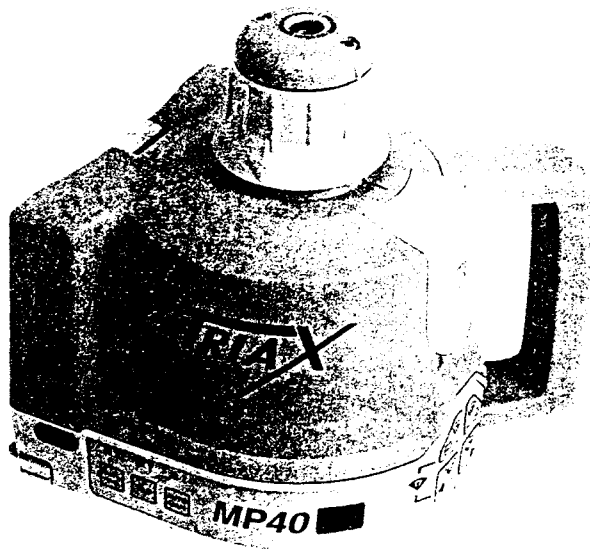




TRIA X

MP40
*Self-Levelling
Multi Purpose Laser*



OPERATOR'S MANUAL



TRIAx – MP40

Although the MP40 is very simple to use, we recommend that you read this manual before operating the laser.

1. General Information

1.1 Description

The MP40 is an automatic visible laser that can be used for levelling, vertical alignment, plumbing and squaring. Applications include installing suspended ceilings, technical flooring, partitions and a variety of outdoor alignment work.

The MP40 laser has these advanced features:

- Automatic self-levelling in both horizontal and vertical modes
- Choice of beams: rotating plane, scanning, chalk line, single point or constant squaring
- Square shot that's left/right adjustable

CAUTION

The MP40 is a class 3R laser and is manufactured to comply with the international rules of safety IEC 285. Although the power of the emission of the beam does not exceed 2mW in Class 3R, the following cautions are recommended:

- Do not stare directly at the laser beam
- Do not set up the laser at eye level.



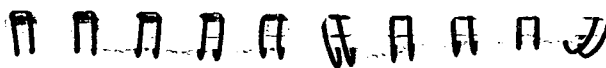
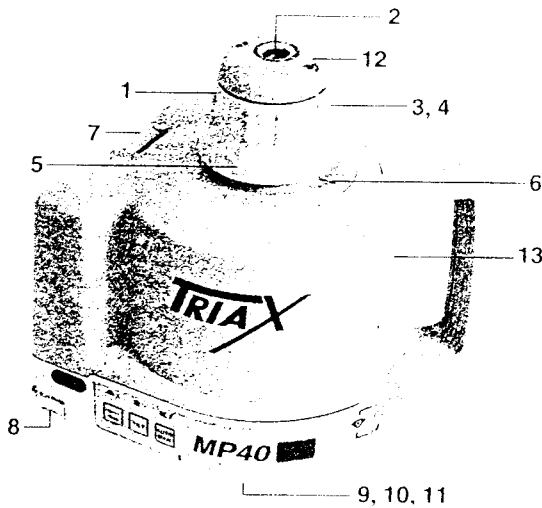
CLASS 3R

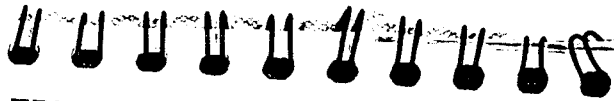
Max. Output Power 2mW

TRIAx – MP40

1.2 Laser Parts Overview

1. Rotating head
2. Plumb or square laser beam aperture
3. Laser beam aperture
4. Laser chalk line aperture
5. Arrow (align with 90° index mark)
6. 90° index mark (one of four)
7. Retractable foot for vertical setup
8. Adjustable feet for vertical setup
9. Batteries (rechargeable or alkaline)
10. Jack for battery charger (on rechargeable models)
11. 5/8" mount
12. Top cover
13. Vial for vertical setup

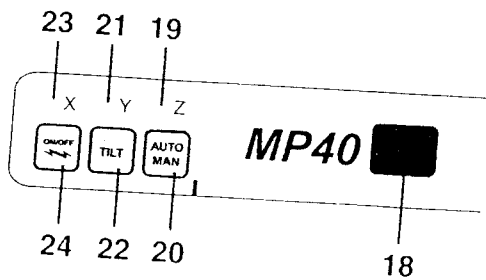
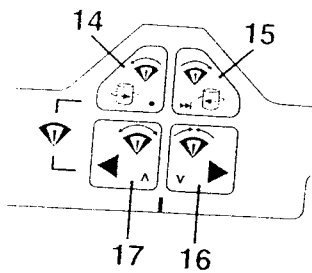




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1.3 Keypad Functions Overview

14. Laser rotation control to left + speed control
15. Laser rotation control to right + speed control
16. Moving the square shot to the right
17. Moving the square shot to the left
18. Capture window for remote control
19. Manual mode light
20. Manual/Automatic
21. Tilt light
22. Tilt
23. Battery low light
24. On/Off



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2. How to use your MP40

An overview of laser and keypad functions can be found on page 4 and 5.

The laser performs a self-test when switched on. The beam blinks while the laser is self-levelling. After the laser is leveled, the head will start to rotate.

2.1 Auto/Man Key

Auto: Automatic levelling - the default mode when the laser is switched on.

Man: Manual use.

The MP40 laser is always in the automatic self-levelling mode (Auto) when switched on. Once the instrument has self-levelled, the laser head will start to rotate.

You can choose to have constant rotation by using the manual mode. This way, the beam will rotate even if the instrument is not leveled (necessary when working on inclined planes).

For safety, a red light will blink above the Auto/Man button to advise the user that the laser is in manual mode.

2.2 Tilt Key

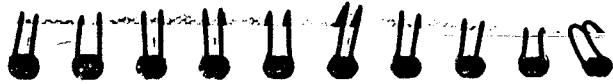
Tilt: Tilt Mode. This will work only when selected. This feature stops the laser automatically if the laser is disturbed or moved, preventing inaccurate readings. Use this feature only in automatic mode, not in manual mode.

Push the Tilt key (22) after switching the instrument on. The Tilt feature is available 30 seconds after the instrument has self-levelled.

The red light above Tilt key will blink when operating in this mode.

If the laser is disturbed, the head will stop rotating and the red light will be on continuously. Turn the laser off, wait 5 seconds and switch it on again (check that the beam is at its original reference).





TRIAX – MP40

9418 6899 MP40

2.3 Horizontal Setup

1. The MP40 can be used directly on the ground, on the TRG-SM200 wall mount or on a tripod with a 5/8" screw.
2. Press the On/Off key (24) to switch the laser on. It will start its automatic levelling.
3. To select the Manual mode, press key (20).
4. To select the Tilt mode, press the key (22). This feature is available 30 seconds after the laser has self-levelled.
5. If you wish to move the laser beam to a specific point, briefly press key (14) or (15).
6. To adjust the rotation speed, press key (14) or (15) continuously according to the direction you wish. To stop the rotation, press once the opposite key.
7. To turn the laser off, press key (24).

2.4 Vertical setup

No accessories are needed for this position. The MP40 can be used directly on the ground. However, it can be used on the TRG-SM200 mount for a better setup.

1. Flip up the retractable foot (7). Place the instrument in vertical position, resting on this foot. Use the adjustable feet (8) to roughly level the laser to adjust the top bubble vial (13).
2. Switch the instrument on. Once the instrument is levelled, the head will start rotating.

2.5 Squaring

Put the laser on the ground and repeat the steps 1 and 2 for vertical use.

Stop the head rotation by pressing key (14) or (15). To position the rotating vertical plane perpendicular to a reference line:

Coincide the arrow (5) located below the beam aperture with the index (6) located above the

TRIAx – MP40

retractable foot (there is also an index mark on the foot).

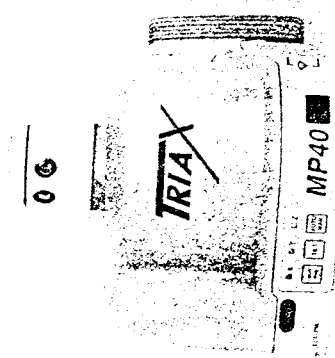
Move the laser so that the beam is over the reference point on the ground, keeping the arrow and index aligned.

Align the beam projecting from the top of the head to your second reference point with key (16) or (17) on the laser or with the TRG-R80 or TRG-R20. (this beam is 90°, or square, to the other vertical plane beam).

Start the head rotation using keys (14) or (15) to change speed or use the chalk line.

CAUTION

It is important to check while you're using the laser that it has not been moved and that your setting is still accurate.



