

Rugby 200



User Manual

Version 3.2

English

- when it has to be **right**

leica
Geosystems



This manual contains important Safety Directions (refer to chapter Safety directions) as well as instructions for setting up the product and operating it.

Read carefully through the User Manual before you switch on the instrument.

The symbols used in the User Manual have the following meaning:



DANGER:

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING:

Indicates a potentially hazardous situation or an unintended use which, if not avoided, could result in death or serious injury.



CAUTION:

Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in minor or moderate injury and / or appreciable material, financial and environmental damage.



Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

Product Identification

The instrument model and serial number of your product are indicated on the label on the base of the unit.

Enter the model and serial number in your manual and always refer to this information when you need to contact your agency or authorized service workshop.

Model-Serial Number: 200/250/255-_____ Date of purchase:_____

Table of Contents

Introduction and general operation	4	Responsibilities.....	26
The Rugby 200 Operating Instructions	4	Hazards of Use	27
Buttons	6	Laser classification	29
LED Indicators	9	Laser classification – Class IIIa ..	29
IR Remote Control	11	Labeling – Class IIIa	30
The Wall Mount Bracket Assembly	12	Laser classification – Class 3R..	31
The Ceiling Grid Target	12	Labeling – Class 3R	32
The Combination Laydown and Wall Mount Bracket.....	12	Laser classification – Class II / 2 ..	33
Labeling – Class II / 2	33	Labeling – Class II / 2	33
NiMH Battery Pack	13	Electromagnetic Compatibility (EMC)	34
Applications	15	FCC Statement	34
Installing Ceiling Grid.....	15	(applicable in the U.S.)	34
Using the Rugby in the Laydown Position.....	16		
General Construction.....	16		
Calibration	17		
Checking Level Calibration	17		
To Enter Calibration Mode	17		
Checking “Laydown” Calibration..	19		
Adjusting “Laydown” Calibration..	19		
Troubleshooting	20		
Care and Transport	22		
Transport	22		
Storage	22		
Cleaning and Drying Windows....	22		
Technical Data	23		
Rugby 200	23		
IR Remote Control (731645)	23		
NiMH Battery Pack (726746)....	23		
NiMH Charger/Adapter (727165 – Charger less AC Cable)	23		
Warranty	24		
Safety Directions	25		
Intended Use of Instruments.....	25		
Permitted uses.....	25		
Adverse uses	25		
Limits of Use	26		

Introduction and general operation

The Rugby 200 Operating Instructions

The Rugby 200 is easy to understand and simple to use. The picture below identifies each of the switches and their basic function.

The Rugby 200 is designed to serve you in a variety of applications.

Designed specifically to meet the needs of the interior contractor, the Rugby 200 can also be used together with a laser receiver for many general construction applications.

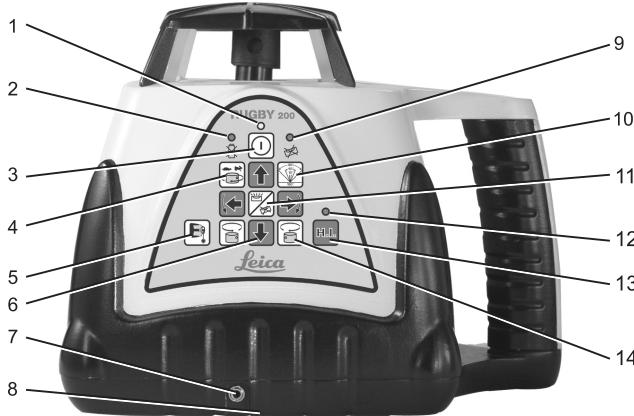
This manual contains operating and set-up procedures for common applications. Its purpose is to describe the features of the Rugby 200 and how it operates. This manual is not intended to describe specific applications. Contact Leica Geosystems or your distributor for information specific to your jobsite requirements.



There are three models / classes of the Rugby 200. These models are identified by the article number, serial number, and the product labelling.

These models represent variations in laser output. All other functions and features are the same on all models.

- Model 250, Serial nr. 250-XXXXX
Article nr. 737484
- Model 255, Serial nr. 255-XXXXX
Article nr. 746718
- Model 200, Serial nr. 200-XXXXX
Article nr. 732001



Rugby200-1 Rugby_200_overview.eps

1 Laser Emission Indicator
Indicates when the laser is leveling (flashing) or is level and the beam is on (solid).

2 Low Battery Indicator
Indicates when the laser's batteries are becoming low.

3 Off/On Power Button
Press to turn the Rugby on and off.

4 Rotation Speed Button
Controls the head speed from 0, 1, 2, 5 and 10 rps.

5 Beam Down Button
Positions the beam directly below the aperture.

6 Manual Grade Buttons (4)
Controls the tilt of the main axis when the Rugby is in Manual mode.

7 Charge Jack
For optional NiMH rechargeable battery pack.

8 Battery Assembly
Located in the base of the laser. Remove the locking ring to replace the alkaline batteries.

9 Manual Mode Indicator
Flashes rapidly (5 Hz) to indicate manual with cross axis self-leveling. Flashes slowly (1 Hz) to indicate full manual control.

10 Scan Button
Controls the scan sweep from 10°, 45°, 90° and 180°.

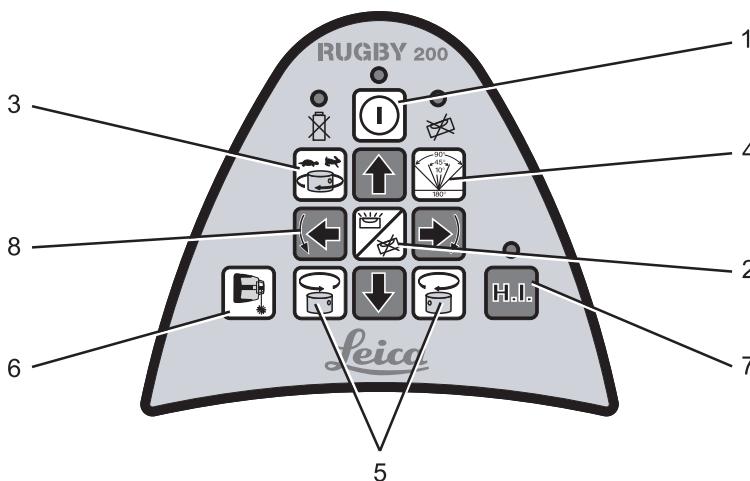
11 Automatic/Manual Button
Press once to enter manual mode with cross axis self-leveling. Press again to enter full manual mode. Press a third time to exit and return to automatic self-leveling.

12 H.I. Alert Indicator
Indicates when H.I. has been turned on (solid) or in an alert condition (flashing).

13 H.I. Alert Button
When activated will reduce the amount of self-leveling range to prevent elevation errors.

14 Rotation Direction Buttons (2)
Used to rotate the head in stopped or scan mode

Buttons



Rugby200-2membrane.eps

1 On/Off Power Button

 Turns the unit on and off. Note: When power is applied to the Rugby 200, it will always start up in automatic mode.

