

Version 2.0 English

- when it has to be **right**



Introduction

Congratulations on the purchase of a GPS900 series instrument.

Purchase

This manual contains important safety directions as well as instructions for setting up the product and operating it. Refer to "9 Safety Directions" for further information. Read carefully through the User Manual before you switch on the product.

Product identification

The type and serial number of your product are indicated on the type plate. Enter the type and serial number in your manual and always refer to this information when you need to contact your agency or Leica Geosystems authorized service workshop.

Туре:_____

Serial No.:

Symbols used in this manual

The symbols used in this manual have the following meanings:

Туре	Description
▲ Danger	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
Marning	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.
() J	Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

- The RX900 controller is available as RX900 or as RX900c. The name RX900 is used througout the manual and may also represent the RX900c.
- A GPS900 real-time rover can only be made up of an ATX900 GG GNSS antenna together with the RX900 controller, the GFU radio and the GHT56 holder.
- A GPS900 real-time reference station can only be set up using an ATX900 GG GNSS antenna and the RX900 controller, the GFU radio and the GEV205 cable.



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1 Unpacking the Container

1.1 Container Contents

Description

The main components required for the cableless GNSS real-time system are combined in one transport container.

Container for GPS900 and delivered accessories part 1 of 2



Container for GPS900 and delivered accessories part 2 of 2



- a) GEB211 batteries for ATX900 GG and RX900
- b) GEV205 Y-cable
- c) ATX900 GG
- d) GHT56 holder for RX900
- e) Stylus for touch screen
- f) GHT52 clamp
- g) Radio antennas
- h) CD ROM
- i) Radio housing
-) Tightening screw for GHT52
- k) GEV173 ATX900 GG-RX900 cable
-) ATX900 GG

GPS900

1.2 Components of the RX900 Controller

Upperside of RX900



- a) Touch screen
- b) Keyboard
- c) Hand strap bottom clips
- d) LEMO port, with integrated USB port



- a) Bottom spring clip for pole holder
- b) Top clips for pole holder
- c) Hand strap top clips
- d) Stylus for touch screen
- e) Hand strap bottom clips
- f) LEMO port, with integrated USB port
- g) Battery compartment For RX900c with CompactFlash card compartment

A Bluetooth port is included inside RX900, to facilitate connectivity to ATX900 GG.

1.3

Components of the GHT56 Holder and GHT52 Clamp

Components of the GHT56 holder and GHT52 clamp The GHT56 holder and GHT52 clamp both consist of a number of components, as shown in the diagram.



Available Documentation and CD ROM Contents

Available product manuals

1.4

Three product manuals are available for GPS900:

Name of	Description of manual	Manual format	
manual		PRINTED	PDF
User Manual	All instructions required in order to operate the product to a basic level are contained in the User Manual. Provides an overview of the product together with technical data and safety directions.	✓	✓
Quick Guide	Provides an overview of the product and selected program functions.	✓	
Tutorial Manual	Step-by-step instructions, explaining/showing how to complete various survey tasks.		✓
Technical Reference Manual	Overall comprehensive guide to the product and program functions. Included are detailed descriptions of special software/hardware settings and software/hardware functions intended for technical specialists.		✓

CD ROM contents The GPS900 CD ROM contains software and documentation specific to GPS900:

Туре	Description
Software	System software
	Language software
	Application programs
	GPS900 Simulation
Documentation	GPS900 User Manual
	GPS900 Tutorial Manual
	GPS900 Technical Reference Manual
	GPS900 Equipment List

2 Using the RX900 Controller

2.1 The Keyboard

Keyboard display



Special Keys

Кеу	Function
Hot keys F7-F12	User definable keys for access to any application, configura- tion or function.
PROG (ON)	If the receiver is off: press and hold for 2 s to turn it on.
	If the receiver is on: press at any time to access the Programs screen, where a program can be selected.
USER	User definable menu for quick access anytime and access to all STATUS panels.

Other Keys

Кеу	Function
CAPS	Switches between upper case and lower case letters.
CE	Clears all entry at the beginning of user input.
	Clears the last character during user input.
ENTER	Selects the highlighted line and leads to the next logical menu / dialogue.
	Starts the edit mode for edit fields.
	Opens a choicelist.

Кеу	Function
ESC	Leaves the current menu or dialogue without storing any changes.
	Turns receiver off when held for 2 s in the Main Menu screen.
SHIFT	Switches between the first and the second level of function keys.
SPACE	Enters a blank.
Arrow keys	Moves the focus on the screen.
Alpha keys	To type letters.
Function keys F1-F6	Correspond to six softkeys that appear on the bottom of the screen when the screen is activated.
Numeric keys	To type numbers.

Key combinations

Кеу	Function
PROG plus USER	Turns receiver off when held in the Main Menu screen.
SHIFT 스	Pages up.
SHIFT 🤝	Pages down.

Кеу	Function
SHIFT PROG (💐)	Displays the Windows CE task bar and start menu.

2.2

The Screen Display

Screen



Elements

Туре	Description	
Time	The current local time is shown.	
Caption	Shows location either in the Main Menu screen, under PROG key or USER key.	
Title	Name of the screen is shown.	
Screen area	The working area of the screen.	

Туре	Description	
Message line	Messages are shown for 10 s.	
Icons	Shows current status information of the receiver. Can be used with touch screen to access the subsequent screen.	
ESC ⊠	Can be used with touch screen. Same functionality as the ESC fixed key. The last operation will be undone.	
CAPS	The caps mode for upper case letters is active. The caps mode is activated and deactivated by pressing UPPER (F5) or LOWER (F5) in some screens.	
SHIFT icon	Shows the status of the SHIFT key; either first or second level of softkeys is selected. Can be used with touch screen and has the same functionality as the fixed key SHIFT .	
Softkeys	Commands can be executed using F1 - F6 keys. The commands assigned to the softkeys are screen dependent. Can be used directly with touch screen.	

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2.3 **The Icons - Showing Receiver Status** Description Icons show infomation about the current status of the receiver. Position of the Ь c d e f ล g h icons on the screen 11:39 A 11.0% Hir I 8 1218 Henu Position status a) Ь) Number of visible satellites Contributing satellites c1 Stakeou ograms_ 3 Real-time status d) Position mode e) Bluetooth f) 6 Tools_ Convert_ Б Config_ Data management g) h) Batterv CONT i) SHIFT GPS900 007

Position status

Displays the status of the current position. Touch screen: Tapping the icon leads to STATUS Position.

lcon	Description	
No icon	No position available.	

lcon	Description		
\oplus	Autonomous solution available.		
*	Code solution available.		
- -	Phase fixed solution available. The ticks indicate that an ambiguity check is being made.		

Number of visible satellites Displays the number of theoretically visible satellites above the configured cut off angle according to the current almanac. Touch according to the current almanac. Touch according to the current almanac.

Touch screen: Tapping the icon leads to STATUS Satellites.

lcon	Description	
46 8	The number of satellites being tracked.	

ContributingDisplays the number of satellites that are contributing to the currently computedsatellitesposition solution.

Touch screen: Tapping the icon leads to STATUS Satellites.

lcon		Description		
L1= 8 L2= 8	G= 8 R= 2	When a position status icon is displayed, the number of satellites currently used for the position computation are shown.		
		If no position is currently available but satellites are being tracked then the L1 and L2 values (GPS only) or the G and R values (GPS & GLONASS) show how many satellites are being tracked.		
		(B)	The number of contributing satellites can differ from the number of visible satellites. This may be either because satellites cannot be viewed or the observations to these satellites are considered to be too noisy to be used in the position solution.	
G= 5 R= 0		J.	The number of contributing GLONASS satellites could be zero if five or more GPS satellites are used for the position computation. The processing algo- rithm automatically selects the best possible set of satellite combinations for the position computa- tion. A position computation with R = 0 is certainly within the specified reliability.	

Real-time device and real-time status Displays the real-time device configured to be used and its status. **Touch screen:** Tapping the icon leads to **STATUS Real-Time Input**.

Real-time mode: Reference

An arrow pointing up indicates a reference configuration, it does not indicate if the device is working. The arrow flashes when a real-time message is sent. When two real-time devices are configured, then the icon for the real-time 1 device is shown.

Icon Description	
	Radio transmitting

Real-time mode: Rover

An arrow pointing down indicates a rover configuration. The arrow flashes when realtime messages are received.

Icon	Description
	Radio receiving.