2.6 Rotation speed

Your laser is equipped with a visible laser diode. It may be necessary to adjust the rotation speed according to the ambient light conditions using keys (14) and (15). The laser beam is more visible in slow motion. It is possible to stop the rotation and point the beam manually to view the beam over long distances.

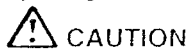




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2.7 Using the laser chalk line

Ideal for viewing at short distances. To use the laser chalk line feature, hold the head and rotate the top cover (12) so that the beam comes out the laser line aperture (4). This gives a precise and stable laser line for working directly on your reference plane. You can move the line by rotating the head manually or by using the remote control.



The TRG-R80 detector will not work with the chalk line feature.

2.8 Using the scanning

Allows you to see the beam easier when the laser is further away. To use the scanning, turn the laser on. The laser should be in 'point' mode.

If it is in chalk line, hold the head and rotate the top cover (12) so that the beam comes out the beam aperture (3).

To put laser on scan mode, use keypad (see below), detector (page 17), or remote (page 20).

To scan, simultaneously press (14) and (17). The beam will blink until it has self-leveled, and then will start scanning. Use (14) or (15) to aim the scan. Use the bottom two keys to adjust the scanning length. Use (17) to increase and (18) to decrease (10° to 48°). To turn the scanning off, simultaneously press (14) and (17) again.

The square shot cannot be moved left or right when scanning; laser must be in point or chalk line mode.

2.9 Power

2.9.1 Installing alkaline batteries

1. To install alkaline batteries in your MP40 laser, use a coin to unscrew the battery cap located at the bottom of the instrument.
2. Remove the battery pack.

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3. Insert two alkaline batteries (D or LR20) in the pack, matching the polarity ("+" or "-") as indicated at the bottom of the pack.
4. Put the battery back into its place and tighten the screw. Your MP40 is ready for use.

To replace batteries

1. When battery power is low, the laser head will stop rotating, the laser beam will blink, and the low battery light (23) will come on.
2. Replace both batteries at the same time.

2.9.2 Using rechargeable batteries

First-time use

If your MP40 is equipped with an optional rechargeable battery, you must recharge it for 15 hours before first use.

1. Insert the re-charger plug into the jack located on the battery pack (10).
2. Plug the charger into an electrical outlet (110 volts or 220 volts, depending on charger and country).
3. Charge for 15 hours.

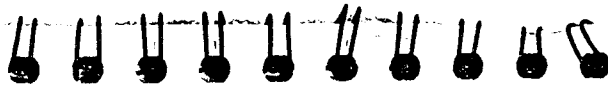
Later recharges

The MP40 can be charged while working. If electricity is available on the job site, simply plug in the charger and keep on working. You can also remove the battery pack to charge it, and replace with the alkaline battery compartment to keep on working.

For optimum life of the battery, it is recommended to charge the battery after fully discharged. To assure battery life, do not charge over 20 hours.

The battery and the charger can be damaged if damp. Always store and charge your instrument in a dry and covered place.





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3. Care and handling



Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

1. The MP40 is a precision instrument, which must be handled with care. Avoid shock and vibrations. Always store and transport the laser and accessories in the carrying case.
2. Although weather resistant, you must always keep your laser and its accessories dry and clean after using. This will increase the battery life.
3. Do not store your laser at temperatures below -20°C or above 80°C, because the electronic components could be damaged.
4. **Do not store your instrument in its case if the instrument or the case is wet, to avoid water condensation inside the instrument.**
5. To maintain the precision of your laser, check and adjust it regularly.
6. Keep the lenses of the apertures (2) and (3) clean. Use a soft cloth and glass cleaner.
7. It is recommended to regularly charge the batteries (for rechargeable version only). Nevertheless, make sure to charge them only when they are out of power or becoming so. Recharging batteries that are still useable will shorten their capacity.

4. Warranty

Your MP40 laser is guaranteed to be free of manufacturing defects for a period of 12 months. Any abnormal usage or if the instrument has been subjected to shock will void this warranty. Under no circumstances will the liability of the manufacturer exceed the cost of repairing or replacing the instrument. Disassembling the instrument by other than qualified technicians will

TRIAX – MP40

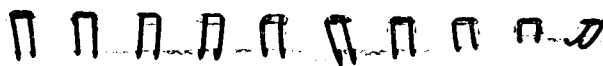
void this warranty. Specifications are subject to change without notice.

5. Accessories

5.1 TRG-R80 Detector / Remote Control

A detector is recommended when it's difficult to see the laser beam (outdoors, bright light).

Key	Detector Mode	Remote Control Mode	Scanning Mode
1	On	Off	Off
2	Coarse/Fine	Start min. rotation left Move square shot left	Increase length
3	Sound On/Off	Start min. rotation right Move square shot right	Decrease length
4	LCD display		
5	Battery location		
6	Slots for bracket		
7	Capture window		
8	Magnet		
9	Bubble vial		
10		Rotation/Speed control left	Aim scan left
11		Rotation/Speed control right	Aim scan right
12			Scan on/Off

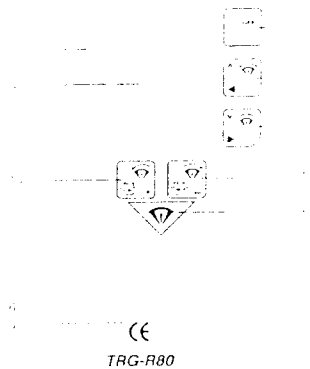




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CAUTION

Before using the TRG-R80 detector mode, it is very important to set laser on "laser point" mode (turning the top cover). The receiver cannot detect the beam in chalk line mode.



5.1.1 Using the TRG-R80 in detector mode

1. Press the On/Off button to turn the detector on.
2. Press button (2) (Fine/Coarse) to select the detection mode. A symbol appears either on the right or left side of the LCD, displaying which mode was selected.
3. Press the Sound button (3) to select level of sound (mute, normal, high). Default mode is mute, indicated with no symbol. The sound symbol will blink when you select normal loudness, and be constant in high mode.
4. Turn the capture window (7) towards the laser beam and move the detector up or down, following the indication on the LCD. A down arrow indicates the detector should be lowered. An arrow facing up indicates

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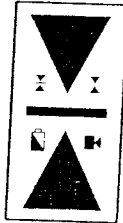
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the detector should be raised. When a horizontal line appears on the display, the detector is at the same level as the laser beam.

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LCD Display

- 1 Lower the detector
- 2 Raise the detector
- 3 Level
- 4 Sound On/Off
- 5 Battery level
- 6 Coarse/Fine mode

5. Use the two marks on the side of the TRG-R80 to draw your level.
6. You can also view the same information on the LCD on the back of the detector.
7. Press the On/Off button to turn the detector off. Automatic switch-off will occur after 5 minutes if not used.
8. The detector has a magnetic attachment (8) for use on ceiling grids or partition rails. To use the detector with a rod, slide the rod bracket into the slots (6).
9. Keep the capture window (7) clean, using a soft cloth and glass cleaner.

5.1.2 Using the TRG-R80 in remote control mode.

The MP40 stops, starts, or changes direction of the laser rotation, and moves the square shot to Level the left or right. It also controls scanning and calibration. To use it as a remote control, press any key (except On/Off). If in detection mode, press On/Off to change to the remote control functions.

5.1.3 To change the battery

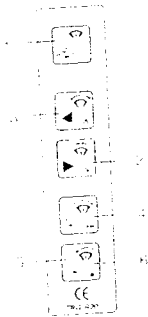
To install a new 9V (LR6) battery, open the compartment on the back of the detector. First raise the left side of the cover, then the right side, and lift out. Follow the polarity indications inside (- is next to the side wall of the detector).



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5.2 TRG-R20 Remote Control

The TRG-R20 stops, starts, or changes direction of laser rotation, and moves the square shot left or right. It also controls scanning and calibration. An AA alkaline battery (1.5V) ensures 50 hours of continuous use. To open the battery compartment, push the tab at the top up, in the direction of the arrow (with a screwdriver).



	Beam/Chalk Line Mode	Scanning
1	Switch to Rotation Mode	Switch to Scan Mode
2	Start minimum rotation left Move square shot left	Increase scan length
3	Start minimum rotation right Move square shot right	Decrease scan length
4	Rotation/Speed control left	Aim scan left
5	Rotation/Speed control right	Aim scan right
6	AA Battery	

5.3 Mounts

5.3.1 TRIAX Universal mounts

The universal mounts can be used as a wall mount and for vertical setups on a tripod. It features sturdy, all metal construction, with a spring-activated mechanism that allows you to easily change height for quick set-ups. Also, it has a fine adjustment screw on the bottom for precise positioning.

