

Viasis 3003

viasis the mobile and independent
speed indicator system¹

User Manual



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via
traffic
controlling
GmbH

Campusallee 1
D-51379 Leverkusen
Germany
Tel. +49 - (0)2171 - 50 49 30
Fax. +49 - (0)2171- 50 49 50
Email: info@viattraffic.de
Web: <http://www.viattraffic.de>

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1 The concept of visual speed indication

The visual speed indication and thereby the attempt to influence the driver's speed is quite a new field in the common road and traffic technology, although the well known traffic lights are established since decades. Nowadays public authorities start to install luminary speed indication signs above highways for the same purpose and additionally to manage the traffic flow. Besides avoiding traffic jams, these systems also shall decrease the drivers speed in order to reduce the rate of accidents and the heaviness of their consequences.

Our system of a mobile, autonomous and numerical speed indication display fulfils this aim especially in communal and urban areas, speed limit zones, living areas and in front of schools and nursery schools.

If we look to the effects of such a speed display, we can state three main effects:

- The driver gets the speed of his car publicly displayed and realizes his „over speeding“. Therefore the most drivers will be set under psychological pressure and reduce their actual speed.
- The inhabitants of living areas with low speed zones can prove the driving speed of passing vehicles objectively and as far as local source and target traffic is concerned speak with well known „fast drivers“ personally.
- The communal authorities, often quite helpless with complaints of angry citizens about over speeding, get an appropriate tool to react. With this tool they delegate in a psychological way the control function to the concerned citizens.

The police are and was never able to observe the mentioned low speed zones and living areas in a repressive manner effectively and the expenses for repressive supervision there are not covered by fines for over speeding drivers. By the way, whether repressive supervision of speed limitations in living areas is politically suitable is another question.

Up to now the only possibilities of local administrations are road reconstructions to lower drivers speeding. But such steps are quite costly and under the aspect of the economic situation of the communities, with low funds not longer practicable.

The systems for visual speed indication however make sense in a wide area covering action. This wide area covering action just can be run by easy installable and transportable units, working completely independent for an appropriate time.

Since 1994 via traffic controlling has delivered the speed measurement systems viasis with integrated display. The viasis 3003 is an actual version of this system with low energy consumption, integrated battery buffered memory for speed and time data, serial data interface and a couple of different operating modes.

The possibility not only to measure and to display speed data, but also to collect and herewith to analyze the collected values statistically grants a control of the effectiveness of the viasis systems in a certain traffic situation.





In common speed data can be collected (with or without ‘publicly’ displayed speed on the board) and later on processed statistically permitting the system user profound statements about the car drivers speeding behavior on a certain road. This makes decisions for or against further measures, like road reconstruction, repressive speed controls and so on, much easier.



2 General hints and used symbols

- Read the manual before you use the viasis system.
- Forward the viasis to other persons only with a manual.
- The viasis housing may only be opened by qualified personal.
- If the viasis housing is opened by the customer, the manufacturer will reject any claims of warranty and guaranty.
- The manufacturer is not liable for damage caused by improper use or modifications to the viasis device.
- The following manual is valid for several variants of the viasis 3003 system, like viasis COMPACT, MINI, PLUS, PLUS SMILE... etc.

2.1 Used symbols and text forms

	Safety information, warning of a general danger, evidence of possible misuse or misconduct with serious consequences.
	Danger of hazardous voltages, mortal danger.
	Helpful hints, tips and recommendations
	Troubleshooting advice
Standard text	Normal text instructions
Bold text	Highlighting of important text passages
<i>Bold and italic text</i>	References to program texts, symbols and functions
Information text:	Program cited text passages

3 System delivery

3.1 Unpacking



Unpack the delivered parcel with the viasis system immediately. From the outside invisible transport damages (see also chapter 8.7) can be enforced only a few days against the hauler.

Please retain the original packaging, because if the equipment is sent back it should be packed only in the original packaging. We will gladly accept send back packing material, if it is not possible for you to store it due to a lack of storage space.

Small parts and cables will be packed in the battery box. Please check the box when unpacking the system.



3.2 Supply schedule and equipment

To the delivery containment of our systems belong following components:

1. Viasis speed measurement and display system for vehicle speeding
2. Fuses, 2 pieces (one spare piece)
3. Sliding nuts M6, 4 pieces for standard C-profile rails
4. Serial interface cable, about 4 meters long
5. CDROM with manual, terminal and data evaluation software
6. Option USB – USB cable and USB flash storage stick

Measured and stored data from a viasis can be read with a personal computer, a notebook or laptop with serial RS232 interface and the delivered viagraph software working with Windows XP/Vista/7/8 and Windows 10.

If you want to use the serial RS232 interface of the viasis, but your computer offers only a USB interface, you can obtain a serial USB-RS232 adapter from us, see annex chapter 10.1 – list of viasis equipment.

4 System description

The viasis 3003 measures and displays vehicle speeds of one drive lane and direction. The viasis is an accumulator supplied, mobile measurement system, particularly designed for lowest power consumption. Measured speeds are shown on a 300 mm high, seven-segment LED board with 2 ½ digits. The used high brightness LED are mounted behind a rigid “phantom light” mask to avoid seemingly display of speeds due to sun or vehicle light reflection.

Alternating with the numeric speed display, several warning and speed limit sign symbols with a circle diameter of 300 mm can be shown. Optionally the viasis 3003 is equipped with two LED display colors, with the possibility to change the displayed color according the comparison result of measured vehicle speed and a set speed threshold.

Measured vehicle speeds are stored in the viasis, marked with time and date of the measurement and can be later transferred by means of a serial communication interface like RS232, USB or other optional radio data interfaces, like Bluetooth or GSM/GPRS mobile phone. The viasis can be set to measure data of both driving directions of a two lane road and to store the data for later evaluation.

Typically the viasis measures periodically every 1.5 seconds and shows the result. In case of a new vehicle measurement the display is refreshed after 1.5 seconds, otherwise the display is hold for maximal 3 seconds.

The measuring unit consists of a continuous wave „Doppler Radar“, a permanent sending high frequency radio wave emitting and receiving unit, whose antenna is not visible through the front window pane. This measuring unit delivers the received signals by an amplifier and digital processing electronic to a microprocessor unit that evaluates the signals.

The viasis 3003 is delivered with numerous options, see also chapter 6.3.6, in several variants like viasis COMPACT, MINI, PLUS, PLUS SMILE, etc. for various different applications.

5 Start-up with the viasis

5.1 Mounting and Fixation

The viasis must be mounted **orthogonal to the road** and stable in a height of 2 meters till 4 meters below the housing edge, see . First mount the system and finally insert the battery.

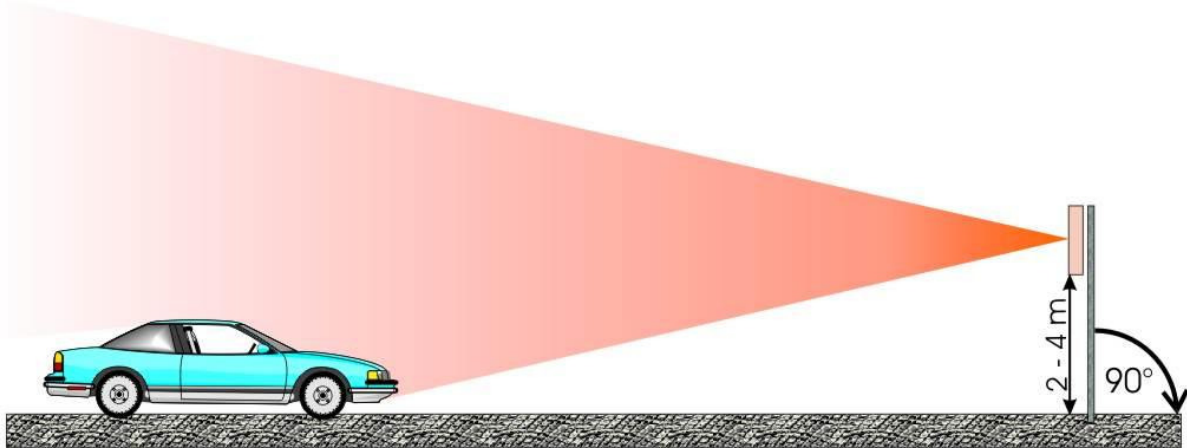


Illustration 1: Vertical orientation

Following items must be observed:



- Another mounting height or a strong inclination of the housing (exceeding $90^\circ \pm 8^\circ$) may influence the distance range of the vehicle detection and the accuracy of the displayed speed values.
- The radar detector in the viasis needs „free sight“ on the measured vehicles. Avoid a mounting behind trees, poles, high parking vehicles and so on.
- The system shall not be used in the range of road turns and bends. Otherwise too low measured speeds can be the result.

For the fixation of the viasis at pole clamps use the delivered M6 slide nuts. Pull two slide nuts in each C-profile rail at the backside of the viasis housing. With 2 x 2 M6 screws (not delivered) the pole clamp is fixed at the slide nuts, respectively the profile rails.

We offer a solid and lockable pole fixation kit for the viasis, see annex list of equipment chapter 10.1 and our website www.viatraffic.de.

If there is no possibility to mount to already existing poles or if the system is used only in short mobile campaigns, we also deliver a mobile tripod, see annex list of equipment, with a telescope pole. If you use a mobile tripod you should be aware that you need to guard the system!

5.2 Horizontal orientation

Direct the system horizontally through turning the system board around the mounting pole. The ideal orientation to reach a maximum distance range depends on the local circumstances.

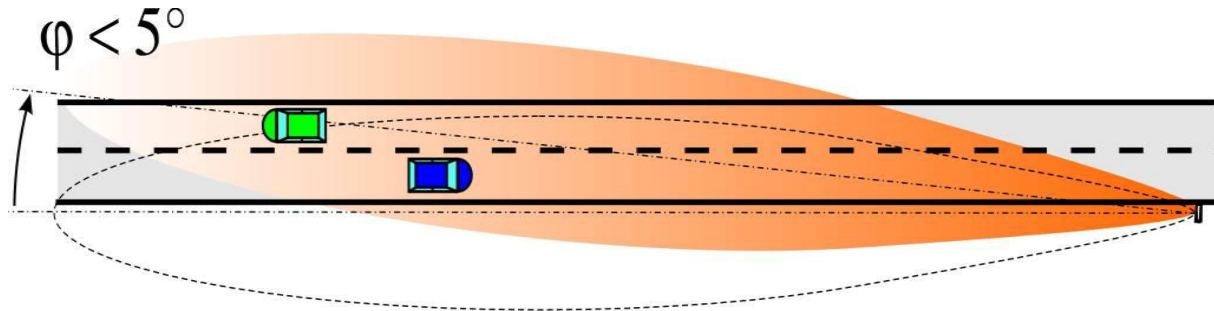


Illustration 2: viasis display directed to the road with a measurement angle $\varphi = 5^\circ$

For the first the system should be straightened **parallel** the roadway and can be **turned until a measurement angle φ of 5°** to the lane (see illustration 2) until the vehicles are detected from the unit at the maximum distance range.

If leaving traffic reduces the distance range remarkably, the system board can also be turned away from the roadway up to a measurement angle of 5° (see illustration 3).

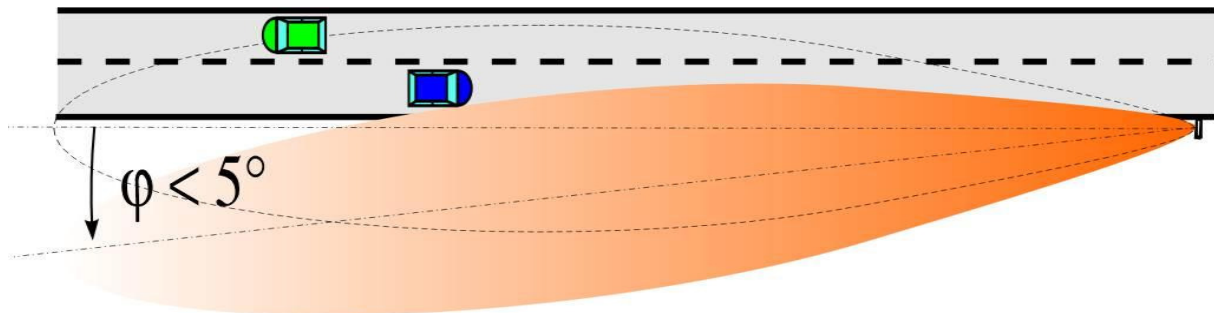


Illustration 3: viasis display directed away from the road with a measurement angle $\varphi = 5^\circ$

A measurement angle of more than 5° lead to the display of too small speed values and may cause measurement errors outside the specified accuracy.

5.2.1 Leaving traffic

The system is adjusted to approaching objects (toward the front side of the board). Leaving objects are also detected but filtered out.

Practically also leaving traffic can cause a distance range reduction. Because the object with the highest reflection amplitude, under certain circumstances the leaving traffic can be dominant for a short time and therefore „blinding“ the detector, although this detection is filtered out and is not displayed.

If necessary the display board can be turned away from the leaving traffic lane within certain limits to get an undisturbed detection, see also chapter 5.2.

5.2.2 Crossing traffic

Diagonal crossing traffic passing the radar beam can lead to a disturbing speed value display. By following measures you can reduce the detection distance range of the radar:

- Decline the viasis housing vertically (see illustration 1) up to 8° towards ground.
- Reduce the sensitivity of the radar receiver, see also chapter 6.3.7.

If both measures show no satisfying results there is nothing to do as to get away from the crossing traffic.

5.3 Viasis MINI text panel

During the mounting the fixed text of the viasis MINI is folded in the visible upright position by means of a movable flap board, see illustration 5.

If the flap board is open and upright both hinges are fixed with rotatable hooks in this position, see also red arrow in illustration 4.

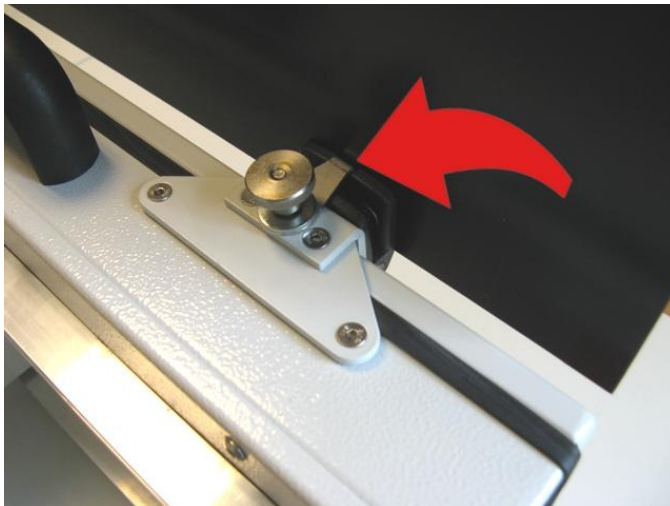


Illustration 4: Fixation hook

The closed flap board is attached to the housing during transport by two hidden magnetic holders.



Attention: Don't forget to tighten the knurled nuts before you transport the viasis MINI. Otherwise they may get loose and lost together with the hooks.



Illustration 5: Open flap board

The fixation hook is hanged into the slot at the hinge and secured by tightening the knurled nut above.



Illustration 6: viasis MINI flap board closed

5.4 Electrical preparation



Illustration 7: viasis control panel

Untighten the knurled nut of the battery attachment, turn the fixation bolt aside and insert the battery into the box. Secure the battery in its position with the turn bolt and by tightening the knurled nut, see also illustration 7 and illustration 8.



Warning: Hold the battery always and as long as possible with both hands. Secure the battery immediately after insertion with the turn bolt. Falling down batteries can cause severe injuries.

Plug the connector of the battery cable into the socket of the control panel labelled *Akku 12VDC*, see also illustration 7. The 5 ampere system fuse should already be placed into the fuse holder on the control panel. Press the On/Off toggle switch (labeled 1/0) in position 1 so that the viasis is turned on.

Illustration 7 shows the viasis control panel in the open battery box with USB connectors. Only if optional USB interfaces are equipped the green function control LED (*USB-Link*) can be found, which is lit during the viasis power on initialization time.

Directly after power on, during initialization the viasis shows “188” on the numeric LED display for about 3 seconds. Further 3 seconds the battery voltage is shown, for example 13.2 representing a viasis supply voltage of 13.2 Volt. Hereafter the system is ready for operation and the display is empty until the first vehicle is detected.

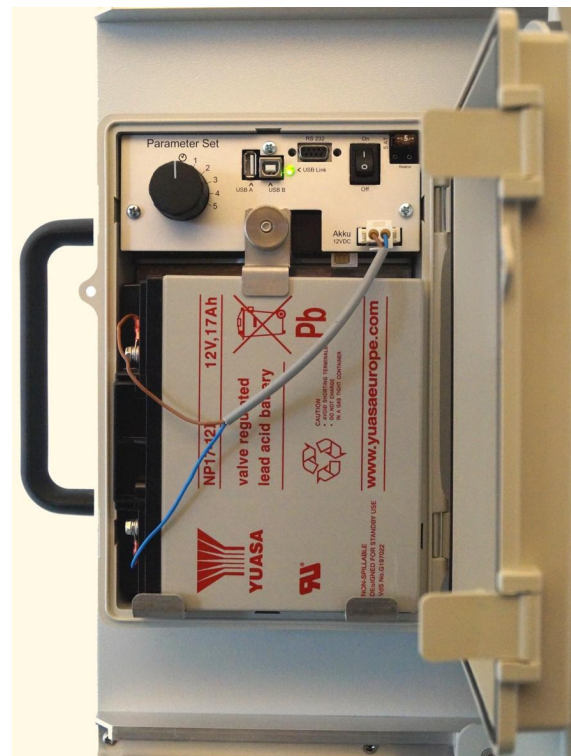


Illustration 8: Battery box and control panel



Later in cyclic offline measurement mode the green function control LED is lit during the radar measurement, what means typically all 1,5 seconds for 50 to 100 milliseconds.

The lead acid accumulator batteries are only partly charged after delivery. Before you start a longer measurement campaign charge the battery to its full capacity. Otherwise the operating time will be reduced. In order to power the system on, the battery voltage level must be above 11,3 Volt.



Attention: Wait 5 seconds or more to repower the viasis after you powered it off before. Otherwise malfunctions and error messages of viasis components, which did not reach the off state completely, can be caused.

Take care not to press or damage the battery wires, when you close the box cover.

The battery box can be protected against unauthorized access with a padlock through the foreseen holes in battery box body and cover, see illustration 8.

The Viasis is configured for permanent operation after delivery (see also chapter 6.3) and is ready for operation.

6 Viasis 3003 software and Data

6.1 Software installation

6.1.1 System requirements for the ViaApp

For smartphones and tablets with Android operating system version 4.0 and higher the *ViaApp* can be installed for the communication with the viasis by the Bluetooth interface. The file *viatrafic_app_1_2_3.apk* can be found in the folder */Tools/via_app* on the delivered CD-ROM. After transfer of the *apk* file to your smartphone/tablet by Bluetooth/USB or as an email attachment the installation procedure is started in common automatically.

After the installation of the *ViaApp* an update to the newest version is also started automatically in case a connection to the Internet exists.

With the ViaApp parameters of the viasis can be set, measurement data can be downloaded and forwarded as an email file attachment.

ViaApp was tested with several devices, but due to the large number of devices on the market no right to the proper functioning of ViaApp with each individual system can be granted. A list with smartphone/tablet devices tested by via traffic with the ViaApp can be found in the folder */Tools/via_app* on the delivered CD-ROM.

6.1.2 System requirements for viagraph

For the successful installation and later operation of the delivered data evaluation program *viagraph* on your computer following minimum requirements must be fulfilled:

- Windows XP/Vista/7/8 and 10 in standard installation
- 280 MB free hard disk space
- Monitor resolution of minimal 1024 x 768 pixel
- CD/DVD drive



The software package viagraph is delivered on CD-ROM. For notebooks without CD-ROM/DVD drive you may copy the CD-ROM to an USB flash disk and start the software installation from the USB flash disk hereafter.

6.1.3 Installation and deinstallation of viagraph

After insertion of the delivered CD-ROM in the CD-ROM drive of your computer the installation program is in common started automatically. If the „auto run“ function of your CD-ROM drive is deactivated, start the installation program *autostart.exe* located on the CD-ROM root folder with the Windows task bar start menu *start – execute*.

With a mouse click select **Software** in the dialogue page shown in illustration 9.

In the following page click on the line **viagraph** and the installation of the software package is started.

The software package **viagraph** allows the evaluation of measurement data of Via devices. Further a communication program for the data transfer between the viasis and your computer is an integral part of the software.



Illustration 9: Software installation



- **For the first installation you need administrator user rights!**
- **During the installation select the option field „Installation for all users“.**
- **The later user needs all access rights for the installation folder.**

Depending on the Windows version the installation of the Microsoft .NET run time module including an appropriate language support is done automatically.

For the correct deinstallation click the Windows start button in the task bar and then **Start – system control – software**, respectively **Start – control panel – programs**, depending on your Windows version and select **viagraph** for the deinstallation in the program list.



6.2 Viasis 3003 data connections

The viasis 3003 is always equipped with a serial RS232 and a Bluetooth interface. Depending on the viasis variant other interface options vary. It is possible to equip the viasis additionally with USB host interface for computer connections and USB client interface for memory sticks. Further a GSM/GPRS radio modem interface with GPS function can be installed.



Attention: At the same time only one data connection shall be active. Otherwise an existing connection might be interrupted and the new connection may not work properly.

6.2.1 Data connection with serial cable

Connect the delivered RS232 interface cable to a serial RS232 socket of your computer and to the viasis RS232 interface socket on the control panel in the battery box, see also illustration 7. Connect the battery to the viasis and power it by the On/Off switch, if not done already.



Start the *viagraph* program with a mouse double click on the *viagraph* icon placed on your Windows desktop after installation. After *viagraph* has started you may choose the preferred program language version from the offered list in the menu

Options – Language.

In the following dialogue click the on *Connect to device*, see illustration 10.

The empty *viagraph* main window appears, see illustration 11.

