



Leica Viva GNSS

October 2010

CS 10/15 and GS 10/15 Communication Connections

Summary This quick guide will go through the several procedures outlining the different methods of communication connection with the RTK Rover Wizard, manual configurations and Base setups.

The following connections will be discussed:

- SLG modems
- SLC modems
- ADL Radios for Base and Rover
- PDL Base setup
- Cellular phone connection via Bluetooth
- Corrections via Wi-Fi



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- when it has to be right

License Keys and Devices The flowing list is from the Equipment List for Leica Viva GNSS. The license keys and currently available are shown.

771 497	LOP16	DGPS option for GS10 and GS15 receivers, enables the receiver to compute a DGPS position.
767 812	LOP9	5km RTK option, enables RTK positions to be computed up to a distance of 5km from a single base station.
767 813	LOP10	Unlimited RTK option, enables RTK positions to be computed from a single base station with no limit of distance.
767 814	LOP11	Upgrade from 5km RTK to unlimited RTK. (LOP9 to LOP10)
767 815	LOP12	Unlimited RTK and Network RTK, enables RTK position to be computed from a single base station and within a RTK network.
767 817	LOP14	Upgrade option for GS10 or GS15 receivers from RTK unlimited only to RTK unlimited including RTK Network. (LOP10 to LOP12)
771 971	LOP20	Leica Lite option, to receive System 900 RTK data on the GS10, GS15 receivers.
767 816	LOP13	RTK Reference station option, allows a GS10 or GS15 receiver to transmit RTK data.
Satelline	radio modules	
767 819	SLR1	Satelline M3 T1 403-470 MHz TXO radio. RTK transmitting only UHF radio module to be easily plugged into the GS15 GNSS receiver.
767 820	SLR2	Satelline M3 R1 403-470 MHz RXO radio. RTK receive only UHF radio module to be easily plugged into the GS15 GNSS receiver.
Pacific Cr	est radio modu	lles
767 821	SLR3-1	Pacific Crest ADL RX/TX radio 390-430Mhz. RTK receive and transmit UHF radio module to be easily plugged into the GS15 GNS5 receiver.
767 822	SLR3-2	Pacific Crest ADL RX/TX radio 430-470Mhz. RTK receive and transmit UHF radio module to be easily plugged into the GS15 GNSS receiver.
Mobile ph	none modules	
767 823	SLG1	5-Band (850/900/1800/1900/2100MHz) Telit 3G GSM/GPRS/UMTS module. Provides full flexibility due to 5-band technology and is globally compatible to all GSM, GPRS, EDGE and UMTS network providers. Can be easily plugged into the GS15 GNSS receiver.
774 689	SLG2	4-Band (850/900/1800/1900MHz) Siemens MC75i GSM/GPRS module. Universal 4-band technology supports GSM, GPRS, and EDGE network providers. Can be easily plugged into the GS15 GNSS receiver.
767 824	SLC1	Dual band Telit CDMA 1xRTT module for US. Supports Sprint (US) network

License Keys and Devices

Satelline Radio Modems				
(G	Satelline	modems		
	733 275	GFU14-0	Satelline 3AS radio modem (433.525MHz, 25.0kHz channel spacing, 0.5W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.	
	733 276	GFU14-1	Satelline 3AS radio modem (406.425MHz, 25.0kHz channel spacing, 1.0W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.	
	738 272	GFU14-2	Satelline 3AS radio modem (445.000MHz, 12.5kHz channel spacing, 1.0W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.	
	738 273	GFU14-3	Satelline 3AS radio modem (443.000MHz, 12.5kHz channel spacing, 1.0W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.	
	738 274	GFU14-4	Satelline 3AS radio modem (440.550MHz, 25.0kHz channel spacing, 0.5W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.	
	738 275	GFU14-5	Satelline 3AS radio modem (458.150MHz, 12.5kHz channel spacing, 1.0W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.	
	738 276	GFU14-6	Satelline 3AS radio modem (439.8625MHz, 12.5KHz channel spacing, 1.0W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.	
	753 928	GFU14-7	Satelline 3AS radio modem (464.5000MHz, 25.0kHz channel spacing, 1.0W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.	
	756 623	GFU14-8	Satelline 3AS radio modem (458.6000MHz, 25.0kHz channel spacing, 0.5W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.	
	Cables for Satelline modems		dems	
	733 297	GEV171	1.8m Y-cable to program the Satelline 3AS radio modem inside the GFU14 housing.	
	762 026	GEV221	Y-cable, connects Satelline 3AS Epic Pro (10W) to GS10/GS15 and 12V car battery.	
D 10 C	639 968	GEV125	Cable for Satelline radios without GFU housing to be connected to GS10/GS15.	
Pacific Cr	est kadi	o wodems		
	Pacific Crest radio modems must be ordered directly from your local Pacific Crest office or represent- ative.			
			PDL receive only modems built into the Leica GFU radio housing with 12.5 or 25kHz channel spacing within the following frequency bands are available: 410 - 430MHz 430 - 450MHz 450 - 470MHz	
Mobile P	hones			
	750 242	GFU24	Housing with Siemens MC75 GSM/GPRS module (Quad-Band GSM 850/900/ 1800/1900MHz), fits on side of GS10 receiver.	
	750 243	GFU25	CDMA cellular phone for Canada, Multitech MTMMC-C-N12 for Bell mobility network, integrated into housing, fits on side of GS10 receiver.	
	744 754	GFU19	US CDMA cellular phone Multitech MTMMC-C-N3 for Verizon network, integrated	

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License Keys and Devices

,	Field Cor	ntroller	
	767 866	CS10 Radio Field Controller	CS10 Radio Field Controller. Ruggedized WinCE field controller with full VGA touch display, 1GB NAND flash memory, 512MB SDRAW, CF/SD card slot and 2MP camera. Includes Bluetooth, internal WLAN module, internal TPS radio module, numeric keypad, stylus. Available with either Lemo connector (CBC01) or DSUB connector module (CBC02).
	767 871	CS15 Radio Field Controller	CS15 Radio Field Controller. Ruggedized WinCE field controller with full VGA touch display, 1GB NAND flash memory, 512MB SDRAM, CF/SD card slot and 2MP camera. Includes Bluetooth, internal WLAN module, internal TPS radio module, QWERTY keypad, stylus. Available with either Lemo connector (CBC01) or DSUB connector module (CBC02).