Position mode Displays the current position mode depending on the configuration defined. Symbols are added to the basic position mode icon when logging of auto points is configured. As soon as this icon becomes visible the receiver is in a stage where practical operation can commence.

lcon	Position Point mode occupation		Logging of auto points	Move antenna	
抓	Static	Yes	No	No	
র্ক্ষা	Moving	No	No	Yes	
<u>چې</u> او	Moving	No	By time	Yes	
\$] /	Moving	No	By distance or height or by user decision	Yes	
\$ 1 .	Moving	No	By stop & go	Yes	

Bluetooth

The status of each Bluetooth port and any Bluetooth connection is displayed. **Touch screen:** Tapping the icon leads to **STATUS Bluetooth**.

Icon	Description		
*	Bluetooth is integrated.		
***	A Bluetooth connection is established and active.		
∦ 123	Bluetooth connection not established. Bluetooth port 1, 2 and 3 are down.		
∦ ∷∷ 123	Bluetooth connection established. Bluetooth port 1, 2 and 3 are active.		

Data managementThe number of lines and areas currently open in the active job is displayed.Touch screen: Tapping the icon leads to MANAGE Data: Job Name

Icon	Description
- 23 -	The active job in Data Management.

Battery icons

The status of the battery is displayed. The remaining power in the battery is indicated by six levels.

Touch screen: Tapping the icon leads to STATUS Battery & Memory.

Icon	Description	
	Internal battery is in use.	

SHIFT

The status of the **SHIFT** key is displayed.

Touch screen: Tapping the icon shows additional softkeys.

Icon	Description	
Û	Additional softkeys are available in the currently visible screen.	
1	The SHIFT key has been pressed.	

2.4 The Symbols - Showing Receiver Settings

Description

Attributes

Symbols show information about current receiver settings.

Symbol	Description	Example
8	The attribute symbol is displayed in the MANAGE Codes screen to indicate codes that have attributes attached.	e E

Filter

Symbol	Description	Example
Ŷ	The filter symbol is shown on the Points page if a stakeout filter is active.	Points ▼

Limits

Symbol	Description	Example
ā	The limits symbol indicates that a defined limit has been exceeded. For example, the exceeding of a residual limit in the Determine Coordinate System program.	0.022 0.0519 -0.005

Largest residual

Symbol	Description	Example
Y	The largest residual symbol is used to indicate the largest residual in the Determine Coordinate System program - DET C SYS Step 4: Check Residuals.	East[m] -0.069! 0.022

Staked out

Symbol	Description	Example
₽s	The staked out symbol is used in the MANAGE Data: Job Name screen to indicate points which have been staked out.	1233

3	Using the ATX900 GG Antenna	
3.1	Understanding Antenna Heights	
Description	 The height of the GNSS antenna above the point consists of three components the vertical height reading, the vertical offset, the vertical phase centre variations. For most operations, pre-configured standard settings in RX900 can be used. They automatically take the vertical phase centre variations into account. 	
MRP	GPS900 accepts vertical height readings to the Mechanical Reference Plane, MPR.	
Vertical phase centre variations	These are handled automatically in the standard antenna records. The antenna cali- brations to determine the phase centre variations were executed by Geo++ [®] GmbH.	
(F	Pillar setup . For other than the GRT146 carrier, the dimensions must be determined and the vertical offset must be adapted.	
	Tripod setup . For height measurement devices other than the height hook, the dimensions must be determined and the vertical offset must be adapted.	
(B)	Pole setup. For other than Leica poles, the dimensions must be determined.	

3.2 The Mechanical Reference Plane, MRP

Description

The Mechanical Reference Plane:

- is where the antenna heights are measured to.
- is where the phase centre variations refer to.
- varies for different antennas.

MRP for ATX900 GG The MRP for ATX900 GG is shown in the diagram.



a) The mechanical reference plane is the underside of the threaded metal insert.

3.3

Measuring the Antenna Height for a Pillar Setup

Measuring the antenna height, a quick overview

Setup type	Antenna name	The required measurement
Pillar	ATX900 GG Pillar	the vertical height reading to the MRP.



- a) Mechanical reference plane MRP
- b) Vertical phase centre offset for L1
- c) Vertical phase centre offset for L2
- d) Vertical Height Reading

The Vertical offset = 0.00

Determining the antenna height with the GRT146 carrier step-bystep



3.4

Measuring the Antenna Height for a Tripod Setup

Measuring the antenna height, a quick overview

Setup Type	Antenna type	The required measurement
Tripod	ATX900 GG Tripod	the vertical height reading from the height hook.



- a) Mechanical reference plane MRP
- b) Vertical phase centre offset for L1
- c) Vertical phase centre offset for L2
- d) Vertical offset
- e) Vertical Height Reading

Vertical offset = 0.36
Determining the antenna height with the height hook step-by-step

Step	Description
1.	The vertical height reading = vertical height reading from the height hook.
	 The vertical height reading is the height difference between the ground mark and the bottom end of the height hook.
	• The vertical offset of 0.36 m is automatically stored in the antenna setup record for a tripod setup and will automatically be taken into account. It does not need to be entered.

3.5

Measuring the Antenna Height for a Pole Setup

Measuring the antenna height, a quick overview

Setup Type	Antenna type	The required measurement
Pole	ATX900 GG Pole	the vertical height reading of the pole.





- b) Vertical phase centre offset for L1
- c) Vertical phase centre offset for L2
- d) Vertical Height Reading

Vertical offset = 0.00

Determining the antenna height step-by-step

Step	Description	
1.	The vertical height reading =	
	 2.00 m for the Leica threaded aluminium pole consisting of an upper half and a lower half. 3.00 m for the Leica threaded aluminium pole consisting of an upper 	
	 half and a lower half, with an additional 1.00 m pole section. 2.00 m for the fully extended Leica telescopic carbon-fibre pole. 	

3.6 The LED Indicators on the ATX900 GG Antenna

LED indicators

Description

ATX900 GG has Light Emitting $\mathbf{D}\text{iode}$ indicators. They indicate the basic antenna status.

Diagram of the LED indicators



TRK Tracking LED BT Bluetooth LED PWR Power LED

Description of the LED indicators

IF the	is	THEN
TRK	off	No satellites are tracked.
	flashing green	Less than four satellites are tracked, a position is not yet available.
	green	Enough satellites are tracked to compute a position.
	red	ATX900 GG is initialising.
BT	green	Bluetooth is in data mode and ready for connecting.
	purple	Bluetooth is connecting.
	blue	Bluetooth has connected.
	flashing blue	Data is being transferred
PWR	off	Power is off.
	green	Power is okay.
	flashing green	Power is low. The remaining time for which enough power is available depends on the type of survey, the temperature and the age of the battery.

Turning On / Turning	g Off GPS900	42	
4	Turning On / Turning Off		
4.1	Turning On/Off, Switching to Desktop		
Turning RX900 on	• Press and hold PROG (ON) for 2 s. (RX900 must have a power supply).		
Turning RX900 off	 RX900 can only be turned off in the Main Menu screen. Press the USER and PROG keys simultaneously, or Hold ESC for 2 s. 		
Putting RX900 into sleep mode	 In sleep mode, RX900 shuts down and reduces power consumption. Reboo from sleep mode is quicker than a cold start after turning off. RX900 can only be put into sleep mode in the Main Menu screen. Press SHIFT SLEEP (F3) to put RX900 into sleep mode. 	ting	





Accessing the Main Menu screen

IF	THEN
RX900 is started	• the Leica software starts up automatically.
Windows CE desktop is active	• double click 🔓 to display the Leica software, or

IF	THEN	
	• press SHIFT PROG (#) to display the Leica software.	
Leica software is minimised	double click b to maximise it, or	
	• select GPS900 in the task bar to maximise it.	

Accessing the Windows CE desktop

IF	THEN
Leica software is to be minimised	SHIFT MINIM (F5) in the Main Menu screen.
Leica software is to be closed	SHIFT EXIT (F6) in the Main Menu screen.
Windows CE task bar is to be displayed	SHIFT PROG (🐙).

4.2 Operating by Keyboard or Touch Screen

Operating with the keyboard and the touch screen

The user interface is operated either by the keyboard or by the touch screen, with supplied stylus. The workflow is the same for keyboard and touch screen entry, the only difference lies in the way information is selected and entered.

Operation by keyboard

Information is selected and entered using the keys. Refer to "2.1 The Keyboard" for a detailed description of the keys on the keyboard and their function.

Operation by touch screen

Information is selected and entered on the screen using the supplied stylus.