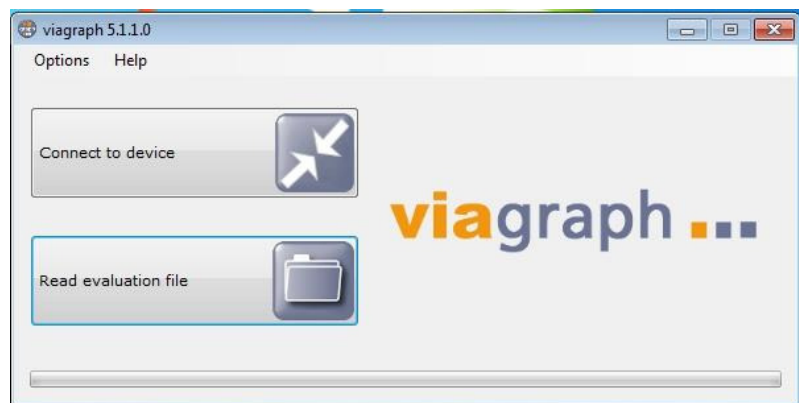


Illustration 10: Program selection

The program scans all serial interface ports of the computer for known devices and modems. and will choose automatically the first serial port with a connected via device.



In case of several connected via devices or modems by different serial interface ports (Bluetooth, USB or GSM) it may happen that *viagraph* does not select the device or modem to which you wish to connect. In this case please refer to chapter 6.2.7.



If the connection is established successfully, the viasis main menu appears in the white terminal input/output area of the viagraph window, see illustration 11.

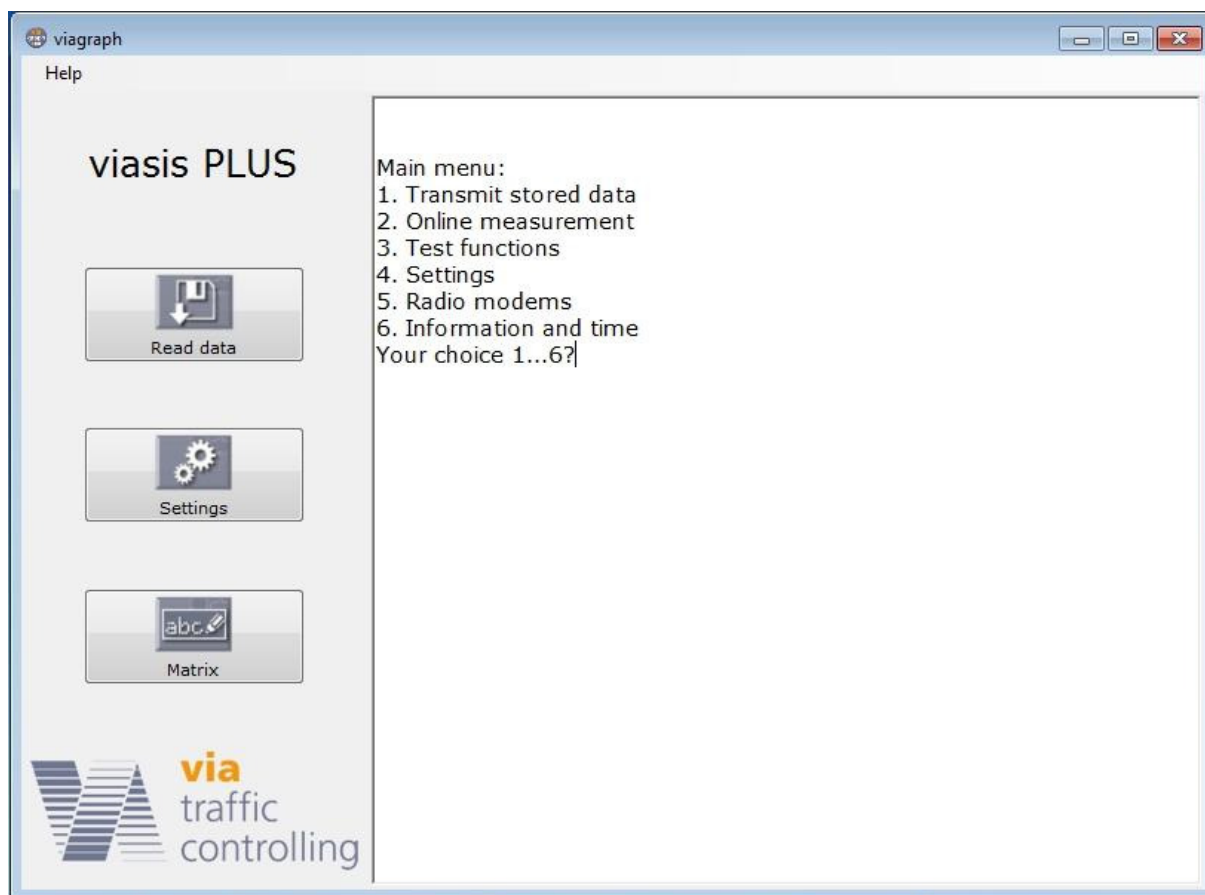


Illustration 11: Viagraph connection window with viasis main menu in the terminal

Top left the type of the found viasis system is shown, e. g. viasis, viasis PLUS, viasis PLUS SMILE, etc. Depending on the viasis type and equipment appears one or more buttons below. The buttons **Read data** and **Settings** appear always for viasis 3003 systems, the button **Matrix** is only shown for viasis 3003 PLUS devices.

By a click in the input/output terminal area (white background) you may make insertions by your computers keyboard to the viasis menu system directly. Menus, messages and responses from the viasis are displayed then in the terminal area.



- The more comfortable way to change viasis parameters is to click the **Settings** button, respectively the **Matrix** button if you want to change parameters and text pages of a viasis PLUS.
- In case you connected to a viasis with GSM/SMS/Email function by serial RS232 cable, an Email or SMS transfer may occur while you are connected. The text “**Send Email/SMS...**” may appear in you terminal window. Please make no insertions further on, respectively do not click any buttons in viagraph until you see the transfer closing message “**Email/SMS ok**”.

More information about **viagraph** you will find in its online help¹ menu **Help – Manual**.

¹ To read the viagraph online manual requires an installed Adobe Acrobat Reader Version 3.0 or higher. You may obtain it from Adobe by the Internet on the website <http://www.adobe.com/>



6.2.2 Using an USB-RS232 serial adapter

Connect the USB-RS232 serial adapter to a free USB port of your computer. Depending on which Windows operating system you use, the presence of the USB-RS232 adapter is recognized by Windows as soon the adapter is plugged in. A message like “*new hardware detected*” is shown and you will be asked to install a driver for the USB device.

For the installation of the USB device driver please refer to the instructions of the USB adapter package. The adapter package in common includes a CD-ROM with the needed device drivers and installation instructions.

If the USB-RS232 interface adapter has been correctly installed as a serial **COM** port, you may check it in the windows “*Device manager*”. Unfortunately the way to, respectively the placement of the device manager varies with the different Windows operation systems. In the Windows 7 desktop click “*Start – Control Panel – System and Security – Device Manager*”. Under Windows XP/Vista the “*Device manager*” is found in the “*System properties*” register “*Hardware*”, see illustration 12.

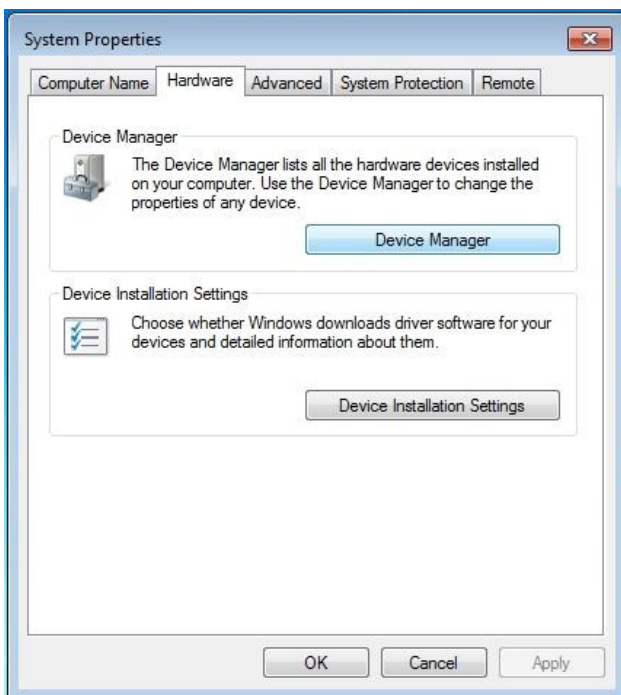


Illustration 12: System properties

Open the „Device manager“ and expand the line „Ports (COM & LPT)“. The USB-RS232 adapter must be listed here below.



Hint: In case you use several different USB sockets to connect the adapter you may have to reinstall the USB driver.

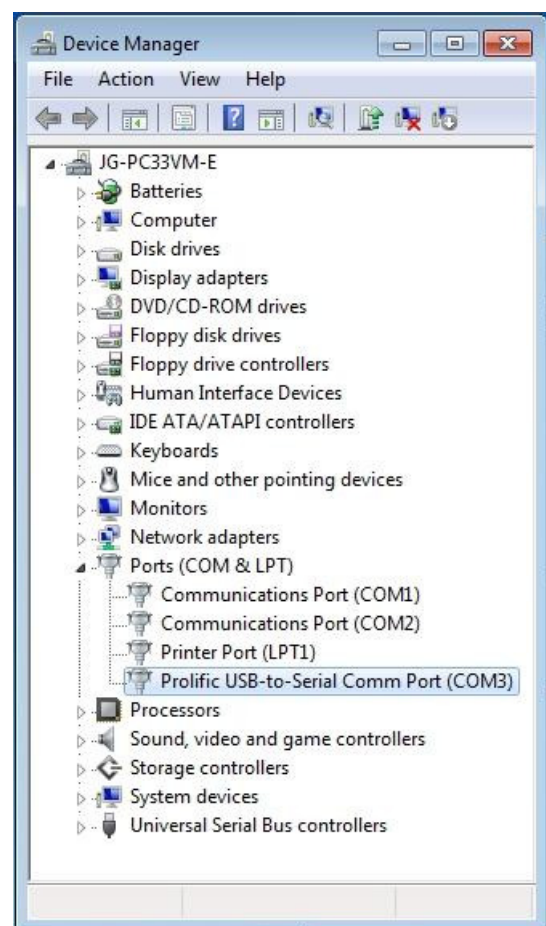


Illustration 13: Device Manager

Now connect the USB-RS232 adapter to the viasis with the delivered RS232 cable, connect the battery and proceed as described in chapter 6.2.1.



6.2.3 USB host interface connection (optional)

If the viasis 3003 is delivered with USB interfaces the USB sockets USB-A (for memory sticks) and USB-B (PC connection) are placed on the control panel, located in the battery box, see also illustration 14.

Before you can establish a USB data connection with your computer you need to install an USB device driver, see chapters 6.2.3.1, 6.2.3.2 and 6.2.3.3.

The used driver is a Windows standard interface driver “usbser.sys” for a so called CDC (Communication Device Class) device, which also sets up a virtual COM port (a virtual serial interface), which can be used by terminal programs.

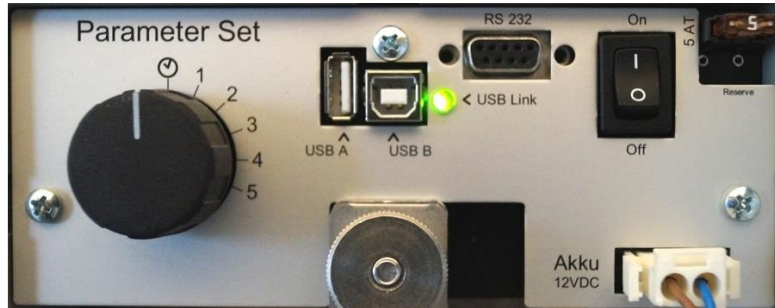


Illustration 14: Control panel with USB sockets

The USB driver installation should preferably done with administrator user rights.

The **USB-Link** LED is lit continuously as soon you plugged the cable in the viasis USB-B socket and a USB-A socket of your computer.

For a proper operation be aware of:



- The viasis cannot be supplied by the USB interface, therefore the viasis must be powered e. g. by a charged 12Volt battery for establishing a data connection.
- The internal viasis microcontroller has physically only one USB host/client interface, which can be configured either as a host or client USB interface, so either a PC connection can be made or else a USB memory stick shall be plugged in, but both will not work the same time.
- During power on initialization (**USB-Link** LED lit) no USB connection shall exist or shall be established. As soon the viasis completed initialization and the LED begins to flash shortly make a USB connection.
- In case the USB connection to your computer is made by means of a USB hub, the data transmission speed can be reduced remarkably.
- Always close the data connection before you unplug the cable. In viagraph this is done by closing the main window, e. g. in the terminal program HyperTerminal exists a **connect/disconnect** button to separate and close the connection. Otherwise the programs may hang up or do not recognize a reconnected viasis.



6.2.3.1 Windows XP and Vista 32 bit USB device driver installation

The following installation dialogue is shown here for Windows XP and differs minimal for Windows Vista 32 bit.

If the USB cable connection has been made the Windows **Found New Hardware Wizard** appears automatically.

A search on the Windows Update website is time consuming and not needed, so click **No, not this time** and **Next**, see picture right aside.

Enter the delivered „Via“ CD-ROM in the DVD/CD-ROM drive of your computer.



Illustration 15



Illustration 16

Choose **Install from a list** and click **Next**, as shown in illustration 16.

In the next window below activate **Search for the best driver ...** and click the option field **Include this location in the search**, see illustration 17.

Click on the **Browse** button and search on the CD-ROM drive first the **Tools** and then the **LPC-USB Driver** folder.

Click the **OK** button and the driver installation will start.

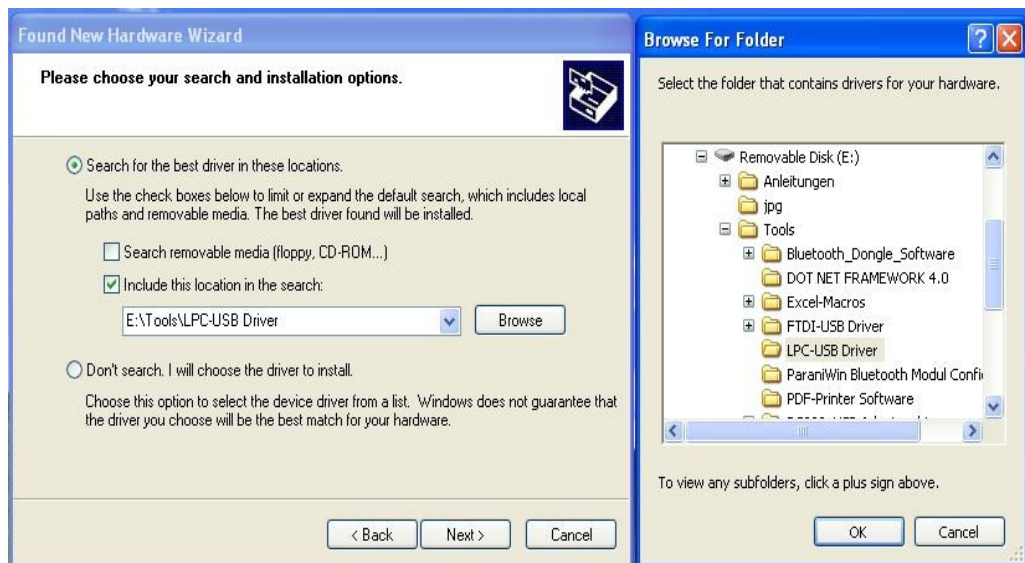


Illustration 17



The „...*Windows Logo Test*...“ message confirm with a mouse click on the *Continue Anyway* button.

Depending on your Windows user rights, respectively the Windows settings regarding device driver installations, the installation may fail. In such a case contact your system administrator, respectively repeat the installation with administrator rights.

After a successful USB driver installation you should also find it in the Windows *Device manager* (*Start – Control Panel – Performance and*



Illustration 18: USB driver installation completed



Illustration 19: Device manager with virtual COM port

Maintenance – System – Hardware – Device manager), see illustration 19, in the expanded *Ports (COM & LPT)* line the *LPC USB Vcom Port*.

The serial USB interface of the viasis can be used now with viagraph or another terminal program and a COM port to the viasis 3003 can be opened, see also chapter 6.2.1.

6.2.3.2 Windows Vista 64, 7, 8, 8.1 USB driver installation

In order to avoid long and unnecessary waiting time switch the automatic search for driver on the Windows update server off. The needed driver resp. the driver information cannot be found there. To switch the automatic driver search off open the **Devices and Printers** window, see illustration 21, either by the Windows **Start** menu or the **Control Panel**.



Illustration 21: Windows Devices and Printers

Click with the right mouse button on the symbol of your computer in **Devices and Printers**. In the displayed menu selection choose **Device installation settings**.

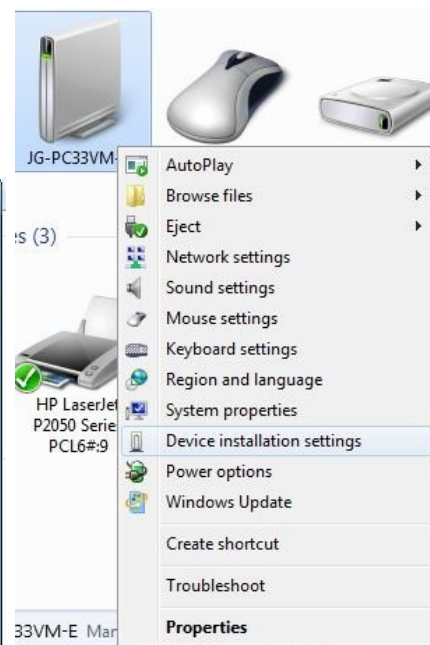
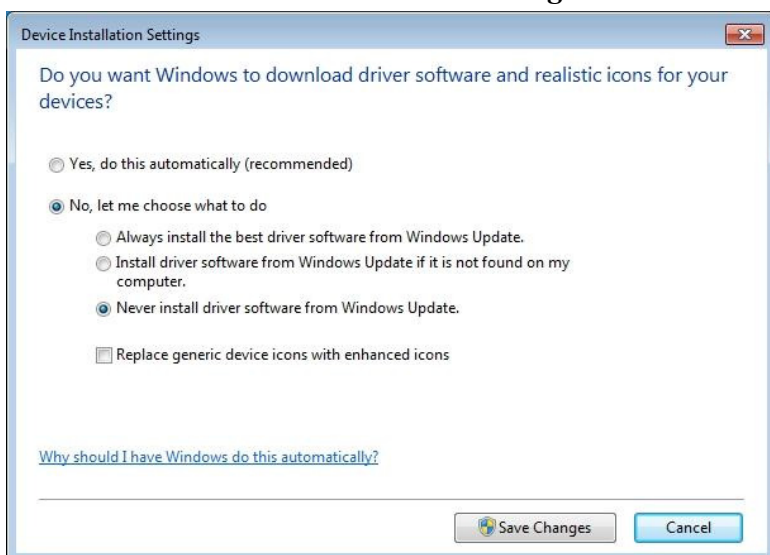


Illustration 22

Illustration 20

Activate **Never install driver software from Windows Update** and click on the **Save Changes** button, see illustration 22 above. After the USB driver installation you may restore the old installation settings in this window.



Now connect the powered viasis and your computer with the delivered cable. Plug the USB-B connector in the viasis operator panel USB-B socket, see also illustration 14 and the USB-A connector in your computer socket. The message *Device driver ... not ... installed* appears.

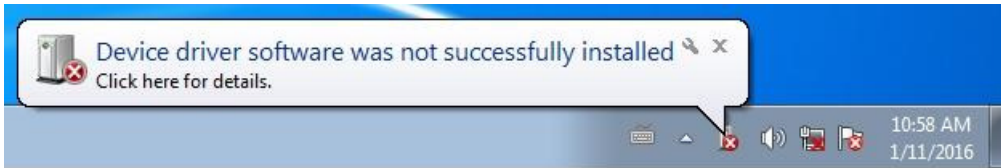


Illustration 23

Open the *Device Manager*, e. g. with the Windows menu *Start – Control Panel – System and Security – System – Device Manager*. In the device class *Other devices* you will see the device *USB_CDC0_0*. Make a right mouse click to *USB_CDC0_0* and select *Update driver Software* in the displayed menu, see illustration 25.

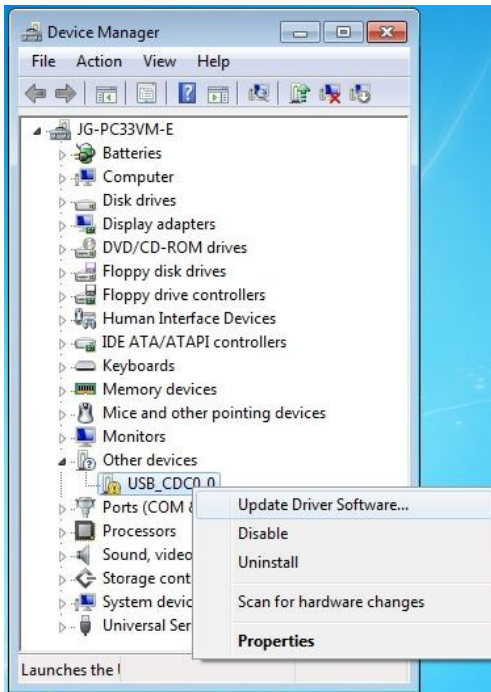


Illustration 25: Driver update

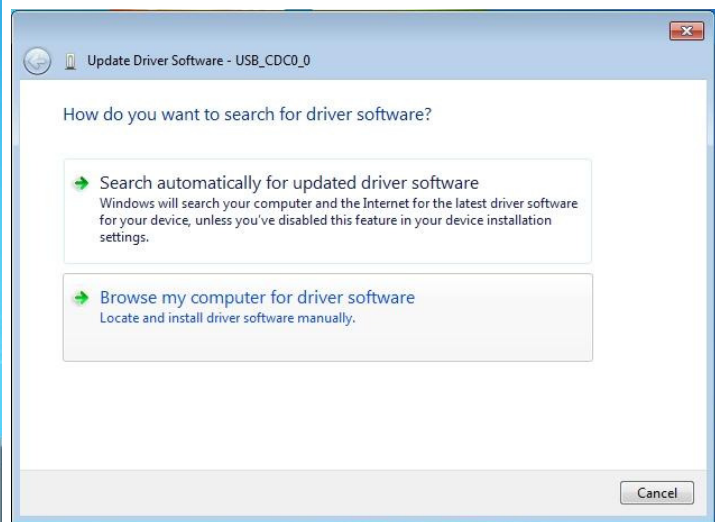


Illustration 24: Driver search

Choose *Browse my computer for driver software*, see illustration 24. Enter the delivered CDROM in your CD/DVD drive. In the following dialogue click the Browse button and navigate to the folder *\Tools\LPC-USB Driver* on the delivered CDROM, see illustration 26.



