



**Self-Leveling Combination Cross-Line Laser
and Five-Beam Laser Dot**
Model No. 40-6685, 40-6687 & 40-6688



Instruction Manual

Congratulations on your choice of this Self-Leveling Combination Cross-Line Laser and Five-Beam Laser Dot. 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.

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1. Kit Contents

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Mounting Strap	1
“AA” Alkaline Batteries	3
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2. Features and Functions

- Laser simultaneously projects two, three or five laser beams (up, down, front, left and right directions).
- Able to project one horizontal, vertical or cross-line beam.
- Magnetic dampened compensation system.
- Laser beam flashes and sounds audible alarm when the laser is beyond its self-leveling range.
- Pendulum locking mechanism helps protect units inner mechanisms.
- Multi-functional magnetic base for attaching to tripod or any metal surface.
- Manual mode feature allows unit to be tipped at extreme angles without the audible alarm and laser flash being triggered.
- Pulsed line feature allows outdoor use with line generator laser detector (included in 40-6687).





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 (40-6685 & 40-6687)
Wavelength: 532nm (40-6688)

**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



40-6688



40-6685 & 40-6687





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.

Battery Installation

Note: Always check to be sure that the compensator lock/unlock switch is in the locked position before removing and replacing batteries.

1. As shown in figure, open the battery cover.
2. Put three “AA” alkaline batteries into the battery compartment noting polarity
3. Close the battery cover.



7. Using the Product

Place the laser on a relatively smooth, flat and level surface.

Note: Product must be within $\pm 4^\circ$ of level for self-leveling feature to function properly. Greater than 4° will result in an alarm condition (flashing laser and intermittent beeping sound).



Place the laser on a tripod using the multi-functional base.





Attach the laser to a steel object.



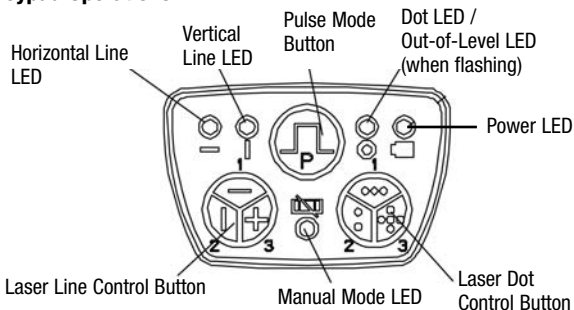
Laser can pivot on base.



Strap the laser to a pole.



Keypad Operations



Power LED:

LED On: Laser is on or pendulum compensator is unlocked

LED Off: Pendulum compensator is locked and laser is off

LED Flashing: Low Battery

Manual Mode LED:

LED Flashing: The pendulum compensator is locked (laser is not self-leveling) and laser is on

LED Off: The laser is in self-leveling mode or the laser is off

Horizontal Laser Line LED:

LED On: The horizontal laser line is on

LED Flashing: The horizontal laser line is in pulse mode and can be used with a line detector (40-6780)

LED Off: The horizontal laser line is off

**Vertical Laser Line LED:**

LED On: The vertical laser line is on

LED Flashing: The vertical laser line is in pulse mode and can be used with a line detector (40-6780)

LED Off: The vertical laser line is off

Dot LED:

LED On: Dot laser is on

LED Off: Dot laser is off

LED Flashing: Laser is outside its self-leveling range

Pendulum Compensator Lock Switch

Unlock the laser, the laser will be on, and the power LED is on. Lock the laser, the laser will be off, and the power LED is off.



Locked Position





Unlocked Position

When unlocking the laser, if the laser flashes and sounds an alarm, the laser is out of its self-leveling range.





Pulse Mode Button

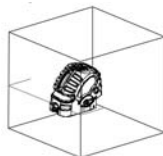
When the horizontal laser line, vertical laser line, or both laser lines are on, press the pulse  button and the laser line will enter Pulse Mode and the corresponding LED will flash. Press the pulse  button again and the laser will exit the pulse mode, and the corresponding LED will return to solid.