Operation	Description
To select an item	Tap on the item.
To start the edit mode in input fields	Tap on the input field.
To highlight an item or parts of it for editing	Drag the supplied stylus from the left to the right.
To accept data entered into an input field and exit the edit mode	Tap on the screen outside of the input field.

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5

Understanding the Main Menu

Description

The Main Menu is the first screen displayed when the instrument is switched on.

The Main Menu screen



Description of the Main Menu functions

Main menu function	Short description of functions
J. Stakeout	To start staking out.
A Programs	To select and start programs.

Main menu function		ort description of functions
🔋 Manage	•	To manage jobs and their data, codelists and coordinate systems.
Sonvert	•	To export data from a job on RX900 to a file in the internal memory (RX900) or on the CF card (RX900c) in a customised ASCII format or in DXF format.
	•	To import ASCII, GSI or DXF data from a file in the internal memory (RX900) or on the CF card (RX900c) to a job on RX900.
	•	To copy points between jobs.
🤹 Config	•	To access all configuration parameters related to a survey, RX900 and the radio.
Tools	•	To format the memory device.
	•	To transfer non data related files between RX900 and internal memory (RX900) or CF card (RX900c).
	•	To upload files relevant for RX900 and ATX900 GG func- tionality, for example, firmware and language files.

1

Main menu function	Short description of functions
	 To perform arithmetic operations such as addition, subtraction, multiplication, division, statistical func- tions, trigonometric functions, conversions or roots.
	• To view files in the internal memory (RX900) or CF card (RX900c).
	• To manually type in or upload a licence key.

6 Setting Up and Starting Up

6.1 Setting Up as a Real-Time Reference

Diagram showing real-time reference setup



The GRT146 carrier has a screw fitting. ATX900 GG fits directly onto this fitting.

Setup and Startup for real-time reference step-by-step

Step	Description		
1.	Setting Up the Equipment		
	• Set up the tripod, mount and level the tribrach onto the tripod.		
	Check that the tribrach is correctly centred over the marker.		
	Place and lock the carrier into the tribrach.		
	 Insert the battery into ATX900 GG and screw ATX900 GG onto the carrier. 		
	Check that the tribrach is still correctly positioned and levelled.		
	Hang the external battery onto a tripod leg.		
	• Hang the tripod bracket onto a tripod leg and attach the radio housing onto the tripod bracket. Make sure that the radio antenna is screwed onto the radio housing.		
	Take the Y-cable.		
	• Attach the connector with the 8 pin plug to ATX900 GG.		
	Attach the connector with the 5 pin plug to the external battery.		
	Attach the connector without pins to the radio housing.		
	Insert the CompactFlash card into RX900 (for RX900c only).		
	• Insert the battery into RX900 and turn on RX900 and ATX900 GG.		

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Step	Description
2.	Starting Up with the Setup Reference Program



2.a Selecting the Job

- Select a Job.
- Press **DATA (F5)** to check all of the points in the selected job.
- Press CONT (F1) to continue.

		38
CONT	DATA	CSYS

11:38 SETUP REF Reference: Set Antenna X	2
Antenna : ATX900 Tripod) ID Address : 01d1d1d1 Device : 1231 ATX900	•
CONT I SRCH I 15.21 CONFIGURE 田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田	• 2
Radio Type : Satelline 3AS	
Channel : 7 Actual Freq : 433.7000 MHz	•
CONT SCAN	

2.b Selecting the Antenna

 Select the antenna.*
 For a pillar setup, select ATX900 GG Pillar.

For a tripod setup, select ATX900 GG Tripod.

- Press **SRCH (F4)** to start searching for the antenna, via Bluetooth.
- Press CONT (F1) to continue.

2.c Setting the Radio Channel **

Enter the radio channel. It is important to remember that the radio at the reference and the radio at the rover must be set to the same frequency.

Press **SCAN (F5)** to scan for the radio at the reference.

• Press CONT (F1) to continue.

13:11 SETUP REF Set Up Refer Point ID	ence Station	* `. 1 X	2 • •
Antenna Ht	:	1.6860 m	
WGS84 Lat	: 47°24'3	3.14057" N	
WGS84 Long	: 9°37'0	3.22003" E	•
WGS84 E11 Ht	: :	474.2801 =	
		3 0	
CONT COORD	HERE		•
SETUP REF	F 0 12 0 1 €	* `	2
Reference		×	
Point ID	:	0001	
Antonna Ht	:	1.5850 =	
Time at Poin	it:	00:00:47	
GDOP	:	•••••	
FNSH		30	

2.d Selecting the Reference Point

- Select the known point.***
- Enter the antenna height.
 For a pillar setup, this will be the vertical height reading to the MRP.
 For a tripod setup, this will be the vertical height reading from the height hook.
- Press HERE (F4) to use the current navigated position for the setup.
- Press CONT (F1) to continue.

2.e Completing the Setup

 Press FNSH (F1) to continue and return to the Main Menu screen.

- * Refer to "3 Using the ATX900 GG Antenna" for further information on antennas and antenna heights.
- ** Depending on the radio attached the screen content slightly differs.
- *** When setting the reference point for the setup, the selected point must be able to be viewed as WGS1984 coordinates.

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6.2

Setting Up as a Real-Time Rover

Diagram showing real-time rover setup



- a) ATX900 GG
- b) GEB211 battery for ATX900 GG, RX900 and radio
- c) Compression lock of the pole
- d) GHT56 holder for RX900
- e) Snap-lock of the pole
- f) GLS30 telescopic carbon-fibre pole
- g) Radio antenna
- h) CompactFlash card
- i) RX900
- j) Radio

Setup and Startup step-by-step

Step	Description
1.	Setting Up the Equipment
	Insert the battery into ATX900 GG.
	• Screw ATX900 GG onto the top of the telescopic pole.
	Ensure that the compression lock is not clamped.
	• Fully extend the telescopic pole and ensure that the snap-lock clicks into its position. The snap-lock ensures that there is no slipping of the telescopic pole.
	Clamp the compression lock. The compression lock maintains straight- ness.
	• Remove the plastic sleeve from the clamp. Slide the clamp onto the bottom part of the telescopic pole.
	• Fix the holder to the clamp with the tightening screw. Before tight- ening, ensure that the holder is at a comfortable working height and angle. This can be achieved by sliding the clamp along the pole and rotating the holder about the clamp. Tighten the tightening screw.
	Insert the CompactFlash card into RX900 (for RX900c only).
	Insert the battery into RX900.

Step	Description	
	• Clip RX900 onto the holder and lock into position. Refer to "Attaching RX900 to the GHT56 holder step-by-step" for further information.	
	• Turn on ATX900 GG and RX900.	
2.	Starting Up with the Survey Program	

11:41 SURVEY	8 L2-7	`∎#I *	ž	-	2.
Survey Begin Job	:	Det	fault	× •	•
Coord System	:	WGS	1984	l I	•
Codelist	:	<	None>	· •	

a Selecting the Job

- Select the Job Default.
- Select the WGS1984 coord system.
- Press CONT (F1) to continue.

			38
CONT	CONF	DATA	CSYS

11:43 SURVEY	- 8 12-7 13	÷ ž 😈
Survey Auto M	ap	
Point ID	:	0002
Antenna Ht	:	2.0000 m
3D CQ	:	0.0095 a 0
		FAVE

2.b Surveying the Point

- Move to the point, enter the point ID.
- Enter the antenna height. For Leica standard poles = 2.00 m.
- Press OCUPY (F1) to start measuring the point.*/*****

Press **STOP (F1)** when enough data is collected for the point. Press **STORE (F1)** to store the point.

- Are more points to be surveyed? If yes, repeat the first three points. If no, continue with the next point.
- Continue to press **ESC** until the Main Menu screen appears.
- * Before the point is measured, the position mode icon is the moving icon, indicating that the rover can still be moved around.
- ** As the point is being measured, the position mode icon changes to the static icon, indicating that the rover should remain stationary.
- *** SHIFT QUIT (F6) always terminates the survey operation. In this case all data collected since pressing OCUPY (F1) is lost.

Setting Up and Starting Up

Attaching the GHT56 holder to the left or right side of the pole

The GHT56 holder can be attached either to the left side or right side of the pole.		
Step	Description	
(a)	Refer to "1.3 Components of the GHT56 Holder and GHT52 Clamp" for further information on the holder.	
1.	Remove the thumb screw from the mounting plate.	
2.	Remove the mounting arm from the mounting plate and re-position it.	
3.	Re-fix the mounting arm to the mounting plate with the tightening screw.	