Method: GS15 SLG Modem via RTK Rover Wizard The SLG is Leica's GSM slot modem for the GS15. In the United States the prevailing GSM carriers are AT&T (Cingular) and T Mobile. For Canada it is Rogers and Bell. The following explanation will go through the commonality of connecting the SLG to the internet and receiving NTRIP corrections through the Leica Spider Network.

A successful connection from the GS and CS is required by either by Bluetooth or cable.

Procedure: GS15 SLG Modem via RTK Rover Wizard

From the Main menu of Smartworx go to 3 (Instrument), 1 (GPS settings..), 1 (RTK rover wizard), select the 'Create a new profile' radio button and press F1 (Next)

	Instrument
Go to Work! Survey & stake pts Start base station	GPS settings Connect to instr Instrument status
SmartWorxWiki	
Instrument Settings & status Connections Screen & audio	
3DCQ:5.001m 2DCQ:2.726m 1DCQ:4.192m Fn abc 08:05 OK	3DCQ:6.337m 2DCQ:3.387m 1DCQ:5.356m Fn abc 08:07 OK
GPS Settings	RTK Rover Wizard
	would you like to do?
RTK rover wizard Satellite tracking Antenna heights	Create a new profile
۵.	\odot Load an existing profile
Quality control Raw data logging	• Edit an existing profile
3DCQ:5.088m 2DCQ:2.661m 1DCQ:4.336m Fn abc 08:07	3DCQ:4.766m 2DCQ:2.543m 1DCQ:4.031m Fn abc 08:08
	Next 2

Procedure: GS15 SLG Modem via RTK Rover Wizard



Create a name for the Profile. This RTK Profile can be saved and copied to an external memory device and re-imported for future use.

Once created, press F1 (Next) then select 'Internet (e.g. NTRIP) radio button, press F1 (Next)



Select 'Port 3 of GS sensor' ... The SL devices are always Port 3 on the GS15. If an external antenna is to being used on the GS 15, the box "Use external antennae on GS15 must be selected. Press F1 (Next).

Select 'GSM/GPRS/UMTS device' and from the pull-down select the 'Telit GSM(SLG1) Press F1 (Next).

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Procedure: GS15 SLG Modem via RTK Rover Wizard

RTK Rover Wizard	s of SIM card.		RTK Rover Wizard > How is the device connecting to the internet? >
PIN code: PUK code:			○ Using dial-up Internet connection
GS Port 3: GSM initialised		Fn ABC 08:40 Back	3DCQ:4.627m 2DCQ:2.054m 1DCQ:4.146m Fn ABC 08:42 Next Back

The PIN or PUK codes do not need to be entered. Once the message 'GS Port 3: GSM Initialized' appears at the bottom of the screen, Press F1 (Next)

Next, select the GPRS/CDMA Internet connection radio button Press F1 (Next)

Image: Constraint of the second se	Additional optional Internet connection settings.
APN: This information can be obtained from your Internet provider.	Use static IP address for Internet connection
	Use user ID & password for Internet connection
3DCQ:4.235m 2DCQ:1.906m 1DCQ:3.782m Fn ABC 08:47	Connected to the Internet Fn ABC 08:49
Next Back	Next Back

Enter in the APN (Access Point Name) in the APN: field. This information is obtained from your Internet Provider and is unique for each provider. Press F1 (Next)

Unless a static IP address was purchased from the Internet Provider leave the "Use static IP address fro Internet connection" box unchecked. If there is a static IP address purchased, then select the top box enter the address. If there is a User ID and password are required by your Internet Provider select the second box and fill in the appropriate fields. Press F1 (Next)

Note: If the correct APN is entered, the SLG1 will connect to the internet, as indicated on bottom of the optional connection settings screen.

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Procedure: GS15 SLG Modem via RTK Rover Wizard

ARTK server is required. What would you like to X	RTK Rover Wizard 5 Enter new server details. X
do? • Create a new server	Server name:
O Select a server	Port: 0
O Edit a server	Use NTRIP with this server
	NTRIP user ID: NTRIP password:
3DCQ:4.590m 2DCQ:2.002m 1DCQ:4.130m Fn ABC 09:00 Next Back	3DCQ:4.432m 2DCQ:1.936m 1DCQ:3.987m Fn ABC 09:01 Next Back

Once connected to the Internet, select the 'Create a new server' radio button and press F1 (Next)

You must enter the Server name, IP Address (Address: field) and Port for the server connection. If your network is utilizing a NTRIP caster protocol, select the 'Use NTRIP with this server' box and populate the required fields.



Select the 'Select mountpoint from source table' option and press F1 (Next)

From the pull-down (as pointed out with arrow in image), select the appropriate Mountpoint. Next, select F1 (Next)

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Procedure: GS15 SLG Modem via RTK Rover Wizard

The second se	Image: Constraint of the state of the s
Receive RTK corrections from RTK network Network type: MAX Send GGA message Send user ID	RTK data format: <u>RTCM v3</u> RTK base has a unique ID Automatically connect Use auto coordinate system Receive RTK network information
3DCQ:4.087m 2DCQ:2.448m 1DCQ:3.273m Fn abc 09:42	3DCQ:4.325m 2DCQ:2.540m 1DCQ:3.500m Fn abc 09:44
Next Back	Next Back

Check the top box to receive correction from the network. Use the drop down to select the network type the is for the mount point chosen in the previous step. Check the 'Send GGA message' box to send out the uncorrected position of the instrument to the network server. If user ID and password and/or password are needed, select the last box and fill in the appropriate information. Press F1 (Next)

Using the pull down, select which RTK correction format of data the instrument will receive from the network. Unless specified from your RTK Network Administrator, all other boxes should stay unchecked. Press F1 (Next)



Once the settings are all correct, select 'Yes, test my connections'. The following screen will give a visual of what the input settings will accomplish. If all items are checked the instrument will then proceed to get a fixed position (as indicated in the highlighted icon). The pulsating arrow pointing towards the instrument icon in the middle of the icon bar is also an indication that corrections are being received from the network.