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6.1 Horizontal checking/calibration (X and Y axis)

6.1.1 Horizontal checking

1. Place the laser on a flat surface 15 or 30 m from a wall. Position it so that the X1 is facing the wall.
2. Switch the laser on. After it's level, stop the rotation so that the beam is a point.
3. Mark the location of the beam.
4. Rotate the laser 180°. After 90 seconds, mark the location of the beam near the first mark.
5. Both measurements must be at the same place. At 30 m, the marks should be no more than 3 mm apart. This is 3 mm at 30 m levelling accuracy.
6. If the marks are close enough, X-axis is within calibration. The second axis (Y) must then be checked (see Step 7). If the marks are not close enough, the X-axis needs to be calibrated (see instructions below).
7. To check the Y-axis, turn the laser 90° from Step 4 so that Y1 is facing the wall. Repeat the same steps: mark the Y beam, rotate 180°, and mark again. If the marks are more than 3 mm apart at 30 m, the Y-axis should be calibrated.

6.1.2 Horizontal calibration

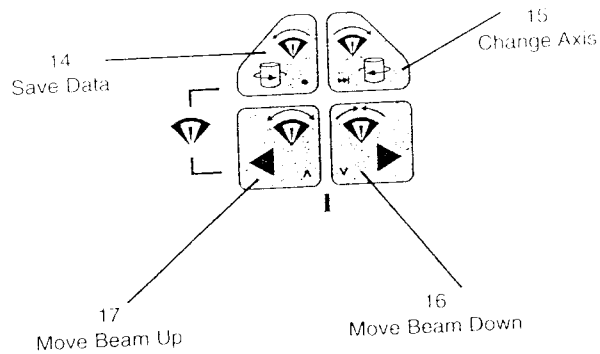
The laser must be calibrated to bring beam to the center of the two marks (Steps 3-4 in 6.1.1). The calibration is easily done using the laser keypad, remote control, or detector.

X-axis calibration

1. Turn the laser off before switching to calibration mode. Simultaneously press two laser keys, On/Off and auto/man.
2. After a few seconds, release On/Off key.
3. The X LED indicator (23) will blink, then the Y LED (21). Release the auto/man key.
4. The X LED (23) will blink rapidly, indicating the laser is ready to be calibrated in the X-

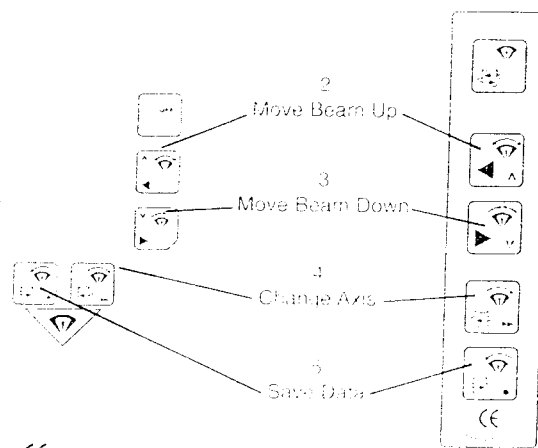
TRIAx – MP40

- axis. If you have not moved the laser, use the X marks made in Steps 3 and 4 of 6.1.1 (Horizontal Checking).
5. Mark the spot that's halfway between the two marks.
 6. With X2 facing the marks, bring the laser beam up or down to the center mark by using (16) or (17) on the laser keypad or (2) or (3) on the detector or remote.
 7. Next, check Y-axis against center mark. Turn the laser 90° so that Y2 faces the wall. If the beam is not on the center mark, calibrate Y. If y is OK, see «Saving calibration» below.





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CE
TRG-R80

- v = Beam Up
- ^ = Beam Down
- = Change Axis
- = Save Calibration

Y-axis calibration

1. To change to Y-axis calibration, press (15) on the laser or (4) on detector or remote. The Y LED will blink rapidly, indicating that the laser is ready to be calibrated in the axis.
2. If you have not moved the laser, use the center mark from above. Bring the laser beam up or down to that center spot by using (16) or (17) on the laser keypad or (2) or (3) on the detector or remote.

Saving the calibration

The laser is now calibrated in the X and Y-axis. Press (14) on keypad or (5) on detector or remote to save the calibration data. If you don't wish to save the calibration, press the On/Off key (24) on the laser.

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7. Specifications

7.1 MP40 Specifications

Recommend use (diameter)	Ø 300 m with detector
Levelling accuracy	3 mm at 30 m
Levelling range	± 10%
Scanning angle	10° - 48°
Laser diode	635 nm - EU: 2mW, Class 3R
Power	- 2 alkaline batteries (1 R20 or D) - Rechargeable battery pack
Charging time	15 hours
Battery Life	- Alkaline batteries: 160 hours - Battery pack: 40 hours
Dimensions	- 150 x 160 x 170 mm
Weight	- 1.3 kg
Rotation speed	60 - 610 rpm
Environmental	IP65 (Rain and dustproof)

7.2 TRG-R80 Specifications

TRG-R80 operating distance	- Detector mode: 180 m - Remote mode: 30 m
Capture window	- 40 mm
Sound	High, normal, mute
Displays	Front and back LCD
Power	9V alkaline battery (LR6 type)
Battery life	50 hours
Dimensions	- 150 x 80 x 30 mm
Weight	- 300 gr.

SCANNED

Manual No: 497

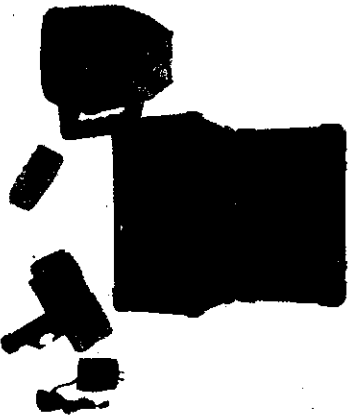
Machine Type: Laser Level Self Levelling

Plant No: 2402

Model: VH 550R.

Self-Leveling Rotary Laser

Operating Manual



WARNING AND CAUTION

- While the instrument is operating, be careful not to expose your eyes to the emitting laser beam. Exposure to a laser beam for a long time may be hazardous to your eyes (laser beam: equivalent to class 2 laser level).
- Do not try to dismantle the instrument. Have it repaired by your dealer or supplier. Dismantling it by yourself may worsen the problem.
- When attaching the instrument to a tripod, make sure the instrument is securely fixed to the tripod and the tripod leg clamps should be securely fastened. If not securely fastened or tightened, the main unit could fall off or the tripod could fall over.
- When setting the tripod, beware of the tripod shoes which are sharp. These sharp points allow tripod to be securely positioned on the ground.
- Operate this laser product with the height of laser avoiding that of eyes of vehicle drivers or pedestrians. Avoid putting the laser on a highly reflective material such as mirror. When disposing of this instrument, take a measure by removing the batteries so that the laser will not be emitted.

PRECAUTIONS

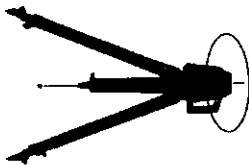
- The instrument should not be store or used in extreme temperature or job on place subject to rapid change of temperature. The instrument may not function properly if used out of the ambient temperature range.
- Store inside the carrying case and place in a dry area not subject to vibration, dust or high moisture.
- When storage and usage temperature are widely different, leave the instrument in the case unit it can adjust to the surrounding temperature.
- The instrument should be transported or carried carefully to avoid impact or vibration.
- The instrument should be stored in the carrying case and packed with cushioning material. Always handle the item with care.
- Be sure to observe the items in the instruction manual for proper use of the instrument.

2

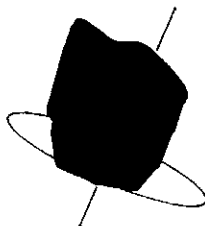
1. Functions

This instrument is equipped with the semiconductor diode with wavelength of 635 nm, which the laser beam has supreme visibility. And the laser module of instrument will rotate freely to form a laser-scanning surface. Emitting direction of rotary laser-beam illustrated as follows:

Upright-setting



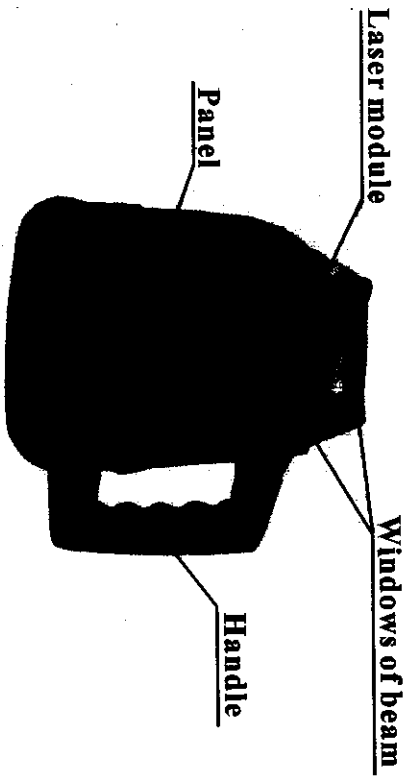
Horizontal-setting



When the instrument is set upright, it will emit laser-beam to form a horizontal scanning surface and a plumb line automatically. When set horizontally, it will form a plumb scanning surface and a vertical line.