2 Automatic/Manual Button

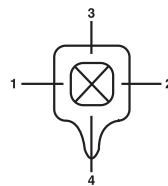
 Switches the unit between (1) automatic self-leveling mode, (2) manual mode with cross axis self-leveling, and (3) full manual mode.

- Press the Auto/Manual Button once to enter manual mode with cross axis self-leveling. The Manual Mode Indicator will flash rapidly (5 Hz) when in this mode.

- Press the Auto/Manual Button a second time to enter full manual mode. The Manual Mode Indicator will flash slowly (1 Hz) when in this mode.
- Press the Auto/Manual Button a third time to return to automatic mode. The Manual Mode Indicator will be off when in automatic mode.

Cross Axis Self-Leveling

The Rugby 200 has a unique feature that will continue to maintain the level position of the cross axis when manual grade is put into the main axis.



Rugby200-3 Rugby top view2.eps

Main Axis Manual Grade (1-2)
Cross Axis Self-Leveling (3-4)

3 Rotation Speed Button

 Used to change the speed of the rotating head from stationary to fast rotation. The head speed increases each time the button is pressed. Speed selections are 0, 1, 2, 5 and 10 rps.

4 Scan Button

 Allows the operator to select an area for the rotating head to scan instead of completing a full 360° revolution. Scan selections are approximately 10°, 45°, 90°, and 180°. The scan area increases each time the button is pressed. If the head is rotating and the Scan Sweep Button is pressed, the head will begin to scan in the area last selected.

5 Rotation Direction Buttons

 Allows the operator to position the rotating head by moving it clockwise or counterclockwise when it is stopped or is scanning. Pressing the button will move the head in small increments. Pressing and holding the button move the head more quickly.

6 Beam Down Button

 Positions the beam directly below the aperture for laydown setups.

7 H.I. Button

 Also called Height of Instrument or Elevation Alert, when activated will reduce the amount of self-leveling range to prevent elevation errors as a result of movement of the tripod or other sudden movement.

- The Rugby must reach a completely level position and remain undisturbed for 30 seconds before the Alert becomes active.
- The LED at the side of the H.I. Button will turn on solid when elevation alert is turned on. It will flash rapidly (5 Hz) when the laser has moved and an alert condition exists.
- Press the H.I. or Automatic/Manual Button to stop the alert.
- Check for the cause of the alert, adjust the height of the instrument, allow the unit to relevel.
- Press the H.I. Button again to reset the alert.

8 Head Tilt Arrow Buttons

This set of four buttons control the tilt of the rotating head when the Rugby 200 is in manual mode. The left and right arrow buttons also function when the unit is used in the laydown position to control alignment of the plumb beam to a second control point. In manual mode the arrow buttons allows the operator to tilt the head to match an existing line or slope. Pressing the button will move the head in small increments. Pressing and holding the button move the head more quickly.



Rugby200-4 Head-up



The Rotating Head tilts in the direction shown.

In Laydown, the Top Plumb Beam moves **upward**.



Rugby200-5 Head-right



The Rotating Head tilts in the direction shown.

In Laydown, the Top Plumb Beam moves from **left to right**.



Rugby200-6 Head-down



The Rotating Head tilts in the direction shown.

In Laydown, the Top Plumb Beam moves **downward**.



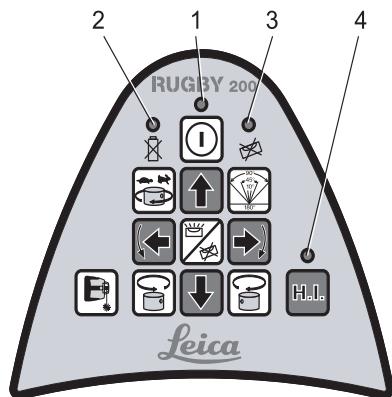
Rugby200-7 Head-left



The Rotating Head tilts in the direction shown.

In Laydown, the Top Plumb Beam moves from **right to left**.

LED Indicators



Rugby200-8 Rugby_membrane.eps

- 1 Laser Emission Indicator (yellow)**
 - Off: The Rugby and the laser beam are off.
 - Flashing: Leveling in progress.
 - On: The Rugby has leveled and the laser beam is on.
- 2 Low Battery Indicator (red)**
 - Off: Battery ok
 - Slow Flashing 1Hz: Low Battery
 - Fast Flashing 5Hz: Low Battery, turns off soon
 - On: Turns off in 5 Minutes
- 3 Manual Mode Indicator (red)**
 - Off: Automatic Self-Leveling
 - Fast Flashing 5Hz: Manual, Cross Axis Self-Leveling
 - Slow Flashing 1Hz: Manual, Both Axes
- 4 Elevation Alert (H.I.) Indicator (red)**
 - Off: The H.I. Alert function is off.

- On: The H.I. Alert function is on.

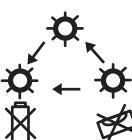
- Flashing: H.I. Alert. The Rugby has moved.

Calibration Mode

- In Calibration Mode, the Low Battery and Manual Mode Indicators will blink alternately.

- In the first axis the Low Battery will blink at 5 Hz, the Manual Mode at 1 Hz.
- In the second axis the Low Battery will blink at 1 Hz, the Manual Mode at 5 Hz.
- When an arrow button is pressed to change calibration, the Emission Indicator LED will turn off for one half second to indicate a button press.

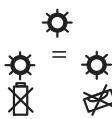
Out of Level Indication



When there is an Out of Level Failure, the Rugby has been set up outside of its self-leveling range and cannot achieve level. The LED's will blink in sequence. Turn the unit off, level the top of the tripod and try again.

If running line or grade in manual mode, the Rugby will also give an out of level indication if a limit is reached, reverse directions and continue working.

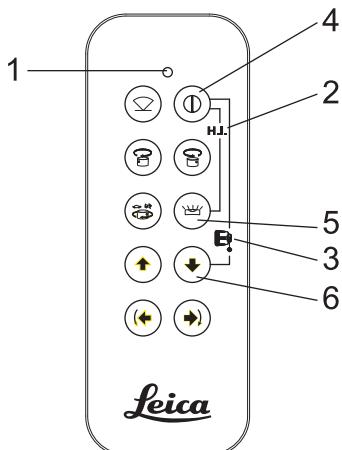
Out of Temperature Range



If the unit is set up and the environment is out of the specified operating temperature range, all three LED's will turn on

at the same time. The operating temperature range for the Rugby is -4° to +122 °F (-20 ° to 50 °C).

IR Remote Control



Rugby200-9_200remote.eps

The buttons of the IR Wireless Remote perform the same functions as the buttons on the face of the laser with the following exceptions:

1 Red LED

 The Red LED at the top of the remote will flash when the remote is sending information to indicate that a button has been pressed.