With all complete, the choice of disconnecting the instrument from the network is given. Press F1 (Finish) to complete the RTK Rover Wizard.

Method: GS15 SLC Modem via RTK Rover Wizard SLC is Leica's CDMA slot modem for the GS15. In the United States the prevailing CDMA carriers is Sprint. The following will go through the commonality of connecting the SLC to the internet and receiving NTRIP corrections through the Leica Spider Network.

A successful connection from the GS and CS is required by either by Bluetooth or cable

Procedure: GS15 SLC Modem via RTK Rover Wizard

From the Main menu of Smartworx go to 3 (Instrument), 1 (GPS settings..), 1 (RTK rover wizard), select the 'Create a new profile' radio button and press F1 (Next)



Procedure: GS15 SLC Modem via RTK Rover Wizard



Create a name for the Profile. This RTK Profile can be saved and copied to an external memory device and re-imported for future use.

Once created, press F1 (Next) then select 'Internet (e.g. NTRIP) radio button, press F1 (Next)



Select 'Port 3 of GS sensor' ... The SL devices are always Port 3 on the GS15. If an external antenna is to being used on the GS 15, the box "Use external antennae on GS15 must be selected. Please make sure that this box is set correctly. Press F1 (Next).

Select 'CDMA device" and from the pull-down select the 'Telit CDMA (SLC1), Press F1 (Next).

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Procedure: GS15 SLC Modem via RTK Rover Wizard



Select the GPRS/CDMA Internet connection radio button Press F1 (Next) Make sure that the GS Port 3: CDMA initialized message appears at the bottom of the screen before continuing to the next screen.

Unless a static IP address was purchased from the Internet Provider leave the "Use static IP address fro Internet connection" box unchecked. If there is a static IP address purchased, then select the top box enter the address. If there is a User ID and password are required by your Internet Provider select the second box and fill in the appropriate fields. Press F1 (Next)

After the pertinent information has been filled in the 'Connected to the Internet' should pop up. If this does not occur here, contact your modem service provider to verify the data plan is correct.

Create a new server O Select a server	Address: Port: 0	
O Edit a server	Use NTRIP with this server	
	NTRIP user ID:	
	NTRIP user ID: NTRIP password:	

Once connected to the Internet, select the 'Create a new server' radio button and press F1 (Next)

You must enter the Server name, IP Address (Address: field) and Port for the server connection. If your network is utilizing a NTRIP caster protocol, select the 'Use NTRIP with this server' box and populate the required fields.

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Procedure: GS15 SLC Modem via RTK Rover Wizard

Image: Select mountpoint from source table Image: Select mountpoint manually	Image: Constraint of the second se
3DCQ:4.644m 2DCQ:2.504m 1DCQ:3.911m Fn abc 09:36 Next Back	3DCQ:4.405m 2DCQ:2.383m 1DCQ:3.705m Fn abc 09:36 Next Back

Select the 'Select mountpoint from source table' option and press F1 (Next)

From the pull-down (as pointed out with arrow in image), select the appropriate Mountpoint. Next, select F1 (Next)

The second se	The second se
Receive RTK corrections from RTK network Network type: MAX Send GGA message Send user ID	RTK data format: <u>RTCM v3</u> RTK base has a unique ID Automatically connect Use auto coordinate system Receive RTK network information
3DCQ:4.087m 2DCQ:2.448m 1DCQ:3.273m Fn abc 09:42	3DCQ:4.325m 2DCQ:2.540m 1DCQ:3.500m Fn abc 09:44
Next Back	Next Back

network type the is for the mount point chosen in the previous step. Check the 'Send GGA message' box to send out the uncorrected position of the instrument to the network server. If user ID and password and/or password are needed, select the last box and fill in the appropriate information. Press F1 (Next)

Using the pull down, select which RTK correction format of data the instrument will receive from the network. Unless specified from your RTK Network Administrator, all other boxes should stay unchecked. Press F1 (Next)

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Once the settings are all correct, select 'Yes, test my connections'. The following screen will give a visual of what the input settings will accomplish. If all items are checked the instrument will then proceed to get a fixed position (as indicated in the highlighted icon). The pulsating arrow pointing towards the instrument icon in the middle of the icon bar is also an indication that corrections are being received from the network.

With all complete, the choice of disconnecting the instrument from the network is given. Press F1 (Finish) to complete the RTK Rover Wizard.

Method: GS15 PDL & SLR3 Base setup The PDL and SLR3 ADL is a Pacific Crest radio offered in the SLR housing. The following demonstrates the procedure of setting up a base radio to transmit RTK corrections. It is assumed that before the user attempts to connect the base to a rover that the frequencies for each channel have been programmed. Please contact your salesperson to accomplish this.

A successful connection from the GS and CS is required by either by Bluetooth or cable.

Procedure: GS15 PDL & ADL Base setup



From the main menu in Smartworx, press 3 (Go to Work!), 7 (Go to base menu) FROM THE BASE MAIN MENU: 3 (Instrument), 2 (Base connections)

Procedure: GS15 PDL & ADL Base setup



Select 2 (All other connections), Highlight the connection 'Base RTK 1' and press F3 (Edit)

ADL and PDL differences

🕀 💥 🛗	1 10					
RTK base settings	(RTK1)	15	Devices	5		
General Data rates Tin	ne slicing		Radios Modems/GSM Others			
🗹 Transmit RTK ba	se info	A	Name	Туре		
			Int. Radio	Internal radio		
Connect using:	GS Port 3		Intuicom 1200 DL	Intuicom 1200 DL		
Device:	<gs 3="" port=""></gs>		Pac Crest ADL	Pac Crest ADL		
			Pac Crest PDL	Pac Crest PDL		
		`	Pac Crest RFM	Pac Crest RFM96W		
RTK data format:	Leica 4G	- <u>-</u>	Satel 2ASx	Satel 2ASx		
SCROLL DOWN F	OR EXTERNAL		Satel 2ASxe	Satel 2ASxE		
ANTENNA OPTION			Satel 3AS(GEL14)	Satel 345/345d		
3DCQ:3.061m 2DCQ:1.61	.1m 1DCQ:2.602m Fr	abc 12:51	3DCQ:2.970m 2DCQ:1.572r	m 1DCQ:2.520m Fn abc 12:54		
ОК	Devo	e)Page	OK New. Edit	Delete More Page		

At this point the differences between utilizing an ADL and a PDL radio as a base station will be discussed.