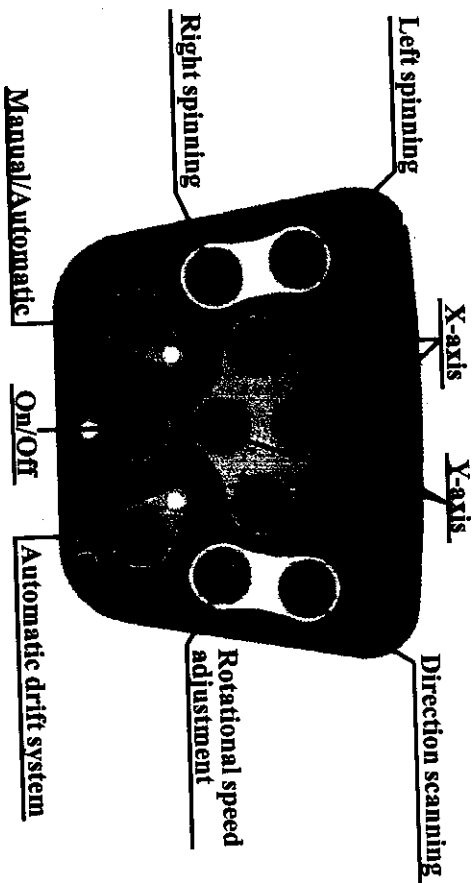
3

2. Introductions
2.1 Main body



4

2.2 Panel



5

2.3 Utilities of Panel

- (1) ON/OFF: Controlling the state of power.
- (2) Power indicator: When it lights, the instrument is starting up. Otherwise it is closing down.
- (3) Mode indicator: When it lights, the instrument is leveling manually. When it winks, it stays in alarm. (The slope of the instrument is out of range).
- (4) Key of Automatic drift system model: Warns the user for a misaligned device
- (5) Light of Automatic drift system model: When the light is twinkling slowly, it is in Automatic Drift System model. When the light is twinkling quickly, the laser level will not level.
- (6) Speeding-up: Circling knob. Speed of scanning includes 5-knots: 0-60-120-300-6000 r.p.m
- (7) Directional scanning: Circling knob. Angle of scanning includes 5 levels: 0-10° -45° -90° -180°
- (8) Manual/Automatic: Controlling the mode of leveling.
- (9) Left-spinning: Making the laser module step-move counter-clockwise, when the laser module is power off or it is scanning directionally.
- (10) Right-spinning: Making the laser module step-move clockwise, when

6

the laser module is power off or it is scanning directionally.

(11) X-axis: Adjusting the slope of X-axis, when the instrument stays in manual mode.

(12) Y-axis: Adjusting the slope of Y-axis, when the instrument stays in manual mode.

3. Directions:

3.1 Battery Installation

4 X C size Ni-MH Rechargeable batteries can be used in laser. Please put the battery park which is supplied specialize by manufacturer. Put the battery park into the fixed place at the bottom of laser. Then tight all screws.

3.2 Instrument Placement

3.2.1 Horizontal scanning

Lay the instrument on the tripod or stable flat surface, or even hang it on the wall. Set upright the instrument, and keep the slope of instrument within the range from -5° to +5°.

3.2.2 Vertical scanning

Lay the instrument on the flat surface, and keep the slope of instrument

7

within the range from -5° to $+5^{\circ}$.

3.3 Operations

3.3.1 Power

Press the Key ON/OFF to bring automatic leveling into function when the power indicator lights.

When Power indicator lights, it shows the voltage of the batteries is insufficient. Then the rechargeable batteries need to be charged.

Press the Key ON/OFF again to switch off the instrument and power indicator will go out.

3.3.2 Leveling

Press the Key ON/OFF to bring automatic leveling into function when the laser beam begins to wink. After automatic leveling, the laser module will rotate at the speed of 600r.p.m.

If the instrument is placed improperly, or the slope of instrument exceeds the range of $\pm 5^{\circ}$, at that moment mode indicator and the laser beam will wink together. Then place the instrument properly.

3.3.3 Spinning

(1) Continuous spinning

Press the Key "Rotational speed adjustment" to control the spinning speed of the laser module. If press the key repeatedly, the spinning speed of the laser module will continuously change as follows: 0-60-120-300-600-0 r.p.m.

(2) Stepping spinning

Locate the Key Speeding-up at speed of 0 r.p.m, the laser module will stop spinning. And press the Key Right-spinning, the laser module will step-move clockwise. Then if press the Key Left-spinning, the laser module will step-move counter-clockwise.

3.3.4 Directional scanning

(1) Locate the Key Speeding-up at speed of 0 r.p.m, the laser module will stop spinning. Press the Key Directional scanning; the laser module will scan directionally. If press the key repeatedly, the angle of scanning of laser module will continuously change as follows: 0° - 10° - 45° - 90° - 180° - 0° .

(2) Press the Key Left-spinning or the Key Right-spinning to change the direction of scanning.

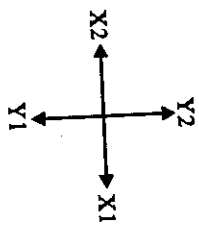
3.3.5 Slope Adjustment

When the instrument is set upright to do horizontal scanning, the slope of X-axis and Y-axis can be setted.

Press the Key Manual/Automatic when mode indicator lights, the instrument enters the mode of manual leveling.

(1) Slope of X-axis

a. Aim the X1-beam to the direction of the slope required then to adjust.



b. Press the Key \leftarrow or \rightarrow to move the laser beam up or down.

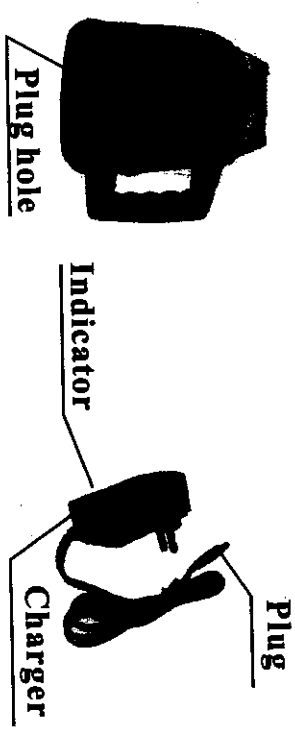
(2) Slope of Y-axis

a. Aim the Y1-beam to the direction of the slope required then to adjust.

b. Press the Key \uparrow or \downarrow to move the laser beam up or down.

(3) Quit slope adjustment mode
Press Manual/Automatic key again. After mode indicator goes off, the instrument then will quit the slope adjustment mode and will self-leveling again.

4. Power



When the voltage indicator lights, the batteries needs to be charged immediately. Connecting the charger with AC, insert the plug of charger into the plughole at the bottom of the instrument (As depicted above).

If the red indicator of charger lights, it shows the batteries are being charged. If the green indicator of charger lights, it shows the course of recharging has finished.

Notices:

(1) Using the standard rechargeable batteries of the instrument, recharging will be finished within 7 hours.

(2) Power required for the charger: Frequency: 50-60HZ; Voltage: 85-265V.

(3) Charging and using of the instrument can progress simultaneously.

(4) If keeping the instrument in storage (or Leave the instrument unused for a long time), the batteries (dry battery or rechargeable battery) needs to be taken out.

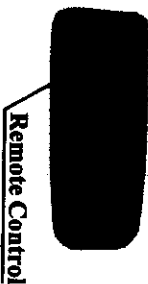
(5) Brand-new rechargeable batteries or long-time unused rechargeable batteries need to be recharged and discharged three times to attain the capacity required.

5.Remote

The remote control of the instrument adopts the infrared technique.

Aim the aperture of infrared ray to the instrument (as depicted below) to bring remote controlling into function (Available distance: indoor: 30M;

outdoor: 20M). The keypad panel includes 9 keys; the indicator on the RC will wink to show the operating signal has been sent out once pressing any key.



Remote Control

Functions fulfilled by the remote as follows:

(1) Rotating: Operating method referring to 3.3.3

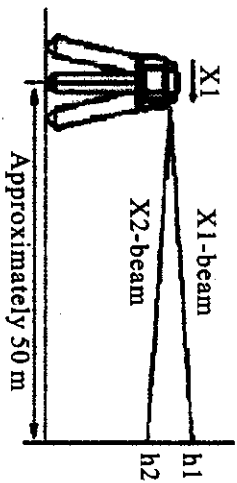
(2) Directional scanning: Operating method referring to 3.3.4

(3) Slope adjustment: Operating method referring to 3.3.5

6.Accuracy Checking

6.1 Horizontal-surface Checking

(1) Place the instrument at the point of 50m in front of wall (or set a scaleplate at the point of 50m away from the instrument), and then adjust the level of the base approximately to aim the X1 to the wall (or scaleplate), as depicted below:



(2) After switching on the power, use the laser detector measuring the h1 of X1-beam on the wall or scaleplate.