Note:


1. When the laser lines are off, the pulse mode button will not function.
2. Pulse mode is for use with a detector.

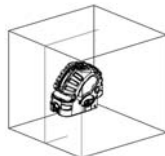
Laser Line Control Button

Press the line  button to turn the laser line on or off. Unlock the laser and press the line  button once. The horizontal laser line LED will be on and the output of the laser is as follows:




Horizontal Line

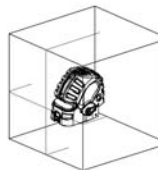
Press the line  button a second time, the horizontal laser line LED will be off, the vertical LED will be on, and the output of the laser is as follows:




Vertical Line





Press the line  button a third time, the horizontal laser line and vertical laser line LED will be on, and the output of the laser is as follows:

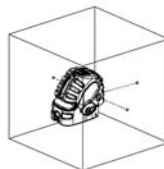


Cross-Line


Press the line  button a fourth time, the horizontal laser line and vertical laser line LED will be off, there is no laser line output.

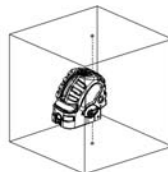
Laser Dot Control Button

Press the dot  button to turn the laser dot on or off, unlock the laser and press the dot  button once. The Laser Dot LED is on and the output of the laser is as follows:



3 Dots


Press the dot  button a second time, the Laser Dot LED is on, the output of the laser is as follows:

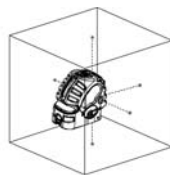


2 Dots






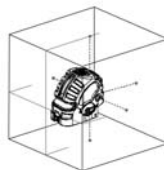
Press the dot  button a third time, the Laser Dot LED is on, the output of the laser is as follows:



5 Dots



Press the dot  button a fourth time, the Laser Dot LED is off, there is no laser dot output.

With all laser lines and laser dots being on the laser, the output is as follows:



Cross-Line and 5 Dots

Manual Mode

With the lasers compensator pendulum switch locked, press the  button or the  button, the laser will be in manual mode, the power LED is on, and the manual mode LED will be flashing.

Note:

1. When manual mode is on, the laser does not self-level and no out-of-level alarm is indicated.
2. If the lasers compensator pendulum switch is unlocked during manual mode, the laser will go into self-leveling mode and the manual mode LED will turn off.





Note: To use model 40-6688 with a detector, a green detector is required and is sold separately. For help in selecting a proper green laser detector for model 40-6688, please call Johnson Level Customer Service at 888-9-LEVELS (USA) or 800-346-6682 (Canada) or email service@johnsonlevel.com.

Detector Usage (included in Model No. 40-6687)

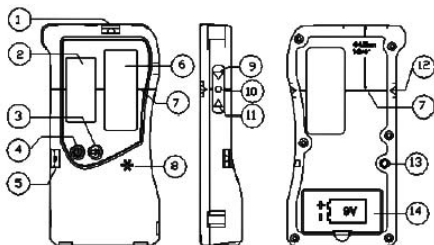
1. Detector Technical Specifications

Detecting Accuracy:	0.019" \leq 50 ft. (0.5mm \leq 15m) 0.039" \leq 100 ft. (1mm \leq 35m) 0.059" \geq 100 ft. (1.5mm \geq 35m)
Automatic Shut-off:	6 minutes
Power Supply:	9V battery
Sound Indicator:	fast tone, double tone and solid tone
LCD:	Up arrow, Down arrow, Center sign
LED Indication:	Up, Middle, Down
Dimensions:	5.905" x 2.992" x 1.142" (150 x 76 x 29mm)
Weight:	0.386 lb. (0.175kg)
Others:	Rain and dust resistant

2. Components

With this laser detector, a line generated pulsed Johnson® laser can be used both indoors with bright light and/or outdoors in the sunlight where the beams are not visible.

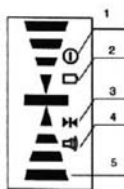




- | | |
|------------------------|----------------------------|
| 1. Horizontal Vial | 8. Beeper |
| 2. Reception Window | 9. Top Indicator Light |
| 3. Sound On/Off Key | 10. Middle Indicator Light |
| 4. Power On/Off Key | 11. Bottom Indicator Light |
| 5. Vertical Vial | 12. Rear On Grade Mark |
| 6. Display Window | 13. Rod Bracket Thread |
| 7. Front On Grade Mark | 14. Battery Door |

Display Window Symbols

1. Power On
2. Low Voltage
3. Coarse/Fine
4. Sound On
5. Position Indication Arrows





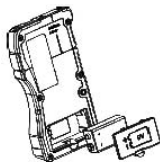
3. Operation Instructions

1. Battery Installation

Open the battery door, and put in one 9V battery according to the polarity shown inside. Then snap the battery door back.