Attaching RX900 to the GHT56 holder step-by-step

Step	Description
() I	A locking mechanism is incorporated in the mounting plate of the holder.
1.	Before RX900 is placed onto the mounting plate ensure that the locking pin is put into the unlocked position. To unlock the locking pin, push down the red button situated on top of the mounting plate.
2.	Hold RX900 above the holder and lower the end into the holder.

1	-
ο	2

Step	Description	
3.	Apply slight pressure in a downward direction and then lower the top part of RX900 until the unit is clicked into the holder. The guides of the holder aid in this action.	

Step	Description
4.	After RX900 is placed onto the mounting plate ensure that the locking pin is put into the locked position. To lock the locking pin, push up the red button from below.
	GF5900.071

Detaching RX900 from the GHT56 holder step-bystep

Step	Description
1.	Unlock the locking pin by pushing down the red button situated on top of the mounting plate.
2.	Place the palm over the top of RX900 until the fingers grip the bar of the holder under RX900.
3.	Push the top of RX900 toward the bar of the holder.

Step	Description	
4.	While in this position, raise the top of RX900 from the holder.	2 (P5900.009

Connecting to the ATX900 GG Antenna with Bluetooth

Communicating via Bluetooth step-by-step

6.3

Step	Description
1.	Select Main Menu: 🎬 🔐 📭
2.	Select Comm: Bluetooth.
3.	Press SRCH (F4) to search for Bluetooth devices. The ATX900 GG antenna must be turned on.
4.	The CONFIGURE Search Bluetooth Device screen appears.
	All available Bluetooth devices are displayed.
5.	Highlight and select the antenna to be used.
6.	Press CONT (F1). Press CONT (F1) to return to the Main Menu screen.
	If the antenna selected is connected for the first time, a Windows CE authentication request comes up. Type in 0000 as identification number for Leica's Bluetooth and click OK .
(F	Once the Bluetooth connection is established, the Bluetooth LED on the antenna starts flashing in blue.

Setting Up and Starting Up

GPS900

6.4 Changing the Battery on the RX900 Controller

Changing the battery on RX900 step-by-step



Step	Description
1.	Turn RX900 over to gain access to the battery compartment.
2.	Push the slide fastener in the direction of the arrow with the open-lock symbol.
3.	Open the battery compartment.

Step	Description
4.	Pull the battery from the battery compartment.
5.	A polarity of the battery is displayed inside the battery compartment. This is a visual aid to assist in placing the battery correctly.
6.	Place the battery into the battery compartment, ensuring that the engraved arrow symbol is pointing toward the battery contacts.
7.	Close the battery compartment by pushing the slide fastener in the direction of the arrow with the close-lock symbol.

GPS900



Step	Description
	The CompactFlash card is inserted into a slot inside the battery compart- ment (only valid for RX900c).
1.	Turn RX900c over to gain access to the battery compartment.

Step	Description
2.	Push the slide fastener in the direction of the arrow with the open-lock symbol.
3.	Open the battery compartment.
4.	Pull the battery from the battery compartment.
5.	The card should be held with the label for the care instructions upwards and the contacts facing the slot.
	Slide the card firmly into the slot until it clicks into position.
6.	Place the battery into the battery compartment, ensuring that the engraved arrow symbol is pointing toward the battery contacts.
7.	Close the battery compartment by pushing the slide fastener in the direc- tion of the arrow with the close-lock symbol.
8.	To remove the card, open the cover of the battery compartment.
9.	Pull the battery from the battery compartment.
10.	Press the eject button on the right side of the card slot twice.
11.	Pull out the CompactFlash card and close the compartment cover.

Setting Up and Starting Up

6.6

Changing the Battery on the ATX900 GG Antenna

Changing the battery on ATX900 GG step-by-step



Step	Description
1.	Turn ATX900 GG over to gain access to the battery compartment.
2.	Open the battery compartment by pushing the slide fastener in the direc- tion of the arrow with the open-lock symbol.
3.	Pull out the battery housing. The battery is attached to the housing.
4.	Hold the battery housing and pull the battery from the battery housing.
5.	A polarity of the battery is displayed inside the battery housing. This is a visual aid to assist in placing the battery correctly.

Step	Description
6.	Place the battery onto the battery housing, ensuring that the contacts are facing outward. Click the battery into position.
7.	Close the battery compartment by pushing the slide fastener in the direction of the arrow with the close-lock symbol.

6.7 Essential Battery Operating Principles



Primary Use/Charging

- The battery must be charged prior to using it for the first time because it is delivered with an energy content as low as possible.
- For new batteries or batteries that have been stored for a long time (> three months), it is effectual to make only one charge/discharge cycle.
- For Li-Ion batteries, a single discharging and charging cycle is sufficient. We recommend carrying out the process when the battery capacity indicated on the charger or on a Leica Geosystems product deviates significantly from the actual battery capacity available.
- The permissible temperature range for charging is between 0°C to +40°C/ +32°F to +104°F. For optimal charging we recommend charging the batteries at a low ambient temperature of +10°C to +20°C/+50°F to +68°F if possible.
- It is normal for the battery to become warm during charging. Using the chargers recommended by Leica Geosystems, it is not possible to charge the battery if the temperature is too high.



(B

Operation/Discharging

- The batteries can be operated from -20°C to +55°C/-4°F to +131°F.
- Low operating temperatures reduce the capacity that can be drawn; very high operating temperatures reduce the service life of the battery.
| 6.8 | Using Licence Keys | | |
|--------------------|--|--|--|
| Description | A licence key can be used to activate protected programs and protected receiver options and can be used to define the expiry date of the software maintenance. | | |
| Protected | A licence key is required for the following protected programs: | | |
| programs | Protected programs | | |
| | DTM Stakeout | | |
| | DXF Export | | |
| | Reference Line | | |
| | RoadRunner | | |
| | Volume Calculations | | |
| | | | |
| Protected receiver | A licence key is required for the following protected receiver option: | | |
| option | Protected receiver option | | |
| | • 2 Hz update rate | | |
| | • 5 Hz update rate | | |
| | GLONASS option | | |

Access



• Select a program on RX900 which is not yet activated.

Entering/Loading a licence key

- A licence key file can be uploaded to RX900. To upload a licence key file the file should be located on the \SYSTEM directory of the internal memory (RX900) or the CompactFlash card (RX900c). Licence key files use the naming convention L_123456.key, where 123456 is the instrument serial number.
- Licence keys can also be typed in manually.



Field	Description of Field
Method	• The method used to input the licence key to activate the program or the protected options or the software maintenance.
	• Upload Key File . The licence key file is uploaded from the internal memory (RX900) or the CompactFlash card (RX900c). The licence key file must be stored in the \SYSTEM directory in the internal memory (RX900) or the CompactFlash card (RX900c).
	 Manual Entry of Key. Allows the licence key to be typed in manually.
Кеу	 Available for <method: entry="" key="" manual="" of="">. The licence key required to activate a program. Entry is not case sensitive.</method:>

The next step

IF a licence key is to be	THEN
uploaded	select the method used to input the licence key and press ${\bf CONT}$ (F1).
deleted	press SHIFT DEL (F4).

Setting Up and Starting Up GPS900		
6.9	Checking and Adjusting the Circular Level of the T	[ribrach
Description	 The adjustable circular level on the tribrach is used to level the ATX⁴ antenna over the observation point. An incorrectly adjusted circular that the ATX900 GG antenna is not properly positioned over the pomeans that another point on the ground is observed. The tribrach should be checked and adjusted: at regular periods, before the first use, after long periods of transport, after long periods of work, if the temperature changes by more than 20 °C. 	900 GG level means int, which
Equipment checklist	 The required equipment for the checking and adjusting of the circular le Tripod, Tribrach, A carrier, with a precision bubble checked and adjusted or a TPS ins 	vel are: trument,

• Adjusting pin.

Checking and adjusting the circular level step-by-step

Step	Description
1.	Set up the tripod.
2.	Screw the tribrach onto the tripod.
3.	Fix the carrier/instrument onto the tribrach.
4.	Level the tribrach using the precision bubble on the carrier or the precision bubble on the instrument.
5.	Is the circular level on the tribrach centered and not extended beyond the enscribed circle?
	 If yes, no adjustment is required. The procedure is finished.
	• If no, the bubble requires adjusting. Continue with step 6.
6.	Remove the carrier/instrument.

Step	Description
7.	Centre the circular level using the adjustment pin in conjunction with the adjustment screws on the underside of the casing of the circular level.
8.	Fix the carrier/instrument onto the tribrach.
9.	Repeat steps 4. to 5.