Check the box to Transmit RTK base info. From the drop down menu Select GS Port 3 if using an ADL or GS Port 2 if using a PDL radio connect to Port 2 via a cable. Select the desired RTK format... this format needs to be the same as on the rover. Scroll down to the bottom of the screen for the option of using the external antenna on the GS15. Press F5 (Devce..)

From the Radio tab select the correct radio.

If using the PDL or if the GS15 being used as a base has a separate CS controller being used with the base and rover highlight the appropriate Pac Crest PDL or Pac Crest ADL and press F1 (OK).

ADL Base and Rover with One CS unit



The same CS cannot have two devices running the same radio. So it is necessary to copy the Pac Crest ADL and name it different. If the user is using only one CS to operate both the Base and Rover and have ADL radios, highlight the Pac Crest ADL and select F2 (new). You need to create a new device for the base and you are now making a copy of the original ADL device listing. Give the new device a unique name such a "ADL Base" and save the new device by selecting F1 (Store)

Highlight the newly created Radio and press F1 (OK).

RTK base settings (RTK1) 5	Base Connection Settings 🕽
General Data rates Time slicing	Connection Port Device
Transmit RTK base info	Base Sensor Cable GS10/GS15
	GS Internet
Connect using: GS Port 3 •	Base RTK 1 GS Port 3 ADL BASE
Device: ADL BASE	Base RTK 2
RTK data format:	
3DCQ:2.124m 2DCQ:1.156m 1DCQ:1.783m Fn ABC 13:39	3DCQ:6.899m 2DCQ:3.607m 1DCQ:5.881m Fn ABC 13:40
OK Devce Page	OK Edit Cntrl

With the Device as the correct radio, Press F1 (OK).

As illustrated by the icon on the top bar, the radio will have an arrow pulsating out; indicating the radio is transmitting out a signal.

Method: GS15 SLR3 Rover via RTK Rover Wizard SLR3 ADL is the Pac Crest slot radio for the GS15. The following will go through the process of connecting the SLR3 in an RTK Rover GS15 with the RTK base. Please see the section covering base station setups. This guide assumes that the user has the correct frequencies programmed. Please contact a Leica salesperson for assistance.

A successful connection from the GS and CS is required by either by Bluetooth or cable.

Procedure:

GS15 SLR3 Rover via RTK Rover Wizard

From the Main menu of Smartworx go to 3 (Instrument), 1 (GPS settings..), 1 (RTK rover wizard), select the 'Create a new profile' radio button and press F1 (Next)



Procedure: GS15 SLR3 Rover via RTK Rover Wizard



Name the RTK Profile

Starting in the Wizard, Select Radio and press F1 (Next)



Select 'Port 3 of GS sensor' ... The SL devices are always Port 3 on the GS15. If an external antenna is to being used on the GS 15, the box "Use external antennae on GS15 must be selected. Press F1 (Next).

Note: If the antenna is attached and this is not checked the system will not actual physically switch to the use of the external antennae. In reverse if the this box is checked and the external antenna is mounted on the GS15 the RX signal will be extremely weak.

The Rover Wizard will automatically detect the ADL and the currect channel that is set in the radio. To scan for other signals that maybe transmitting in the work area on this frequency the user can selct the F5 (Scan) option to check if the is surrounding radio traffic.

Press F1 (Next)

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Wizard



Select the RTK data format that the Base Station is transmitting.

When using a Leica receiver as the RTK base station, leave the Sensor at base: and Antenna at base: fields as 'Automatically detect'. Otherwise, select the type of Sensor and Antenna of the RTK base being received by choosing from the selections in these fields.

Press F1 (Next)

The Instrument will check off what the current settings will accomplish. The icon on the top of the radio will also have an arrow pointing down and will be pulsating at the rate of receiving corrections from the base. Press F1 (Next)

Once the wizard is finished, Press F1 (Finish).

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CS 10/15 and GS 10/15 Communication Connections

Method: Bluetooth connection via GSM cellular phone to CS10/15 With this method, a cellular phone must have a data plan that allows the phone to connect to the internet. More importantly, the Bluetooth capabilities of the phone MUST allow the phone to be the slave in the connection process. Phones that do not allow itself to do this will not work; i.e. I-phones, droids, blackberries (without a tethering option) or any 'smartphone'. Please contact your service provider to inquire if your phone allows Bluetooth tethering for data transfer through an internet connection.

This method will demonstrate the typical steps to connect the Field Controller to the internet via a Bluetooth connection to a GSM phone. Once connected to the internet, additional steps will be illustrated to connect the instrument to the Smartnet server and receive corrected positions.

A successful connection from the GS and CS is required by either by Bluetooth or cable.