Illustration 26: Driver file folder



Illustration 27: Driver verification



In the *Windows Security* message window click on *Install this driver software anyway*, see illustration 27.

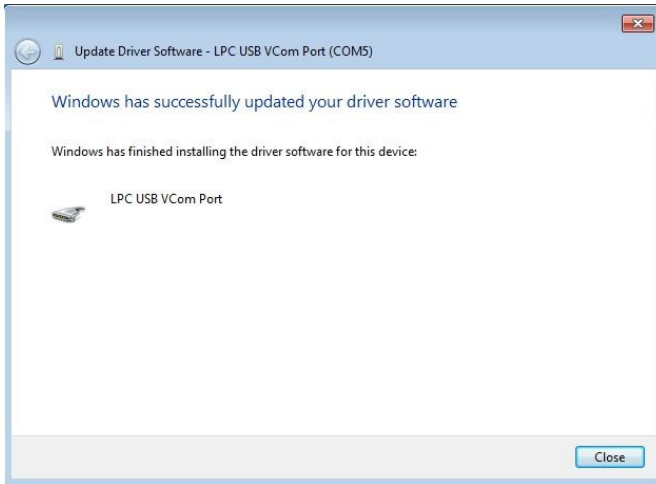


Illustration 28 : Installation completed

Click the *Close* button as soon the message *Windows successfully updated your driver software* is shown, see illustration 28.

The device manager will list in *Ports (COM&LPT)* the USB device driver *LPC USB Vcom Port*, see illustration 29.

By means of the established virtual serial COM port as a device interface viagraph and other terminal software can communicate now with the viasis.

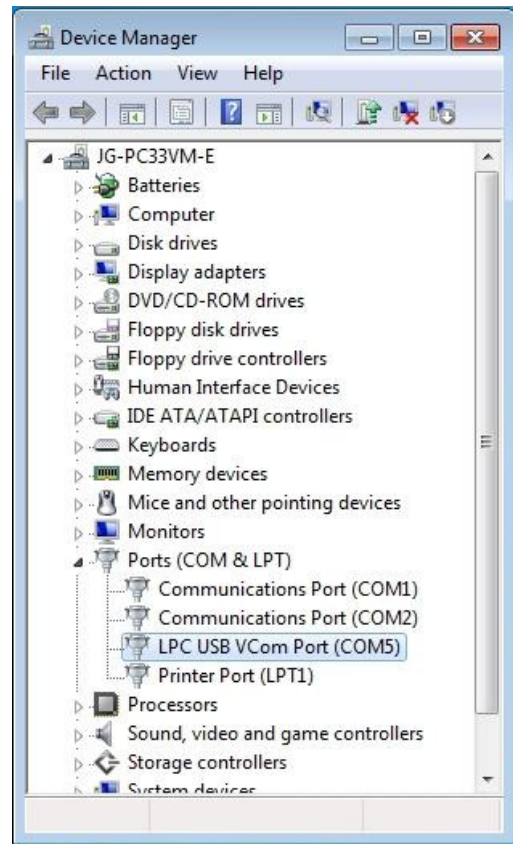


Illustration 29: LPC USB Vcom Port

6.2.3.3 USB driver for Windows 10

Under Windows 10 in case a USB CDC (communication device class) system is connected the first time the Windows integral standard driver file “usbser.sys” is installed automatically without the need to provide additional driver information files (*.inf) or catalogue files (*.cat).

During the USB cable connection between viasis and your computer with a Windows 10 operating system a virtual COM Port *Serial USB device (COMn)* is visible in the Device Manager in *Ports (COM & LPT)*.

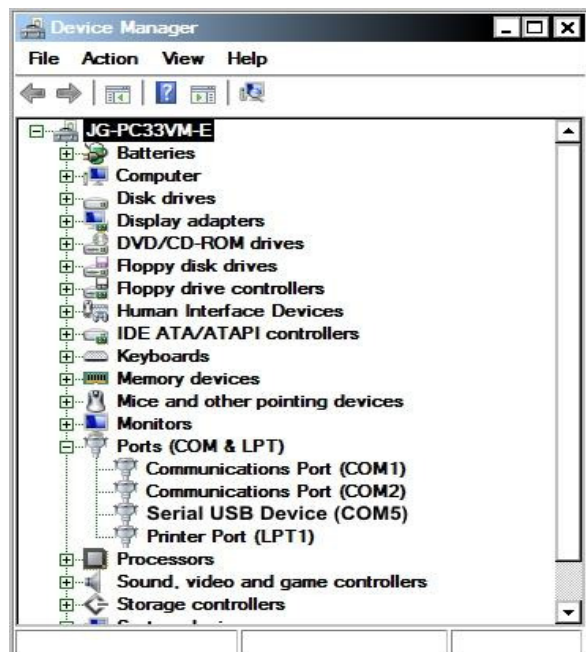



Illustration 30: Windows 10 serial USB device



6.2.4 USB client interface for USB flash storage sticks (optional)

USB flash drives or memory sticks can be plugged in the USB-A socket of the control panel located in the battery box, see also illustration 14.

Following points shall be recognized for a trouble free operation:

	<ul style="list-style-type: none"> - As long as a USB memory stick is plugged into the viasis control panel no other data connection between the viasis and a computer, particularly no USB host connection shall be established. - The USB interfaces of the control panel fulfills the USB 2.0 specification. According a USB client interface need to deliver maximal 100 mA for „low power“ mass storage devices. - The USB memory stick shall only be plugged for the time of a data transfer and be removed afterwards. As long as the USB memory stick is plugged in the viasis does operate in measurement mode
---	--

After connection of a USB memory stick the viasis executes in sequence following tasks:

- If not found in the USB stick root directory a folder “**VIASIS**” is created
- Download of stored measurement data in a file (*.VTF) in the “VIASIS” folder. Stored measurement data in the viasis are deleted afterwards.
- If a firmware file¹ (*.BIN) is found in the “VIASIS” folder it is loaded and a firmware update is started.
- In case a parameter file (file extension *.PAR) is found in the “VIASIS” folder it is loaded into the viasis and the viasis is reconfigured.
- If not already created before a new the log file “USBINFO.TXT” is placed in the “VIASIS” folder. All up- and download actions are logged herein.

A text entry example for writing a measurement data file in “USBINFO.TXT” follows:

```
Viasis 3003 - Version 4.12, 15SC4321
Date: 15.09.2015, Time: 14:14:46
Write SC_15SC4321_150915_001.VTF ok
```

Also if the viasis measurement data store is empty a file with the extension *.VTF will be created. This file includes the current parameter and the event protocol of the viasis.

The meaning of the **USB-Link** LED on the operator panel when using an USB memory stick shows the following table:

Green USB-Link LED	USB-Stick LED ²	Status
Permanent lit	Permanent lit	USB stick is initialized.
Diminishes quickly	Diminishes quickly	Data are transferred, read and written
Slowly Blinking, 0,5s on and 0,5s off	off	Remove the USB stick, all actions done by the viasis

¹ viasis microcontroller program software

² if exists



For the operation of USB memory sticks at your computer in common no customer installed device driver is needed, because they can be operated with already installed Windows standard mass storage device drivers

6.2.4.1 Parameter transfer from and to the viasis using a USB memory stick

The viagraph software allows it to modify viasis settings offline and to store the settings in a parameter file on a USB stick. When the USB stick is plugged the next time in the viasis the parameter settings are read and the viasis is reconfigured.

With viagraph created parameter files (file ending *.par) are named with the unique serial number of the viasis (e. g. 15SC4321.PAR) and are only loaded by the viasis with the same serial number. So several parameter files can be placed in the “VIASIS” folder of a USB memory stick for several viasis systems.

The precondition for the modification of the viasis system parameter settings offline is that the viasis type and version is already known to the viagraph program:

- Either you connect the viasis directly to your computer and click on the “Settings“ button in viagraph, see also chapters 6.2.1, 6.2.3 and 6.2.5, resp. illustration 10 and illustration 11.
- Else plug an USB stick into the powered viasis to retrieve a VTF file, see also chapter 6.2.4. Afterwards plug the USB Sticks into an USB port of your computer and „evaluate“ the VTF file with the viagraph software.

The actions of first possibility are already described before in the manual. For the second possibility start viagraph by the **viagraph** button on your desktop. In the viagraph program selection, see also illustration 10, choose **Read evaluation file**.

Plug in the USB stick and open the VTF file in the VIASIS folder of the viasis system, whose setting you want to modify later, see illustration 31. The VTF file probably contains no measure data, therefore you are prompted with a viagraph error message, which you can ignore.

Close and reopen viagraph.

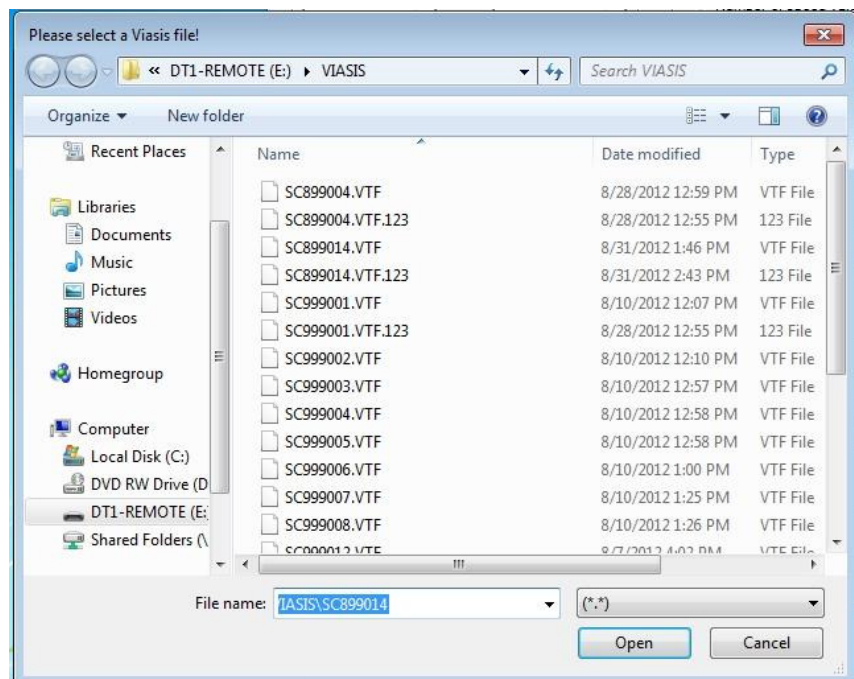


Illustration 31: Open viasis VTF file to retrieve the settings



In the viagraph start window select the menu **Tools** and further **Parameter set**, see illustration 32. From the here given list of parameter files (*.par) select the viasis with the serial number, whose settings you want to modify.



Illustration 32: viasis parameter file selection

The screen with the viasis settings is shown then, with several tabs depending on the viasis type, see illustration 33.

Here you can make the needed parameter changes offline, see also chapter 6.3 following.

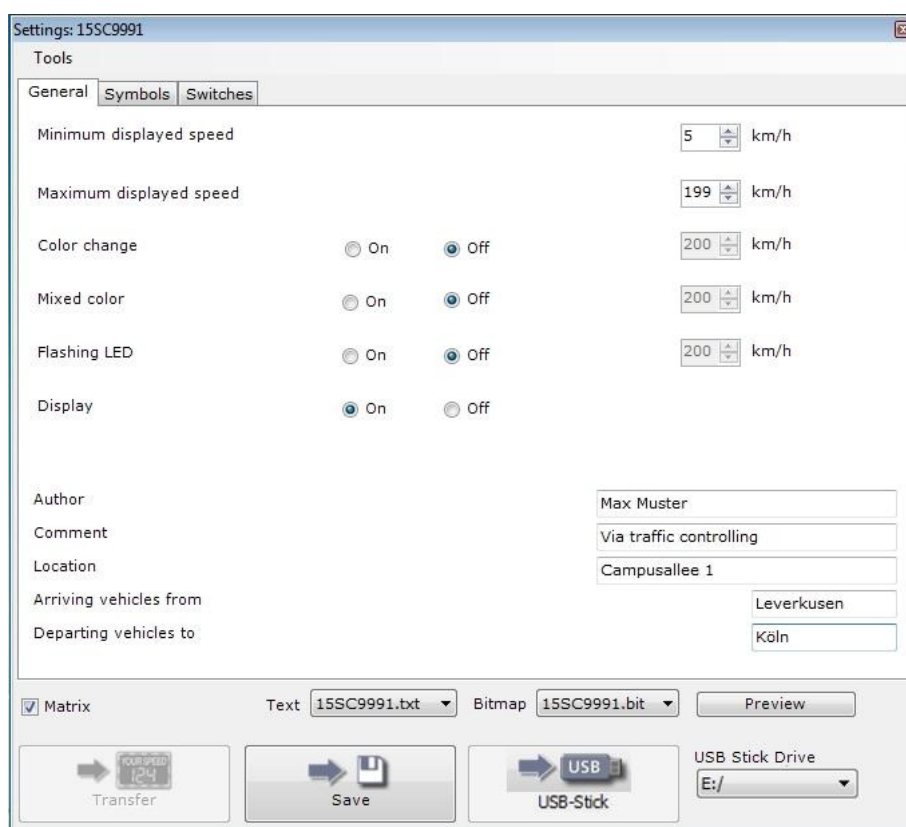


Illustration 33: viasis settings

Only if you selected the parameter file of a viasis PLUS, see illustration 32, appears the checkbox **Matrix** in the settings window, see also illustration 33.

Is the option **Matrix** activated you can save text pages and bitmaps (see also chapters 6.10.1 and 6.10.2), which are stored in files on the hard disk, together with the parameter settings in a single parameter file on the USB stick for a further transfer to a viasis PLUS. With the drop down selections **Text** and **Bitmap** you can choose the files.

With the buttons **Save** and **USB-Stick** you may save the parameter settings for later use on the computer hard disk drive or the changed parameters directly to the USB stick.

Before you click the **USB Stick** button, select the correct **USB Stick Drive** letter.

If you plug-in the USB stick with the changed parameters at your viasis, the parameter file is automatically read and the viasis reconfigured.



6.2.5 Bluetooth modem connection

Check whether your computer is equipped with a Bluetooth radio interface ready for operation. If not you may obtain e. g. a USB Bluetooth dongle and install the device driver and operating software delivered by the manufacturer.

Depending on the operating system of your computer and the installed Bluetooth interface, either internal or external modem, the way to establish a Bluetooth data connection will vary. Therefore for internal Bluetooth modems please check the online help system of your computer and for external Bluetooth modems solution check the installation and operation manual of the manufacturer, delivered with the modem.

If standard (generic) Windows Bluetooth interface drivers are used for the Bluetooth modem operation, the initial configuration of the Bluetooth connection is shown for Windows 7 below:

- Open **Devices and Printers** by the Windows **Start** menu or the **Control Panel**. In the **Devices and Printers** window, see also illustration 21, click to **Add a device** in the menu bar.
- The viasis Bluetooth module is ready for operation ex factory and reported e. g. with the device name **VIASIS_15SC9991**, where 15SC9991 is the 8 character long viasis serial number.
- During the connection setup you are further asked for a pairing code or pin number. Enter here the default in the viasis set four digit pin number **1234**.

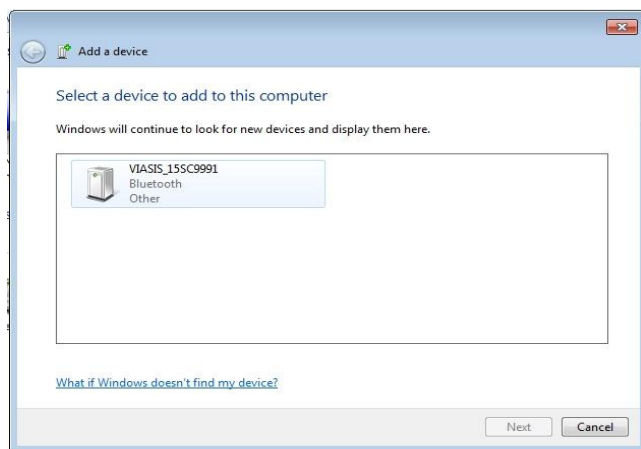


Illustration 34: Reported found new device(s)

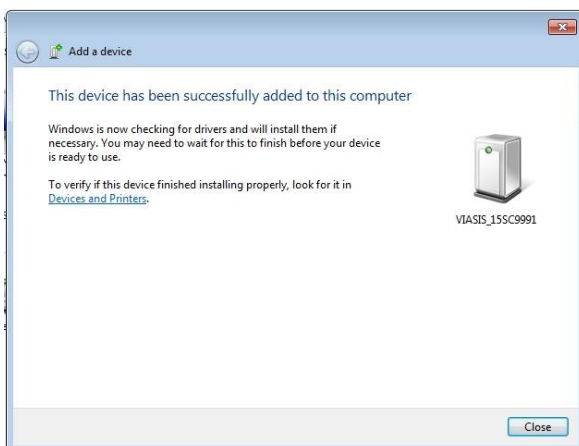


Illustration 35: Bluetooth device added

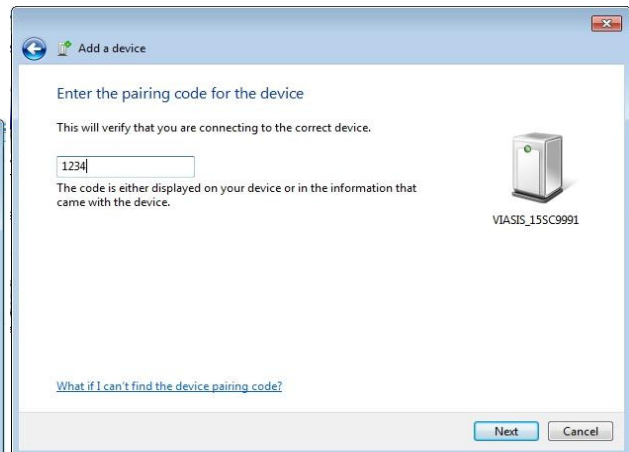


Illustration 36: Pairing code, pin number

If the Bluetooth connection is established successfully the later started **viagraph** software can find the viasis, otherwise not.



If you use other terminal software or make a manual terminal connection with *viagraph* you need to know which virtual COM port number was assigned to the Bluetooth device and set the COM port in the terminal program accordingly. This COM port number can be either found in the Windows *Device manager*, see chapters 6.2.2 and 6.2.3.1 or else with a right mouse click to the device, which was added in *Devices and Printers*, menu item *Properties* in the *Services* tab, see also illustration 37 below:

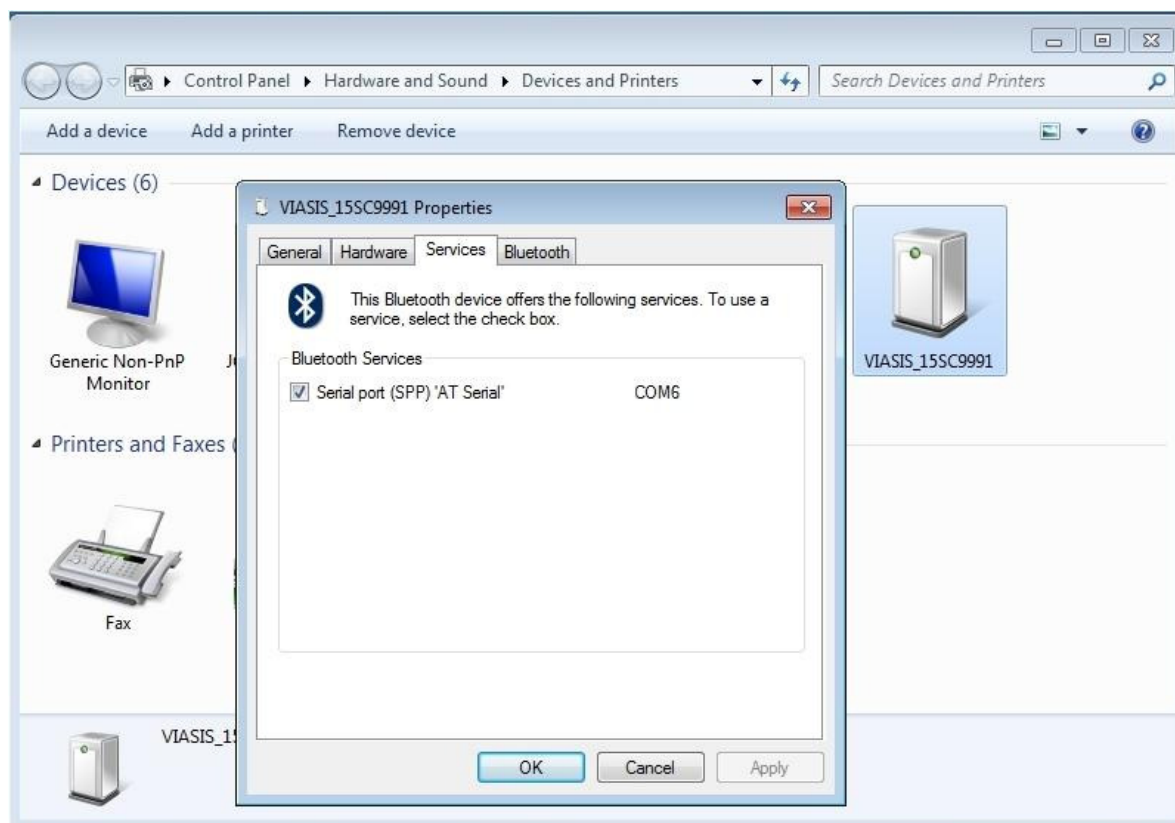


Illustration 37: COM port number of the serial Bluetooth device

The radiation of the Bluetooth antenna and therefore the zone where radio connections are possible is similar to the radar in front of the display. Directly aside, below and behind the viasis a connection is only possible if reflectors (buildings, fences or vehicles) are nearby.



- Internal Bluetooth modems of laptops, notebooks and mini computers are in common designed for the connection of peripheral Bluetooth devices like keyboards, mouse, mobile phones, which are placed close by your computer. Therefore their radio transmission strength and reception sensitivity is often quite bad. In such a case turn off the internal modem and invest a few Euro for an external class 2 or better class 1 USB Bluetooth dongle, with which you can have a much better and stable distant Bluetooth connection.
- If you have already established some Bluetooth data connections to different viasis or more generally to via devices in the past and these devices are still reachable while you try to connect in *viagraph* with *Connect to device* you may experience the fact that *viagraph* automatically connects to the first found via device and not to the device you wanted *viagraph* to connect to. In this case you have to choose the connection and the device manually, please see chapter 6.2.7.