6.10 Checking and Adjusting the Circular Bubble of the Pole

Checking and adjusting the circular bubble It is important that the adjustable circular bubble of the pole is kept in adjustment. Whenever the GPS900 equipment is sent for servicing to a Leica Geosystems authorized service workshop, it is recommended that the pole is also sent for servicing.

6.11	Guidelines for Correct Results with GNSS Surveys
Undisturbed satellite signal reception	Successful GNSS surveys require undisturbed satellite signal reception, especially at the receiver which serves as a reference. Set up the receivers in locations which are free of obstructions such as trees, buildings or mountains.
Steady antenna for static surveys	For static surveys, the antenna must be kept perfectly steady throughout the whole occupation of a point. Put the antenna on a tripod or pillar.
Centred and levelled antenna	Centre and level the antenna precisely over the marker.

7 Connecting a Computer with ActiveSync Description of To transfer data to or from the office computer, the RX900 controller must be ActiveSvnc connected to the office computer (optional for the RX900 controller with color screen) using Microsoft ActiveSync. Microsoft ActiveSync is the synchronization software for Windows mobile-based pocket computers. Installing Before data can be transferred, the ActiveSync software must first be installed on ActiveSync the office computer. The ActiveSync software is freeware and is supplied on the CPS900 CD ROM. Translated versions can be downloaded from the Microsoft website Installing the Description Step USB Driver This procedure is only required when connecting for the first time. (B) using the GEV161 USB cable 1. Start the office computer. step-by-step 2. Turn on RX900 by pressing and holding **PROG** (ON) for 2 s. 3. Connect the USB cable to RX900 and to the office computer. 4 Installing the USB driver The Found New Hardware Wizard appears on the office computer. . Select the **No** option (Windows Updates), click **Next** to continue. Select **Install from a list or specific location**. click **Next** to continue. •

Step	Description		
	•	Insert the GPS900 CD ROM, which contains the necessary USB driver.	
	•	Select Search removable media, click Next to continue.	
	•	The system will search and install the USB driver from the CD ROM. A confirmation window may appear, click Continue Anyway .	
	•	Click Finish to complete the process.	

Connecting to a PC	Step	Description
GEV161 USB cable	1.	Setting up the RX900 controller
step-by-step		• Turn on RX900 by pressing and holding PROG (ON) for 2 s.
		• Connect the USB cable to RX900 but not to the office computer.
	2.	Setting up ActiveSync for USB connection
		Start Microsoft ActiveSync on the office computer.
		 From the File menu, select Connection Settings. Ensure that the Allow USB connection with this desktop computer is checked. Click OK to close the dialogue.

• Connect the USB cable into a USB port on the office computer.

Connecting a Computer with ActiveSync GPS900

Step	Description		
	•	The New Partnership wizard appears on the office computer. Select the No option and click Next to continue.	
	RX900 is connected to ActiveSync as a guest. The following scree indicates a successful connection.		
		🚱 Microsoft ActiveSync 🛛 🔿 🖃 🖃 🗙 File: View: Tools: Help	
		CO CO Explore Options	
		Guest	
		Connected	
3.	Tra	ransferring Data	
	•	When the USB connection is established, data files can be transferred between RX900 and the office computer.	
	•	In the Microsoft ActiveSync window, click Explore to open an Explorer window.	
	•	The RX900 folders are displayed under Mobile Devices.	
	•	The RX900 internal memory (CF card for RX900c) is displayed under StorageCard .	



Ensure that RX900 has been configured to connect to the computer with USB cable. The settings can be checked from **Start/Settings/Control Panel/PC Connection**.

Connecting to a PC (LEICA Geo Office) using the GEV161 USB cable step-by-step

Step	Description		
1.	Setting up the RX900 controller		
	• Turn on RX900 by pressing and holding PROG (ON) for 2 s.		
	Connect the USB cable to RX900 but not to the office computer.		
2.	Setting up ActiveSync for USB connection		
	Start Microsoft ActiveSync on the office computer.		
	 From the File menu, select Connection Settings. Ensure that the Allow USB connection with this desktop computer is checked. Click OK to close the dialogue. 		
	Connect the USB cable into a USB port on the office computer.		
	• The New Partnership wizard appears on the office computer. Select the No option and click Next to continue.		
	RX900 is connected to ActiveSync as a guest.		
3.	Setting up LEICA Geo Office		
	Start LEICA Geo Office on the office computer.		
	Open Data Exchange Manager from the Tools menu.		

Connecting to

Step	Description	
	Click Refresh (F5) on the ActiveSync folder.	

Connecting to a PC	Step	Description
step-by-step	1.	Activating Bluetooth on the office computer
		• The steps required depend on the Bluetooth driver and other computer specific configurations. On the office computer, always ensure that:
		• the correct COM port is defined.
		• the COM port is configured as incoming, which allows Bluetooth devices to detect the computer.
	2.	Activating Bluetooth on RX900
		• Turn on RX900 by pressing and holding PROG (ON) for 2 s.
		Go to Start/Settings/Control Panel/Bluetooth Device.
		Click Scan Device.
		• Highlight the service required in the Untrusted box.
		• Click the> arrow to move the service to the Trusted box.

Step	Description
	Highlight the service required in the Trusted box.
	Right mouse click to access the context menu.
	Tick Active.
	 Go to Start/Settings/Control/System/Device Name to give RX900 a specific name.
	Go to Start/Settings/Control Panel/PC Connection.
	Select Bluetooth from the combo box.
	Go to Start/Programs/Communication/ActiveSync to initialise the communication.
	 As soon as the communication is initialised on RX900, ActiveSync establishes the link between the office computer and RX900.
3.	Setting up LEICA Geo Office
	Start LEICA Geo Office on the office computer.
	Open Data Exchange Manager from the Tools menu.
	Click Refresh (F5) on the ActiveSync folder.

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8	Care and Transport
8.1	Transport
Transport in a road vehicle	Never carry the product loose in a road vehicle, as it can be affected by shock and vibration. Always carry the product in its transport container and secure it.
Shipping	When transporting the product by rail, air or sea, always use the complete original Leica Geosystems packaging, transport container and cardboard box, or its equivalent, to protect against shock and vibration.
Shipping, transport of batteries	When transporting or shipping batteries, the person in charge of the product must ensure that the applicable national and international rules and regulations are observed. Before transportation or shipping, contact your local passenger or freight transport company.

8.2	Storage			
Product	Respect the temperature limits when storing the equipment, particularly in summe if the equipment is inside a vehicle. Refer to "10 Technical Data" for information about temperature limits.			
Li-lon batteries	 Refer to "10 Technical Data" for information about storage temperature range. A storage temperature range of -20 to +30°C/-4 to 68°F in a dry environment is recommended to minimise self-discharging of the battery. At the recommended storage temperature range, batteries containing a 10% to 50% charge can be stored for up to one year. After this storage period the batteries must be recharged. Remove batteries from the product and the charger before storing. After storage recharge batteries before using. Protect batteries from damp and wetness. Wet or damp batteries must be dried before storing or use. 			

GPS900	90
Cleaning and Drying	
Use only a clean, soft, lint-free cloth for cleaning. If necessary, moisten the c water or pure alcohol. Do not use other liquids; these may attack the polyme nents.	loth with er compo-
Dry the product, the transport container, the foam inserts and the access temperature not greater than 40° C / 108° F and clean them. Do not repack everything is completely dry.	ories at a cuntil
Keep plugs clean and dry. Blow away any dirt lodged in the plugs of the co cables.	nnecting
	GPS900 Cleaning and Drying Use only a clean, soft, lint-free cloth for cleaning. If necessary, moisten the construction of the second

Safety Directions General Introduction

Description

9 9.1

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

9.2	Intended Use	
	intended obe	

Permitted use

- Measuring raw data and computing coordinates using carrier phase and code signal from GNSS (Global Navigation Satellite System) satellites.
- Carrying out measurement tasks using various GNSS measuring techniques.
- Recording GNSS and position related data.
- Computation and evaluation by means of software.
- Data exchange via wireless communication.

Adverse use

- Use of the product without instruction.
- Use outside of the intended limits.
- Disabling safety systems.
- Removal of hazard notices.
- Opening the product using tools, for example screwdriver, unless this is specifically permitted for certain functions.
- Modification or conversion of the product.
- Use after misappropriation.
- Use of products with obviously recognizable damages or defects.
- Use with accessories from other manufacturers without the prior explicit approval of Leica Geosystems.
- Inadequate safeguards at the surveying site, for example when measuring on roads.