Procedure: Bluetooth connection via GSM cellular phone to CS10/15

From the Main menu of Smartworx go to 3 (Instrument), 1 (GPS settings..), 1 (RTK rover wizard), select the 'Create a new profile' radio button and press F1 (Next)



Procedure: Bluetooth connection	RTK Rover Wizard Enter a name for the n	ew RTK profile.	RTK Rover Wizard What type of connection do you want to use?	(13) (13) (13) (13) (13) (13) (13) (13)
cellular phone to CS10/15	Name: Description:	BT PHONE GSM	 Radio Internet (e.g NTRIP) Dial-up (phone number) 	

3DCQ:m	2DCQ:m	1DCQ:m	Fn ABC	10:34	3DCQ:m	2DCQ:m	1DCQ:m	En a	abc	06:38
Next				Back	Next				1	Back

Enter in a name for the Profile and Press F1 (Next)

Select the 'Internet (e.g. NTRIP)' radio button. Press F1 (Next)

RTK Rover Wizard 5	RTK Rover Wizard 5
Which port is the RTK device connected to?	Which RTK device is being used?
O Port 2 of GS sensor	• GSM/GPRS/UMTS device
O Port 3 of GS sensor	O CDMA device
Bluetooth mobile phone	Name of device: Motorola Phone •
2000	2000

Select the 'Bluetooth mobile phone' radio button and Press F1 (Next)

Back

Select the 'GSM/GPRS/UMTS device' radio button and choose the device which is to be used. Press F1 (Next)

Next

Continued on Next Page

Back

Next

Procedure: Bluetooth connection via GSM cellular phone to CS10/15



With the Bluetooth turned on in the cell phone, take the necessary to enable the phone to be Bluetooth discoverable. Once that is accomplished, Press F1 (Next). The CS will now perform a Bluetooth search to find available devices.

After the search is completed the CS instrument will display which devices were found. Select the correct device and Press F1 (Next).

Note: If there is more Bluetooth devices available then what the screen can display, the cell phone may not show up. If this is the case, isolate the number of devices and search again.

Image: Constraint of the second se	Image: Connected to the mobile phone.				
Connecting to Bluetooth mobile phone.	Connected to the mobile phone.				
Your phone might prompt you for a passcode to authenticate the Bluetooth connection. The passcode is "0000". Please wait					
3DCQ:m 2DCQ:m 1DCQ:m Fn abc 06:51	BT connection OK using CS Bluetooth 1 Fn abc 06:52				
Cancel	Next Back				

The phone should ask for permission to Bond with the CS and will prompt for a passcode . This is simply 0000 (four zeros) which is given on screen in the CS instructions. Input the passcode onto the phone. Press F1 (Next) on the CS.

Once the phone and the instrument has bonded, the screen will indicate so; as well as a message to pop up at the bottom of the screen. When this occurs, press F1 (Next).

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Procedure: Bluetooth connection via GSM cellular phone to CS10/15





Internet provider.



Select the 'Using GPRS/CDMA Internet connection' Radio Button.

Enter in the GSM carrier APN: (Access Point Name) This information is obtained from your salesperson and is different for each provider. A form is available at the end of this guide to list all of the pertinent information regarding your connections. Select F1 (Next).

Image: Constraint of the second section of the second section of the second section section section sections. Additional optional Internet connection settings.	RTK Rover Wizard C Enter new server details. X
Use static IP address for Internet connection	Server name: Address: Port: 0
Use user ID & password for Internet connection	Use NTRIP with this server
CS Bluetooth 1: GSM initialized Fn abc 06:53	Connected to the Internet Fn abc 06:54
Next Back	Next Back

Unless a static IP address was purchased from the Internet Provider leave the "Use static IP address for Internet connection" box unchecked. If there is a static IP address purchased, then select the top box enter the address. If there is a User ID and password are required by your Internet Provider select the second box and fill in the appropriate fields. Press F1 (Next)

The bottom of the screen will post a message stating that the instrument in connected to the Internet. The icons on the top of the screen (World and Instrument) will also indicate that the instrument is connected to the internet by removing the yellow yields signs. Press F1 (Next).

Enter in all pertinent information, Press the 'Use NTRIP with this server' box and populate the required fields.

Once connected to the Internet, select the 'Create a new server' radio button and press F1 (Next)

Continued on Next Page

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Procedure: Bluetooth connection via GSM cellular phone to CS10/15

Server name: gm do? Address: smartnet.ga.leica-geos	RTK Rover Wizard	tails.	RTK Rover Wizard C A mountpoint is required. What would you like to X
Address: smartnet.ga.leica-geos Port: 10000 Use NTRIP with this server nTRIP user ID:	Server name:	am	do?
Port: 10000 O Enter mountpoint manually Image: Use NTRIP with this server NTRIP user ID: Image: Use NTRIP with this server	Address:	smartnet.ga.leica-geos	Select mountpoint from source table
✓ Use NTRIP with this server NTRIP user ID:	Port:	10000	O Enter mountpoint manually
NTRIP user ID:	Use NTRIP with	this server	
NTRIP password:	NTRIP user ID:		
	NTRIP user ID: NTRIP password	d: Fn abc 07:14	3DCQ:m 2DCQ:m 1DCQ:m Fn abc 07:15

You must enter the Server name, IP Address (Address: field) and Port for the server connection. If your network is utilizing a NTRIP caster protocol, select the 'Use NTRIP with this server' box and populate the required fields. Press F1 (Next).

Choose the 'Select mountpoint from source table' radio button. Press F1 (Next).

RTK Rover Wizard Choose a mountpoint	1. 0 9 .		Image: Constraint of the state of the st	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)
Mountpoint: Identifier: Format: Solution: System:	RTCM3_MAX RTCM3_MAX RTCM 3 Network GPS & GLONASS		 Receive RTK corrections from RTK network Network type: MAX Send GGA message Send user ID 	Ĭ
CS Internet 1 disconnecte Next	ed Fnabc	07:15 ack	3DCQ:m 2DCQ:m IDCQ:m Fn	abc 07:15 Quit

From the pulldown (as pointed out with arrow), select the appropriate mountpoint. Press F1 (Next)

Check the top box to receive correction from the network. Use the drop down to select the network type the instrument will be used in.

Check the 'Send GGA message' box to send out the uncorrected position of the instrument to the network server. If user ID and password and/or password are needed, select the last box and fill in the appropriate information. Press F1 (Next)

Continued on Next Page

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Procedure: Bluetooth connection via GSM cellular phone to CS10/15



Using the pull down, select which format of data the instrument is to receive. Unless specified from your RTK Network Administrator, all other boxes should stay unchecked. Press F1 (Next)

Once the settings are all correct, select Yes, test my connections'.

