.**

13. Accessories

Johnson® accessories are available for purchase through authorized Johnson® dealers. Use of non-Johnson® accessories will void any applicable limited warranty and there will be NO WARRANTY. If you need any assistance in locating any accessories, please contact our Customer Service Department.

In the U.S., contact Johnson Level & Tool's Customer Service Department at 888-9-LEVELS.

In Canada, contact Johnson Level & Tool's Customer Service Department at 800-346-6682.





14. Trouble Shooting

- If the theodolite will not rotate, clean all debris from the base.
- If the theodolite will not turn on, confirm that the battery pack is securely seated. Clean the battery terminals. Alkaline: Check the battery polarity or install new alkaline batteries. Rechargeable: Attempt to recharge the batteries by charging for 12-14 hours, unplug the unit and then turn the unit on until battery runs out. Repeat this process 2-3 times.
- If the theodolite does not illuminate, confirm that the battery pack is securely seated. Clean the battery terminals. Alkaline: Check the battery polarity or install new alkaline batteries. Rechargeable: Attempt to recharge the batteries by charging for 12-14 hours, unplug the unit and then turn the unit on until battery runs out. Repeat this process 2-3 times.
- If the theodolite will not take a charge, confirm that the battery pack is securely seated. Clean the battery terminals. Alkaline: Check the battery polarity or install new alkaline batteries. Rechargeable: Attempt to recharge the batteries by charging for 12-14 hours, unplug the unit and then turn the unit on until battery runs out. Repeat this process 2-3 times.
- If the theodolite turns off after a short time, confirm that the battery pack is securely seated. Clean the battery terminals. Attempt to recharge the batteries by charging for 12-14 hours, unplug the unit and then turn the unit on until battery runs out. Repeat this process 2-3 times.
- If the theodolite is out of calibration, follow the calibration procedure in the user manual.
- If the theodolite will not calibrate, contact an authorized Johnson Service Center or Johnson Level & Tool's Customer Service Center.
- If the keypad or vertical measuring mode will not work, rotate the telescope 360° to activate the keypad and the vertical measuring mode.
- If the telescope will not move, confirm that the telescope clamp is unlocked.