2 H.I. Alert Function

 With the unit on, press and hold the off/on switch (4), then press the auto/manual switch (5) to turn the H.I. Alert on and off.

3 Beam Down Function

 With the unit on, press and hold the off/on switch (4), then press the down arrow (6) switch to turn the beam down function on and off.

4 Off/On/Sleep Button

 Puts the Rugby 200 into sleep mode for a minimum of 2 hours.* Press and hold the Sleep/Power Button for 1.5 seconds to enter sleep mode. During the sleep mode period, press the button once to wake the unit up. The Off/On/Sleep Button also acts as a Shift key for activating the H.I. Alert function and the Beam Down function.

 *The IR Remote Control cannot turn on the Rugby 200 except during the sleep mode period. This is done to conserve battery life.

The Wall Mount Bracket Assembly



Rugby200-10 wallmount2.eps

Allows the user to mount the Rugby 200 on a wall grid at the necessary height. The rotating beam then provides a reference height to hang the ceiling grid.

To adjust the height, loosen the adjustment knob on the side of the bracket and slide the bracket up or down until the desired height is achieved.

A 5/8"-11 mounting hole is molded into the back of the bracket for using the Rugby 200 in the laydown position mounted to a tripod.

The Ceiling Grid Target

Allows the user to visually detect the rotating beam throughout the jobsite. The ceiling grid target's magnet attaches to the bottom of the ceiling grid. The grid can then be adjusted until the beam is hitting the target's center line.

The Combination Laydown and Wall Mount Bracket



Rugby200-11 wallmount2.eps

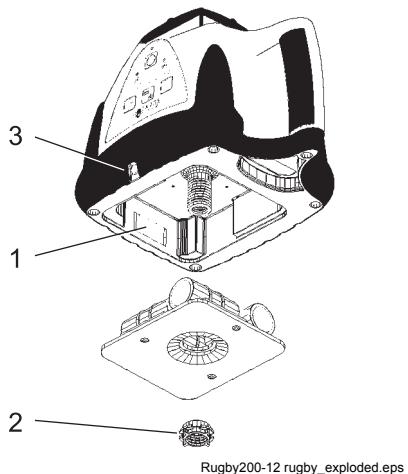
Allows the user to perform all the same functions as the Wall Mount Bracket but has additional features that allow for fine adjustments to be made when the Rugby 200 is mounted to the bracket and used in the laydown position.

NiMH Battery Pack

General Information

The battery pack contains four high capacity D-cell Nickel Metal Hydride Batteries. Fully charged the Rugby will run more than 35 hours in optimal conditions.

The charger/adapter is a universal charger and will accept an input voltage from 100 to 240 VAC. The charger requires that the correct cable be ordered for the country of use.



Installation

The NiMH Battery Pack will fit into the bottom of the Rugby in only one direction. The three silver tabs on the battery should be aligned with the tabs (1) in the base of the laser. Lock the battery pack in place using the large plastic nut (2).

Charging

The charge jack (3) is located on the front of the Rugby. Insert the plug into the jack and the AC adapter into the appropriate wall outlet. The NiMH Battery Pack can also be charged separately from the laser.

Low Battery Indication

There is a low battery, warning indicator on the switch panel of the Rugby that will indicate when the batteries require recharging. Should the batteries become low, the charger/adapter will both run and charge the laser at the same time.

NiMH Battery Pack Care

To ensure optimal performance and life of the NiMH Battery Pack, please note the following guidelines:

 Exposure of batteries to extreme temperatures can cause battery degradation and early failure.

Long-term storage of the battery pack should be in moderate temperatures - 0°F to 95°F (-18°C to 35°C). If the batteries are to be stored for an extended period of time, fully charge them and then remove them from the laser unit.

If stored for more than 60 days, it is recommended that the batteries be recharged to extend their useful life.

Always charge the batteries in an area of moderate temperatures.

Troubleshooting

If your Rugby laser will not take a charge, check the following:

- Check the AC input and DC output of the charger unit.
- Check that the Rugby has a rechargeable pack installed.
- Check charger cables for wear or damage.
- Refer to your Rugby User Manual for proper operation.
- Contact the nearest authorized service center.

Applications

Installing Ceiling Grid

- 1 Attach the Rugby 200 to the Wall-mount Bracket. The side with the control buttons should be facing outward. Tighten the bottom locking knob until the Rugby is secured to the bracket.
- 2 After mounting the first strip of ceiling trim at the desired height, attach the Wallmount Bracket to the trim. Tighten the locking knob on the top of the bracket until the secured.
- 3 Press the Off/On Power Button to turn on the Rugby. The Rugby will always turn on in automatic mode.
- 4 Allow the Rugby to self-level.
- 5 Adjust the Rugby so the rotating beam is at the desired distance below the grid height. Loosen the adjustment knob on the side of the bracket and slide the Rugby up or down. When the Rugby is at the desired height on the scale, retighten the adjustment knob.
- 6 Install the ceiling grid. With the Rugby attached to the first piece of trim and adjusted to the desired height, work can begin. Attach the magnetic target to the ceiling grid and adjust the height of the grid until the rotating beam is striking the center of the target.

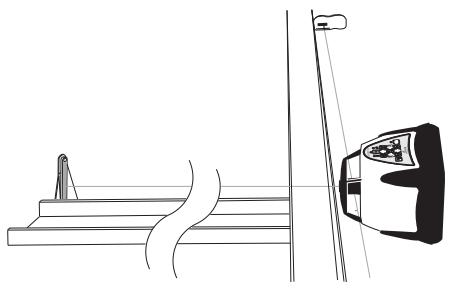
Use the Remote Control to slow the rotation of the beam or to change to scan mode and rotate the scanning beam to the area being worked.



Rugby200-13 ceiling.eps

Using the Rugby in the Laydown Position

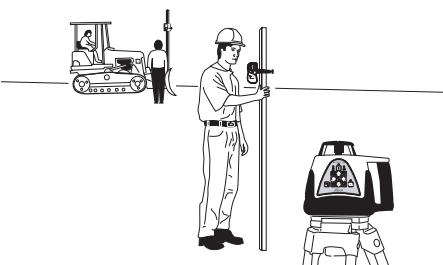
- 1 Place the Rugby in the laydown position on a flat, level surface.
- 2 Press the Off/On Power Button to turn on the Rugby. The Rugby will always turn on in automatic mode and begin to level.
- 3 Press the Plumb Down Button and the beam will rotate down to be used to align the laser. Move the Rugby until the spot is directly over a control point.
- 4 Start the head rotation and rough align the rotating beam to a second control point.
- 5 Using the buttons on the laser or on the remote, fine adjust the beam until it is rotating over the second control point.
- 6 Once aligned, the split beam out the top of the laser can be used to identify 90° angles for layout.