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RTK Rover Wizard 5	RTK Rover Wizard 5
RTK connection status	RTK rover wizard finished
RTK device auto detected	You are now receiving RTK corrections
SIM card found	Disconnect after finishing wizard
✓ PIN/PUK OK	
GSM network found	
Connected to the Internet.	
Connected to RTK service	
RTK corrections being received	
3DCQ:0.065m 2DCQ:0.015m 1DCQ:0.063m Fn abc 07:21	3DCQ:3.995m 2DCQ:0.884m 1DCQ:3.896m Fn abc 07:23
Next Back	Finish Back

The following screen will give a visual of what the input settings will accomplish. If all items are checked the instrument will then proceed to get a fixed position (as indicated in the highlighted icon). The pulsating arrow pointing in towards the instrument icon is also an indication that corrections are being received from the network.

With all complete, the choice of disconnecting the instrument from the network is given. Press F1 (Finish) to complete the RTK Rover Wizard.

Method: Bluetooth connection via CDMA cellular phone to CS10/15 With this method, a cellular phone must have a data plan that allows the phone to connect to the internet. More importantly, the Bluetooth capabilities of the phone MUST allow the phone to be the slave in the connection process. Phones that do not allow itself to do this will not work; i.e. I-phones, droids, blackberries (without a tethering option) or any 'smartphone'. Please contact your service provider to inquire if your phone allows Bluetooth tethering for data transfer through an internet connection.

This method will demonstrate the typical steps to connect the Field Controller to the internet via a Bluetooth connection to a CDMA phone. Once connected to the internet, additional steps will be illustrated to connect the instrument to the Smartnet server and receive corrected positions.

A successful connection from the GS and CS is required by either by Bluetooth or cable..

Procedure: Bluetooth connection via CDMA cellular phone to CS10/15

From the Main menu of Smartworx go to 3 (Instrument), 1 (GPS settings..), 1 (RTK rover wizard), select the 'Create a new profile' radio button and press F1 (Next)



Continued on Next Page

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Procedure: Bluetooth connection via CDMA cellular phone to CS10/15

RTK Rover Wiza Enter a name for t	rd the new RTK profile.	د ۱ ۱	RTK Rover Wizard What type of connection do you want to use?
Name: Description:	BT PHONE CDMA		○ Radio ● Internet (e.g NTRIP) ○ Dial-up (phone number)

Enter in a name for the Profile and Press F1 (Next)

Select the 'Internet (e.g. NTRIP)' radio button. Press F1 (Next)

RTK Rover Wizard 1 1 5 Which port is the RTK device connected to? X	RTK Rover Wizard C Which RTK device is being used? X
 Port 2 of GS sensor Port 3 of GS sensor Bluetooth mobile phone 	O GSM/GPRS/UMTS device CDMA device Name of device: CDMA Phone
3DCQ:m 2DCQ:m 1DCQ:m Fn abc 06:43 Next Back	3DCQ:-,m 2DCQ:-,m 1DCQ:-,m Fn ABC 10:22 Next Back

Select the 'Bluetooth mobile phone' radio button and Press F1 (Next)

Select the 'CDMA device' radio button and choose the device which is to be used. Press F1 (Next)

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Procedure: Bluetooth connection via CDMA cellular phone to CS10/15

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RTK Rover Wizard 5	RTK Rover Wizard
Bluetooth device connection.	The following devices were found
Ensure that the mobile phone is switched on & ready to be found.	Press Next to select the highlighted device. Press Search to search again.
Press Next to search for the bluetooth	LG VX9700 21fb57f002
mobile phone.	TS1610067 134300d987
	GS1500138 1343006b4d

3DCQ:m	2DCQ:m	1DCQ:m	Fn ABC	10:22	3DCQ:m	2DCQ:m	1DCQ:m	Fn ABC	10:23
Next				Back	Next		Search		Back

With the Bluetooth turned on in the cell phone, take the necessary steps to enable the phone to be Bluetooth discoverable. Once that is accomplished, Press F1 (Next). The CS will now perform a Bluetooth search to find available devices.

After the search is completed the CS instrument will display which devices were found. Select the correct device and Press F1 (Next).

Note: If there is more Bluetooth devices available then what the screen can display, the cell phone may not show up. If this is the case, isolate the number of devices and search again.

Image: Constraint of the second se	Image: Connected to the mobile phone.
Connecting to Bluetooth mobile phone. Your phone might prompt you for a passcode to authenticate the Bluetooth connection. The passcode is "0000". Please wait	Connected to the mobile phone.
3DCQ:m 2DCQ:m 1DCQ:m Fn abc 06:51 Cancel	BT connection OK using CS Bluetooth 1 Fn abc 05:52 Next Back

The phone should ask for permission to Bond with the CS and will prompt for a passcode . This is simply 0000 (four zeros) which is given on screen in the CS instructions. Input the passcode onto the phone. Press F1 (Next) on the CS.

Once the phone and the instrument has bonded, the screen will indicate so; as well as a message to pop up at the bottom of the screen. When this occurs, press F1 (Next).

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Procedure: Bluetooth connection via CDMA cellular phone to CS10/15







Internet provider.



Select the 'Using GPRS/CDMA Internet connection' Radio Button. Select F1 (Next)

There is NO APN for a CDMA phone. Bypass the screen. Press F1 (Next).



Unless a static IP address was purchased from the Internet Provider leave the "Use static IP address fro Internet connection" box unchecked. If there is a static IP address purchased, then select the top box enter the address. If there is a User ID and password are required by your Internet Provider select the second box and fill in the appropriate fields. Press F1 (Next)

The bottom of the screen will post a message stating that the instrument in connected to the Internet. The icons on the top of the screen (World and Instrument) will also indicate that the instrument is connected to the internet by removing the yellow yields signs. Press F1 (Next).

Enter in all pertinent information, Press the 'Use NTRIP with this server' box and populate the required fields.