6.2.6 Data connection by GSM radio modem, Email and SMS transfer



- If you like to transfer data or parameter of the viasis by GSM radio link you need in common to obtain a second GSM radio modem for the communication with your remote computer¹. The radio modem must support CSD² protocol data communication. Further on you need two SIM cards of a provider, whose radio network supports explicitly CSD data transfer with 9600 Baud data transfer speed.
- For the use of E-mail data transfer and automatic viasis SMS alarm messages you need SIM cards and contracts which include GPRS and SMS services. You may ask if the provider offers contracts with data transfer only (without voice) services for business customers.
- Before you obtain the SIM cards ask the provider if he covers the needed radio services (CSD, GPRS, SMS) at the viasis measurement place(s) himself. Roaming service, the radio service by a contractor of your radio service provider might be paid with high charges later on.



Regarding the questions „How to connect, install drivers and setup your radio modem at your computer”, please refer to the information given by the radio modem manufacturer. Finally a virtual COM port must have been created in the Windows *Device manager*, typical either in the device class *COM&LPT* or *Modems – Properties – Extended*, see also chapters 6.2.2 and 6.2.3.

Before you can connect with *viagraph*³ or another minimal software, check that the viasis is powered and the radio modem is switched on by its related time ule and (if needed) the PIN number of the SIM card is set in the viasis, refer also to chapters 6.4.2.1 and 6.4.2.2.

In order to establish a connection with viagraph click the button *Connect to device* see illustration 10 in the viagraph start window.

After the modem was found the *Modem* screen is shown, see also illustration 38. Enter the dialing number of the SIM card inserted in the viasis in the field *Number*. In the *Comment* field enter a unique description for the viasis.

Illustration 38: Viagraph radio modem support

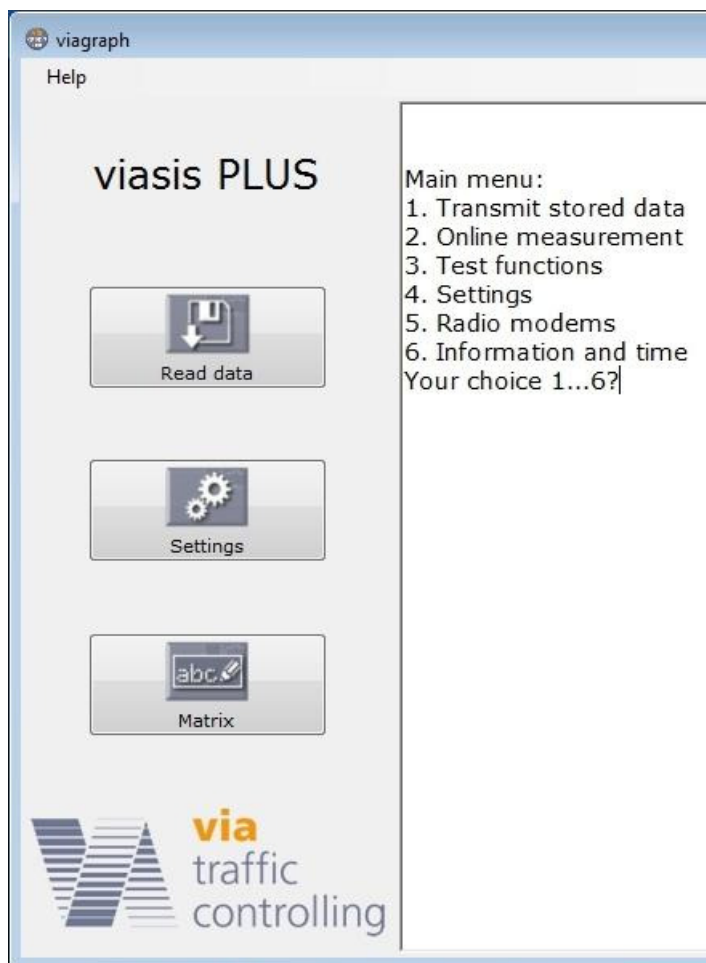
¹ Laptop or notebook integrated radio modems or “surf sticks” often offer an integrated modem with a virtual COM port for various radio link protocols. But in almost all cases they do not provide CSD protocol capability. Therefore check if CSD explicitly listed in the modem features in the provided manufacturer information.

² CSD – circuit switched data

³ Viagraph expects a radio modem inserted SIM card with switched off PIN number request. This can be done by inserting the SIM card in a mobile phone. Please follow the mobile phone manual, how to do it.



Have you already added the *Number* entry to the list mark it with a left mouse click and click hereafter on the button *Dial number*.



As soon the GSM data connection is established the viagraph connection window with the viasis main menu in the terminal is shown, see illustration 11. Depending on the viasis type recognized by viagraph several buttons appear on the left side of the viagraph window, see also illustration 39 left aside.

As soon the viagraph connection window is closed again the modem connection is also disconnected.

Illustration 39: Viagraph connection window and viasis main menu

6.2.7 Manual selection of the viagraph communication (COM) port

The manual selection of the communication (COM) port might be necessary, in case of:

- multiple connections to different via devices are possible, but with the *Connect to device* search only the first found device is automatically connected.
- several modems with virtual COM ports are installed at your computer. Viagraph always offers only the first found modem, which is the inappropriate one for a GSM connection to the viasis device.
- several Bluetooth connections were established in the past, each with a COM port number, some viasis with Bluetooth modem are in reach, but only the first found device is automatically connected by viagraph.

In this cases or a combination of them, please have a look in the Windows *Device manager* (see chapters 6.2.2 and 6.2.3), particularly in the device classes *COM&LPT*, *Bluetooth devices* and *Modem* to find the COM port number of the wished viasis device or modem.

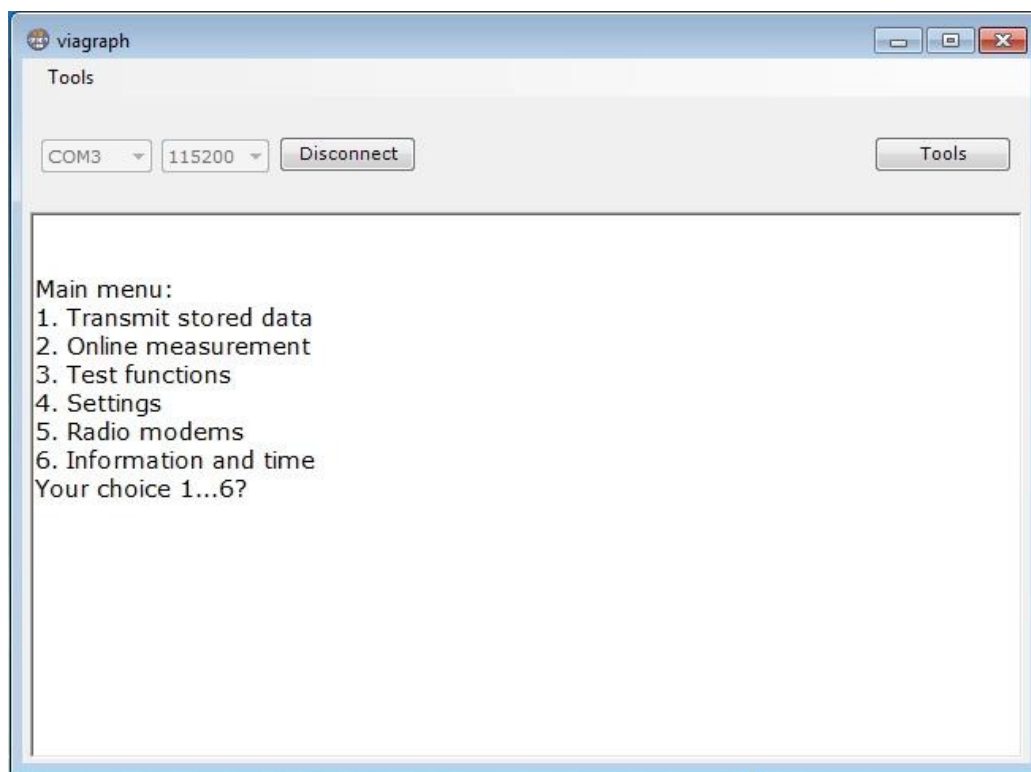


Illustration 40: Viagraph terminal connection

Start viagraph and select *Terminal* from the *Tools* menu, see also illustration 32. The initially empty terminal window appears. In the *COM* port selection field select the COM port of the wished viasis device or modem. The data transfer rate must be always **115200** Baud. as shown in Illustration 40. Now click the *Connect* button.

As soon you are connected the *Disconnect* button is shown. Now, you can use the *Tools* button, to force viagraph to show the defined extended functions for a recognized viasis or radio modem, like *Read data*, *Settings* or *Dial number*, see also illustration 11 and illustration 38.

6.3 Viasis settings and parameter sets

The most often used settings can be made after a click on the *Settings* button in the viagraph connection window (see illustration 11) in the tabs *General*, *Symbols* and *Switches* of the Settings window, see illustration 41.

Following description is based on the direct menu input, which is possible with any ASCII terminal or terminal program, or also in viagraph terminal window.

As information the input windows of viagraph are shown at the respective menu descriptions.

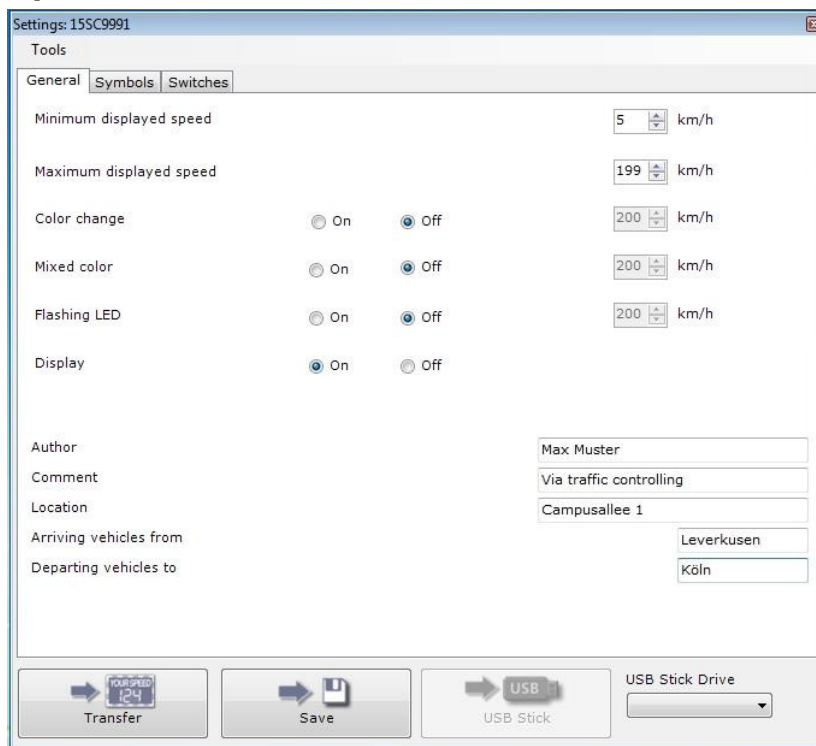


Illustration 41: Viagraph settings window

While inputs in the menu system are made directly to the viasis, changes to the actual parameters shown in the viagraph input windows are cached in the program and need to be transferred to the viasis by clicking the *Transfer* button, otherwise the changes are discarded.

Hint: To avoid a malfunction of viagraph take care that the viagraph terminal window shows the viasis main menu before you click to the „Settings“, „Matrix“, etc. button!

The viasis 3003 main menu appears after a click to the „Connect to device“ button in viagraph automatically. If you use other terminal software, it depends on the used communication interface (RS232, USB, Bluetooth, GSM) whether the main menu appears or not. If the systems are connected and the main menu is not shown, press the „Shift“ and the „H“ key together, so the menu will be send.

If you insert one of the selection numbers 1 till 6 in the viasis main menu, displayed in the terminal window (see illustration 11) the related sub menu will be send by the viasis.

Main menu:

1. Transmit stored data
 2. Online measurement
 3. Test functions
 4. Settings
 5. Radio modems
 6. Information and time
- Your choice 1...6?



If you enter **4** for **Settings** in the main menu the settings menu with the current parameter values is displayed:

- Settings:
1. Parameter set: 1
 2. Time schedule
 3. Bidirectional detection: off
 4. Speed display options
 5. Optimizing display: Balanced
 6. Extensions thresholds
 7. Radar sensitivity: 100 %
 8. Back
- Your choice 1...8?

The parameter values above for the items number 3, 5 and 7 are default settings ex factory.

The parameters of the sub menus **Speed display options** and **Extensions thresholds** constitute a **Parameter set**. A **Parameter set** is valid for the times defined in the **Time schedule**. Here-with different display parameters can be set for different weekdays or daytimes in a flexible way.

The settings for **Bidirectional detection**, **Optimizing display** and **Radar sensitivity** are the same for all parameter sets and times.

6.3.1 Parameter set

A parameter set is the collection of all display parameters of the submenus **Speed display options** and **Extensions thresholds** and its submenus for the times defined in the submenu **Time Schedule**.

Up to 5 complementary parameter sets for different periods can be used for a variable measurement and display behavior. This can be used for example during school hours in order to set a different display behavior in case of a temporary speed restriction, as to the other times of the day off school and weekends, for example at 30 km/h, from Monday till Friday, from 7:30 to 13:30 o'clock only.

With the entry **1** in the Settings menu you can change the parameter set shown in the concerned submenu **Speed display options** and **Extensions thresholds** :

- Settings:
1. Parameter set: 1
 2. Time schedule
 3. Bidirectional detection: off
 4. Speed display options
 5. Optimizing display: Balanced
 6. Extensions thresholds
 7. Radar sensitivity: 100 %
 8. Back
- Your choice 1...8?1



In the following command prompt, select the desired, such as the second parameter set:

Parameter set=2

If you look in the submenus *Speed display options* and *Extensions thresholds* you will find now the values of the 2nd parameter Set. In the submenu *Time Schedule* you find the valid times and days which are defined for the 2nd parameter Set.

If you want to know which parameter set is active in the viasis you need to look into the main menu submenu *Information and Time*.

In the viagraph Settings input window by default only the parameters of parameter set 1 are shown, see illustration 41. Just after the release in the menu *Tools – Parameter sets - On*, the access to all parameter sets and the combined time schedule *Scheduling* gets visible, see also illustration 42.

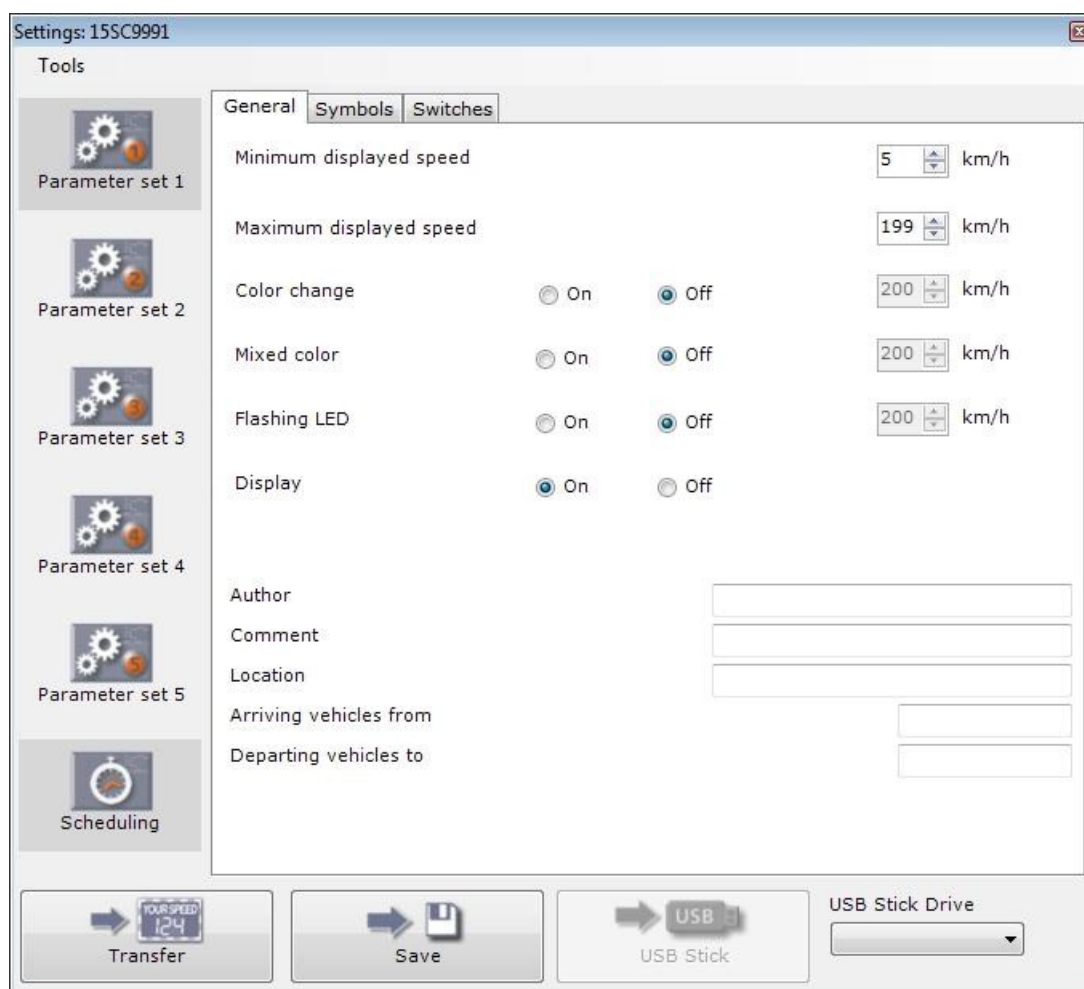


Illustration 42: Parameter sets and time schedule

6.3.2 Time schedule

Each parameter set, see chapter 6.3.1, owns a time schedule, which determines during which times the settings of the parameter set are used by the viasis for the measurement, display and possible extensions

Time schedule:

1. LED display: on
2. Operation weekdays: Su,Mo,Tu,We,Th,Fr,Sa
3. Daily start time: 00:00
4. Daily stop time: 00:00
5. Back

Your choice 1...5?

The values of the time schedule shown above are the default values for parameter set 1 ex factory. All weekdays are operation weekdays and the daily operation time is the whole day in case daily start and stop time are set to equal values. So parameter set 1 is valid the whole week for each day. For the other parameter sets is by default no operation day defined, therefore they are deactivated.

In time periods not covered by the time schedules, no measurements and self evident no display operation will happen. The viasis is in a low power energy saving mode, without active radar and the viasis will be “awaked” only at the next valid time schedule time entry.

If the operation time of two or more parameter sets overlap, always the parameters of the lowest number parameter set get valid.

In viagraph the time schedules of all parameter sets are concentrated in the input windows „*Scheduling*“, which gets visible by activation of the menus *Tools – Parameter sets – on*, see illustration 42 and illustration 43.

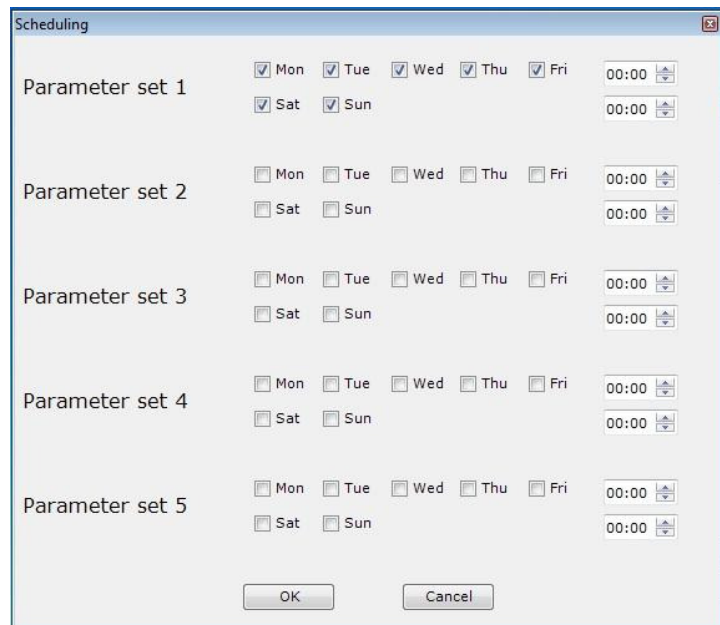


Illustration 43: Time schedule

6.3.2.1 Time schedule – Led display

This option permits a hidden measurement and storage of vehicle speeds without a visible output on the numeric LED display for the vehicle driver. This function can be also realized if the minimal and the maximal displayed speed parameters are set to equal values, see also 6.3.4.2.



Enter **1** in the **Time schedule** menu and the following menu choice is offered:

LED display:

1. off

2. on

Your choice 1...2?

6.3.2.2 **Time schedule – Operation weekdays**

In the submenu **Operation weekdays** the days are chosen, at which measurements shall be done and depending to other settings of the parameter set the speed shall be shown on the numeric LED speed display or other actions defined in the **Extensions thresholds** shall be made.

The menu **Time schedule** (chapter 6.3.2) lists the current operation weekdays, e. g. **Su, Mo, Tu, We, Th, Fr, Sa** of the parameter set.

After selecting **2** in the menu **Time schedule** you are asked to select the day you want to change in the submenu **Weekday** :

Weekday:

1. Sunday

2. Monday

3. Tuesday

4. Wednesday

5. Thursday

6. Friday

7. Saturday

Your choice 1...7? _

The chosen day of the week is added to the list of operation days in the **Time schedule** menu, if it was not listed before, respectively removed from the list, if it was listed.

6.3.2.3 **Time schedule – Daily start and daily stop time**

The daily start and stop time determine the daily time of the measurement and display operation at the chosen operation weekdays (chapter 6.3.2.2).

If the **Daily start time** and the **Daily stop time** is set to the same time values, these times are ignored by the system and the task is performed at the whole selected operation weekdays.

You have to insert the time values in the format hh:mm. Valid are time values between 00:00 and 23:59.

Examples:

1. You intend to measure in front of a school only during school visiting times. Only at schooldays from Monday till Friday, in the time from 07:30 till 13:30 the viasis shall measure and display the vehicle driver's speed.

Following settings must be made in parameter set 1 in the time schedule menu:

- Set LED display to „on“.

- Change the operation weekdays to „Mo,Tu,We,Th,Fr“.

- Set the daily start time to „07:30“ and the daily stop time to „13:30“



- If set, the operation weekdays of the other parameter sets must be discarded.