General Construction

 The rotating beam creates a level plane of laser light over the entire jobsite that is used as a reference. Used together with a Rod Eye handheld receiver or a machine mounted 360° receiver, the Rugby 200 is an extremely versatile tool.

- 1 Place the Rugby on a flat level surface or on a tripod with a 5/8"-11 adapter. Put the Rugby 200 in a location where the rotating beam will be at a convenient height and will not be obstructed.
- 2 Press the Off/On Power Button to turn on the Rugby. The Rugby will always turn on in automatic mode and begin to level.
- 3 Press the Rotation Speed Button to select the highest head speed.
- 4 Use the plane of laser light as a reference to take elevation readings.
- 5 Attach the Rod Eye to a grade rod or stick. Turn it on and adjust the height to center on the beam over a control point. The receiver's bandwidth and audio volume can be adjusted using the buttons on the receiver.



Calibration

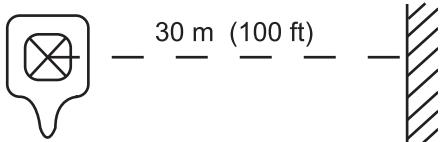
 The Rugby is calibrated to the defined accuracy specification at the factory. It is recommended to check your laser for calibration upon receipt and periodically before using the laser to ensure calibration is maintained. If your laser requires calibration, send it to your nearest authorized service center, or calibrate the laser using the following procedure.

 Do not enter this mode or attempt calibration unless you plan to change the calibration. Calibration should be performed only by a qualified individual that understands basic calibration principles.

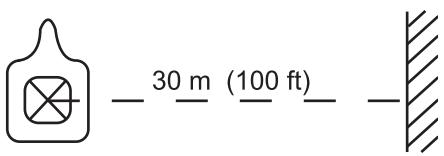
Checking Level Calibration

- 1 To check level calibration of your Rugby Laser, place the unit on a flat, level surface or tripod approximately 100 ft (30 m) from a wall.
- 2 Align Axis one of the Rugby so that it is square with the wall. Allow the unit to self-level completely approximately one minute after the unit begins to rotate), and then mark the position of the beam (position 1).
- 3 Rotate the Rugby 180°, allow it to self-level and mark the opposite side of the first axis (position 2).
- 4 Align the second axis of the Rugby by rotating it 90° so that this axis is now square with the wall. Allow the unit to self-level completely, and then mark the position of the beam (position 3).

- 5 Rotate the Rugby 180°. allow it to self-level and mark the opposite side of the second axis (position 4). The Rugby is within its calibration specification if the four marks are within $\pm 1/16"$ (1.5 mm) from center.



Axis 1 (Position 1)



Axis 1 (Position 2)

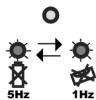
To Enter Calibration Mode

- 1 With the power off, press the Power Button once to turn on power. Then, press the head speed button to set the head speed at its fastest setting (10 rps).
- 2 Press and hold the Up and Down Arrow Buttons.



While holding these buttons, press and release the power button. Then, release the arrow buttons.

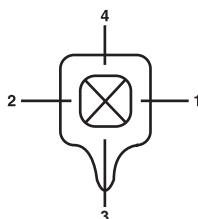
- The Rugby is now in calibration mode. The low battery indicator will blink at 5 Hz and the out of level indicator will blink at 1 Hz alternately to confirm that the unit is in calibration mode for Axis One.



Rugby200-18 Cal Mode 5 to 1.tif

Do not push the arrow buttons unless you plan to change calibration! To exit this mode, press the power button once. The unit will power off without making any changes.

- Align the unit so that you are facing the control panel and looking over the top of the unit to the calibration marks on the wall. This is Axis One (position 1).



Rugby200-19 Rugby top view1.eps

Axis One (1-2)
Axis Two (3-4)

- Use the Up or Down Arrow Buttons to raise or lower the beam to the desired elevation for level calibration in position 1. When the arrow button is pressed, the top laser emission indicator LED will turn off for one half second to indicate that a key has been pressed.

- Rotate the laser 180° and check the opposite side of Axis One (position 2).

- Reposition the Rugby so that the handle is now pointing at the calibration marks on the wall. This is Axis Two (position 3).

- Press the Auto/Manual Button to enter the calibration mode for the second axis. The low battery and out of level indicators will now reverse their blink modes to confirm the Rugby is now in calibration mode for Axis Two.

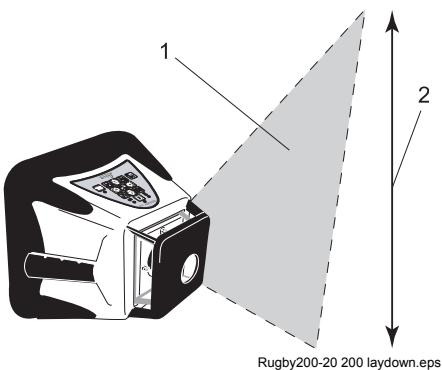
- Use the Up or Down Arrow Buttons to raise or lower the beam to the desired elevation for level calibration in Axis Two (position 3). When the arrow button is pressed, the top, laser emission indicator LED will turn off for one half second to indicate that a key has been pressed.

- Rotate the laser 180° and check the opposite side of Axis Two (position 4).

- Once the desired calibration has been set for both axes, press the Power Button once to store the information and turn the power off. The Rugby will be set to the new calibration when power is re-applied.

Checking "Laydown" Calibration

- 1 To check laydown calibration, place the Rugby 200 on its side on a flat level surface 100 ft (30 m) from a wall so that the rotating beam projects a line on the wall.
- 2 Hang a plumb line on the wall.
- 3 If the rotating beam is not plumb, adjustment is necessary.



1) Scan Area
2) Plumb Line

Adjusting "Laydown" Calibration

- 1 With the Rugby still in laydown position, enter calibration mode the same as described for upright calibration (steps 1–3)
- 2 Have the rotating beam scan the plumb line, then use the Up and Down Arrow Buttons to align the beam vertically.

 Using the IR Remote will allow calibration to be adjusted remotely while closely monitoring the beam at the plumb line.

- 3 Once desired calibration is achieved, press the Power Button on the Rugby once to store the information and turn the power off. The Rugby will be set to the new calibration when power is re-applied.