(3) Loose the screw of the tripod, turn around the instrument for 180° to measure the h2 of X2-beam on the wall or scale-plate. The method should be the same with h1.

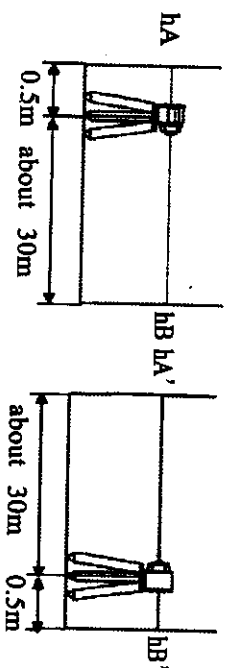
D-value between h1 and h2 ought to be less than 10mm.

(4) Check the Y-beam in the same way.

6.2 Horizontal-line Checking

(1) Place the instrument between two walls with the distance of 30m (or two scaleplates with the distance of 30m).

14



(2) Place the instrument according to horizontal setting and then adjust the instrument.

(3) Switch on the power, and then measure the middle point of the laser beam on the wall (or scaleplate): hA, hB and hA', hB'.

(4) $\Delta 1 = hA - hA'$, $\Delta 2 = hB - hB'$

D-value between $\Delta 1$ and $\Delta 2$ ought to be less than 6mm.

15

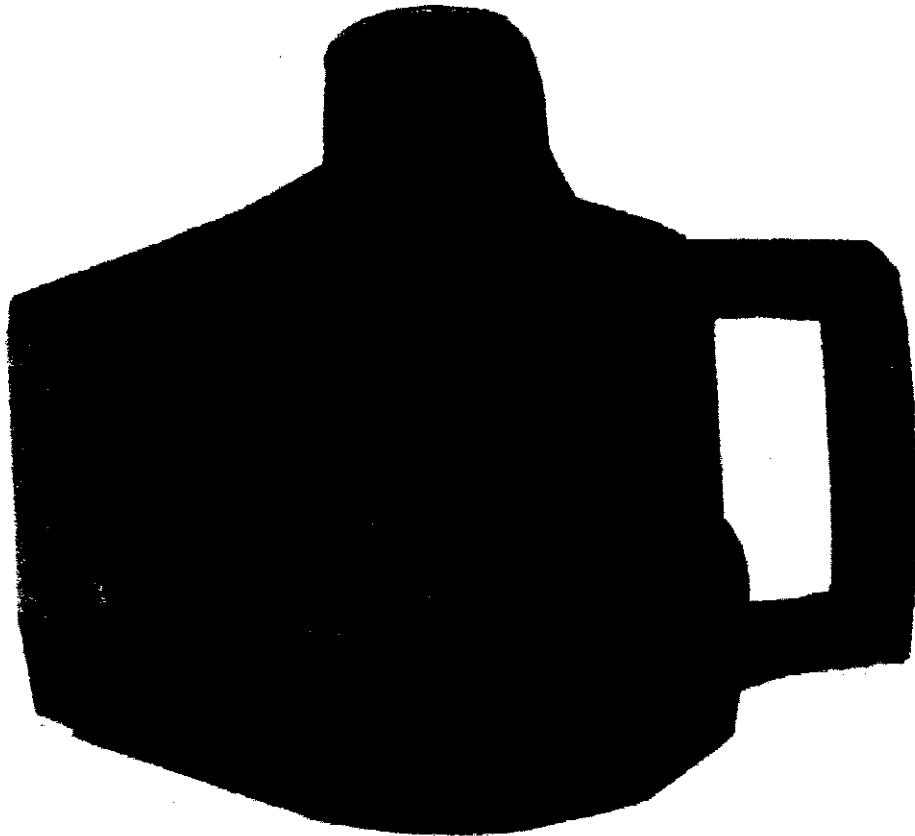
SCANNED

Manual # 498

Plant No.: 2402 004

Machine Type: Laser Level Self
Levelling.

UNIVERSAL



A410S

Operation Manual

Warranty

Statement of Limited Warranty

The A410S Laser is warranted to be free from defects in performance and workmanship for a period of twelve months from date of purchase. The warranty covers all costs of repair or replacement at the manufacturer's option.

LIMITS AND EXCLUSIONS:

The warranty will not apply to any damage resulting from negligence, accident, damage, misuse, repair or storage, or in case of abnormal use.

The warranty is considered void absolutely if any attempt is made to repair, modify or recalibrate the unit whatsoever. In these circumstances the manufacturer reserves the right to charge for costs incurred in repair or replacement of the unit.

Universal is not liable for:

- 1 Freight charges incurred in return of defective unit to manufacturer.
- 2 Loss of income or inconvenience relating to defect in performance of the unit.
- 3 Leasing charges of alternative equipment during repair of a defective unit.

Universal requires that the customer make reasonable attempts to inform Universal Lasers of problems with the product prior to returning the unit for repairs.

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Congratulations! You have just purchased the A410S visible laser level. Although it is very simple to use, we highly recommend that you read this manual before operating the instrument.

1. General Information

1.1 Description

The A410S laser has been specifically designed for contractors and can be used for levelling, vertical alignment, plumbing and squaring. Applications include : levelling, installing suspended ceilings, technical floorings, tiling, partitions, etc.

CAUTION

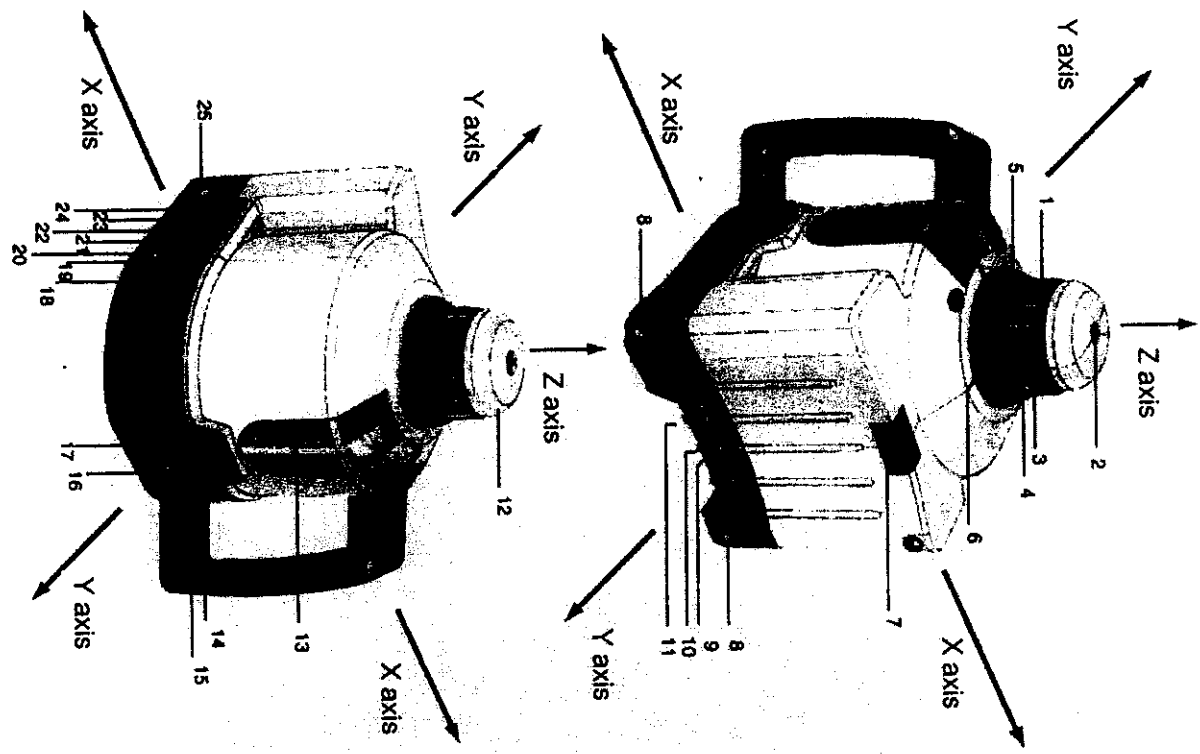
The A410S is a Class IIIa laser and is manufactured to comply with the international rules of safety IEC2385. Although the power of the emission of the beam does not exceed 2 mW in Class IIIa, the following cautions are recommended:

- Do not stare directly at the laser beam
- Do not set up the laser at eye level

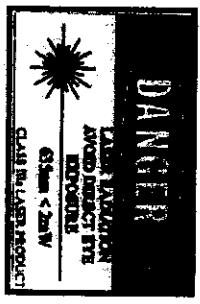
The A410S laser has these advanced features:

- * Automatic self-levelling in both horizontal and vertical modes
- Laser point, laser rotation, laser chalk-line and square shot
- * Scanning capability
- On job calibration via the laser keypad or remote control
- Remote control capability
- Rainproof and dustproof
- Optional : rechargeable battery. A 15-hour charge allows 40 hours of use

1.2 Overview



- 1 Rotating head
- 2 Laser plumb or square laser beam aperture
- 3 Laser beam aperture
- 4 Laser chalk line aperture
- 5 Arrow (align with 90° index mark)
- 6 90° index mark (one of four)
- 7 Retractable foot for vertical setup
- 8 Adjustable feet for vertical setup
- 9 Batteries (rechargeable or alkaline)
- 10 Jack for battery charger (only on rechargeable battery models)
- 11 5/8 - 11" mount
- 12 Top cover
- 13 Vial for vertical setup
- 14 Laser rotation to the left / speed control
- 15 Laser rotation to the right / speed control
- 16 Moving the square shot to the right
- 17 Moving the square shot to the left
- 18 Capture window for remote control
- 19 Manual mode light
- 20 Manual / automatic
- 21 H.I. Alert light
- 22 H.I. Alert (Tilt)
- 23 Battery low light
- 24 On / off
- 25 Calibration screws with cap



2. How to use your A410S Laser

When switching on the laser, the A410S does a self-test. The beam blinks while the laser is self-levelling. After it has levelled, the head will start to rotate.

“Auto/Man” Key (20)

-Auto: Automatic leveling. Default mode when laser is switched on.

-Man: Manual use.

The A410S laser is always in the automatic self-levelling mode (auto) when turned on. Once the instrument has self-levelled, the laser head will start rotating. While levelling, the head does not rotate and the laser beam will blink.

You can choose to have constant rotation by switching to the Manual mode. This way, the beam will rotate even if the instrument is not levelled (necessary when working on inclined planes).

For safety, a red light will blink above the Auto/Manual button to advise the user that the laser is in manual mode.

“H.I.” - Key (22)

H.I.-Alert mode. Will work only when selected. The Tilt function is also known as the H.I. (height of instrument) Alert. This feature stops the laser automatically if the laser is jarred or moved, preventing inaccurate readings. Use this feature only in automatic mode, not in manual.

Push the Tilt key (22) after turning the instrument on. The H.I. Alert feature is available 30 seconds after the instrument has self-levelled.

The red light above the Tilt key will blink when operating in this mode. If the laser is disturbed, the head will stop rotating and the red light will be on continuously. Turn the laser off, wait 5 seconds, and turn it on again (check that the beam is at its original reference).

2.1 Horizontal Setup

- 1 The A410S laser can be used directly on the ground, on the wall mount or on a standard tripod (5/8 - 11).
- 2 Press the On/Off key (24) to switch the laser on. It will start its automatic leveling.
- 3 To select the Manual mode, press key (20).
- 4 To select the H.I.-Alert mode, press key (22). This feature is available 30 seconds after the laser has levelled itself.
- 5 If you wish to move the laser beam to a specific point, briefly press key (14) or (15).
- 6 To adjust the rotation speed, press key (14) or (15) continuously according to the direction you wish. To stop the rotation press once on the opposite key.
- 7 To turn the laser off, press key (24).

2.2 Vertical Setup

- No accessories are need for this position. The A410S can be used directly on the ground. However, it can be used on the wall mount for a better setup.
- 1 Flip up the retractable foot (7). Place the instrument in the vertical position, resting on this foot. Use the adjustable feet (8) to rough level the laser to adjust the top bubble vial (13).
 - 2 Turn the instrument on. Once the instrument is level, the head will start rotating.

2.3 Slope Setup

By selecting manual mode (key 20) you are able to slope the laser between the horizontal and vertical axis.

For accurate adjustment in the X axis, you can use the following keys:

1. On the laser use keys 16 and 17. See section 1.2
2. Remote Control use keys R2 and R3. See section 6.4
3. Sensor use keys C2 and C3. See section 6.1

Press and hold one of the keys above, and beam will then move in the X axis. (Movement will be slow at first, and then speed up). If slope is out of adjustment range, you will need to tilt the laser level manually closer to the required slope range, and then use the adjustment keys listed above.

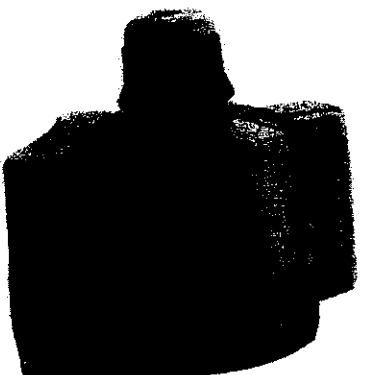
There is no fine adjustment on the Y axis. A suggestion is to use a wall bracket (see section 6.3), and hold on slope using a strong adjustable G clamp.

2.4 Squaring

- 1 Put the laser on the ground and repeat steps 1 to 2 for vertical use.
- 2 Stop the head rotation by pressing key (14) or (15).
- 3 To position the rotating vertical plane perpendicular to a reference line:
 - Coincide the arrow (5) located below the beam aperture with the index (6) located above the retractable foot (there is also an index mark on the foot).
 - Move the laser so that the beam is over the reference point on the ground, keeping the arrow and index aligned.
 - Align the beam projecting from the top of the head with key (16) or (17) to your second reference point. (This beam is 90°, or square, to the other vertical plane beam).
 - Start rotating the head using keys (14) or (15) to change speed or use the chalk line.

It is important to check while you are using the laser that it has not been moved and that your setting is still accurate.

Do not use scanning mode for squaring.



2.5 Rotation Speed

Your laser is equipped with a visible laser diode. It will be necessary from time to time to adjust the rotation speed according to the ambient light conditions (keys 14 and 15). The laser beam is more visible in slow motion.

It is possible to stop the rotation and point the beam manually to view the beam over long distances.

2.6 Using the Laser Chalkline

To use the laser line feature, hold the head and rotate the top cover (12) so that the beam comes out the laser line aperture (4).

You will obtain a precise and stable laser line and be able to work directly on your reference plane.

You can move the line by rotating the head manually or by using the remote control.

The detector will not work with the chalk line feature.

2.7 Scanning

In addition to a rotating point and chalk line, the A410S has a

scanning mode. The chalk line is ideal for viewing at short distances, while the scanning mode allows you to see the beam easier when the laser is further away. The scanning beam length is adjustable.

2.7.1 How to use the scanning feature

Turn the laser on.

The laser should be in "point mode". If it is in "chalk line" mode, hold the head and rotate the top cover until the beam is a point.

Use the laser keypad, the remote control to put the laser in scanning mode.

2.7.2 Using the laser keypad

- 1 To switch to scanning, simultaneously press (K1) and (K2) on laser keypad, (R1) on remote. The scanning will blink until the laser has levelled.
- 2 Press (K1) or (K3) on the keypad, (R4) or (R5) on remote, to aim the scan.
- 3 Press (K2) to increase and (K4) to decrease the length of the scan.
- 4 To turn the scanning off, simultaneously press (K1) and (K2) again.

The square shot cannot be moved left or right when scanning; laser must be in point or chalk line mode.

The other functions of these four keys, for rotation control and moving the square shot, are described on pages 10 and 11 of the owner's manual.

2.7.3 Using the remote control

Turn the laser on with laser keypad.

- 1 To use the scanning mode, press (R1). The laser may blink until it has self-levelled. It will then start scanning.

- 2 Use (R4) or (R5) to aim the scan
- 3 To adjust the scanning length, use (R2) to increase the scan, and (R3) to decrease.
- 4 Press (R1) to turn the scanning off.

The square shot cannot be moved left or right when scanning; laser must be in point or chalk line mode. The other functions of the remote keys, for rotation control and moving the square shot, are described on pages 10 and 11 of the owner's manual.

2.8 Power

2.8.1 Using alkaline batteries (D)

To Install batteries

- 1 To install alkaline batteries in your A410S loser, use a coin to unscrew the battery cap located at the bottom of the instrument.
- 2 Remove the battery pack.
- 3 Insert two alkaline batteries (D) in the pack, matching the polarity ('+' or '-') with those indicated at the bottom of the pack.
- 4 Put the battery back into its place and tighten the screw. Your A410S is ready for use

To replace batteries

- 1 When battery power is low, the laser head will stop rotating, the laser beam will blink, and the low battery light (23) will come on.
- 2 Replace batteries as indicated above.

Always replace the 2 batteries at the same time.