Note:

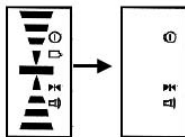
- Remove the battery when the unit is being stored for a long time.
- Replace the battery when the low voltage indicator shows a low battery.



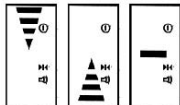
2. Operating Instructions

IMPORTANT: This detector will only work when the laser is in the pulse mode.

A. Press the Power on/off key: The detector will beep twice and all the symbols will be displayed on the display window. After 0.5 seconds the detector will enter its detecting mode.

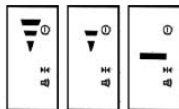


B. Detecting the horizontal laser signal: Put the detector in a vertical position and center the bubble in the horizontal vial with the reception window facing the laser. A down arrow shown on the display window and a lit red light indicates the laser signal is below the detectors on grade

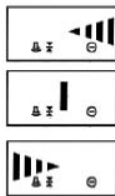


mark. An up arrow plus a yellow lit light indicates the laser signal is above the detectors on grade mark. A middle sign plus a lit green light indicates the laser signal is on grade.

Note: When the laser signal moves towards the center position, the displayed up or down arrows will decrease in size, until the center single line appears.



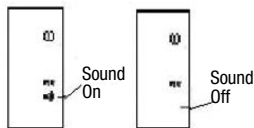
C. Detecting the vertical laser signal: Put the detector in a horizontal position (center the bubble in the horizontal vial) with the reception window and indicator lights facing up. Have the reception window face the unit to receive the vertical laser signal. Left arrow shown on LCD plus a lit red light indicates the laser signal is on the left side of center. A middle sign with a lit green light indicates the laser signal is on the middle position. A right arrow plus a lit yellow light indicates the laser signal is on the right side of center.



D. Press the Power on/off key to power off the detector. The detector will beep twice for off.

3. Sound Function

Pressing the sound key when the unit is powered-on. This will switch the unit between sound on and sound off, note the sound sign indication on LCD.





Sound function on:

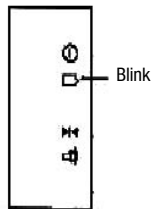
- If the laser signal is on the top (left) side, then the detector will give a fast tone.
- If the laser signal is on the bottom (right) side, then the detector will give a double tone.
- If the laser signal is on the middle, then the detector will have a solid tone.

4. Automatic Shut-Off Function

When not receiving a laser signal and with no operation of the keys for six continuous minutes, the unit will power off automatically to preserve battery life.

5. Low Battery Indicator Function

- When the power indicator sign is blinking, it indicates that the battery is low and should be replaced.
- A very low battery will result in an automatic power-off, which requires the user to replace before continued operation.





8. Self-Check & Fine Calibration

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

Horizontal line accuracy (horizontal)

1. Place unit on a tripod approximately 5m from a wall. Secure the instrument on the tripod.
2. Face the front of the instrument to the wall, unlock the instrument, and power on the horizontal and vertical laser lines. Make a mark on the wall where the cross-line is displayed. Label this as 'A'.
3. Make a mark 2.5m from A, along the horizontal laser line, and label as 'M'.
4. Turn the instrument until the vertical line meets 'M', and then make a mark 2.5m from 'M', and 5m from 'A'. Label this mark as 'B'. Also make a mark on the vertical line where it meets 'B'.
5. Measure the height distance between 'M' and where the horizontal laser line currently sits.
6. If $e > 1\text{mm}$, the instrument accuracy is out of tolerance, and calibration is necessary.

Horizontal accuracy self-check (Vertical)

1. Stand up two straight poles/boards 5m from each other, or two walls which are parallel and more than 5m distance.
2. Place the instrument on the tripod, and place in the center of the poles/boards/walls, and level the instrument by adjusting the tripod.