Safety Directions	GPS900	94
	 Controlling of machines, moving objects or similar monitoring app additional control- and safety installations. 	lication without
Marning Warning	Adverse use can lead to injury, malfunction and damage. It is the task of the person responsible for the equipment to inform hazards and how to counteract them. The product is not to be operate has been instructed on how to work with it.	the user about ed until the user

9.3 Limits of Use

Environment Suitable for use in an atmosphere appropriate for permanent human habitation: not suitable for use in aggressive or explosive environments.

Danger Local safety authorities and safety experts must be contacted before working in hazardous areas, or in close proximity to electrical installations or similar situations by the person in charge of the product.

Safety Directions	GPS900	96
9.4	Responsibilities	
Manufacturer of the product	Leica Geosystems AG, CH-9435 Heerbrugg, hereinafter referred to as Leica Geos tems, is responsible for supplying the product, including the user manual and origi accessories, in a completely safe condition.	ys- nal
Manufacturers of non Leica Geosystems accessories	The manufacturers of non Leica Geosystems accessories for the product are resp sible for developing, implementing and communicating safety concepts for their products, and are also responsible for the effectiveness of those safety concepts combination with the Leica Geosystems product.	on- 5 in
Person in charge of the product	 The person in charge of the product has the following duties: To understand the safety instructions on the product and the instructions in taser manual. To be familiar with local regulations relating to safety and accident prevention to inform Leica Geosystems immediately if the product and the application becomes unsafe. To ensure that the national laws, regulations and conditions for the operation radio transmitters are respected. 	the on.
Marning	The person responsible for the product must ensure that it is used in accordance w the instructions. This person is also accountable for the training and the deployme of personnel who use the product and for the safety of the equipment in use.	<i>i</i> ith ent

9.5 International Warranty, Software Licence Agreement International The International Warranty can be downloaded from the Leica Geosystems home Warranty page at http://www.leica-geosystems.com/internationalwarranty or received from vour Leica Geosystems dealer. Software Licence This product contains software that is preinstalled on the product, or that is supplied to you on a data carrier medium, or that can be downloaded by you online pursuant Agreement to prior authorization from Leica Geosystems. Such software is protected by copyright and other laws and its use is defined and regulated by the Leica Geosystems Software Licence Agreement, which covers aspects such as, but not limited to, Scope of the Licence, Warranty, Intellectual Property Rights, Limitation of Liability, Exclusion of other Assurances. Governing Law and Place of Jurisdiction. Please make sure, that at any time you fully comply with the terms and conditions of the Leica Geosystems. Software Licence Agreement. Such agreement is provided together with all products and can also be found at the Leica Geosystems home page at http://www.leica-geosystems.com/swlicense or vour Leica Geosystems dealer. You must not install or use the software unless you have read and accepted the terms and conditions of the Leica Geosystems Software Licence Agreement. Installation or use of the software or any part thereof, is deemed to be an acceptance of all the terms and conditions of such licence agreement. If you do not agree to all or

some of the terms of such licence agreement, you may not download, install or use the software and you must return the unused software together with its accompanying documentation and the purchase receipt to the dealer from whom you purchased the product within ten (10) days of purchase to obtain a full refund of the purchase price.

9.6 End User Licence Agreement EULA

EULA terms

- You have acquired a device RX900 that includes software licenced by Leica Geosystems from an affiliate of Microsoft Corporation ("MS"). Those installed software products of MS origin, as well as associated media, printed materials, and "online" or electronic documentation ("SOFTWARE") are protected by international intellectual property laws and treaties. The SOFTWARE is licenced, not sold. All rights reserved.
 - IF YOU DO NOT AGREE TO THIS END USER LICENCE AGREEMENT ("EULA"), DO NOT USE THE DEVICE OR COPY THE SOFTWARE, INSTEAD, PROMPTLY CONTACT Leica Geosystems FOR INSTRUCTIONS ON RETURN OF THE UNUSED DEVICE(S) FOR A REFUND. ANY USE OF THE SOFTWARE, INCLUDING BUT NOT LIMITED TO USE ON THE DEVICE, WILL CONSTITUTE YOUR AGREEMENT TO THIS EULA (OR RATIFICATION OF ANY PREVIOUS CONSENT).
- **GRANT OF SOFTWARE LICENCE**. This EULA grants you the following licence:
 - You may use the SOFTWARE only on the DEVICE.
 - NOT FAULT TOLERANT. THE SOFTWARE IS NOT FAULT TOLERANT. Leica Geosystems HAS INDEPENDENTLY DETERMINED HOW TO USE THE SOFTWARE IN THE DEVICE, AND MS HAS RELIED UPON LEICA GEOSYSTEMS TO CONDUCT SUFFICIENT TESTING TO DETERMINE THAT THE SOFTWARE IS SUITABLE FOR SUCH USE.
 - NO WARRANTIES FOR THE SOFTWARE. THE SOFTWARE is provided "AS IS" and with all faults. THE ENTIRE RISK AS TO SATISFACTORY QUALITY,

PERFORMNCE, ACCURACY, AND EFFORT (INCLUDING LACK OF NEGLIGENCE) IS WITH YOU. ALSO, THERE IS NO WARRANTY AGAINST INTERFERENCE WITH YOUR ENJOYMENT OF THE SOFTWARE OF AGAINST INFRINGEMENT. **IF YOU HAVE RECEIVED ANY WARRANTIES REGARDING THE DEVICE OR THE SOFT-WARE, THOSE WARRANTIES DO NOT ORIGINATE FROM, AND ARE NOT BINDING ON, MS.**

- No Liability for Certain Damages. EXCEPT AS PROHIBITED BY LAW, MS SHALL HAVE NO LIABILITY FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL OR INCIDENTAL DAMAGES ARISING FROM OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THE SOFTWARE. THIS LIMITATION SHALL APPLY EVEN IF ANY REMEDY FAILS FOF ITS ESSENTIAL PURPOSE. IN NO EVENT SHALL MS BE LIABLE FOR ANY AMOUNT IN EXCESS OF U.S. TWO HUNDRED FIFTY DOLLARS (U.S.\$250.00).
- Limitations on Reverse Engineering, Decompilation, and Disassembly. You may not reverse engineer, decompile, or disassemble the SOFTWARE, except and only to the extent that such activity is expressly permitted by applicable law notwithstanding these limitation.
- SOFTWARE TRANSFER ALLOWED BUT WITH RESTRICTIONS. You may permanently transfer rights under this EULA only as part of a permanent sale or transfer of the Device, and only if the recipient agrees to this EULA. If the SOFTWARE is an upgrade, any transfer must also include all prior versions of the SOFTWARE.
- EXPORT RESTRICTIONS. You acknowledge that SOFTWARE is subject to U.S. and European Union export jurisdiction. You agree to comply with all applicable

international and national laws that apply to the SOFTWARE, including the U.S. Export Administration Regulations, as well as end-user, end-use and destination restrictions issued by U.S. and other governments. For additional information see http://www.microsoft.com/exporting/.

Safety Directions	GPS900	102
9.7	Hazards of Use	
Marning Warning	The absence of instruction, or the inadequate imparting of instruction incorrect or adverse use, and can give rise to accidents with far-reac material, financial and environmental consequences. Precautions: All users must follow the safety directions given by the manufactured tions of the person responsible for the product.	on, can lead to hing human, r and the direc-
Murning Warning	Watch out for erroneous measurement results if the product has been has been misused, modified, stored for long periods or transported. Precautions: Periodically carry out test measurements and perform the field adjustr in the user manual, particularly after the product has been subjected t and before and after important measurements.	en dropped or nents indicated o abnormal use



Because of the risk of electrocution, it is very dangerous to use poles and extensions 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.