2.8.2 Using rechargeable batteries (optional)

First time use

If your A410S is equipped with a rechargeable battery, you must recharge it for 15 hours before first use.

- 1 Insert the recharger plug into the jack located under the battery pack (1 0).
- 2 Plug the charger into an electrical outlet.
- 3 Charge for 15 hours.

Later recharges

Note that the A410S be charged while working. If electricity is available on the job site, simply plug in the charger and keep on working. You can also remove the battery pack to charge it, and replace with the alkaline battery compartment to keep on working.

For optimum life of the battery, it is recommended to charge the battery after fully discharged.

To assure battery life, it is recommended not to charge over 20 hours. The battery and the charge can be damaged if damp. Always store and charge your instrument in a dry and covered place.

3. Checking and Calibrating your A410S

THIS CHAPTER IS VERY IMPORTANT

Here are a few simple Instructions to check your A410S for calibration. Remember that the laser is a precision instruments and that it is important that you keep it calibrated and in proper condition. The accuracy of your work is completely your responsibility and you should regularly check your Instrument especially prior to important jobs.

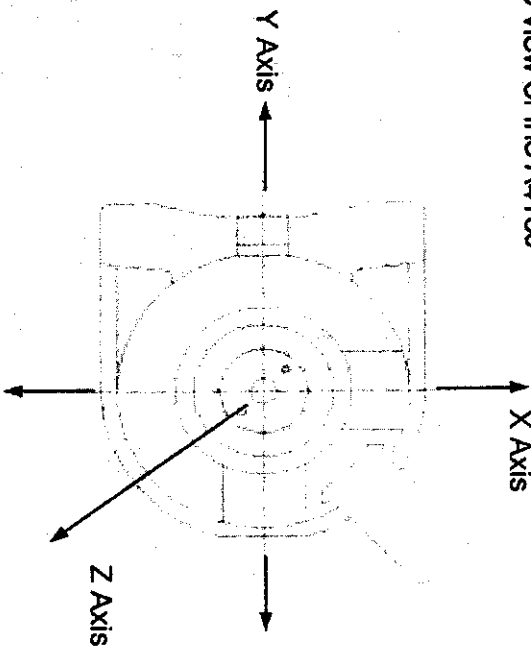
We recommend that calibration be performed by qualified technicians. It is also Important that you check your Instrument regularly.

How to check and calibrate the A410S

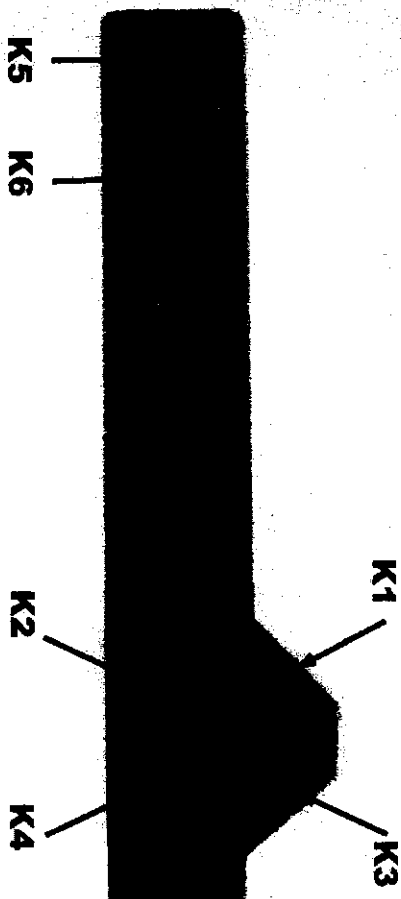
The laser has 3 axes (see X, Y and Z below).

Follow the following directions for checking and calibrating each axis. If the laser needs to be calibrated, follow the instructions or take it to a service

Top View of the A410S



Sketch of A410S touch control switches used for calibration are set out below:



3.1 Horizontal checking(XandY axis)

- 1 Place the laser on a flat surface 30 meters away from a wall or door. Position it so that the "Danger" label (X) is facing the wall.
- 2 Turn the laser on. When A410S is levelled, stop the rotation so that the beam is a point.
- 3 Mark the location of the beam.
- 4 Rotate the laser 180 degrees. After 90 seconds, mark the location of the beam near the first mark.
- 5 Both measurements must be at the same place. At 30 meters, the marks should be no more than 11 mm apart. At 15 meters, the marks should be no more than 5 mm apart.
- 6 If the marks are not close enough, the X axis needs to be calibrated (see instructions below).
- 7 To check the Y axis, turn the laser 90 degrees from Step 4 (Y will face the wall). Repeat the same steps: mark the Y beam, rotate 180 degrees, and mark again. If the marks are more than 11 mm apart at 30 meters, Y axis should be calibrated.

3.1.1 Horizontal Calibration

The laser must be calibrated to bring the beam to the center of the two marks. This is easily done using the loser keypad or the remote control.

3.1.2 X axis calibration

- 1 Turn the laser off before switching to calibration model. Simultaneously press two keys on the laser keypad, (K5) and (K6).
- 2 After few seconds, release the (K5) key.

- 3 The X LED indicator will blink, then the Y LED, Release the (K6) key.
- 4 The X LED will blink rapidly, indicating the laser is ready to be calibrated in the X axis.

If you have not moved the laser, use the X marks made in Step 4 of "Checking".

- 5 Mark the spot that's halfway between the two marks.
- 6 Bring the laser beam up or down to that center spot by using (K2)or (K4) on the laser keypad , (R2) or (R3) on the remote,
7 Next, check the Y axis against this center mark. Turn the laser 90 degrees (Y will face the wall). If the beam is not on the center mark, calibrate Y.

If Y is OK, see "Saving calibration" below.

3.1.3 Y Axis calibration

- 1 To change to Y axis calibration, press (K3) on the laser keypad, (R4) on the remote. The Y LED will blink rapidly, indicating the laser is ready to be calibrated in the Y axis.
- 2 If you have not moved the laser, use the center mark from above. Bring the laser beam up or down to that center spot by using (K2) or (K4) on the laser keypad, (R2) or (R3) the remote control.

3.1.4 Saving the calibration

The laser is now calibrated on X and Y axes. Press (K1) on the keypad, (R5) on remote to save the calibration data. If you don't wish to save the calibration, press the "On/Off" key on the laser (K5).

3.2 Vertical checking

- 1 Place the laser in vertical mode, on a flat surface about 3 meters away from a plumb line (plumb bob hanging on a string, at least 8 feet high). If you need to calibrate, the beam will be easier to see in a darkened room.
- 2 Use the adjustable feet to rough level the laser to adjust the top bubble vial.
- 3 Turn the laser on. Stop the rotation so the beam is a point.
- 4 Hold the laser head and move the beam up and down the plumb line by hand. If the beam is slanted, and not vertical like the plumb line, the z axis needs calibration.

3.2.1 Z axis calibration

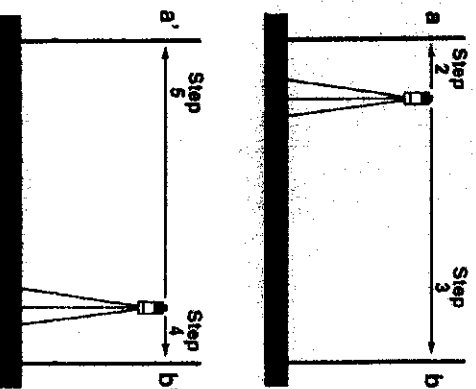
- 1 Turn the laser off before switching to calibration mode. Simultaneously press two keys on the laser Keypad, (K5) and (K6).
- 2 After few seconds, release (K6).
- 3 The X LED indicator will blink, then the Y LED. Release the (K5) key.
- 4 The Z LED will blink rapidly, indicating the laser is ready to be calibrated in the Z Axis.
- 5 Use (K2) or (K4) on laser keypad, (R2) or (R3) on remote control to move the beam until it's vertical, and parallel to the plumb line. Move the laser slightly so that the beam is over the plumb line for the final check.

3.2.2 Saving the calibration

The laser is now calibrated on the Z axis. Press (K1) on keypad, (R5) on remote control to save the calibration data. If you don't wish to save the calibration, press the (K5) key on the laser.

3.3 Cone Error Checking

- 1 Set up the laser about two feet away from one wall (a) or pole and 100 feet from another wall (b) or pole. Turn the laser on.
- 2 After it is level, stop the rotation so that the beam is a point. Mark the location of the middle of the beam on the near wall (a).
- 3 Turn the laser 180° and mark the location of the middle of the beam on the far wall (b).
- 4 Now set up the laser about two feet away from the far wall. After the laser has levelled itself, stop the rotation so that the beam is a point. Carefully line up the previous mark on wall (B).
- 5 Turn the laser 180° and mark the location of the middle of the beam on wall (a'), near the first mark.
- 6 Compare the two marks on the wall. If the difference between a' and b' exceed 3/8" (9 mm), contact your local service centre.