3. Power on horizontal and vertical laser lines, and make a mark where the cross laser meets target 'A'. Mark this as 'A1'.
4. Turn the instrument by 180°, so that the cross line meets target 'B'. Mark this as 'B1'.
5. Move the tripod within .6m of target 'A'. Make a mark where the cross meets target 'A', and label as 'A2'.
6. Rotate the instrument by 180° and make a mark where the cross meets target 'B', and label as 'B2'.
7. Calculate $(A1-A2)-(B1-B2) = E$. If the absolute value of E is above 1mm, the instrument accuracy is out of tolerance and calibration is required.

Self-check and Calibration

The instrument has two calibration apertures. Aperture 'A' adjusts the horizontal axis. Aperture 'B' adjusts the Vertical axis

Notes regarding adjustment:

1. Use a 3mm Hexagon tool for adjustment.
2. The adjustment of each axis may influence the other. When making fine adjustments in the left/right direction horizontally, the front and back direction vertically may change. When adjusting the front/back direction vertically, the left and right direction will possibly change. Adjustments may need to be checked and repeated alternately.
3. The adjustment of the self calibration screw cannot exceed 4 turns in either direction.
4. If the instrument accuracy cannot be adjusted through self calibration, please contact an authorized repair facility, or contact Johnson Level & Tool.



Dot Accuracy

1. With the laser on its base and set on a flat platform, turn the laser on.
2. Mark the down beam location and use this as your reference point.
3. Locate the up beam and mark its point as 'A'.
4. Rotate the laser (not moving the base) 180° by swiveling the laser on its base and mark the up beam location as 'B'.
5. Rotate the laser 90° and mark the up beam as 'C'.
6. Rotate the laser 180° and mark the up beam as 'D'.

Note: Do not move the base, and always have the down beam in the same location.

7. Connect the four dots. Connect A to B, and C to D.
8. If the center point 'E' is more than 1/8" at 50', or 1/32" at 24.5' from points A,B, C, and D, the unit needs to be recalibrated.

Fine Calibration

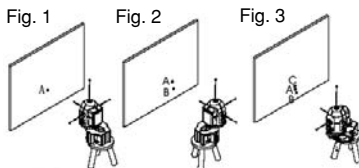
1. Remove plastic screws on front and left of the laser.
2. With the unit on its base, and on a flat surface, turn the laser on.
3. Return the laser back to its original starting point from the self check.
4. Use a 2mm allen wrench to turn the front adjusting screw to position the laser beam forward and backward.
5. Use the side adjusting screw to position the laser beam left and right.
6. Move the top beam to the intersection of the 4 dots.



7. Perform another self check calibration as described previously to make sure the laser is calibrated.
8. If the laser is still beyond its accuracy specification, recalibrate the laser again.
9. If laser is still out of calibration, contact Johnson Level & Tool for service.
10. Return the plastic screws, being careful not to over-tighten.

Self-checking the 3 Horizontal Beams

1. As shown in Fig. 1, set the instrument on a tripod or flat platform 50' from an upright wall. Aim the front beam at the face of the wall. Mark the point projected on the wall by front beam as 'A'.
2. Turn the instrument clockwise (Fig. 2) to make the point projected by the right laser beam on the same exact line as point 'A', and then mark the point as 'B'.
3. Turn the instrument clockwise (Fig. 3) to make the point projected by the left laser beam on the same exact line as point 'A', and then mark the point as 'C'.
4. The vertical distance between points A, B and C should not exceed 0.125" (3.2mm).
5. If laser exceeds 1/8" at 50', contact Johnson Level & Tool for service.