Troubleshooting

Symptom	Possible Causes and Solutions
The Rugby 200 does not turn on.	<p>The battery charge is low or dead.</p> <ul style="list-style-type: none">• If the Rugby 200 has alkaline batteries, remove the battery pack from the base of the Rugby and replace all four batteries with fresh D-cell alkaline batteries.• If the Rugby 200 has a rechargeable) NiMH-battery pack, plug the battery charger into the Rugby's charge jack and then connect it to a standard electrical outlet. Always plug the battery charger into the Rugby's charge jack first and then plug it into the electrical outlet, otherwise the Rugby's charge jack might emit sparks.
The Rugby 200 is working, but it does not self-level.	<p>The Rugby 200 must be in automatic mode to self-level.</p> <ul style="list-style-type: none">• In automatic the emission indicator will blink until the laser has completed self-leveling.• In manual mode the Level Warning Indicator will flash at 5 Hz, and the Rugby will not self-level.
The Rugby 200 has stopped working and the H.I. LED indicator is flashing.	<p>The Rugby 200 is displaying an elevation alert.</p> <ul style="list-style-type: none">• The H.I. Indicator will turn on solid when the H.I. is activated and will flash when the laser has moved and an alert condition exists.• Press the H.I. or Auto/Manual Button to stop the alert. Check and adjust the elevation of the laser, then press the H.I. button to reactivate the H.I. Alert function.
The Laser Emission, Low Battery and Manual Mode Indicators are flashing sequentially. (Out of Level Indication)	<p>The Rugby 200 has reached a servo limit or is outside of its self-leveling range.</p> <ul style="list-style-type: none">• In automatic mode the Rugby 200 must be set up within $\pm 5^\circ$ of its upright position to be within the self-leveling range.• Reposition the Rugby. If the LED's continue to flash, turn off the Rugby and try again.• In manual mode, reverse directions and continue working.

Symptom	Possible Causes and Solutions
The Laser Emission, Low Battery and Manual Mode Indicators are all on. (Out of Temperature Range)	<p>The internal temperature has exceeded its operating temperature range of -4° to 122°F (-20° to 50°C).</p> <ul style="list-style-type: none"> Move the laser out of direct sunlight or shield it. Allow the Rugby to cool and it will automatically begin operation.
The Low Battery Warning Indicator is on.	<p>The battery charge is low or dead.</p> <ul style="list-style-type: none"> See symptom #1 above. See explanation of LED indicator functions.
The Rugby's distance is reduced.	<p>Dirt is reducing the output of the laser.</p> <ul style="list-style-type: none"> Clean the windows on the Rugby and the Rod-Eye receiver to improve performance.
The Rugby will only spin quickly and the low battery LED is blinking	<p>The battery charge is low or dead.</p> <ul style="list-style-type: none"> See symptom #1 above. The Rugby is rotating at seven rps to indicate to the Rod-Eye Pro that the laser has reached a low battery condition.
The Rod-Eye receiver is not functioning properly. (See also the Rod-Eye User Manual.)	<p>Check for proper operation.</p> <ul style="list-style-type: none"> The Rugby is not rotating. It is leveling or in elevation alert. The power or audio feature is not active on the Rod-Eye. The Rod-Eye is out of usable range. The Rod-Eye's batteries are dead or low.
The IR Remote Control is not functioning properly	<p>Check for proper operation.</p> <ul style="list-style-type: none"> See Remote section regarding "sleep mode" when using the remote. Check that the Rugby 200 is turned on before using the Remote. Aim the remote directly at the laser for maximum distance. The Remote is out of usable range. The Remote's batteries are dead or low.

Transport

 When dispatching the instrument, always use the complete original Leica Geosystems packaging (case and cardboard box).

When transporting the instrument in the field, always make sure that you:

- Either carry the instrument in its original transport case
- Or carry the tripod with its legs splayed across your shoulder, keeping the attached instrument upright.

Never carry the instrument loose in a road vehicle. It can be affected by shock and vibration. Always carry it in its case and secure it.

When transporting the instrument by rail, air or ship, always use the complete original packaging (case and cardboard box), or its equivalent, to protect it against shock and vibration.

 After transport, or after long periods of storage, inspect the field adjustment parameters given in this user manual before using the instrument.

Storage

 Temperature Limits (-40° to 70°C / -40° to 158°F) Respect the temperature limits when storing the instrument, particularly in summer if the instrument is inside the vehicle.

 Damp instruments must be unpacked. Dry the instrument, the case and the accessories at not more than 40°C / 108°F and clean them. Do not repack until everything is completely dry.

Cleaning and Drying Windows

 Windows

- Never touch the glass with your fingers.
- Use only a clean, soft, lint-free cloth for cleaning. If necessary, moisten the cloth with pure alcohol. Use no other liquids; these may attack the polymer components.

Technical Data

Rugby 200

Operating Range

(Rotating Beam)..... up to 1000 ft (300 m) diameter, with sensor
up to 330 ft (100 m) diameter, visual

Operating Range (Plumb Beam) up to 200 ft (60 m)

Self-Leveling Accuracy $\pm 1/16''$ at 100 ft (± 1.5 mm at 30 m)*

Self-Leveling Range $\pm 5^\circ$ (upright and laydown)

Dimensions (HWD) 7.8 x 9.8 x 6.9 in (197 x 248 x 175 mm)

Weight with batteries 6.5 lbs. (2.95 kg)

Rotation Speeds 0, 1, 2, 5, 10 rps

Scan Mode 10°, 45°, 90°, 180°

Laser Diode 635 nm visible

Laser Classification FDA21CFR / IEC/EN60825-1

Article nr. 737484, Serial nr. 250- Class IIIa

Article nr. 746718, Serial nr. 255- Class 3R

Article nr. 732001, Serial nr. 200- Class II / 2

Operating Temperature -4° to 122°F (-20° to 50°C)

Storage Temperature -40° to 158°F (-40° to 70°C)

Battery Life 50 hours with alkaline/ 30 hours with NiMH**

Batteries Four D-Cell Alkaline or NiMH Pack

Environmental Waterproof, IPX-6

IR Remote Control (731645)

IR Remote Range up to 130 ft. (40 meters)

IR Remote Battery/Operation Lithium, up to 5 years

NiMH Battery Pack (726746)

Input voltage 7.5 VDC

Input current 1.0 amp

NiMH Charger/Adapter (727165 – Charger less AC Cable)

Input voltage 100 to 240 VAC, 50-60 Hz

Output voltage 7.5 VDC

Output current 1.0 amps

Polarity Shaft – negative, Tip – positive

* From 23° to 95°F -5° to 35°C). Accuracy is de-rated outside of this temperature range.

** Battery life is dependent upon environmental conditions.

Specifications are subject to change without notice.

Warranty

Leica Geosystems AG ("Leica Geosystems") warrants to the original end user (Customer) that this Product will be free from defects in workmanship and materials under normal use for two (2) years, and provided any and all operating and maintenance instructions are strictly respected, in particular in case of extreme and/or continuous applications/use of the Product.

Knockdown Warranty - In addition to the standard Leica Geosystems 24 month warranty, the internal self-leveling system of the Rugby 200 is covered regardless of failure. Should any accident or knockdown occur within the warranty period, all repairs to the internal self-leveling assembly will be covered under the knockdown warranty policy.

For specific information regarding your warranty refer to the Leica Geosystems International Limited Warranty found on our website:

www.leica-geosystems.com/internationalwarranty

Safety Directions

The following directions should enable the person responsible for the laser unit, and the person who actually uses the instrument, to anticipate and avoid operational hazards. The person responsible for the instrument must ensure that all users understand these directions and adhere to them.