2. You want to measure at a road construction site by night from 19:00 till 06:00 display the vehicle driver's speed. But you want to measure the whole day around the clock.

Following settings must be made in parameter set 1 in the time schedule menu:

- Set LED display to „on“.
- Change the operation weekdays to „ Su,Mo,Tu,We,Th,Fr,Sa “.
- Set the daily start time to „19:00“ and the daily stop time to „06:00“

Additionally following settings need to be done in parameter set 2 in the time schedule menu:

- Set LED display to „off“.
- Change the operation weekdays to „ Su,Mo,Tu,We,Th,Fr,Sa “.
- Set the daily start time to „6:00“ and the daily stop time to „19:00“

In the second example with the time schedule of parameter set 1 a measurement with numeric speed display is made from 19:00 till 6:00 o'clock each night. During the daytime from 06:00 till 19:00 o'clock the time schedule of parameter set 2 measures without displaying the speed on the numeric LED display.

6.3.3 Bidirectional detection

The viasis radar detects also the data of leaving vehicles, whose data by default are not stored in memory and whose speed in principle are not shown on the numeric LED display. The feature **Bidirectional detection** allows an additional memorization of data of leaving vehicles for later data evaluation purposes.

If you enter 3 in the „Settings“ menu you are prompted to change the **Bidirectional detection** state:

```

Bidirectional detection
1. off
2. on
Your choice 1...2?
  
```

Is the **Bidirectional detection** set to “on” you are given in the **Online measurement** menu the speed data of vehicles of both driving directions by the serial data connection(s), see chapter 6.6.



Hint: The bidirectional detection delivers only at low traffic density, respectively low vehicle meeting rate, complete and meaningful data for the leaving vehicle traffic, whose vehicles cannot be detected as long they are in the radar shadow of approaching vehicles.

The setting for the **Bidirectional detection** is valid for all parameter sets. In viagraph the feature **Both directions** can be activated in the **Tools** menu of the **Settings** window.



6.3.4 Menu Speed display options

The menu *Speed display options* is shown if you choose **4** in the *Settings* menu:

Speed display options:

1. Decimal places: off
2. Minimal speed displayed: 5 km/h
3. Maximal speed displayed: 199 km/h
4. Threshold blinking LED: 200 km/h
5. Threshold Led mixed color: 200 km/h
6. Threshold LED color change: 200 km/h
7. Back

Your choice 1...7?

The parameter values shown above are the default values ex factory.

For viasis LED displays with only one LED color the options *Threshold LED mixed color* and *Threshold LED color change* do not exist. The *Threshold LED mixed color* is only shown for viasis with two appropriate LED colors. The options given in menu “Speed display options”, with exception of the Decimal places, need to be defined for each activated parameter set.

6.3.4.1 Decimal places

For applications where low vehicle speeds shall be measured exactly, e. g. for drive in weighbridges, the display of a decimal digit until 19,9 km/h (or mph) can be activated by entering **1** in the *Speed display options* menu and further activating the decimal:

Decimal places

1. off
2. on

Your choice 1...2?

If vehicle speeds above or equal 20 km/h are measured the speed values are displayed on the numeric LED display as whole numbers again. If the speed decimal is activated the speed data output in the *Online measurement* (chapter 6.6) mode, is also given with a decimal digit.

The setting for decimal places is a general setting equal for all parameter sets.

6.3.4.2 Minimal - and maximal speed displayed

The „*Minimal speed displayed*“ is the lowest measured speed value published on the numeric LED speed display

In the “Settings” menu you are prompted after the selection **4**:

Minimal speed displayed = _

End the numbers input with *<return>*. The new value is shown in the menu immediately.

The values for minimum speed can be set in the range between 5 and 199 km/h. Only values lower or equal the adjusted maximum speed will be accepted by the system.



You may raise the minimal speed factory setting of 5 km/h to e.g. 15 km/h to suppress slow movements of vehicles, pedestrians or wind moved branches of trees, which may also initiate measurements on short distance.

The „Maximal speed displayed“ is the highest measured speed value shown on the numeric LED speed display. With the 2 ½ - digit LED display you may set the value between adjusted minimal speed and a maximum of 199 km/h.

The reduction of the **Maximal speed displayed** to values just above a local speed limit (maybe plus 20%) avoid the driver testing of the maximal shown speed or „tachometer checks“.

The setting of the **Maximal speed displayed** parameter is analogue the setting of the Minimal speed displayed. The setting can be changed by the selection **5** in the **Settings** menu.

Both settings have no influence on the speed data storage and the output of serial data. All speeds measured between 5 km/h and 199 km/h are stored, respectively transferred to a connected computer terminal.



Hint: By setting minimal and maximal speed displayed to equal values e. g. to 5 km/h, the vehicle speed data are memorized, resp. transferred to a connected terminal, without an output on the numeric LED display for the vehicle drivers, see also chapter 6.3.2.1.

6.3.4.3 **Threshold blinking LED**

Depending on the excess of the „Threshold blinking LED“ by the measured vehicle speed, the numeric speed display is alternated for 0.25 seconds on and 0.25 seconds off time. In a display update cycle with 1.5 seconds length the numeric speed „blinks“ up 3 times in short sequence.

This function can be used to reduce the power consumption of the system, with the effect of nearly doubling the system operating time without battery recharge. Hereby the threshold value is set to the minimum speed.

If the threshold is set to a local speed limit, this function can be used to point over speeding drivers to their misbehavior, with the effect of a blinking (warning) display when the speed limit is exceeded.

The threshold is set like the other thresholds in the range from 5 km/h till 200 km/h (blinking deactivated).

6.3.4.4 **Threshold LED mixed color (Option)**

If the viasis is equipped with two LED colors, which can be shown at the same time and emit seemingly a third color, the parameter **“Threshold LED mixed color”** is shown. Practically if the viasis has e. g. green and red LED the result of displaying both colors is the mixture color yellow, which is displayed if a measured vehicle speed exceeds the related, set threshold.

The speed threshold parameter is set similar to the speed threshold LED color change, see also chapter 6.3.4.5.

For example if the viasis is equipped with yellow and red emitting LED the color sequence of the display yellow – orange – red would be chosen with rising measured speed values, the mixed LED color threshold (orange display) would be set to 31 km/h and the threshold LED color change to 41 km/h.

Is the LED mixed color threshold set to a higher value than the LED color change threshold it will have no visible effect on the display.



6.3.4.5 *Threshold LED color change*

The viasis is supplied in several versions, with a numeric LED display with one or two LED colors. Only the two color versions have a menu item for changing the LED display color dependent of the measured vehicle speed. The color of the numeric speed display changes, for example from yellow to red color, if a detected vehicle moves faster than the set “**Threshold LED color change**” speed limit.

Also this option can be used to indicate the vehicle drivers that they drive too fast and their vehicle speed exceeds the local speed limit.

The threshold is set like the other thresholds in the range from 5 km/h till 200 km/h (numeric speed display color change deactivated).

6.3.5 **Optimizing display**

The viasis is equipped with a sensor for the environment brightness. With the measured values the needed brightness of the display LEDs for a good visibility is calculated and controlled.

With the menu **Optimizing display** the LED display brightness can be influenced if needed:

Optimizing display

1. Operating time
2. Balanced
3. Visibility

Your choice 1...3?

If the option **Operating time** is chosen the display appears darker and reaches maximal 50% of the possible brightness adjusted ex factory. If you choose **Visibility** the LED display appears to be brighter in compare to the **Balanced** setting. Here the viasis reaches the adjusted maximal brightness earlier and needs up to 50% more battery energy with the consequence of having a reduced operating time with battery supply.

6.3.6 **Menu extensions thresholds**

The viasis can be equipped with several optional extensions, which can be divided in two groups.

One group are the LED display extensions in form of LED warning symbols, which are integrated in the numeric LED speed display field, which are shown alternating to the numeric speed values, see chapter 6.3.6.1.

The other group consists of controlled switches as relays or power MOSFET transistors switches or switched optical output units, like LED warning lamps, LED matrices with text or symbols, which are activated additionally to the numeric LED speed display at the same time, see also chapter 6.3.6.2 foll.



All switches or output units are activated by the excess of a set speed threshold by the measured vehicle speed. More precisely an “on and an off speed threshold can be set for each symbol, switch or peripheral device.

The following „*Extensions thresholds*“ menu is an example. Number and sequence of the submenus depend on the installed viasis equipment:

Extensions thresholds:

1. Led symbols 30,50,60
2. Led symbols 70,80,!
3. Led symbols smileys
4. Led warning light
5. Relays
6. Display pages
7. Definition of symbols
8. Back

Your choice 1...8?

The first three menus *Led symbols...* are predefined by default. These symbol menus and their contenting symbol definitions can be changed, however not the number of symbols in the menus, see chapter 6.3.6.2.

6.3.6.1 Thresholds LED circle symbols

The viasis is delivered with integrated signs, red LED circle symbols with white speed limit (diameter 300 mm). The related speed thresholds for the activation and deactivation are placed in the *Settings - Thresholds Extensions* menu.

The display of speed limit or warning symbols alternates with the numeric speed display. The display is changed each $\frac{3}{4}$ second (750 ms).

If you select *LED symbols 30, 50, 60* in the *Thresholds Extensions* menu the following submenu for the related speed thresholds is shown:

Led symbols 30,50,60:

1. Symbol 30 on: 31 km/h
2. Symbol 30 off: 50 km/h
3. Symbol 50 on: 200 km/h
4. Symbol 50 off: 200 km/h
5. Symbol 60 on: 200 km/h
6. Symbol 60 off: 200 km/h
7. Back

Your choice 1...7?

For each symbol an „on“ and „off“ speed threshold can be set between 5 km/h and 200 km/h (threshold inactive). Is the measured speed below the „on“ or above the „off“ threshold only the numeric speed is displayed. In the menu example above the speed limit 30 symbol is shown at measured speeds from 31 km/h till 49 km/h alternating to the numeric speed.



Illustration 44: Circle symbol 50

In viagraph the speed thresholds of the circular warning symbols are set in the **Symbols** tab for the selected parameter set, see illustration 45 below:

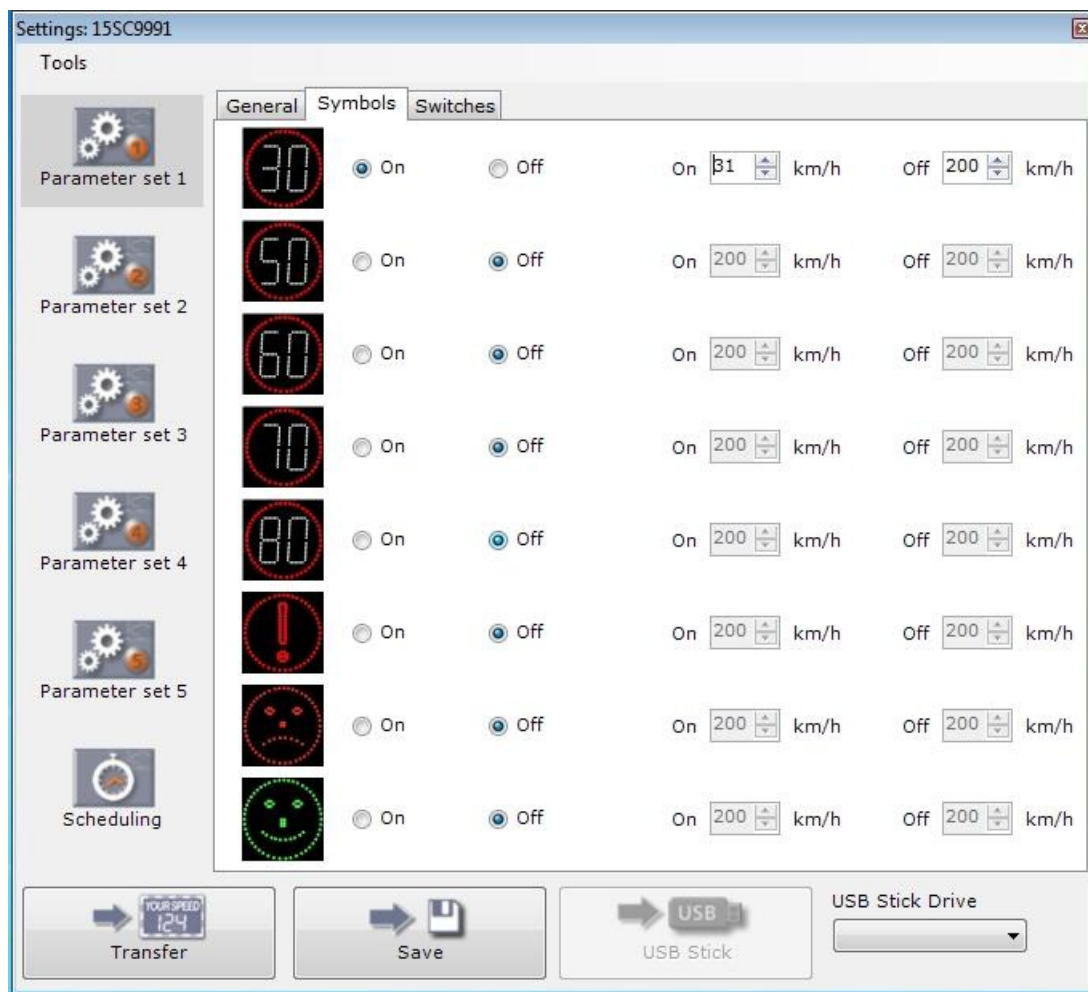


Illustration 45: Viagraph symbol tab

6.3.6.2 Definition of symbols

The predefined symbols in the first three menus of the **Thresholds Extensions** menu, see chapter 6.3.6, can be changed, however not the number of symbols in the menus.

For example if you need the circle symbols 8, 25 and 50 instead of the symbol group 30, 50 and 60, you may enter 7 in the **Thresholds Extensions** menu and the symbol group you want to change is requested:

Select symbol group

1. 30, 50, 60

2. 70,80,!

3. Smiley

Your choice 1...3?1

Choose with **I** the symbol group 30, 50, 60 and enter a new name for the symbol group (max. 31 characters long):

New symbol group name = 8,25,50 < Return >



Now each new symbol name (max. 11 characters) with a related font number, see also table 1, must be inserted:

Symbol name: 8 < Return >

Font: 408 < Return >

Symbol name: 25 < Return >

Font: 425 < Return >

Symbol name: 50 < Return >

Font: 450 < Return >

On the two digit 7 segment number display in the circle all numbers between 1 ... 99 can be shown. For the font number you must add 400 to the number, which shall be displayed. What means to display 25 in the circle you must enter $25 + 400 = 425$ for the font number. Besides the numbers in the circle there are four further circle symbols with font number 500 to 503 defined, see following table 1:

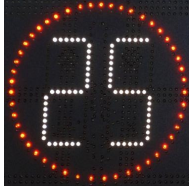
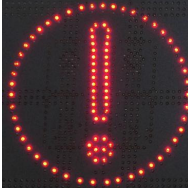
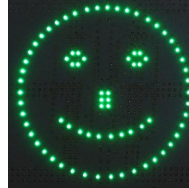
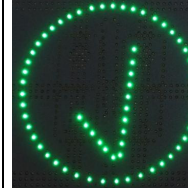
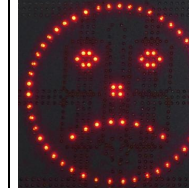
Font	401 499	500	501	502	503
Symbol					
	Example 425				

Table 1: Font numbers of the circle symbols

In the later menu presentation the text “*Led symbols*” is automatically inserted ahead and in front of each symbol name the text “*Symbol*” within the new menu.

After insertion the menu *Extensions Thresholds* is repeated by the viasis with the new menu items:

Thresholds Extensions:

1. Led symbols 8,25,50
2. Led symbols 70,80,!
3. Led symbols smileys
- 4.....

6.3.6.3 LED Warning lights (Option)

If the viasis is delivered with one or more LED warning flash lights in the menu *Thresholds Extensions* a related submenu *Warning light* or similar will appear:

LED warning light

1. Yellow LED on: 200 km/h
2. Yellow LED off: 200 km/h
3. Red LED on: 200 km/h
4. Red LED off: 200 km/h
5. Back

Your choice 1...5?



Depending on the warning light features (uni-/bi- or tricolor) the items of the menu will vary.

The LED of the warning light are switched on or off synchronously to the numeric speed display in case the related on/off threshold is exceeded by the measured speed value. The speed threshold for the activation/deactivation of the LED color(s) of the warning light can be set between 5 km/h and 200 km/h (threshold deactivated).

6.3.6.4 Relays and power MOSFET transistors (optional)

The viasis 3003 can be ordered with up to 7 galvanic isolated low voltage relays, appropriate for switching up to 230 V mains voltage or alternatively with up to 7 high current MOSFET power transistor to switch 12VDC loads, technical data see chapters 10.3.5.

The connection is made either in an external waterproof (IP65) connection box with number labeled screw clamps or the viasis is delivered a connection cable (and scheme) ex factory.

For three installed relays the menu for their related speed thresholds in the menu **Extensions Thresholds – Relays** will look similar to the following menu:

Relays

1. Relay 1 on: 31 km/h
2. Relay 1 off: 51 km/h
3. Relay 2 on: 51 km/h
4. Relay 2 off: 61 km/h
5. Relay 3 on: 61 km/h
6. Relay 3 off: 81 km/h
7. Back

Your choice 1...7?

The relays or MOSFET transistors are switched synchronous to the numeric speed display in case the related speed thresholds are exceeded by the measured vehicle speed. In the menu example above relays 1 is switched for measured speeds from 31 km/h till 50 km/h.

6.3.6.5 LED display pages or additional LED fixed text (viasis PLUS or PLUS SMILE)

The submenu **Display pages** is placed in the menu **Extensions Thresholds** in case the viasis is equipped with additional LED fixed text or symbols (variant viasis PLUS SMILE) or a LED full matrix (variant viasis PLUS) below the numeric speed display for the display of additional text or symbols.

For an additional board with three fixed texts the related menu may look as follows:

Display pages:

1. THANK YOU on: 5 km/h
2. THANK YOU off: 31 km/h
3. SLOW DOWN on: 31 km/h
4. SLOW DOWN off: 41 km/h
5. Sad face :-(on: 41 km/h
6. Sad face :-(off: 200 km/h
7. Back

Your choice 1...7?

For LED fixed texts (PLUS SMILE) the displayed text or a symbol name will be used to label the menu items, for LED full matrices with variable texts and symbols the menu items are labeled only as numbered LED page (1, 2, ... etc.).

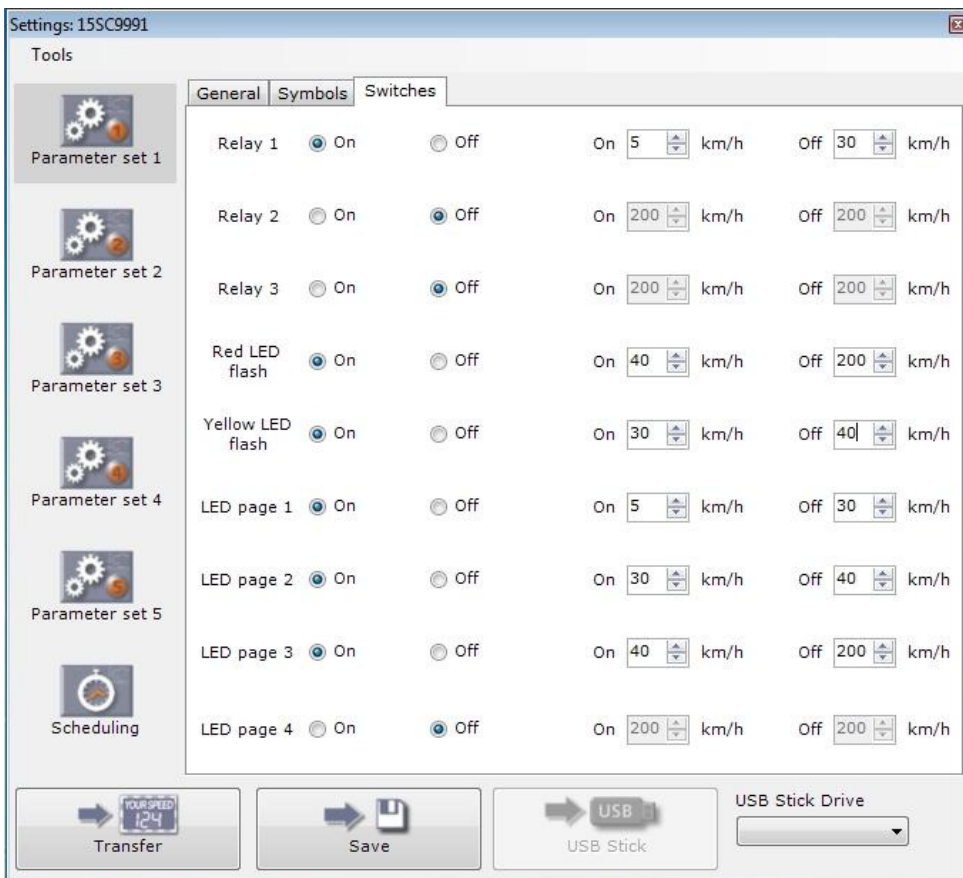
For each text or symbol can be defined an „On“ and „Off“ threshold between 5 km/h and 200 km/h (threshold deactivated).

The text or the symbol is switched synchronous to the numeric speed display if the related threshold is exceeded by the measured speed value. Moreover the switched outputs (relays, ..., display pages) are also activated outside the range of the set minimal and maximal speed displayed thresholds for the numeric speed display, so that for example with the viasis PLUS additional text like “Slow down” can be also shown without having a numeric speed displayed.



For viasis PLUS SMILE with LED fixed text the activation range of two or more texts shall not overlap. The simultaneous display of two fixed texts will cause an unreadable result.

The viasis PLUS shows in case of the simultaneous activation of two or more LED pages, the pages in an alternating sequence each for the time of measurement cycle (typ. 1,5 s). This feature can be used e. g. in bi-lingual regions to show additional text in two languages in an alternating manner. For example Led page 1 shows the text „THANK YOU“, Led Page 2 shows the welsh text „DIOLCH YN FAWR“, the „On“ threshold for both pages is set to 5 km/h and the „Off“ threshold to 30 km/h – as result for the time of detection of a 28 km/h driving vehicle the texts „THANK YOU“ and „DIOLCH YN FAWR“ are shown alternating each for 1,5 seconds.



In viagraph switched outputs are placed in the tab **Switches** of the parameter sets, see illustration 46.