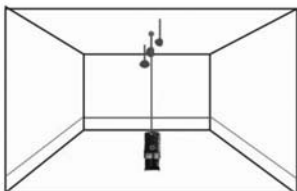
9. Technical Specifications

Laser Wavelength	635nm \pm 10 (40-6685, 40-6687 & 40-6688 (dots only))
Laser Wavelength	532nm \pm 10 (40-6688 lines)
Laser Classification	Class IIIa
Maximum Power Output	\leq 5mW
Accuracy	\pm 1/8"/50 ft. (\pm 1mm/10m)
Interior Range	Dots: Up to 200 ft. (all models) Lines: Up to 150 ft. (40-6685 & 40-6687) Up to 200 ft. (40-6688)
Exterior Range	Up to 300 ft. (90m) with detector (included with 40-6687)
Self-Leveling Range	\pm 4 $^{\circ}$
Power Supply	3 "AA" alkaline batteries (included)
Battery Life	Approx. battery life 20 hours continuous use
Dimensions	4.803" x 2.835" x 4.567" (122 x 72 x 116mm)
Weight	5.164 lbs. (0.6 Kg)
Working Temperature	14 $^{\circ}$ F to 113 $^{\circ}$ F (-10 $^{\circ}$ C to +45 $^{\circ}$ C) (40-6685 & 40-6687) 32 $^{\circ}$ F to 104 $^{\circ}$ F (0 $^{\circ}$ C to +40 $^{\circ}$ C) (40-6688)
Center Screw Thread	5/8" – 11; 1/4" – 20
IP Protection	54

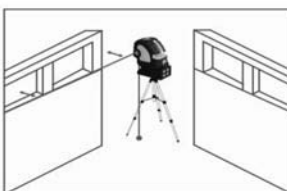




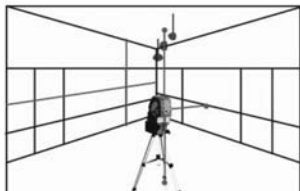
10. Application Demonstrations



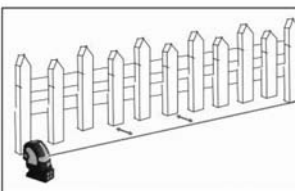
Reference for baseboard installation



Reference for vertical partition



Aligning doors and windows



Reference for fence installation





11. Care and Handling

- This laser unit is a precision tool that must be handled with care.
- Avoid exposing unit to shock vibrations and extreme temperatures.
- Before moving or transporting the unit, make sure that the unit is turned off.
- Remove the batteries when storing the unit for an extended time (more than three months) to avoid damage to the unit should the batteries deteriorate.
- Always store the unit in its case when not in use.
- Avoid getting the unit wet.
- Keep the laser unit dry and clean, especially the laser output window. Remove any moisture or dirt with a soft, dry cloth.
- Do not use harsh chemicals, strong detergents or cleaning solvents to clean the laser unit.

12. 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.

13. Warranty Registration

Please register within 30 days of purchase. Registering ensures we have your information on file for warranty service even if you lose your receipt, and lets us contact you if there is ever a product recall. We will never sell your information and only send you marketing information if you opt-in.

To register, go to www.johnsonlevel.com/register.





14. 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.





15. Trouble Shooting

Symptom	Possible Cause	Solution
Will not turn on	Batteries missing or depleted	Change the batteries
	Polarity reversed	Check polarity
Turns off after a short time	Batteries depleted	Change the batteries
	Compensator lock may be engaged	Verify compensator is in unlocked position
Flashing or Beeping	Laser is beyond leveling range	Place on surface within 4° of level
	Laser is out of calibration	Perform calibration check and calibrate laser if needed
Laser is not accurately reading plumb, level or square	Compensator may be locked	Unlock compensator
	Laser is out of calibration LESS THAN 1/2" per 50'	Calibrate laser (procedure in the manual) or return to Johnson for calibration
	Laser is out of calibration MORE THAN 1/2" per 50'	Return to Johnson for service



Symptom	Possible Cause	Solution
Laser will not calibrate	Laser core parts may be misaligned beyond the limit of field calibration	Return to Johnson for service
Laser light appears dim	Pulse mode may be engaged which makes the beam detectable, but dimmer Batteries are weak Improper battery type	Turn off pulse mode by pressing "P" button until line LED's are solid Replace batteries Ensure high quality Alkaline batteries are used
Laser can not be detected with a detector	Pulse mode may be off Detector may require new batteries The detector may not be the proper one for the product Trying to detect dot lasers when dot laser beams are not detectable; only the lines are detectable	Turn on pulse mode by pressing "P" button until line LED's flash Check and replace detector battery Validate detector is for lines of the appropriate wavelength Do not attempt to detect the dot laser, use the line laser if possible