Intended Use of Instruments

Permitted uses

The Rugby 200 is designed and suitable for the following applications, within the limits of its intended conditions of use:

- The instrument casts a horizontal laser plane or a laser beam for the purposes of alignment.
- The unit can be set up on its own baseplate or on a tripod.
- The laser beam can be detected by the object being surveyed or by means of a laser detector.
- The laser unit, combined with machine control receivers, is also suitable for guiding construction machinery.
- The unit can be powered by rechargeable NiMH (optional) or Alkaline batteries.
- The unit can be used with an infrared remote.
- A plumb beam is generated by the unit for purposes of alignment.

- Scan modes from 10° to 180° can be generated by the unit for purposes of alignment.
- Rotation modes from 0-10 rps can be generated by the unit for purposes of alignment.

Adverse uses

- Use of the product without instruction.
- Use outside of the intended limits.
- Disabling safety systems and removal of hazard notices.
- Opening the instrument using tools (screwdriver, etc.).
- Modification or conversion of the instrument.
- Use after misappropriation.
- Use with accessories from other manufacturers without the prior express approval of Leica Geosystems.
- Inadequate safeguards at the measuring station (e.g. when measuring on roads).
- Deliberate dazzling of third parties.



WARNING:

Adverse use can lead to injury, malfunction, and material damage. It is the task of the person responsible for the instrument to inform the user about hazards and how to counteract them. The laser unit is not to be used until the user has been instructed how to work with it.

Limits of Use

Environment:

Suitable for use in an atmosphere appropriate for permanent human habitation. Cannot be used in an aggressive or explosive environment. *See chapter "Technical Data."*

Responsibilities

Responsibility for the manufacturer of the original equipment Leica Geosystems AG, Heerbrugg (hereinafter referred to as Leica Geosystems):

Leica Geosystems is responsible for supplying the product, including the user manual and original accessories, in a completely-safe condition.

Responsibilities of the manufacturers of non-Leica Geosystems accessories:

 The manufacturers of non-Leica Geosystems accessories for the laser unit are responsible for developing, implementing and communicating safety concepts for their products, and are also responsible for the effectiveness of those safety concepts in combination with the Leica Geosystems product.

Responsibilities of the person in charge of the instrument:



WARNING:

The person responsible for the instrument must ensure that it is used in accordance with the instructions. This person is also accountable for the training and the deployment of personnel who use the instrument and for the safety of the equipment in use.

The person in charge of the instrument has the following duties:

- To understand the safety instructions on the product and the instructions in the user manual;
- To be familiar with local regulations relating to accident prevention;
- To inform Leica Geosystems immediately if the equipment becomes unsafe.

Hazards of Use



WARNING:

The absence of instruction, or the inadequate imparting of instruction, can lead to incorrect or adverse use, and can give rise to accidents with far-reaching human, material, financial, and environmental consequences.

Precautions: All users must follow the safety directions given by the manufacturer and the directions of the person responsible for the instrument.



WARNING:

The charger is not designed for use under wet conditions. If the unit becomes wet it may cause you to receive an electric shock.

Precautions: Use charger only indoors, in dry rooms and protect it from dampness. If the charger is damp, do not use it.



WARNING:

The charger contains potentially hazardous voltages. Opening the charger, may cause you to receive an electric shock.

Precautions: Do not open the charger.



CAUTION:

Watch out for erroneous measurements if the product is defective or if it has been dropped or has been misused or modified.

Precautions: Periodically carry out test measurements and perform the field adjustments indicated in the user manual, particularly after the instrument has been subjected to abnormal use and before and after important measurements.



WARNING:

By working during a thunderstorm you are at risk from lightning.

Precautions: Do not carry out field work during thunderstorms.



WARNING:

Charging of the Rugby 200 while in the carrying case could damage cord and result in electric shock.

Precautions: Do not charge the laser in the carrying case or if cord has been damaged.



DANGER:

Because of the risk of electrocution, it is very dangerous to use staffs and telescopic scales in the vicinity of electrical installations such as power cables or electrical railways.

Precautions: Keep at a safe distance from electrical installations. If it is essential to work in this environment, first contact the safety authorities responsible for the electrical installations and follow their instructions.





WARNING:

Inadequate securing of the working site can lead to dangerous situations, for example in traffic, on building sites, and at industrial installations.

Precautions: Always ensure that the working site is adequately secured. Adhere to the regulations governing accident prevention and road traffic.



CAUTION:

During the transport or disposal of charged batteries it is possible for inappropriate mechanical influences to constitute a fire hazard.

Precautions: Remove the batteries from their compartment before they are transported. Disposal of batteries only if they are fully flat.



CAUTION:

If the accessories used with the instrument are not properly secured and the equipment is subjected to mechanical shock (e.g. blows, falling), the equipment may be damaged or people may sustain injury.

Precautions: When setting-up the instrument, make sure that the accessories (e.g. tripod, tribrach) are correctly adapted, fitted, secured, and locked in position. Avoid subjecting the equipment to mechanical shock. Never position the instrument on the tripod baseplate without securely tightening the central fixing screw. If the screw is loosened, always remove the instrument immediately from the tripod.



WARNING:

If the product is improperly disposed of, the following can happen:

- If polymer parts are burnt, poisonous gases are produced which may impair health.
- If batteries are damaged or are heated strongly, they can explode and cause poisoning, burning, corrosion or environmental contamination.
- By disposing of the product irresponsibly you may enable unauthorized persons to use it in contravention of the regulations, exposing them-selves and third parties to the risk of severe injury and rendering the environment liable to contamination.
- Improper disposal of silicone oil may cause environmental contamination.

Precautions:



The product must not be disposed with household waste.

Dispose of the product appropriately in accordance with the national regulations in force in your country.

Always prevent access to the product by unauthorized personnel.

Product specific treatment and waste management information can be downloaded from the Leica Geosystems home page at <http://www.leica-geosystems.com/treatment> or received from your Leica Geosystems dealer.



WARNING:

Use only the approved charger designed for this battery pack. See manufacturer's reference below.

Precautions: Reference GlobTek Part Nr: TR9KC1000PTP-N, Model: GT-4121DA-09-1.5



CAUTION:

Only Leica Geosystems authorized workshops are entitled to repair these products.

Laser classification

The rotating laser Rugby 200 produces a visible laser beam that emerges from the rotating head.



WARNING:

There are three versions of the Rugby 200. These models represent variations in laser output. All other functions and features are the same on each model. Review the information below for the unit you have purchased. The products are clearly identified by article number, serial number and safety label.