The viagraph settings **Switches** tab example represents a viasis PLUS with 4 Led pages, three relays and a bicolor LED warning flash light (yellow/red LED).

Illustration 46: Viagraph settings tab switches



6.3.7 Radar sensitivity

With the menu item *Radar sensitivity* the gain of the analogue receiver amplifier, preset to a gain of 100%, can be reduced in steps of 20%. In consequence the detection distance range of the viasis will be reduced. This feature can be used to avoid or at least reduce the detection of diagonal moving traffic of a crossing in front of the viasis, see also chapter 5.2.2.

The radar sensitivity can be set to the values 100, 80, 60, 40 and 20 per cent, other values are rejected.

6.4 Radio modems

Which optional radio modems are installed and found during power on initialization can be seen in the information header of the menu „*Information and Time*“, see chapter 6.5.

The content of the menu *Radio modems* varies depending on installed radio interfaces:

Radio modems:

1. Bluetooth modem
2. GSM/GPRS modem
3. GPS module
4. Back

Your choice 1...4?

If the submenu of a not installed radio modem is called only the hint „*Not installed!*“ is shown.

For the menus *Radio modems* and *Information and time* exists (yet) no input screen in the viagraph program.

6.4.1 Bluetooth modem

If you select „*1. Bluetooth modem*“ in the radio modems menu the Bluetooth menu is shown:

Bluetooth menu

1. Device name
2. Pin number
3. Information
4. Back

Your choice 1...4?

With the choice of *3. Information* the current settings of the viasis Bluetooth modem are derived, which will look ex factory similar to the following:

Laird Bluetooth Data Module 730-SA

Version 11.28.0

Bluetooth address = 0016A40D81AE

Device name = "VIASIS_15SC9991"

Trusted device list:

001583501455

001167559110

001A7DDA710D

Clear list (y/n)?



The **Bluetooth address**, is a unique and user unchangeable hardware address provided by the Bluetooth modem manufacturer.

The **device name** is the chosen name for the viasis Bluetooth devices shown if you search for connectable devices under Windows on your computer.

The **Trusted device list** are the Bluetooth hardware addresses of computers to which the viasis was once successfully connected.

The **Trusted device list** might have to be cleared :

- if more than 20 Bluetooth addresses are already shown in the list. Herewith the list is full and the Bluetooth interface in the viasis will not accept connections to new computers with new Bluetooth addresses.
- if the pin number or the device name of a trusted device was changed



Hint: Access to the menu **Bluetooth modem** is either only possible via USB or a RS232 serial cable connection. If you try to make an illegal access e.g. by Bluetooth or GSM connection the hint **Access impossible!** will be displayed on a connected terminal.

6.4.1.1 Bluetooth device name

The so called local device name can be changed and is set by default to „VIASIS-15SC9991“, wherein “15SC9991” is the unique viasis serial number. After you selected **1. Device name** in the Bluetooth menu you are asked to enter the new device name:

Device name = MyBluetooth001

The character string is to be ended by pressing the <Return> key. The device name may consist of 1 till 40 characters. Avoid special characters, apostrophes and similar, because they are in common interpreted by connection software and this often in a different way.

6.4.1.2 Pin number

If you choose **2** for the **Pin number** in the **Bluetooth modem** menu you are asked to enter a new pin number:

Pin number=8241

The pin number itself can be changed, the length of the pin number can be up to 8 digits. All numbers from 1 till 99999999 are valid pin numbers. If a not correct pin number is send by a connecting computer the connection is refused by the viasis, therefore the number protects the viasis from unwished access.



6.4.2 GSM/GPRS Modem

The GSM/Email menu is shown if you enter **2** in the *Radio modem* menu (see also chapter 6.4):

GSM/Email menu:

1. Time schedule
2. Pin number
3. Configure GPRS
4. Configure SMTP-Server
5. Configure EMAIL
6. Configure SMS
7. Back

Your choice 1...7?

The following chapters describe each menu item.

6.4.2.1 GSM/Email time schedule

After the entry **1** at the *GSM/Email* menu prompt the *Time schedule* menu with the currently defined time schedule settings is send. The following example shows the ex factory settings after delivery:

Time schedule GSM/Email

1. Operation weekdays: Mo,Tu,We,Th,Fr
2. Daily start time: 08:00
3. Daily stop time: 18:00
4. Email delivery: None
5. Back

Your choice 1...5?

The setting of the GSM *Operation weekdays* and the *Daily start/stop time* is done similar as the settings made in the time schedule for measurement and LED display, please refer to the chapters 6.3.2.2 and 6.3.2.3.



The menu items *Operation weekdays* and *Daily start/stop time* define only the days and the time span during which the viasis GSM/GPRS modem remains powered and can be called by a dial up GSM connection. The delivery of Email and SMS messages and data works independently from the herewith defined time schedule and are also send outside the here defined days and times.

To reduce the available times, where the viasis radio modem can be called, means to extend the operating time of battery supplied viasis systems remarkably. This due to the fact that the basic power consumption while measuring without active LED display is four times higher if the GSM/GPRS modem is powered. A 24 hour availability of a radio connection to the viasis is in common not needed, because reconfigurations are necessary quite seldom, most often during workdays and only in the common working times (08:00 till 18:00). For an individual time setting and a possible further reduction of the power consumption you can use the described menu items.

During an active GSM connection the modem is not powered off. The modem is switched off as soon as the connection is closed hereafter.



Before you configure the **Email delivery**, please set the PIN number first in case the SIM card is already inserted, see also next chapter.

The submenu **Email delivery** offers different possibilities to initiate the sending of measurement data E-mails:

Email delivery:

1. None
2. Memory full
3. Daily
4. Weekly
5. Monthly

Your choice 1...5?

The selection **Memory full** sends a mail with the measurement data as a file attachment if more than 95% of the data flash storage of the viasis is full.

Further you can choose the time intervals **Daily**, **Weekly** or **Monthly**. If you select them additional menu options for the delivery time and possibly the date appear in the menu. For this options always a mail is send also if no measurements were stored in the selected time interval.

If you select **Daily** mail delivery you need to define the daily delivery time:

4. Email delivery: Daily
5. Time: 03:00

The time value is set in the format “hh:mm”, with time values between 00:00 and 23:59.

For the mail delivery interval **Weekly** additionally the day of the week, where the mails shall be send must be set:

4. Email delivery: Weekly
5. Time: 03:00
6. Weekday: Wednesday

If you enter “6” for the **Weekday** selection a sub menu is shown, which lists all weekdays for your choice.

If the mail delivery is set to **Monthly** the day of the month need to be given instead:

4. Email delivery: Monthly
5. Time: 03:00
6. Day of month: 1

Legal month values are 1 to 28 only in order to avoid delivery gaps in the short months of the year, e. g. in February.

Further hints:



- Use delivery (night) times with low traffic density and low GPRS data transfer volumes. During the time the mail needs to be delivered no vehicle data can be measured and stored. The minimal delivery time for e. g. an 4 MB data long mail is ~12 minutes. The GPRS upload bandwidth must be shared with other devices uploading data to a radio base station.



- Whether an E-Mail or SMS must be delivered is checked once per minute by the viasis. If a delivery cannot be done due to an active Bluetooth, USB or GSM data connection, the transfer its started within a minute after the closure of the connection. Is a viasis powered off during the scheduled time of delivery, the E-mail will not be sent after the next power on anymore.
- An E-mail delivery is valued valid as soon as the mail server (SMTP-server) acknowledges the data reception and the server connection is closed regularly. In this case the stored and transferred measurement data are erased in the flash memory automatically. Otherwise the E-mail delivery is repeated within a minute after the failure and until the transfer is successful.
- Be aware if you use the daily interval a lot of small data files is created, which must be merged later on to be able to create e. g. a week long evaluation.

6.4.2.2 SIM card PIN code

The input of the PIN¹ code or the request of its set status can only be done by a serial RS232 cable connection. Access by the GSM, Bluetooth or USB data connections is refused with the message “*No access possible*”.

Select the GSM/E-mail menu item “**2. Pin number**” to enter the 4 digit PIN code delivered from the service provider together with the SIM card, for example:

Pin number=1234 <Return>

In case the SIM² card is already inserted in the push/pull SIM card holder located at the control panel backside in the battery box you should receive following answer:

+CPIN: READY
OK

In case of an error or problem you get one of the messages listed in the table below:

+ CME ERROR: SIM not inserted	SIM card not in the SIM card holder, not readable or defective
+ CME ERROR: incorrect password	Entered PIN code is wrong
ERROR / ERROR SIM PIN	PIN code wrong or already inserted
+CPIN: SIM PIN	PIN code required
+CPIN: SIM PUK ³	PIN code setting failed 3 times, SIM card is locked. You can unlock the SIM card externally only, e. g. by inserting the SIM card in a mobile phone and insertion of the 8 digit long PUK code ⁴ .



- If you enter <Return> only at the PIN code prompt the status of the PIN setting is delivered without a setting and one of the status messages above are output.
- Repeated insertion of the already set correct PIN code is illegal.

¹ PIN – „Personal Identification Number“ - 4 digit long numeric pass code

² SIM – “Subscriber Identity Module” – Component for radio network user identification

³ PUK – „Personal Unlock Code” – 8 digit long unlock code to be found in SIM card accompanying information of your GSM/GPRS service provider.

⁴ Guidance for the procedure is in common documented in the manual of your mobile phone

- In case the PIN code request of the SIM card was already switched off or you change later to a SIM card with switched off PIN request you need to delete an earlier entered and stored PIN code by insertion of **PIN number = 0 <Return>**.
- For the protection against misuse and theft the inserted PIN code cannot be requested



Attention: Never change the PIN code arbitrarily. The PIN code is send from the viasis to the radio modem after each modem power on automatically. After 3 failing attempts the SIM card is locked and the PUK code is requested further on.

In case the inserted PIN code is rejected check your provider information first before you retry it again.

6.4.2.3 GPRS configuration

If you select “**3. Configure GPRS**” in the GSM/Email menu you will receive the current GPRS configuration. The following example shows the configuration ex factory:

```

APN: not set
USER: not set
PASS: not set
ROAMING: off
Change (y/n)?

```

In case you answer the question “**Change(y/n)?**” with “y” for yes, the APN (access point network), the related USER username and PASS pass code will be requested sequentially by the viasis. Valid entries are up to 31 alphanumeric characters, but without question mark, colon and double point. The text string must be ended with **<Return>**. Entering **<Return>** only will skip the request and the setting remains unchanged.

Thereafter you can allow or deny roaming connections, what means connections made instead of your service provider by another provider, which will bill the connections separately to your provider. This is in common accompanied by much higher connection charges.

You may configure GPRS access by all viasis serial interfaces (RS232, GSM, Bluetooth and USB). But only by using the RS232 connection the configuration is immediately tested and the protocol is send to a connected terminal:

```

Configure ...
AT+CGATT=0
AT+CGDCONT=1,"IP","internet.t-mobile"
AT+QICSGP=1,"internet.t-mobile","tm","tm"
AT+CGATT=1
AT+QIMODE=1
AT+QIREGAPP
AT+QIACT
AT+QILOCIP
+IP: 100.76.160.156
GPRS ok

```

In case of a problem or an error while establishing the GPRS connection the sequence above ends with „**Error GPRS**“. If you configure by other interfaces as RS232 connection a direct



test cannot be done and for a possibly occurred error you need to check the viasis protocol (see chapter 6.5.1) to find errors of the GPRS connection establishment like “**Error GSM/GPRS**”, “**Error GPRS timeout**”, “**Error GPRS communication**”....

The following table lists the GPRS access data of some European provider companies (without warranty):

Provider / Country	APN	USER	PASS
T-mobile Germany	internet.t-mobile	tm	tm
Vodafone Germany	web.vodafone.de	[any]	[any]
O2 Germany	internet	[not set]	[not set]
E-Plus Germany	internet.eplus.de	eplus	gprs
Mobilkom A1 Austria	a1.net	gprs@aipus.at	[not set]
Connect Austria Austria	web.one.at	[user specific]	[user specific]
tele.ring Austria	web	web@telering.de	web
LUXGSM Luxemburg	Web.pt.lu	[not set]	[not set]
Swisscom Switzerland	gprs.swisscom.ch	[not set]	[not set]
Orange Switzerland	internet	[not set]	[not set]
Sunrise Switzerland	internet	internet	internet



- Request the GPRS access data if not known from your SIM card (and service) provider.
- You can delete an already made configuration entry by entering <Blank> and <Return> hereafter.
- If you contact our technical support in case of problems, please provide the output protocol (text download or terminal snapshot) of the GPRS configuration send during RS232 connections.

6.4.2.4 Configuring the SMTP-Server (Mail server)

For the configuration of the mail server enter “4” in the GSM/Email menu and you will receive the actual settings for the E-mail delivery to the SMTP¹-Server:

```
SMTP-SERVER: smtp.viaxmail.de
SMTP-PORT: 25
EHOST: viaxmail.de
EUSER: send@viatrafic.de
EPASS: ****
MAILFROM: viasis@viaxmail.de
```

Change (y/n)?

The shown settings are the default settings ex factory and are valid data if you intend to use our mail server for the E-mail delivery. The viasis connects the SMTP server only for the for-

¹ SMTP – simple mail transfer protocol



warding transport of the viasis E-mail to the final destination mail server of the recipient E-mail account(s), which you have to enter in “5. *Configure Email*” (see next chapter) of the GSM/Email menu.

Note: The use of our SMTP-server takes place on own danger and under exclusion of any liability on the part of the via traffic controlling GmbH.

If you answer “y” to the question “*Change (y/n)?*” you will be prompted for each SMTP-server setup entry. For valid inputs in the text fields see the insertion of APN, USER and PASS in the previous chapter.

The input fields in detail:

SMTP-Server – URL¹ name of a mail server which is ready to receive E-mails delivered by the viasis. The mail server only forwards (relays) emails to the recipient(s). Alternatively to the URL name the IP address (e. g. 192.86.102.245) of a SMTP server can also be inserted.

SMTP-Port – Up to 5 digit long port number (1...65535), at which the mail server listens to mail delivery attempts. Typically mail servers listen at port 25, but this may differ for single SMTP servers.

EHOST – Host name of the E-mail sender

EUSER – Senders user name of its E-mail account at the mail server. In common the E-mail sender owns a user mail account at the providers mail server. Nowadays rarely exist also open mail (relay) server forwarding each mail they get from whoever, with no authorized login needed or allowed. If you use such an open relay server delete user name EUSER and password EPASS.

EPASS – Password of the above described user E-mail account. For the authentication of the mail sender needed password for the login as user at the mail server. For open relay server the password shall be deleted, see above. In order to avoid misuse by unauthorized third persons the set EPASS password is output as a “*****” string only.

MAILFROM – E-mail address of the mail sender

A configuration change of the SMTP-server access data can be done by all serial interface connections (RS232, GSM, Bluetooth or USB) of the viasis. But only if you are connected by RS232 directly the access to the SMTP-Server and if he is ready to receive E-mails from the viasis is tested and a protocol send to a connected terminal (example):

```

Configure ...
AT+QILOCIP
+IP: 100.69.8.51
AT+QIDNSIP=1
AT+QIOPEN="TCP","smtp.viaxmail.de",25
CONNECT
220 mx01.viaxmail.de ESMTP Postfix
EHLO viaxmail.de
250-mx01.viaxmail.de
AUTH LOGIN
334 VXNlcm5hbWU6

```

¹ URL – “Uniform Resource Locator” – unique resource name, simplified e. g. the name of a website or host in the internet. URL names are translated by DNS (domain name system) servers in routable IP addresses.



```
334 UGFzc3dvcmQ6
235 2.7.0 Authentication successful
MAIL FROM: <viasis@viaxmail.de>
250 2.1.0 OK
QUIT
221 2.0.0 OK
```

SMTP-Server ok

If the connection between viasis and SMTP-server could be established and the server declared ready to receive E-mails from the viasis you will finally see the message “**SMTP-Server ok**” otherwise “**Error SMTP-Server**”.



- If you enter <**Return**> only, the text entry is skipped and the text field content remains unchanged.
- To delete the content of a text field to the state “not set” enter <**Blank**> followed by <**Return**>.

- Be aware that mail servers have often limits concerning the maximal length of E-mails. Most mail servers limits are above 10 Megabyte (= limit of our providers mail server) but in some known cases also below. A viasis with 8 MB flash storage installed is capable of producing 12 MB long E-mails in case the storage is full. The reason is the 30% increase in data volume due to the needed base64 coding of the binary measurement file attachment. Ask the mail server provider about existing limits before you start to send E-mails.

- In case you need to contact our technical support, please provide the protocol of the failed SMTP-server configuration, which is essential to analyze the problem.

6.4.2.5 E-mail configuration

With the GSM/Email menu item “**Configure Email**” you can define the recipient(s) email address and whether E-mail alarm messages are send or not. First the actual configuration is send (example):

```
MAILTO: technik@viattraffic.de
MAILCOPY: not set
Email alarm: on
Change (y/n)?
```

Differing from the example no E-mail address is set by default and the E-mail alarm is switched off. To change the setting enter “y” to the “**Change(y/n)?**” prompt. Valid input for the sequentially asked text fields **MAILTO** and **MAILCOPY** are maximal 31 alphanumeric character long E-mail addresses. Excluded characters are question mark, colon and double point. Further is valid things said about the text field input of the previous two chapters.

MAILTO for the recipient of the E-mail and **MAILCOPY** for the recipient of an Email copy shall contain only a single E-mail address, no lists are allowed.

With activated E-mail alarm the viasis will send E-mails for the events of “Measurement storage > 95% full”, “Battery voltage < 11,5V” and for system errors. The system error emails include up to the last 8 viasis protocol entries, see also chapter 6.5.1. The E-mails are send latest after the minute of the occurrence of the event or failure.



If you respond ‘y’ to both questions “*Change(y/n)?*” and “*Send email(y/n)?*”, a test E-mail is send and if you a connected locally by RS232 (only), you will see the delivery protocol of the send E-mail:

```

Send Email...
AT+QILOCIP
+IP: 100.66.122.19
AT+QIDNSIP=1
AT+QIOPEN="TCP","smtp.viaxmail.de",25
CONNECT
MAIL FROM: <viasis@viaxmail.de>
250 OK
RCPT TO: <technik@viattraffic.de>
250 2.1.0 OK
354 End data with <CR><LF>.<CR><LF>
250 2.0.0 Ok: queued as 8DB438049D
QUIT
221 2.0.0 Bye
  
```

EMAIL ok

In case the E-mail was send correctly and the mail server accepted the E-mail for forwarding, you get the final “*Email ok*” message and otherwise “*Error Email*”. Moreover the E-mail recipient should receive a status E-mail with just the line “*E-mail delivery set!*”.

By means of the “*Configure E-mail*” menu item you may also send currently stored measurement data immediately if you respond ‘n’ to the question “*Change(y/n)?*” but ‘y’ to “*Send email(y/n)?*”.

If you are connected by RS232 the E-mail is send immediately, else if you are connected by GSM, USB or Bluetooth interface, the mail is send as soon as the active connection will be closed.



If you need to contact our technical support, please provide the protocol of the failed test E-mail delivery, what is important to analyze a problem.

6.4.2.6 Configure SMS

The menu item “*6. Configure SMS*” in the GSM/Email menu is used to enter the needed phone numbers for the SMS¹ delivery and to activate the delivery of SMS event and error messages:

```

SMS SERVICE CENTER2: +491710760000
SMS phone number: 016312345678
SMS alarm: off
Change (y/n)?
  
```

Legal insertions for the SMS service center number and the phone number of the SMS recipient are up to 16 digits long. The number of the service center is always entered with plus sign

¹ SMS – short message service for text messages consisting of maximal 160 characters

² SMS Service Centre (SMSC) receives SMS messages from the telephone/radio network, forwards and stores messages if the receiver is currently not reachable.



headed international country dialing code. The phone number of the SMS recipient needs to be entered without country code. Moreover the hints to legal text fields contents given in the previous chapters 6.4.2.3 till 6.4.2.5 shall be observed.

If the “*SMS alarm*” is active, short messages for the events “*Battery voltage < 11,5V*”, “*Memory > 95% full*” and “*System error*” are send within one minute after occurrence.

If you change the SMS configuration and respond “y” to the “*Send SMS (y/n)?*” question, you should receive a test SMS with the content “*SMS delivery set!*”. If your computer is connected by RS232 cable locally, the protocol of the SMS delivery is shown in the terminal window:

```
Send SMS...
AT+CSCA="+491710760000"
AT+CMGF=1
AT+CSMP=17,167,0,241
AT+CNMI=2,1,0,0,0
AT+CMGS="016312345678"
SMS ok
```

If the SMS delivery was successful the protocol is ended with “*SMS ok*” otherwise with “*Error SMS*”. Similar to the delivery of E-mails the delivery of SMS is delayed if you are connected by GSM, Bluetooth or USB interface until this active connection is closed.



If you face problems with E-mail or SMS configuration or delivery and contact our technical support, please provide the connection protocol as text or snapshot attached to a send E-mail. The connection protocol is essential for a failure analysis.

6.4.3 GPS Module (optional)

In case the viasis 3003 is equipped with a GSM/GPRS modem an additional GPS module for the determination of the position of the viasis can be build in. The position data are determined regularly and they are transferred as a position list to viagraph. The last position is also send in the text of the viasis emails:

```
Information:
Viasis 3003 - Version 4.16
Serial number: 15SC9991
Active parameter set: 1
Interface options: Bluetooth, USB, GSM/Email, GPS
GPS: 20.09.15, 09:45:00, 51°03.5615',N, 007°00.9070',E
```

```
Date: 20.09.2015, Sunday
Time: 11:15:33
Number of values = 24274, Memory full: 6 % Battery voltage: 13,17 V
```

If you open a viasis measurement data file (*.vtf) with viagraph or you make a direct connection to a viasis with GPS module and click the **Tools** menu in the viagraph menu bar of the **Settings** window, see illustration 33, the menu item **GPS coordinates** is selectable.

If your computer is connected to the Internet and after a click to the **Tools** menu item **GPS coordinates** viagraph will open your standard web browser with the Google Maps web site and sends the viasis GPS coordinates.