Once connected to the Internet, select the 'Create a new server' radio button and press F1 (Next)

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Procedure: Bluetooth connection via CDMA cellular phone to CS10/15

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RTK Rover Wizard	C	RTK Rover Wizard
Enter new server de	tails. 🕺	A mountpoint is required. What would you like to 💸
Server name:	grn	do?
Address:	smartnet.ga.leica-geos	Select mountpoint from source table
Port:	10000	O Enter mountpoint manually
✓ Use NTRIP with	this server	
NTRIP user ID:		
NTRIP passwore	d:	
3DCQ:m 2DCQ:	m 1DCQ:m Fn abc 07:14	3DCQ:m 2DCQ:m 1DCQ:m Fn abc 07:15
Next	Back	Next Back

You must enter the Server name, IP Address (Address: field) and Port for the server connection. If your network is utilizing a NTRIP caster protocol, select the 'Use NTRIP with this server' box and populate the required fields. Press F1 (Next).

Choose the 'Select mountpoint from source table' radio button. Press F1 (Next).

RTK Rover Wizard Choose a mountpoint	1.000	(2) (2) (2) (2) (2) (2) (2) (2) (2) (2)	Image: Wight of the second	
Mountpoint: Identifier: Format: Solution: System:	RTCM3_MAX RTCM3_MAX RTCM 3 Network GPS & GLONASS		 Receive RTK corrections from RTK network Network type: MAX Send GGA message Send user ID 	
CS Internet 1 disconnecto Next	ed Fr	n abc 07:15 Back	3DCQ:m 2DCQ:m 1DCQ:m m	abc 07:15 Quit

From the pulldown (as pointed out with arrow), select the appropriate mountpoint. Press F1 (Next)

Check the top box to receive correction from the network. Use the drop down to select the network type the instrument will be used in.

Check the 'Send GGA message' box to send out the uncorrected position of the instrument to the network server. If user ID and password and/or password are needed, select the last box and fill in the appropriate information. Press F1 (Next)



Using the pull down, select which format of data the instrument is to receive. Unless specified from your RTK Network Administrator, all other boxes should stay unchecked. Press F1 (Next)

Once the settings are all correct, select Yes, test my connections'.



The following screen will give a visual of what the input settings will accomplish. If all items are checked the instrument will then proceed to get a fixed position (as indicated in the highlighted icon). The pulsating arrow pointing in towards the instrument icon is also an indication that corrections are being received from the network.

With all complete, the choice of disconnecting the instrument from the network is given. Press F1 (Finish) to complete the RTK Rover Wizard.

Method: Wi-Fi connection via CS 10/15 With this method, you must have a model of the CS controller that has the Wi-Fi option.

The following section will demonstrate the typical steps to connect the Field Controller to the internet via a Wi-Fi connection. Once connected to the internet, additional steps will be illustrated to connect the instrument to the Smartnet server and receive corrected positions.

A successful connection from the GS and CS is required by either by Bluetooth or cable.

Procedure: Wi-Fi connection via CS 10/15



From the Desktop of the controller, go to Start > Settings > Network and Dial-up Connections.

In the Network Connections screen, the NXPWLAN1 icon is displayed. If there is a red "X" displayed on this icon the wireless radio is not currently powered on.



To activate the radio, tap and hold the stylus on the NXPWLAN1 icon to bring up the choice list. Tap on 'Enable' option and this menu will close. This will effectively turn on the wireless radio.

This can visually be noticed by the removal of the red "X" on the icon.

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Procedure: Wi-Fi connection via CS 10/15



With the radio turned on, the NXPWLAN1 window will pop up along with the list of wireless network. Select the wireless network of your choice and press 'Connect'. Once connected the status filed will display "connected" and will display the signal strength of the connection.

After successfully connected to the Wi-Fi network, press the 'OK' button on the top-right of the window and close out the Network Connection window. Start Viva SmartWorx.

From the main menu of SmartWorx, select "Instrument", then "Connect to instr...", and finally choose "All other connections."

In the CS Connection page highlight the CS Internet option and select F3 (edit). Once in the Internet Connection screen make sure that the "Use Internet connection on CS" is not selected. Next, choose F1 (OK).

🐺 互 🕌	í Tå 🔯		
Connection Settin	igs	C	Internet Connection 5
CS connections GS co	onnections		Internet
Connection	Port	Device	Use Internet connection on CS
CS Internet		-	
GPS Rover	Bluetooth	GS10/GS15	
ASCII Input	-	-	
GPS Hidden Pt	-	-	
Export Job	-	-	
3DCQ:ft 2DCQ:	ft 1DCQ:ft	Fn ABC 07:34pm	3DC0:ft 2DC0:ft 1DC0:ft Fn ABC 07:37pm
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Procedure: Wi-Fi connection via CS 10/15

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Connection Set	ttings		5	RTK Rover Settings		c
CS connections G	S connections			General RTK base RTK n	etwork Advance	d
Connection	Port	Device		Receive RTK data		-
RTK Rover	GS Port 3	Pac Crest A	\DL	Connect using:	CS Internet 1	•
GS Internet	-			RTK device:	Internet	
NMEA 1	-	-				\
NMEA 2	-	-		RTK data format:	RTCM v3	
Remote (OWI)	-	-		Use auto coordin	ate system	
				Receive RTK net	work informa	tion 🔪
				Automatically co	nnect	
3DCQ:m 2DCC	2:m 1DCQ:m	Fn ABC 1	2:14	3DCQ:m 2DCQ:m	1DCQ:m	Fn ABC 13:27
ок	Edit Cntrl	Pa	ige	ОК		Page

On the GS Connections tab, Highlight the RTK Rover Interface and press F3 (Edit..)

From the General Tab, check the 'Receive RTK data'. In the 'Connect using' field, tap the arrow and select CS Internet 1. Select the RTK data format, use the pull down to see choices.