Laser classification – Class IIIa

- **Article number 737484**
- **Serial Number 250-XXXXX**
- **The warning label "CLASS IIIa LASER PRODUCT"**

The product is a Class IIIa laser product in accordance with:

- FDA CFR21 CFR 1040.10 April 2002 (US Department of Health and Human Service, Code of Federal Regulations)

Class IIIa laser products: Direct intrabeam viewing is always hazardous. Avoid direct eye exposure. The accessible emission limit is within five times the accessible emission limits of Class 2/II in the wavelength range from 400 to 700 nm.



WARNING:

Direct intrabeam viewing is always hazardous.

Precautions: Do not stare into the beam or direct it towards other people unnecessarily. These measures are also valid for the reflected beam.



WARNING:

Looking directly into the reflected laser beam could be dangerous to the eyes when the laser beam is aimed at areas that reflect like a mirror or emit reflections unexpectedly (e.g. prisms, mirrors, metallic surfaces, windows).

Precautions: Do not aim at areas that are essentially reflective, such as a mirror, or which could emit unwanted reflections. Do not look through or beside the optical sight at prisms or reflecting objects when the laser is switched on.



WARNING:

The use of Laser Class IIIa equipment can be dangerous.

Precautions: To counteract hazards, it is essential for every user to respect the safety precautions and control measures.

Class IIIa laser products used on construction sites and outdoors (surveying, alignment, leveling):

- a. Only qualified and trained persons should be assigned to install, adjust and operate the laser equipment.
- b. Proof of qualification of the laser equipment operator shall be available and in possession of the operator at all times.

- c. Areas in which these lasers are used should be posted with an appropriate laser warning sign.
- d. Precautions should be taken to ensure that persons do not look directly, with or without an optical instrument, into the beam.
- e. The laser beam path should be located well above or below eye level wherever practicable.
- f. When not in use the laser product should be stored in a location where unauthorized personnel cannot gain access.
- g. Precautions should be taken to ensure that the laser beam is not unintentionally directed at mirror like (specular) surfaces (e.g. mirrors, metal surfaces, windows). But, more importantly, at flat or concave mirror-like surfaces.

Beam divergence: 0.2 mrad

Maximum radiant power: 3 mW

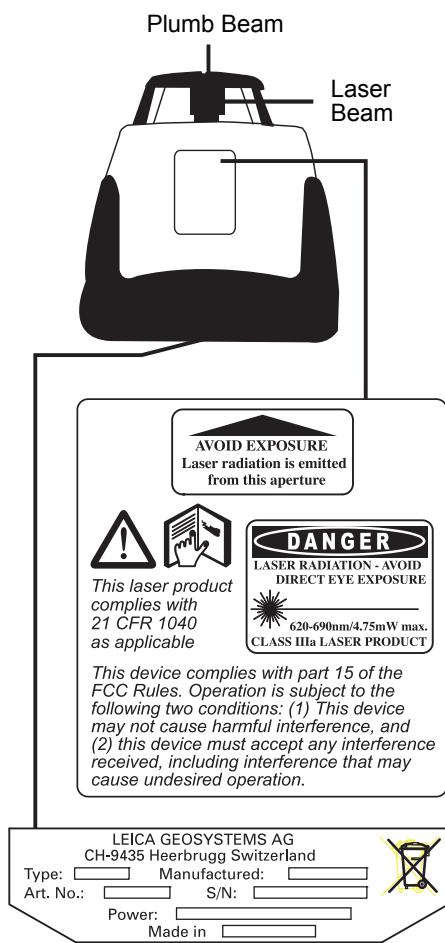
Measurement uncertainty: ±5%

Pulse duration: Not applicable

Max. radiant power

per pulse: Not applicable

Labeling – Class IIIa



Laser classification – Class 3R

- Article number 746718
- Serial number 255-XXXXX
- The warning label "Class 3R LASER PRODUCT"

The product with a stationary rotating head is a Class 3R product in accordance with: *)

- IEC 60825-1 (2001-08): "Safety of Laser Products".
- EN 60825-1:1994 + A11:1996 + A2:2001: "Safety of Laser Products".

*) *Class 2 product if rotating head is rotating or scanning*

Class 3R Laser Products: Direct intrabeam viewing is always hazardous. Avoid direct eye exposure. The accessible emission limit is within five times the accessible emission limits of Class 2 in the wavelength range from 400 nm to 700 nm.



WARNING:

Direct intrabeam viewing is always hazardous.

Precautions: Do not stare into the beam or direct it towards other people unnecessarily. These measures are also valid for the reflected beam.



WARNING:

Looking directly into the reflected laser beam could be dangerous to the eyes when the laser beam is aimed at areas that reflect like a mirror or emit reflections unexpectedly, for example prisms, mirrors, metallic surfaces or windows.

Precautions: Do not aim at areas that are essentially reflective, such as a

mirror, or which could emit unwanted reflections. Do not look through or beside the optical sight at prisms or reflecting objects when the laser is switched on.



WARNING:

The use of Laser Class 3R equipment can be dangerous.

Precautions: To counteract hazards, it is essential for every user to respect the safety precautions and control measures specified in the standard IEC 60825-1 (2001-08) resp. EN 60825-1:1994 + A11:1996 + A2:2001, within the hazard distance*); pay particular attention to Section Three "Users Guide".

Following an interpretation of the main points in the relevant section of the standard quoted.

Class 3R Laser Products used on construction sites and outdoors, for example surveying, alignment, leveling:

- a) Only qualified and trained persons should be assigned to install, adjust and operate the laser equipment.
- b) Areas in which these lasers are used should be posted with an appropriate laser warning sign.
- c) Precautions should be taken to ensure that persons do not look directly, with or without an optical instrument, into the beam.
- d) The laser beam should be terminated at the end of its useful path and should in all cases be terminated if the hazardous beam path extends beyond the limit (hazard distance *) of the area in which the presence and activities of

personnel are monitored for reasons of protection from laser radiation.

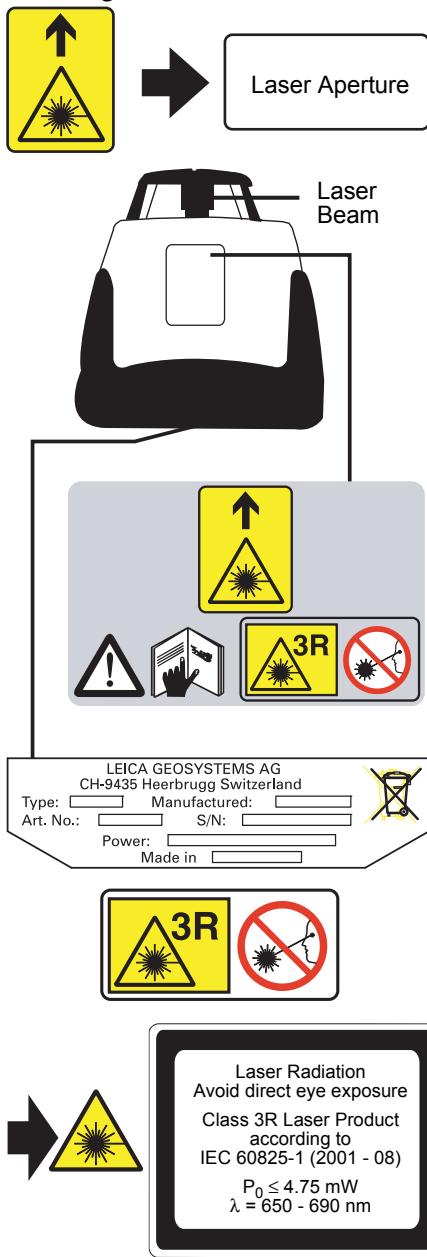
- e) The laser beam path should be located well above or below eye level whereever practicable.
- f) When not in use the Laser Product should be stored in a location where unauthorized personnel cannot gain access.
- g) Precautions should be taken to ensure that the laser beam is not intentionally directed at mirrorlike, specular surfaces for example mirrors, metal surfaces or windows. But, more importantly, at flat or concave mirror-like surfaces.