The web browser shows then the map with the last viasis position, see illustration 47:

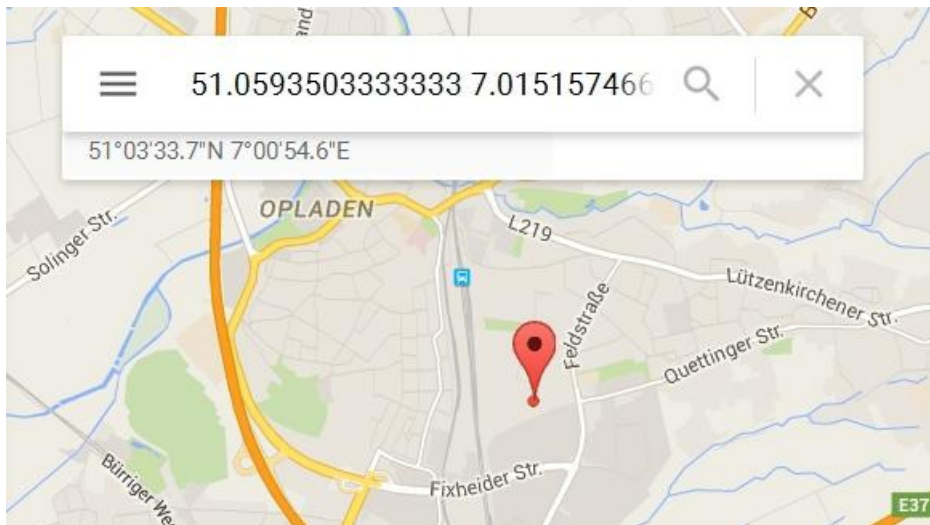


Illustration 47: GPS coordinates of the viasis position in Google maps

In a direct connection to the viasis the last, most current GPS position is displayed. From an open vtf measurement data file the first GPS position of the chosen evaluation time period is shown.

If you enter **3** in the *Radio modem* menu in the viagraph terminal you will receive the menu for the GPS module:

GPS menu:

1. Position list
2. Formatted data output
3. Raw data (NMEA-183)
4. Position fix time: 24h
5. Back

Your choice 1...5?

Due to the high energy consumption of the GPS module the position determination is not done permanently. Instead the position is determined after the viasis power on and further continuously repeated after the time set in the *Position fix time*. The fixation of the position, may just need 30 seconds but also up an hour at unfavorable mounting positions, where the viasis is placed in the satellites signal shadow behind large buildings, walls, trees or other obstacles. After the position data are determined the GPS module is immediately shut down.

During the GPS data output, see chapters 6.4.3.2 and 6.4.2.3, the measurement of vehicles is stopped, but not during the set regular position fixes.

6.4.3.1 GPS position list

After insertion of **1** in the *GPS* menu you will get first the number of stored GPS positions, for example:

Number of GPS positions = 5

Send data (y/n)?



If you enter 'y' the output of the position list will start:

```
30.09.15, 15:47:00, 51°03.5647',N, 007°00.9108',E
30.09.15, 11:46:00, 51°03.5574',N, 007°00.9081',E
30.09.15, 07:45:00, 51°03.5587',N, 007°00.9086',E
30.09.15, 03:41:00, 51°03.5593',N, 007°00.9076',E
29.09.15, 23:40:00, 51°03.5599',N, 007°00.9082',E
Delete data (y/n)?
```

Up to 25 GPS positions can be memorized. Because the oldest position in the list is automatically overwritten by the newest position it is in principle not necessary to clear the list ever.

Separated by colons the viasis system date (DD.MM.YY) and time (hh:mm:ss), the latitude in degree and minutes with 4 decimal digits, N/S for northern/southern latitude, the longitude in degree and minutes with 4 decimal digits and finally E/W for eastern/western longitude of the fixed position is shown in a line.

To make the correlation between viasis measurement data and GPS coordinates easy, the viasis system date and time and not the satellite time (UTC¹) is stored in the GPS position list.

6.4.3.2 Formatted GPS data output

After entering 2 for **Formatted data output** in the GPS menu, you will get following hint first:

End with <CTRL-Z>

What means you can stop the formatted output of GPS coordinate data by pressing the <CTRL²> and the 'z' key simultaneously.

After the repeating headline the result of the GPS position determination follows once per second:

```
Satellites,UTC,Latitude,N/S,Longitude,E/W,HDOP
0,
...
2,073002,
2,073003,
3,073004,
8,073005,5103.5582,N,00700.9059,E,0.96,
...
Satellites,UTC,Latitude,N/S,Longitude,E/W,HDOP
8,073021,5103.5581,N,00700.9059,E,0.96,
8,073022,5103.5580,N,00700.9058,E,0.96,
...
9,073031,5103.5585,N,00700.9049,E,0.89,
10,073032,5103.5587,N,00700.9050,E,0.84,
```

The first number is number of found satellites. As soon the first satellite signal is received by the GPS menu the UTC satellite time, here 07:30:02 (AM) appears.

¹ UTC – Universal time coordinated

² CTRL – control key, depending on your keyboard, might also labelled with CTL or likewise



As soon 3 to 4 satellites signals could be found appears the output of position data – the latitude in degree and minutes with 4 minute decimals, the N/S latitude information and the analogous data for the longitude.

The last number, the HDOP¹ value is a measure for the horizontal, two dimensional variation of the measured GPS data. GPS position data with a HDOP value greater than 10 are not precise and not usable.



With the GPS data output you may check if a sufficient number of satellites respectively the GPS position is found at a viasis mounting place within a reasonable time. In tunnels or in between high buildings the determination of the GPS position might be impossible. In such a case switch the GPS position determination off, see chapter 6.4.3.4, in order to avoid a permanent searching GPS module with the consequence of a reduced operation time of a viasis with battery supply.

6.4.3.3 GPS raw data (NMEA-183 protocol)

The GPS raw data output delivers position data coded according the nautical standard NMEA² developed for the communication between navigation system of ships. These ASCII block data send once per second are a bit confusing, but include numerous information, amongst other things e. g. to the satellites, whose data were used for the calculation of the position:

```
$GPRMC,073114.000,A,5103.5574,N,00700.9062,E,0.00,0.00,011015,,A*64
$GPVTG,0.00,T,,M,0.00,N,0.01,K,A*3C
$GPGGA,073114.000,5103.5574,N,00700.9062,E,1,7,1.05,75.5,M,47.6,M,,*63
$GPGSA,A,3,05,25,26,29,31,21,23,,,,,1.36,1.05,0.86*01
$GPGSV,3,1,12,29,71,062,52,31,54,235,46,26,44,296,48,25,40,118,49*70
$GPGSV,3,2,12,21,37,178,37,39,28,157,,05,16,067,46,16,16,296,44*79
$GPGSV,3,3,12,20,11,116,47,23,09,320,45,02,09,039,44,12,,,39*4D
$GPGLL,5103.5574,N,00700.9062,E,073114.000,A,A*57
```

In the Internet and the literature a lot of publications describe the contents of the NMEA-183 data blocks, therefore we resign to do it here.

Similar to the formatted data output, see chapter 6.4.3.2, the output of the GPS raw data can be stopped by simultaneous pressing of the <CTRL> and 'z' key.

6.4.3.4 GPS position fix time

A few minutes after the viasis power on the determination of the GPS position is done. The **Position fix time** is the time period after which the determination is regularly repeated.

After insertion 4 in the **GPS** menu, following prompt appears:

Position fix time =

You may enter values between 1 and 255 hours for the position determination interval. The default value is 24 hours. If you enter 0 the determination of the GPS position is deactivated.

If no valid GPS position can be determined within 60 minutes, the position search will be cancelled and the GPS module will be switched off until the next viasis power on in order to avoid a fast unwished battery discharge. This might be the case when operating the viasis within buildings, tunnels or behind high buildings.

¹ HDOP – Horizontal dilution of precision

² NMEA - National Marine Electronics Assoziation



6.5 Menu information and Time

The menu *Information and time*, which is reached by inserting **6** in the main menu, is headed by general information to the viasis soft- and hardware:

Information:

Viasis 3003 version 4.16 , H4

Serial number: 15SC9991

Active parameter set: 1

Comments: Via traffic controlling GmbH, Maybachstr. 39, 51381 Leverkusen

Interface options: Bluetooth, USB, GSM/Email, GPS

1. Protocol
 2. Comments
 3. Date: 04.09.2012, Tuesday
 4. Time: 13:57:46
 5. Daylight saving time: off
 6. Back
- Your choice 1...6?

The first line *Viasis 300M3 Version 4.16, H4* includes viasis type designation, software version number and hardware release. The second line displays the unique serial number of the viasis device. Serial number, software and hardware release should be always at your hands in case you contact our technical support.

Active parameter set shows the number of the active parameter set of the measurement and display operation, at the time the menu is called. If at this time no parameter set is valid the number 0 (null) is given.

The item comments shows typically information like measurement location or other given user information, see also chapter 6.5.2. The comment line is missing if not set.

In case that radio modem interfaces like Bluetooth, GSM/Email or other optional serial interfaces as USB are installed and detected during the power on initialization of the viasis they are listed in the last line of the information header.

6.5.1 Protocol

The viasis system includes a ring buffer for a protocol of event and error messages. If the ring buffer is full the new messages overwrite the oldest messages. An explicit deletion of old messages is for a proper function of the protocol therefore not necessary.

If the protocol is selected by the entry **1** in the menu *Information and time* the number of stored messages is displayed and you are prompted, whether the protocol shall be send or not:

Number of log entries = 25

Send data (y/n)?

If you insert „y“ for yes, the list of protocol messages is send (example):

Power on; 31.01.12;12:54:50

Error Xmodem packet type; 30.01.12;17:49:10



Power on; 30.01.12;17:39:34
 Firmware update; 30.01.12;17:39:09
 Power on; 30.01.12;15:30:59
 Power on; 30.01.12;15:29:35
 Error USB; 30.01.12;15:29:25
 Start of measurement; 16.12.11;16:52:10
 Power on; 16.12.11;16:51:07
 Error Xmodem timeout; 16.12.11;15:41:24
 Start of measurement; 16.12.11;15:39:58
 Power on; 16.12.11;15:35:10
 <Continue with Return>

Each protocol entry is followed by date and time of occurrence.

After the output of the protocol you are prompted, whether the protocol shall be deleted or not:

Delete data (y/n)?

As already mentioned you may erase the protocol, for an actual, continuous operation of the log is this not necessary.

The size of the protocol message buffer depends on the size of the installed flash memory and is for 2/4/8 MB storage 191/191/255 protocol entries.

6.5.2 Comment – text field

In the comment text field a text string with a length of 80 characters can be stored. In most cases will this be sufficient to store information about the exact measurement location with postal code, city, street and number and the measured lane direction.

The data of the comment text field are transferred in the header of the viasis measurement data file (VTF file) and will be shown in the viagraph software in the comment field of evaluation charts and spread sheets.

Allowed characters are alphanumeric characters, like letters, digits and punctuation marks, but without question mark ,?' and colon ,:', because both characters are used in the viasis menu control.

To delete the comment content enter <**Blank**> followed by < **Return**>.

6.5.3 System date and time

The date is to be entered with long year format after the choice **3** in the menu **Information and time**. That means dates with year century digits from 01.01.2011 till 31.12.2099 are legal.

The viasis checks all date values within this range for correctness. Together with the date value the actual day of the week must be set. The correct operation of the parameter set time schedules (chapter 6.3.2) require a correct setting of the day of the week.

The system time can be set with the selection **4** in the menu **Information and time** to time values between 00:00:00 and 23:59:59 o'clock.

Incorrect inputs as wrong separator characters, time or date values are rejected by a repetition of the input prompt.



A call of the menu items **Date** and **Time** is refused by the viasis as long as measurement data are stored. This to avoid inconsistent measurement sequences, which may cause later problems during the data evaluation. In case you receive the message „**Access impossible!**“ if you try to change system date or time then download and store the measurement data first. Erase the data and hereafter the change of time and date will be possible.

The real time clock of the viasis never stops and works continuously with the internal lithium buffer battery if the lead-gel main battery is removed. The operating time of the lithium battery is minimum 7.5 years. As more often the viasis is in operation, supplied from the main battery as longer lasts the lithium buffer battery.

6.5.4 Daylight saving time

By pressing the key **5** for the **Daylight saving time** in the menu **Information and time** you can define its use. In the European Community the daylight saving time is used uniquely from the last Sunday in March till the last Sunday in October. The changes occur uniquely in all member states at 01:00 UTC (universal time) time.

In the displayed sub menu, please select the correct time zone for your country:

Daylight saving time:

1. off
2. UTC+0
3. UTC+1
4. UTC+2

Your choice 1...4?

For the United Kingdom, Ireland, Portugal please choose “UTC+0”, for Spain, France, Germany, Poland “UTC+1” and for Greece and Finland “UTC+2”. For countries in time zone “UTC+1” (MEZ) the clock will be altered from 02:00 to 03:00 local time in March and from 03:00 to 02:00 local time in October.

The selection **1** in the menu will switch the daylight saving time (Summer Time) off.

6.6 Online measurement

The transfer of currently measured speed data over a serial data connection (cable RS232, USB or by radio Bluetooth and GSM modem) is done if you select the **Online measurement** in the viasis main menu.

After the hint **<Quit with return>** sends the viasis vehicle speed data synchronous to the measure cycle all 1.5 seconds as long as a vehicle passes the radar beam towards the viasis.

If the option **Bidirectional Detection** in the **Settings** menu is activated, see also chapter 6.3.3, additionally the speed data of vehicles passing the radar beam away from the speed display are send headed by a minus sign ‘-’.

The speed data are send as ASCII numbers, with variable width, what means one till three digits, followed by the control characters carriage return (hex 0x0A) and line feed (hex 0x0D), what means one speed number per line.

So far the numeric display was not deactivated by the parameter **LED display: off**, see chapter 6.3.2.1, the speed measurements are also still shown on the numeric LED display.

6.7 Data memory

The viasis measurement data store is organized as a ring storage, so in case the memory is full the oldest stored data are overwritten by the newest data. Herewith is guaranteed that the viasis still keeps the most actual data in case of a data overflow, respectively a too sporadic measurement data download and deletion.

The viasis is either delivered with 2, 4 or 8 megabyte non volatile flash memory. The herein stored data have a retention of 20 years minimum according the manufacturer and the memory cells can be rewritten 100000 times (write/erase cycles), what means a total of 100000 measurements and parameter changes can be done, before statistically a memory failure should occur.

The measured speed data stored as data blocks with 10 byte length in the memory. Therefore the storage capacity (minus some bytes for parameter and log protocol) is depending on the storage size of 2, 4 or 8 MB finally 212160, 425125 or 842952 measurement data blocks. This is equivalent at a radar range of 120 meter and an average vehicle speed of 50 km/h about 36833, 73806 or 146345 vehicles.

The measurement data store should be deleted after a data download in order to keep the amount of read data and the data transfer times small.

6.7.1 Read measurement data

For the download of stored measurement data of the viasis you can use the program *viagraph* delivered on CDROM, see chapter 6.1.3 or the *ViaApp* for Android Smartphones, see chapter 6.1.1.

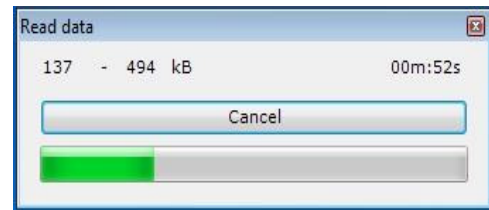


Illustration 48

In order to start the data download with *viagraph* the data connection to the viasis must have been established successfully, see also illustration 11. Click on the button „*Read data*“ and the data transfer progress appears, but maybe just for a glimpse depending on the number of data, see illustration 48.

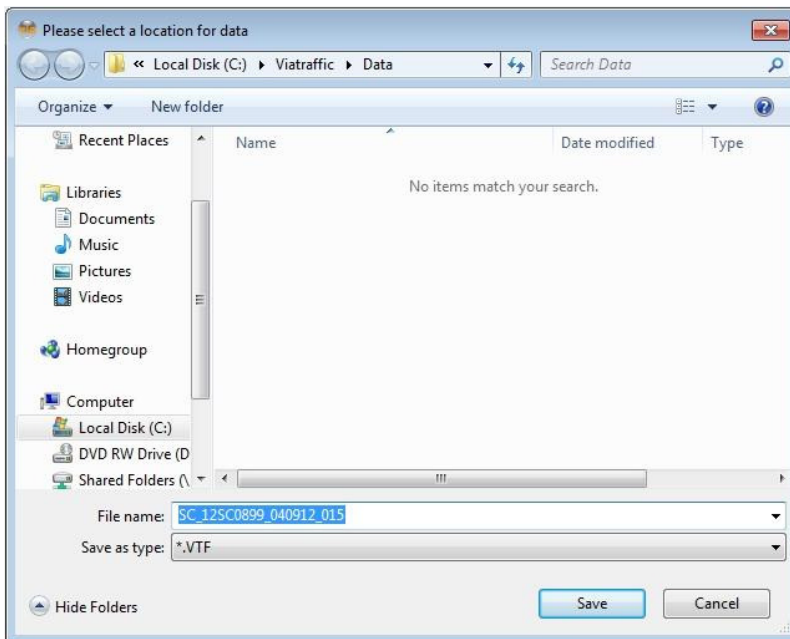


Illustration 49: Save data file

Next the dialogue to save the data in a file appears, see illustration 49.

You may change or extend the proposed file name. In order to keep a good overview over numerous data files you may e. g. add the measurement location to serial number and download date already given in the filename.

With a click on the “*Save*” button store the data to your computer’s hard disk drive.



Select whether you want to delete the measurement data in the viasis or not, see also illustration 50.

Also in case the viasis measurement data storage is empty a file with the file name extension *.VTF (“via traffic format”) is created. The file includes the protocol with event and error messages, the current parameter setting of the system and eventually GPS position data.

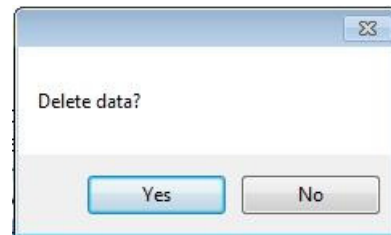


Illustration 50

6.7.2 Checking stored measurement data

A check how much and which measurement data are stored in the viasis you can make by entering **1** for “*Transmit stored data*” in the main menu, see also illustration 11.

If no values are stored the viasis returns immediately back to the main menu, otherwise it reports the number of stored speed values:

Number of values = 21233

It follows the question:

Send data (y/n)?

If you enter **y** the measurement data are send to the terminal, always 25 lines before you are prompted to continue with <return>:

```
25;16.12.11;16:52:10
-32;16.12.11;16:52:12
44;16.12.11;16:52:33
38;16.12.11;16:52:35 ...
<Continue with return>
```

Per line one speed value optional headed by a minus sign indicating leaving vehicle detection, with date and time, and separated by semicolons is send. If you press any key other as <return> the output is ended.

After the data output or if you entered **n** for *Send Data (y/n)?* following message appears:

Delete data (y/n)?

If you enter **j** for yes in the terminal all data are deleted, if **N** for no is given the current measurement is continued. In case the ring data storage is full the oldest data are overwritten by the actual data.



6.8 Test functions

The test functions menu is shown if you enter **3** in the main menu, see also illustration 11 .

Test functions:

1. LED display
2. Flash memory
3. Real time clock
4. Main battery
5. Simulation
6. Light sensor
7. Back

Your choice 1...7?

The test **LED-display** shows first „19.9“ on the numeric LED display in the LED base color, then if equipped in the second LED color and if defined in the last optional mixed LED color with rising brightness in 1%, 2%, 4%, 8%, 16%, 32%, 64% and 100% of the maximal brightness each time for 1,5 seconds. The current value of the **LED brightness** is also transferred via data connection to a terminal.

If the LED mixed color is defined „124“ is displayed in varying color balances, afterwards „124“ is shown in blinking mode in the installed LED colors.

For the following LED display up- and down count test the start and end count value is taken from the set **minimal- and maximal speed displayed** parameters defined in parameter set 1, see chapter 6.3.4.2. Each count value is shown $\frac{3}{4}$ seconds on the numeric LED speed display. Further the thresholds for blinking LED display, LED color change and LED mixed color, as well as for the integrated warning symbols defined in parameter set 1 are recognized for the equivalent display. Optional installed extensions see chapter 6.3.6, are activated during the up- and down count test depending if their on/off threshold is exceeded by the count value, or not.

The **Flash memory** test indicates the installed memory size first:

4 MB Flash installed

The flash memory test destructs stored measurement data and the event protocol, therefore follows the question:

All data will be deleted

Continue (y/n)?

If you perform the test the proper function of all memory cells is checked by erasing and re-writing the cell contents:

Erase Page: 4096 ok

Write Page: 4096 ok

The flash memory cells (bits) are organized in so called pages (256, 512 or 1024 bytes of 8 bits). In case of an error the test stops at the erroneous page and the error is reported. Else the proper memory function is confirmed with **ok** after the last page was tested.

The test of the **Real time clock** includes beside the output of date and time a compare test between a microcontroller and a real time clock time, generated from their crystal oscillator frequencies. Is the compare time difference smaller than 50 ppm (parts per million), equivalent



to an error of less than about 30 seconds per week, the message „*RTC ok!*“ is send, otherwise the error is reported in ppm units.

The **Main battery** test allows the measurement of the lead-gel accumulator voltage and estimation about its charge condition. The measurement is made in contrary to the battery test during power on initialization without load, that means without active LED display of „188“ and can be initiated therefore also remotely by a GSM modem. The result is given with 0,1 Volt resolution between 10,7 and 13,8 Volt (17 Ah accumulator discharge and full charge voltage levels).

The test **Simulation** is useful in order to check the numeric LED speed display but also for a functional test of installed system extensions, as additional text displays, switches like optocouplers, relays or warn lights at a simulated vehicle, without the need to install and measure on a road site with vehicle traffic. Further the made parameter settings defined in the parameter sets, resp. their effects on the behavior of the numeric LED display can be simply tested.

After the test is called you are asked to enter a test speed and the number of the parameter set, whose parameters shall be recognized for the simulation:

```
Test speed=51
Parameter set=1
<Quit with return>
```

The test speed value is compared with the speed threshold parameters defined in the parameter set, resp. the threshold parameters of the **Settings** menu and the submenus **Thresholds Extensions** and **Speed display options**, for the numeric LED display, the integrated LED circle symbols, optional extensions and they are activated accordingly.

Only if the test speed in the range between set minimal and maximal speed displayed, see chapter 6.3.4.2 the test speed is shown on the numeric LED speed display. By pressing the <return> key the LED display and all system extensions are reset and deactivated.

The environment **Light sensor**, which measures the brightness of the environment, delivers for a functional check a numerical result:

```
<Quit with Return>
Light sensor: 955
```

The result drops in bright sun light down to zero. In dusk, dawn and darkness the given results are high and tend up to the maximal value 1023. In case the sensor value does not change despite illumination e. g. with a torch or by dark covering, it is defective. The position of the light sensor in the LED display board is approximately in the middle, right aside the hundred digit.