Safety Directions	GPS900	104
Warning	Inadequate securing of the surveying site can lead to dangerous situations, for example in traffic, on building sites, and at industrial installations. Precautions: Always ensure that the survey site is adequately secured. Adhere to the regulati governing safety and accident prevention and road traffic.	ions
▲ ^{Warning}	Only Leica Geosystems authorized service workshops are entitled to repair thes products.	e
Warning	If computers intended for use indoors are used in the field there is a danger of e tric shock. Precautions: Adhere to the instructions given by the computer manufacturer with regard to f use in conjunction with Leica Geosystems products.	elec-
▲ Caution	If the accessories used with the product are not properly secured and the product subjected to mechanical shock, for example blows or falling, the product may be damaged or people may sustain injury. Precautions: When setting-up the product, make sure that the accessories, for example tripo tribrach, connecting cables, are correctly adapted, fitted, secured, and locked in p tion. Avoid subjecting the product to mechanical stress.	ct is e od, posi-

Marning Warning	If an external antenna is not properly fitted to vehicles or any other means of transportation it can be torn off by mechanical shock, vibration or wind, possibly causing accident and injury. Precautions: Attach the external antenna professionally. The external antenna must be secured additionally, for example by use of a safety cord. Ensure that the mounting device is correctly mounted and able to safely carry the weight of the external antenna (>1 kg).
▲ Caution	The product uses the GPS P-Code signal which by U.S. policy may be switched off without notice.
A Caution	During the transport, shipping or disposal of batteries it is possible for inappropriate mechanical influences to constitute a fire hazard. Precautions: Before shipping the product or disposing of it, discharge the batteries by running the product until they are flat. When transporting or shipping batteries, the person in charge of the product must ensure that the applicable national and international rules and regulations are observed. Before transportation or shipping contact your local passenger or freight transport company.

Safety Directions	GPS900	106
Warning	Using a battery charger not recommended by Leica Geosystems can destroy th batteries. This can cause fire or explosions. Precautions: Only use chargers recommended by Leica Geosystems to charge the batteries.	e
Warning	High mechanical stress, high ambient temperatures or immersion into fluids ca cause leackage, fire or explosions of the batteries. Precautions: Protect the batteries from mechanical influences and high ambient temperatures not drop or immerse batteries into fluids.	n s. Do
Warning	Short circuited battery terminals can overheat and cause injury or fire, for example storing or transporting in pockets if battery terminals come in contact with julery, keys, metallized paper or other metals. Precautions: Make sure that the battery terminals do not come into contact with metallic objects.	ıple ewel- jects.
Marning Warning	 If the product is improperly disposed of, the following can happen: If polymer parts are burnt, poisonous gases are produced which may impain 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 per to use it in contravention of the regulations, exposing themselves and third 	r se sons d

parties to the risk of severe injury and rendering the environment liable to 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.

If the product is used in exposed locations, for example on masts, mountains or buildings, it is at risk from lightning. Danger from high voltages also exists near power lines. Lightning, voltage peaks, or the touching of power lines can cause damage, injury and death.

Precautions:

- Do not use the product in a thunderstorm as you may increase the risk of being struck by lightning.
- Be sure to remain at a safe distance from electrical installations. Do not use the product directly under or in close proximity to power lines. If it is essential to work in such an environment contact the safety authorities responsible for electrical installations and follow their instructions.

Safety Directions	GPS900 10
	 If the product has to be permanently mounted in an exposed location, it is advable to provide a lightning conductor system. A suggestion on how to designal lightning conductor for the product is given below. Always follow the regulation in force in your country with regard to grounding antennas and masts. These installations must be carried out by an authorised specialist. To prevent damages due to indirect lightning strikes (voltage spikes) cables, for example for antenna, power source or modem should be protected with appropriate protection elements, like a lightning arrester. These installations must be carried out by an authorized specialist. If there is a risk of a thunderstorm, or if the equipment is to remain unused ar unattended for a long period, protect your product additionally by unplugging a systems components and disconnecting all connecting cables and supply cable for example, receiver - antenna.
Lightning conductors	 Suggestion for design of a lightning conductor for a GPS system: 1. On non-metallic structures Protection by air terminals is recommended. An air terminal is a pointed solid of tubular rod of conducting material with proper mounting and connection to a conductor. The position of four air terminals should be uniformly distributed around the antenna at a distance equal to the height of the air terminal. The air terminal diameter should be 12 mm for copper or 15 mm for aluminium The height of the air terminals should be 25 cm to 50 cm. All air terminals should should be 25 cm to 50 cm.
be connected to the down conductors. The diameter of the air terminal should be kept to a minimum to reduce GPS signal shading.

2. On metallic structures

Protection is as described for non-metallic structures, but the air terminals can be connected directly to the conducting structure without the need for down conductors.





9.8 Electromagnetic Compatibility EMC

Description The term Electromagnetic Compatability is taken to mean the capability of the product 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 product meets 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.

A Caution

There is a risk that disturbances may be caused in other equipment if the product is used in conjunction with accessories from other manufacturers, for example field computers, personal computers, two-way radios, non-standard cables or external batteries.

Precautions:

Use only the equipment and accessories recommended by Leica Geosystems. When combined with the product, they meet the strict requirements stipulated by the guidelines and standards. When using computers and two-way radio, pay attention to the information about electromagnetic compatibility provided by the manufacturer.

Safety Directions	GPS900	112		
Caution	Disturbances caused by electromagnetic radiation can result in erroneous measure- ments. Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that the product may be disturbed by very intense electromagnetic radiation, for example, near radio transmitters, two-way radios or diesel generators. Precautions: Check the plausibility of results obtained under these conditions.			
Warning	If the product is operated with connecting cables attached at only ends, for example external supply cables, interface cables, the peri electromagnetic radiation may be exceeded and the correct function products may be impaired. Precautions: While the product is in use, connecting cables, for example product battery, product to computer, must be connected at both ends.	one of their two mitted level of oning of other t to external		

Radios or digital cellular phones Warning Use of product with radio or digital cellular phone:

Electromagnetic radiation can cause disturbances in other equipment, in installations, in medical devices, for example pacemakers or hearing aids and in aircraft. It can also affect humans and animals.

Precautions:

Although the product meets 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 or that humans or animals may be affected.

- Do not operate the product in the vicinity of filling stations or chemical installations, or in other areas where an explosion hazard exists.
- Do not operate the product near to medical equipment.
- Do not operate the product in aircraft.
- Do not operate the product for long periods immediately next to your body.

Safety Directions	GPS900	114		
9.9	FCC Statement, Applicable in U.S.			
Applicablility	The grayed paragraph below is only applicable for products without r	adio.		
Warning Warning	 This equipment has been tested and found to comply with the limits digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against hence in a residential installation. This equipment generates, uses and can radiate radio frequency enerinstalled and used in accordance with the instructions, may cause haence to radio communication. However, there is no guarantee that in not occur in a particular installation. If this equipment does cause harmful interference to radio or televis which can be determined by turning the equipment off and on, the uaged to try to correct the interference by one or more of the followi Reorient or relocate the receiving antenna. Increase the separation between the equipment and the receivee Connect the equipment into an outlet on a circuit different from the receiver is connected. Consult the dealer or an experienced radio/TV technician for help 	for a Class B armful interfer- rgy and, if not rmful interfer- nterference will ion reception, user is encour- ng measures: r. that to which o.		



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

Labelling RX900





Labelling GHT56







10.1

RX900 Technical Data

Design	Glass reinforced po	lymer housing with	integrated battery.		
Control unit	Display:	1/4 VGA (320 x 240 pixels), monochrome (RX900) or color			
	Keyboard: Angle Display: Distance Display: Touch screen:	62 keys including 360°''', 360° dec m, ft int, ft us, ft Toughened film c	g 12 function keys, ill imal, 400 gon, 6400 int inch, ft us inch on glass	million, touch screen umination mil, V %	
Dimensions	Туре	Length [m]	Width [m]	Thickness [m]	
	RX900	0.218	0.123	0.047	
			⊥		
Weight	Туре		Weight [kg]/[l	bs]	
	RX900 with GEB21	1 battery	0.741/1.634		
Recording	For RX900, data cai can only be recorde	n only be recorded o ed on the CompactI	on the internal memo Flash card.	ry while for RX900c, data	

Туре	Capacity [MB]	Data capacity
Internal memory	• 256	256 MB is sufficient for about 360000 real-time points with codes
CompactFlash card	 64 256 1024 	256 MB is sufficient for about 360000 real-time points with codes

Power

Туре	Consumption [W]	External supply voltage
RX900/ RX900c	1.1/ 1.4 Bluetooth to ATX900 GG, radio receiving data	Nominal voltage 12 V DC () Voltage range 11.5 V-28 V

Internal battery

Туре	Battery	Voltage	Capacity	Operating time, typical
RX900/ RX900c	Li-Ion	7.4 V	GEB211: 1.9 Ah	11 h/ 10 h Bluetooth to ATX900 GG

Technical Data

Temperature

Туре	Operating temperature [°C]	Storage temperature [°C]
RX900	-30 to +65 Bluetooth: -25 to +65 Color display: -30 to +50	-40 to +80
Internal battery	-20 to +50	-40 to +70

Protection against water, dust and sand

Туре	Protection
RX900	IP67 (IEC60529) Dusttight Waterproof to 1 m temporary immersion

Humidity

Туре	Protection
RX900	Up to 100 % The effects of condensation are to be effectively counter- acted by periodically drying out RX900.