Press the F6 (Page)

RTK Rover Settings 5	RTK Rover Settings 5
Sensor at base: Automatically detect • Antenna at base: Automatically detect •	Use RTK network Network type: MAX
□ RTK base is sending unique ID	Send user ID
3DCQ:m 2DCQ:m 1DCQ:m Fn ABC 13:29 OK Page Page Page Page	3DCQ:m 2DCQ:m 1DCQ:m Fn ABC 13:30 OK GGA Page

Under the RTK Base Tab select 'Automatically detect' for both the Sensor and Antenna at base. Press F6 (Page)

In the RTK Network tab, select the "Use RTK network' box and use the pulldown to select the network type.

Press F4 (GGA)

Procedure: Wi-Fi connection via CS 10/15

	1 🔯	<u></u>	CS		🕈 🕻 🕻	o: 🔹	CS GS
Send GGA NMEA			15	Connection Se	ettings		5
GGA position:	Automatic	•		CS connections	S connections	5	
dan position.	Automatic	•		Connection	Port	Device	
				RTK Rover	CS Interne	t 1 Internet	
			`	GS Internet	-	-	
				NMEA 1	-	-	
				NMEA 2	-	-	
				Remote (OWI)	-	-	
3DCQ:m 2DCQ:m	1DCQ:m	Fn ABC	13:31	3DCQ:15.91m 2DC	Q:5.592m 1DCQ:1	4.89m Fn ABC 1	3:47
ОК				ОК	Edit Cntr	l. Pa	ige

In the GGA page select 'Automatic' to send your uncorrected position to the network server. Press F1(OK)

Press F1 (OK) again. Once you are back in the Connection Settings page, Press F4 (Cntrl..)

Thernet Port Connection	Server to Connect
Internet port: CS Internet 1 Server to use: grn NTRIP mountpoint: Press Source to get a list of mountpoints	Name IP address GRN 70.168.77.230 NJNJN 121.3220.3333.33. grn smartnet.pa.leica-geosyste grn1 smartnet.ga.leica-geosyste pl rtk 70.168.77.230 test 10.222.22.012
3DCQ:8.240m 2DCQ:4.399m 1DCQ:6.968m Fn ABC 13:55 OK Source	3DCQ:6.519m 2DCQ:3.507m 1DCQ:5.496m Fn ABC 14:01 OK New Edit. Delete More

Under the Internet Port Connection page, use the pull-down to view the server choices. Highlight the server you wish to connect to and press F3 (Edit..)

Edit Server		Edit Server	
Server name:	grn	Use NTRIP with this server	
Address:	smartnet.pa.leica-geos	NTRIP user ID: leicage/ NTRIP password: *****	
Port:	10000	•	
3DCQ:6.449m 2DCQ:3.48	34m 1DCQ: 5.426m Fn ABC 14:02	3DCQ:6.419m 2DCQ:3.479m 1DCQ:5.394m Fn ABC 14:	02
Store	Page	Store Pag	е

With correct server connection information in their respective fields, Press F6 (Page) to use and enter the NTRIP User name and password. Press F1 (Store)

Procedure: Wi-Fi connection via CS 10/15

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Server to Connect	c	Internet Port Connection	C
Name	IP address	Internet port: CS Internet 1	
GRN	70.168.77.230	Server to use: arn	5
NUNUN	121.3220.3333.33.	NTRIB mountraint:	
grn	smartnet.pa.leica-geosyste	Bress Source to get a list of moun	traints
_		Press Source to get a list of moun	icpoints
3DCQ:6.119m 2DCQ: 3.478n	n 1DCQ:5.034m Fn ABC 14:04	3DCQ:5.643m 2DCQ:3.120m 1DCQ:4.702m	Fn ABC 14:06
OK New. Edit	Delete More	ОК (So	ource

Highlight the Server to connect to again and Press F1(OK)

To choose a NTRIP mountpoint, Press F5 (Source)

	- 🔶 🗶 🚟 🔮 📜 🔯 🔹 🛗			
Internet Port Connection 5	Connection Settings 5			
Internet port: CS Internet 1	CS connections GS connections			
Server to use: grn 🗠	RTK Rover CS Internet 1 Internet			
NTRIP mountpoint: RTCM3_MAX	GS Internet NMFA 1			
Press Source to get a list of mountpoints	NMEA 2			
	Remote (OWI)			
	30-0-1 207- 30-0-0 561- 10-0-1 191- 5- ABC 14-09			
	OK Edit. Cotrl. Page			
3DCQ:5.591m 2DCQ:3.109m 1DCQ:4.648m Fn ABC 14:07	07			
OK Source	Help Home End Conect Quit			

With the correct NTRIP mountpoint selected Press F1 (OK)

Back in the Connection Settings screen Highlight the RTK Rover interface and press the green <Function> key. On F4 the option (Conect) will appear that allows you to initialize the connection to the RTK Network server. Press F4 (Connect) key to start the connection to the network.

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Procedure: Wi-Fi connection via CS 10/15

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Connection Settings 5		5	Connection Settings			
CS connections GS connections			CS connections GS connections			
Connection	Port	Device	1000	Connection	Port	Device
RTK Rover	CS Internet 1	Internet		RTK Rover	CS Internet 1	Internet
GS Internet		-		GS Internet		
NMEA 1	-	-		NMEA 1	-	-
NMEA 2	-	-		NMEA 2	-	-
Remote (OWI)		-		Remote (OWI)		
Connected to NTRI	P caster	Fn ABC 14	4:25	3DCQ:0.045m 2DCQ	:0.017m 1DCQ:0.042r	m Fn ABC 14:31
ок	Edit Cntrl	Pa	ige	ок	Edit Cntrl	Page

Once connected, the instrument will indicate that there was a successful connection to the NTRIP caster.

Note: Although the instrument is indeed connected to the internet and is receiving a network correction from the SmartNet Server, the icon on the top will not indicate that the instrument is connected. Ignore this icon, a visual check in this screen will be that the arrow next to the cell phone icon is pulsating down, the signal waves are present next to the cell phone and the Smartcheck indicates that the instrument has a fixed position.

Press F1 (OK) to return to the main menu.