**) The hazard distance is the distance from the laser at which the beam irradiance or radiant exposure equals the maximum permissible value to which personnel may be exposed without being exposed to a health risk.*

Products with an integrated distancer of laser class 3R this hazard distance is 103 m / 337 ft. At this distance, the laser beam rates as Class 1, that means direct intrabeam viewing is not hazardous.

Beam Divergence: 0.2 mrad
Maximum radiant power: 3 mW
Measurement uncertainty: $\pm 5\%$
Pulse duration: Not applicable
Max. radiant power per pulse: Not applicable

Labeling – Class 3R



Laser classification – Class II / 2

- Article number 732001
- Serial number 200-XXXXX
- The warning label “Laser class 2” and “CLASS II LASER PRODUCT”

The product is a Class 2 laser product in accordance with:

- IEC 60825-1:1993 + A1:1997 + A2:2001 "Radiation safety of laser products"
- EN 60825-1:1994 + A11:1996 + A2:2001 "Radiation safety of laser products"

The product is a Class II laser product in accordance with:

- FDA 21CFR Ch.I §1040: 2002 (US Department of Health and Human Service, Code of Federal Regulations)

Class 2/II laser products: Do not stare into the beam or direct it unnecessarily at other persons. Eye protection is normally afforded by aversion responses including the blink reflex.



WARNING:

It can be dangerous to look into the beam with optical equipment (i.e. binoculars, telescopes)

Precautions: Do not look directly into the beam with optical equipment.

Beam divergence: 0.2 mrad
Maximum radiant

power: 3 mW rotating mode

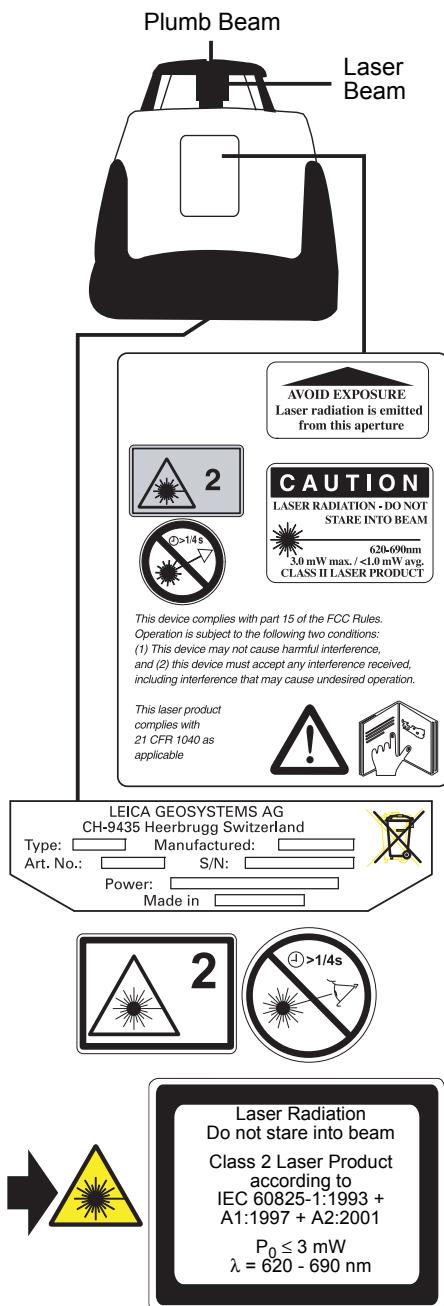
Measurement uncertainty: $\pm 5\%$

Pulse duration Not applicable

Max. radiant power

per pulse Not applicable

Labeling – Class II / 2



Electromagnetic Compatibility (EMC)

The term "electromagnetic compatibility" is taken to mean the capability of the laser unit to function smoothly in an environment where electromagnetic radiation and electrostatic discharges are present, and without causing electromagnetic disturbances to other equipment.



WARNING:

Electromagnetic radiation can cause disturbances in other equipment.

Although the laser units meet the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that other equipment may be disturbed.



CAUTION:

There is a risk that disturbances may be caused in other equipment if the laser unit is used in conjunction with accessories from other manufacturers, e.g. walkie-talkies, mobile phones.

Precautions: Use only the equipment and accessories recommended by Leica Geosystems. When combined with the laser unit, they meet the strict requirements stipulated by the guidelines and standards.



CAUTION:

Disturbances caused by electromagnetic radiation can result in the tolerance limits for measurements being exceeded.

Although the laser meets the strict regulations and standards which are in force in this connection, Leica Geosystems cannot completely exclude the possibility that the laser unit may be disturbed by very intense electromagnetic radiation, e.g. near radio transmitters, walkie-talkies, diesel generators, power cables.

Check the plausibility of results obtained under these conditions.

FCC Statement (applicable in the U.S.)



WARNING:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Increase the separation between the equipment and the receiver.

- Consult the dealer or an experienced radio/TV technician for help.
- Reorient or relocate the receiving antenna.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

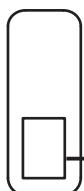


WARNING:

Changes or modifications not expressly approved by Leica Geosystems could void the user's authority to operate the equipment.



This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Leica Geosystems AG,
Heerbrugg, Switzerland,
has been certified as being
equipped with a quality
system which meets the
International Standards of
Quality Management and
Quality Systems (ISO
standard 9001) and
Environmental
Management Systems
(ISO standard 14001).**



**Total Quality Management -
Our commitment to total
customer satisfaction.**

Ask your local Leica
Geosystems agent for more
information about our TQM
program.

- when it has to be **right**

Leica
Geosystems

732987-3.2.1en

Printed in Switzerland -
Copyright Leica Geosystems AG, Heerbrugg
Switzerland 2006
(Original Text)

Leica Geosystems AG

CH-9435 Heerbrugg
(Switzerland)
Phone +41 71 727 31 31
Fax +41 71 727 46 73
www.leica-geosystems.com