Interfa

Interfaces	Туре	RS232 No handshake	USB	Bluetooth
	RX900	LEMO port	LEMO port	Class 2
Data format for	The default va	alues are:		
R5232	Baud rate: Parity: Terminator: Data bits: Stop bits:	115200 None CR/LF 8 1		

Ports

Туре	8 pin LEMO-1
RX900	For power and/or communication

Technical Data		GPS900 124		
10.2	ATX900 GG Technical Data			
10.2.1	Tracking Characte	Tracking Characteristics		
Receiver tech- nology	SmartTrack+			
Satellite reception	Dual frequency	Dual frequency		
Receiver channels	14 channels continuous tracking on L1 and L2 (GPS); twelve channels continuous tracking on L1 and L2 (GLONASS).			
Supported codes	GPS			
	L1	L2		
	Carrier phase, C/A code	Carrier phase, C code (L2C) and P2 code		
	GLONASS			
	L1	L2		
	Carrier phase, C/A code	Carrier phase, P2 code		

Carrier tracking

GPS

Condition	ATX900 GG
L1, AS off or on	Reconstructed carrier phase via C/A code
L2, AS off	Reconstructed carrier phase via P2 code
L2, AS on	Switches automatically to patented P code-aided tech- nique providing full L2 reconstructed carrier phase

GLONASS

GPS

Condition	ATX900 GG	
L1	Reconstructed carrier phase via C/A code	
L2	Reconstructed carrier phase via P2 code	

Code measurements

Condition	ATX900 GG
L1, AS off L1, AS on	Carrier phase smoothed code measurements: C/A code
L2, AS off	Carrier phase smoothed code measurements: P2 code
L2, AS on	Carrier phase smoothed code measurements: Patented P code-aided code

GLONASS

Condition	ATX900 GG
L1	Carrier phase smoothed code measurements: C/A code
L2	Carrier phase smoothed code measurements: P2 code
Carrier phase and co or off.	ode measurements on L1 and L2 are fully independent with AS on
Up to 14 simultaneo	ously on L1 and L2 (GPS) + up to 12 simultaneously on L1 and L2 $$



Satellites tracked

10.2.2	Accuracy				
(F	Accuracy is dependent upon various factors including the number of satellites tracked, constellation geometry, observation time, ephemeris accuracy, ionospheric disturbance, multipath and resolved ambiguities.				
	The following accuracies, given as r oot m ean s quare, are based on measurements processed using LGO and on real-time measurements.				
Differential code	The baseline precision of a differential code solution for static and kinematic surveys is 25 cm.				
Differential phase	Static Kinematic				
in real-time	Horizontal Vertical Horizontal Vertical				
	5 mm + 0.5 ppm 10 mm + 0.5 ppm 10 mm + 1 ppm 20 mm + 1 ppm				

GPS900		128	
Technical Data			
Height: Diameter:	0.089 m 0.186 m	1	
8 pin LEMO-1			
5/8" Whitworth			
1.1 kg including internal battery GEB211			
Power consumption: External supply voltage:	1.8 W typically Nominal 12 V DC (===), voltage range 5-28 V DC		
Type: Voltage: Capacity: Typical operating time:	Li-Ion 7.4 V GEB211 5 h	: 1.9 Ah	
Туре		ATX900 GG	
Voltage		-	
Current		-	
	Technical DataHeight: Diameter:8 pin LEMO-15/8" Whitworth1.1 kg including internalPower consumption: External supply voltage:Type: Voltage: Capacity: Typical operating time:Type Voltage Current	GPS900 GPS900 Technical Data Height: 0.089 m Diameter: 0.186 m 8 pin LEMO-1 5/8" Whitworth 1.1 kg including internal battery GE Power consumption: Power consumption: 1.8 W ty External supply voltage: Nominal Type: Li-Ion Voltage: 7.4 V Capacity: GEB211 Typical operating time: 5 h Type Voltage Current Current	GPS900 Technical Data Height: 0.089 m Diameter: 0.186 m 8 pin LEMO-1 5/8" Whitworth 5/8" Whitworth 1.1 kg including internal battery GEB211 Power consumption: 1.8 W typically External supply voltage: Nominal 12 V DC (===), voltage range 5-28 V DC Type: Li-Ion Voltage: 7.4 V Capacity: GEB211: 1.9 Ah Typical operating time: 5 h Type ATX900 GG Voltage - Current -

Туре	ATX900 GG
Frequency	GPS L1 1575.46 MHz
	GPS L2 1227.60 MHz
	GLONASS L1 1602.5625-1611.5 MHz
	GLONASS L2 1246.4375-1254.3 MHz
Gain	Typically 27 dBi
Noise Figure	Typically < 2 dBi
BW, -3 dBiW	-
BW, -30 dBi	-

Environmental specifications

Temperature

Operating temperature [°C]	Storage temperature [°C]
-40 to +65	-40 to +80
Bluetooth: -30 to +65	

Protection against water, dust and sand

IP67 (IEC 60529)

Dusttight

Protected against water jets

Waterproof to 1 m temporary immersion

Humidity

Protection

Up to 100 %

The effects of condensation are to be effectively counteracted by periodically drying out the antenna.

10.3 GHT56 Technical Data

Dimensions	Length: 0 Width: 0 Thickness: 0	0.169 m 0.123 m 0.130 m
Connector	 8 pin LEMO-1 7 pin clip-on-co	ntacts
Weight	0.460 kg including i	nternal battery GEB211
Power	Power consumption	: Nominal voltage 7.4 V DC () / 2.0 A max
Battery	Type: Voltage: Capacity: Typical operating tir	 Li-Ion 7.4 V GEB211: 1.9 Ah, GEB221: 3.8 Ah ne: The given operating times are valid for one fully charged GEB221 battery. 25°C. Operating times will be shorter when working in cold weather. good data link. GFU14, receive only mode: 14.5 h

Technical Data	GPS90	132	
Environmental	Temperature		
specifications	Operating temperature [°C]	Storage temperature [°C]	
	-20 to +65	-40 to +80	

Protection against water, dust and sand

Protection
IP67 (IEC 60529)
Dusttight
Protected against water jets
Waterproof to 1 m temporary immersion

Humidity

Protection

Up to 100 %

The effects of condensation are to be effectively counteracted by periodically drying out the antenna.

Conformity to National Regulations		
RX900		
 FCC Part 15 (applicat Hereby, Leica Geosys essential requirement declaration of confo tems.com/ce. Class 1 e can be pl tions in a The conformity for co FCC part 15 or Europe operation. 	ble in US) stems AG, declares that the RX900 is in compliance with the its and other relevant provisions of Directive 1999/5/EC. The rmity may be consulted at http://www.leica-geosys- quipment according European Directive 1999/5/EC (R&TTE) aced on the market and be put into service without restric- iny EU Member state. ountries with other national regulations not covered by the ean directive 1999/5/EC has to be approved prior to use and	
Bluetooth	2402 - 2480 MHz	
Bluetooth	2.5 mW	
	Conformity to Na RX900 FCC Part 15 (applicat Hereby, Leica Geosys essential requirement declaration of confor tems.com/ce. Class 1 e can be pl tions in a The conformity for c FCC part 15 or Europ operation. Bluetooth Bluetooth	

Technical Data

Antenna

Туре	Antenna	Gain [dBi]	Connector	Frequency band [MHz]
RX900, Bluetooth	Integrated antenna	-	-	-

10.4.2 ATX900 GG

Conformity to national regulations

- FCC Part 15 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the ATX900 GG is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity may be consulted at http://www.leica-geosystems.com/ce.



Class 1 equipment according European Directive 1999/5/EC (R&TTE) can be placed on the market and be put into service without restrictions in any EU Member state.

 The conformity for countries with other national regulations not covered by the FCC part 15 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band	Туре	Frequency band [MHz]
	ATX900 GG	1227.60 1575.42
	ATX900 GG	1246.4375 - 1254.3 1602.4375 - 1611.5
	Bluetooth	2402 - 2480

Technical Data		GPS900	136
Output power	GNSS Bluetooth	Receive only 5 mW	
Antenna	GNSS Bluetooth	Internal GNSS antenna element (receive only) Type: Internal Microstrip antenna Gain: 1.5 dBi	

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GPS900

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Total Quality Management: Our commitment to total customer satisfaction.



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).

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

Leica Geosystems AG

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www.leica-geosystems.com

- when it has to be right



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