4. Care and Handling

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

- 1 The A410S automatic laser is a precision instrument which must be handled with great care. Avoid shock and vibrations. Always store and transport the laser and accessories in their carrying case.
- 2 Although weather resistant, you must always keep your laser and its accessories dry and clean after using. This will increase the battery life.
- 3 Do not store your laser at temperatures below -20°C or above 80°C , because the electronic components could be damaged.
- 4 Do not store your Instrument in its case if the instrument or the case are wet, to avoid water condensation Inside the instrument.
- 5 To maintain the precision of your laser, check and adjust it regularly.
- 6 Keep the lenses of the apertures (2) and (3) clean. Use a soft cloth and glass cleaner.
- 7 it is recommended to regularly charge the batteries (for rechargeable version only). Nevertheless, make sure to charge them only when they are out of power or becoming so. Recharging batteries that are still useable will shorten their capacity.

5. Warranty

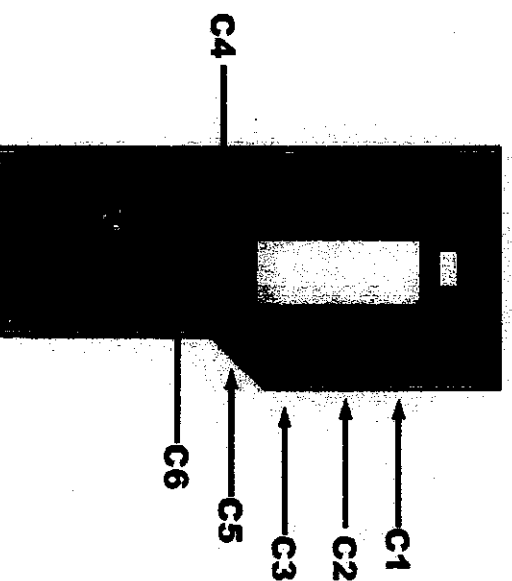
Your A410S laser is guaranteed to be free of manufacturing defects for a period of one year. Any abnormal usage or if the instrument has been subjected to shock will void this warranty. Under no circumstances will the liability of the manufacturer exceed the cost of repairing or replacing the instrument. Disassembling the instrument by other than qualified technicians will void this warranty.

The specifications of this instrument can be modified at any time and can differ from the catalogue and operation manual.

6. Accessories

6.1 LASER DETECTOR

A detector is recommended when it's difficult to see the laser beam (outdoors, in a very bright room, etc.)



Before using the detector, it is very important to set your laser on "laser point" mode (turning the top cover). The receiver cannot detect the beam in laser chalk line mode.

6.1.1 Using the sensor

The new MR80S combines two functions:

- Laser detector
- Remote control

To switch on the MR80S on detector mode, press (C1).

To use the MR80S as a remote control, only press any of the other keys (C2, C3, C4, C5 or C6) key. An arrow on the LCD display indicates that the MR80S is transmitting information to the A410S.

6.1.2 How to use the scanning with the MR80S Use the

MR80S in Remote control mode.

The A410S should be in "point mode" is in Point mode. If laser is in chalk line mode, hold the head and rotate the top cover until the beam is a point.

To start scanning, press key (C6),

To increase Scan, press key (C2),

To decrease Scan, press key (C3),

Use (C4) or (C5) to aim the scan in horizontal.

6.1.3 How to use the MR80S in Remote mode

Do not press (C1) to switch on the detector. Remote functions are available without turning on the detector.

When using the MR80S in remote mode, an arrow will appear on the LCD display. This arrow indicates you that the detector is transmitting information to A410S.

In horizontal mode, press (C2) or (C3) to start minimum rotation in beam or line mode.

Press (C4) or (C5) for rotation control to the left or to the right.

Press (C6) to turn the scanning on or off.

6.1.4 If the A410S is on "Calibration mode"

Press (C2) to move the beam up.

Press (C3) to move the beam down.

Press (C5) to change axis.

Press (C4) to save data.

(for Calibration see Section 3.1)

6.1.5 To change the battery

To replace the battery, slide the cover at the bottom of the detector to the left, take the battery out and replace it with a new one. Position it so that the minus polarity (-) is next to the side wall of the detector.

6.1.7 MR80S Specifications

Operating Distance	More than 500 feet (150 metres)
Capture Window	4 cm
Sound	2 different tones (high, normal) and mute
Displays	LCD (front and back)
Power	Alkaline batteries 9V (LR6 type)
Battery Life	50 hours (Alkaline battery)
Dimensions	145 mm x 70 mm x 25 mm
Weight	300 grams

6.2 Tripods

The laser can be mounted on a 5/8-11" dome or flat head tripod. You can also use a tripod with an elevating column to adjust the height of the laser.

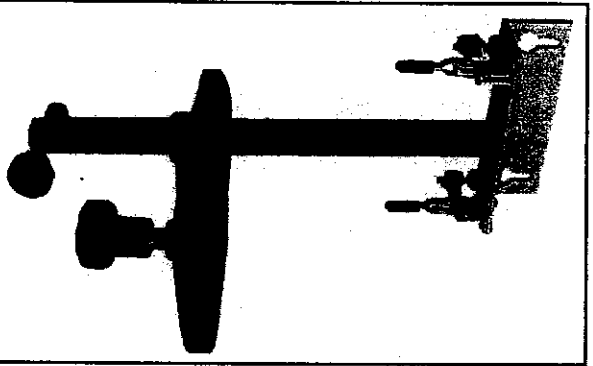
6.3 Mounts

The universal mount can be used as a wall mount and for vertical setups on a tripod. It features sturdy, all metal construction, with a spring-activated mechanism that allows you to easily change height for quick set-ups.

Also, it has a fine adjustment screw on the bottom for precise positions.

-As a wall mount, it can be attached to a grid for suspended ceiling setup.

The can also be used on its side and attached to a tripod (5/8-11") to hold the laser in the vertical position.

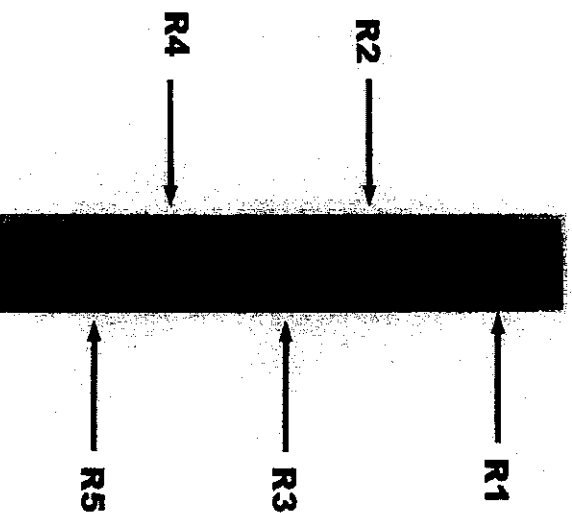


6.4 TL20 Remote Control

The TL20 remote control covers a distance up to 20 metres (65 feet). An optional larger range of 50 metres is also available. It allows you to control your laser speed rotation and move the square shot to the right or left to a desired position. Also, it can be attached to the MR80S detector for easy handling.

A 1.5 volt alkaline battery ensures 50 hours of continuous use. To open the battery compartment, push the tab at the top of the compartment up, in the direction of the arrow (with a screw driver).

- R1 Scanning Mode
- R2 Move Left
- R3 Move Right
- R4 Rotate Clockwise
- R5 Rotate Anti-clockwise



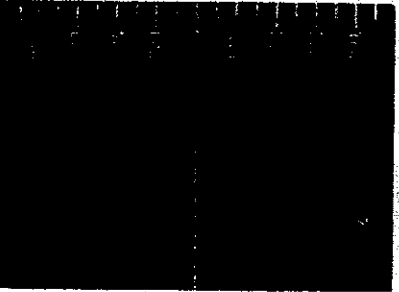
6.5 Laser Glasses

These glasses improve the visibility of the laser beam in bright light conditions.



6.6 Ceiling Target

This red magnetic target improves the visibility of the laser beam in bright conditions. A magnet allows quick attachment to any metallic surface.



7. Technical Specifications

Recommended operating distance	More than 300 metres (1000 feet) dia. with detector
Levelling accuracy	0.015%
Levelling range	±10%
Laser emission	Laser diode Class IIIa, 635 nm maximum 2mW
Power	2 alkaline batteries (D-type) or rechargeable batteries.
Charging time	15 hours
Battery Life (if rechargeable pack supplied)	40 hours with rechargeable batteries, 160 hours with alkaline batteries
Dimensions	15 x 16 x 17 cm
Weight	1.3 kg

Note: We reserves the right to change these specifications without notice.