6.9 Data evaluation

The evaluation of measured speed data is done with the delivered software **viagraph**. The installation of the evaluation program viagraph is already described in chapter 6.1.3.

A detailed description of the evaluations you will find in the online help of the viagraph program in the menu **Help – User Manual**¹.

¹ In order to read the help documents you need to install Adobe Acrobat Reader Version 3 or higher. In the internet you will find Adobes website with <http://www.adobe.com/>.

6.10 Viasis PLUS display

The add-on display board of the viasis PLUS is in general a two line LED full matrix with own separate microcontroller with the „Viamatrix“ firmware and a flash memory for the display text, bitmap graphics and display parameters.

The following description shows how configure the viasis PLUS by using the viagraph input window, which is reached by a click on the *Matrix* button, see illustration 11.

The viasis PLUS display can also be completely configured by using any terminal software and the Viamatrix menu system, which is called by entering <ESC> in the viasis main menu:

- ```
Viamatrix menu
1. Text messages
2. User character bitmaps
3. Test functions
4. Parameter
5. Information
6. Back
Select 1 .. 6
```



Illustration 51: Viasis PLUS

From the Viamatrix menu you get back to the viasis menu if you enter ,6' for *Back*.



**Attention: Before you close a communication connection and if you used the Viamatrix menu before - return always to the viasis menu. Otherwise the Viamatrix program will wait for further menu insertions and will not show any matrix message until you returned to the viasis menu.**

The Viamatrix program has an input menu timeout of 30 seconds until it returns automatically back to the next upper menu level or resp. to the viasis menu, what makes the “forgot to return” problem less grave. But depending on the Viamatrix menu level where closed the connection it still may need several minutes until matrix messages are given again.

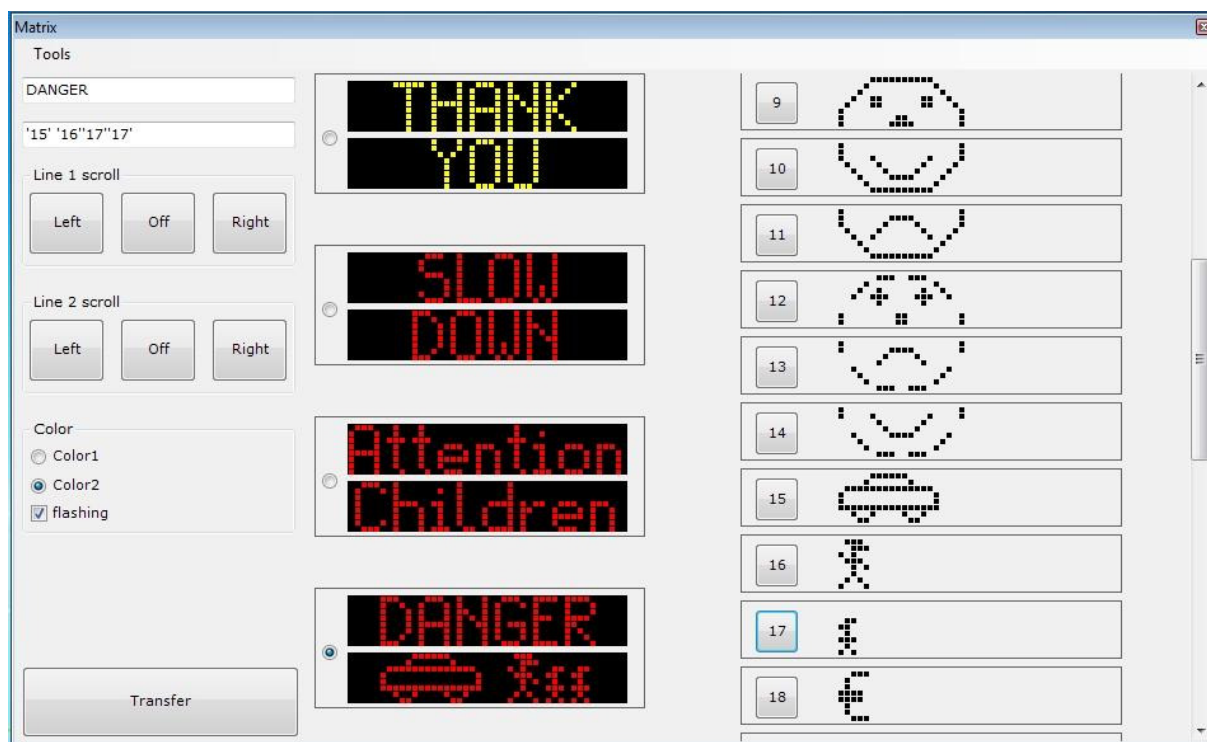
The Viamatrix software *Test functions* and the *Information* menu are not supported by viagraph and can be reached therefore only by the menu system.

As the viasis parameter settings the matrix display pages, bitmaps and parameters can be set offline if you click on the menu *Extra – Matrix – viasis PLUS* in the viagraph start window, see illustration 32. Together with the viasis parameter settings a file can be created (see chapter 6.2.4.1) and stored on an USB flash stick for a later upload in the viasis.

The speed thresholds for the activation of the matrix display pages are part of the viasis parameter sets, see also chapter 6.3.6.5.

### 6.10.1 Viasis PLUS matrix editor – display pages

After a mouse click to the viasis PLUS *Matrix* button in the viagraph connection window (illustration 11) the matrix editor appears and in case the viasis is directly connected with the current settings:



**Illustration 52: Matrix editor main window**

The left part of the window is used to edit the LED display pages, each consists of two text lines. Which page is currently enabled for editing is selected with the check boxes in the middle column showing the current line contents, see illustration 52.

The two white input lines in the upper left corner of the window are used to enter the needed display text or symbols. Legal are all printable 7 bit ASCII characters, what means letters, digits and most punctuation marks, except quotation marks (“”), which are used to label bitmaps and placeholders in the text.

Below the lines in the group field *Line 1 scroll* and *Line 2 scroll* determine the buttons *Left*, *Off* and *Right*, if the line text is displayed static or if the text is scrolled through the matrix line to the right or to the left.

In the group field *Color* you can define for a two color viasis PLUS matrix, which LED color is shown and if the text is shown permanently or in a *flashing* mode.

The black back grounded output fields in the middle column of the windows show how the text lines will be later displayed on the viasis PLUS LED matrix.



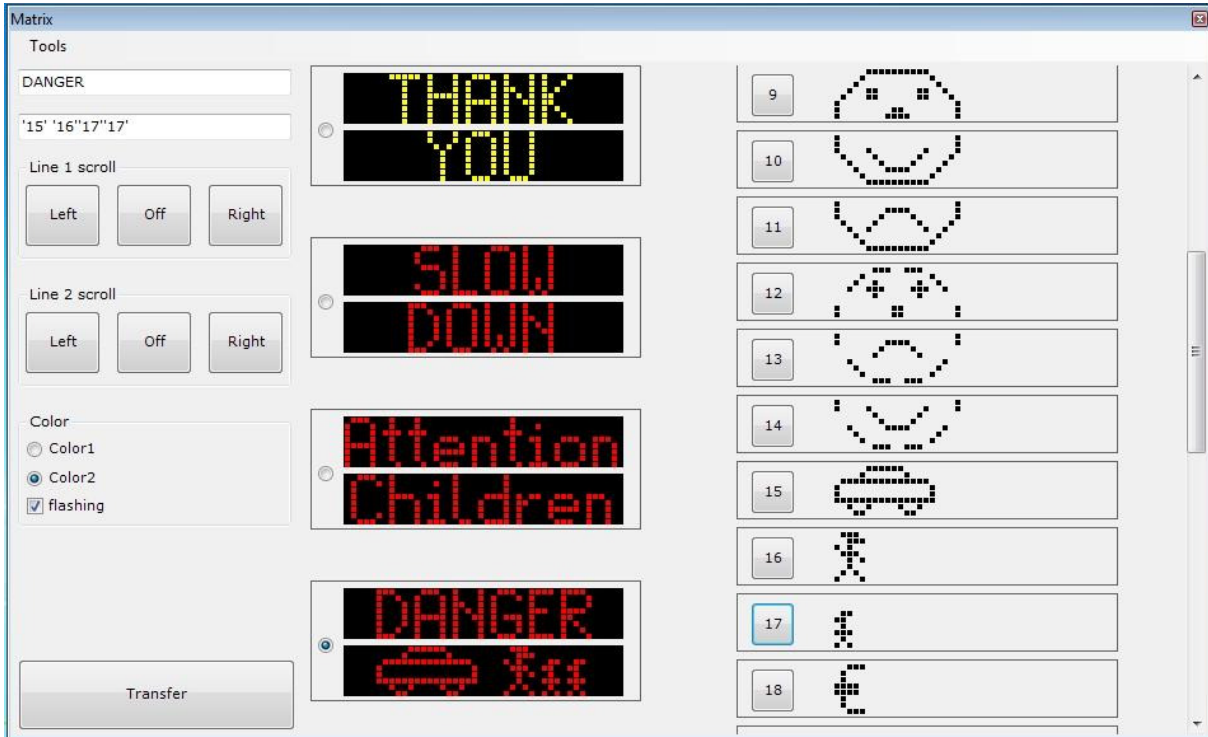
The entered text will be displayed centered in the matrix display. If you need a left- or right bound display add spaces to the right or left of the text.

Before you close the matrix editor, respectively if you modified all display pages as you wanted send them to the viasis with the *Transfer* button otherwise all changes are lost.



### 6.10.2 Viasis PLUS matrix editor – bitmaps

Beside text the LED matrix can also show so called bitmap graphic. In the right column of the matrix editor window up to 31 bitmap graphic characters can be defined:



**Illustration 53: bitmap column at right side of the matrix editor**

As bitmaps also country specific special characters, as Umlauts, apostrophic characters, etc., can be defined. By a click on the number button left of the bitmap the character or the graphic is placed in the active line, respectively in its text at the current cursor position, see also illustration 53, Bitmap 17.

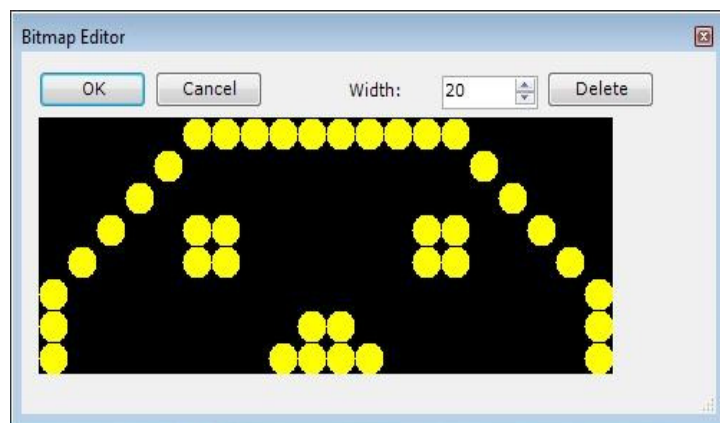
In the page line the bitmap is placed by its bitmap number, delimited by apostrophes (e. g. '17'), therefore the use of apostrophes in the text is not allowed.

In order to edit or create new bitmaps double click with the mouse the bitmap picture behind the number button and the *bitmap editor* will appear.

### 6.10.3 Bitmap editor

A pixel (LED) is activated / deactivated with a left/right mouse click in the bitmap editor. With the button *Delete* all pixel are cleared.

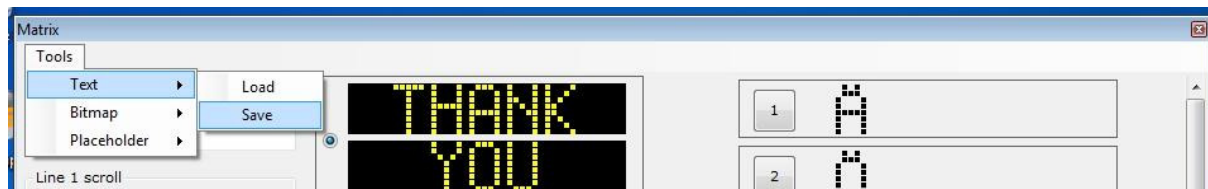
Before you start editing the bitmap set the width of your bitmap, resp. the number of needed LED columns with *Width* button. The maximal width of the bitmap is the matrix column width, which can be found in the Viamatrix menu *Information*.



**Illustration 54: Bitmap editor**

#### 6.10.4 Matrix editor menu Tools

In the matrix editor menu **Tools** – **Text** you will find the menu items **Load** and **Save**. With **Save** you can store edited display pages on your computer hard disk in a text file (\*.txt), with **Load** you can load already saved display page text files.



**Illustration 55: Matrix editor tools menu**

If you click one of the **Text** menu items the Windows standard dialogues for “file save as”, resp. “file open” will appear. Besides the text also edited bitmaps can be stored from or loaded into the matrix editor by the menus **Tools** – **Bitmap** – **Load** and **Save**.

Predefined placeholder like date<sup>1</sup>, time in short format (hh:mm) or long format (hh:mm:ss) can be inserted like bitmaps in the lines of the display pages, by a mouse click to the wished line position and hereafter by a click to the menu **Tools** – **Placeholder** with the selection of **Time1**, **Time2**, **Date** or **Placeholder**. Within the display page lines the placeholders are shown as apostrophe delimited numbers, which start at ‘127’ (short time format), similar to the bitmaps (‘1’ – ‘31’). The value or content of placeholders are determined or calculated just before they are displayed.

Placeholders for time and date can be used for example together with a permanent shown text page and a 230V net supplied viasis, see also chapter 6.11. Placeholders are further used in special software which displays calculated money or point penalties depending on the measured over speeding.

#### 6.10.5 Permanent text page

The viasis PLUS offers the possibility to define a **Permanent shown page**, that means a display page shown if no other page is activated due to vehicle detection above the set speed thresholds.



**Be aware:** *The energy consumption of a permanent shown LED text in compare to the short time activated, switched text due to vehicle detections, is very high and therefore only appropriate for 230V mains supplied viasis PLUS. For viasis PLUS with 12V accumulator is this no option due to the strong reduction of operating time.*

For the configuration of a permanent text page proceed as follows:

- In the Viamatrix menu **Parameter** – **Number of text pages**, see menu chapter 6.10, rise the number from 4 to 5.
- In the Viamatrix menu **Parameter** – **Permanent text page** enter page number 5. Permanent text page 0 means deactivated.
- Return to the viasis main menu

<sup>1</sup> The time and date clock of the Viamatrix, whose values appear in the matrix lines, are loaded from the viasis real time clock (RTC) at power on. So changes at the viasis time and date settings, see chapter 6.5.3 get valid on the matrix after the next power on.

If you click now the **Matrix** button in the viagraph connection window again the new 5. Display page gets visible if you scroll down with the scrollbar of the middle display column. Together with the already set placeholders for date and time the permanent 5<sup>th</sup> text page looks like in the matrix editor as follows:

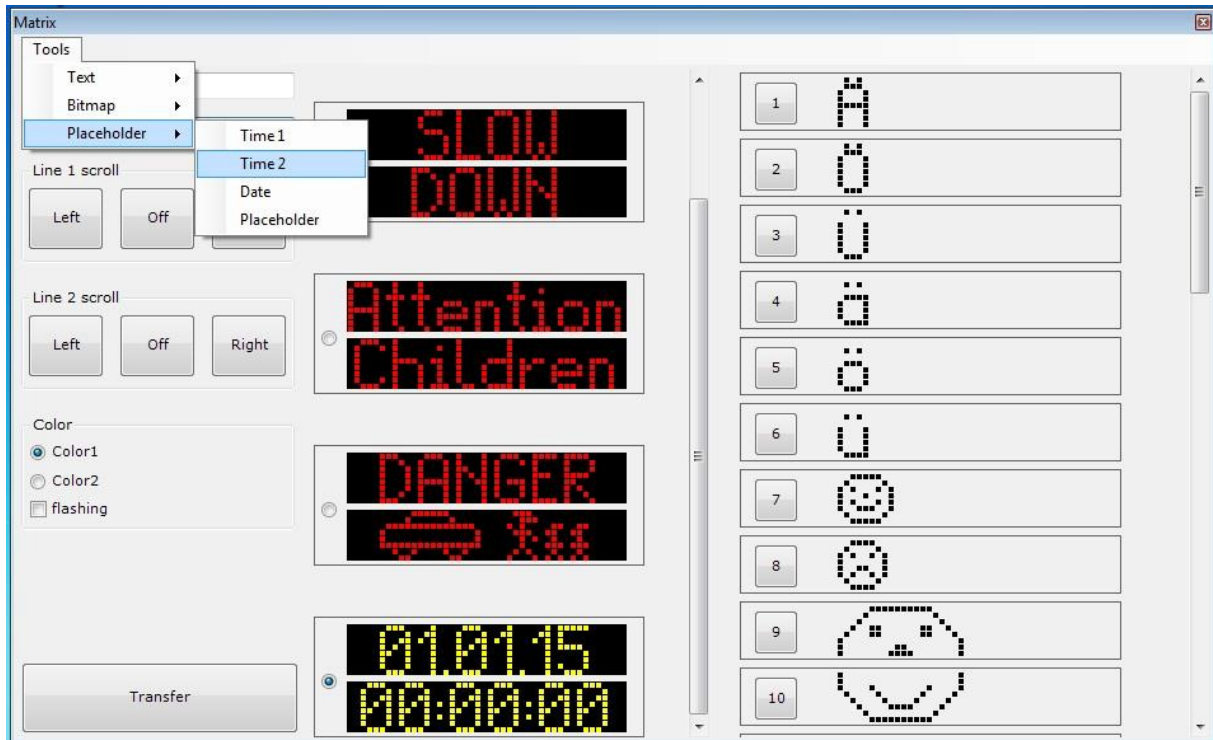


Illustration 56: Matrix editor with date and time placeholder in permanent display page

## 6.11 Select switch option

For the selection of the display parameters the viasis can be optionally delivered with a rotary turn switch. The turn switch is located in the accumulator box on the control unit board; please see following illustration 57 below.



Illustration 57: Select switch parameter sets



If the select switch is in position of the clock symbol the viasis works in normal mode. This means the display parameters of the parameter sets 1 to 5 are activated by the time settings of their weekly calendar.

In case the turn switch is in position 1 to 5 the display parameters of the selected parameter set (see also chapter 6.3.1) are permanently active.

If the viasis is used at various, changing measurement locations with differing local speed limits, the switch offers the possibility to change quickly the display parameters to appropriate values of an another parameter set.

## **7 Technical and physical properties**

### **7.1 Distance range**

The detection distance range of all microwave detectors depends to a large extend to reflection properties of the measured objects and interference properties of the near surrounding.

In common is valid:

- As bigger, planer and orthogonal to the microwave beam axis the reflection surface is, as longer is the distance range.
- As less absorbing and scattering the reflection surface, as longer is the distance range.
- As more other objects are in measurement beam, as shorter is the distance range (diffraction scattering and foliage losses, shadow losses and so on).

Practically following factors have a reducing effect to the distance range:

- High up to the edge of the driveway leading buildings, trees, poles, parked cars and containers, which hamper the „free sight“ of the detector and/or lead to strong scattering losses.
- Influence through weather, rain and snow lead to absorption losses of the radar
- „Blinding of the detector“ through other moving objects as tree branches, persons, resp. a reduction of the detection range by a too far in the leaving traffic directed radar beam, see also chapter 5.2.

The above mentioned negative influences have practically a much smaller meaning than it may seem now, but it makes clear that the reason for a too small distance range is only in rare cases a deficient microwave detector.

In the free field the radar unit has a typical distance range of more than 120 m for genuine passenger cars. Each viasis is tested before delivery regarding a sufficient distance range. For trucks the distance range is about 50% higher due to the larger reflection front surface, for motorcycles it is reduced to 50% and less.

The distance from where the numeric LED display can be read due to the chosen digit size is also higher than 120 meter.

The highest distance range has a detector mounted in a height of 2 up to 3 meter to the housing bottom side. This offset from the ground results from the practically necessary small inclination of the microwave antenna inside the display housing.



## 7.2 Measurement angle

The angle between detector beam axis and the movement axis of the detected vehicles has decisive influence on the measured speed. Microwave detectors and all on the physical „Doppler“ principle based measurement systems (some laser, most infrared and ultrasonic) do not measure the absolute speed of a vehicle. They measure the relative speed or exactly the angular speed vector component of a vehicle moving towards the radar beam axis.

This is expressed by following formula:

$$V_{\text{measure}} = V_{\text{absolute}} \times \cos \varphi \quad \text{with } \varphi: \text{measuring angle}$$

The ideal measurement angle is  $0^\circ$ , this means  $V_{\text{measure}} = V_{\text{absolute}}$  and the movement axis and the radar beam axis are identical in this case.

In practice the system board can only be mounted laterally, besides the driveway. But you don't get a measurement error outside the specified accuracy, if you are aware the limits of the measurement angle (see chapter 5.2).

Please notice the following:

- A too large measurement angle can only have a too small speed value as result!
- Up to a measurement angle of  $4^\circ$  (equal to which direction) the relative speed measured by the detector and the absolute speed are the same through the rounding of the not displayed digits.

## 7.3 Accuracy

The accuracy of the speed value is:

**$\pm 2\%$  and  $\pm 1$  digit**, for the whole measurement range

Herewith the accuracy is better than specified for repressive velocity measurement systems in the German „Eichordnung“ of the „Physikalisch-Technische Bundesanstalt“ ( $\pm 3\%$  for  $v > 100$  km/h and  $\pm 3$  km/h for  $v < 100$  km/h).

Despite this fact, this system is not used in Germany for repressive measurements, because it is not equipped with a electronic calibration circuitry, what is claimed by the „Eichordnung“. Also in future we won't design the system in this way, because the pedagogical intention of this system for visual speed indication would be mislead.

## 7.4 Display field and visibility

The display field consists of the 300 mm high LED digits and the 190 mm high digits of the integrated warning symbols. The chosen letter sizes guarantee readability above 100 Meter.

The angle of readability of the LED digits is with  $15^\circ$  sufficiently high to be seen by the vehicle drivers with full brightness also in bright sunlight. However for spectators looking from aside the LED display just seem to glow depending on the viewing angle and may even disappear in bright sunlight (similar to the fiber optic signs on highways). In common the visibility decreases for LED with rising brightness of the environment a little bit.

A „phantom light mask“ is placed in front of the LED, which suppress a seemingly glowing of the LED to a large extent when they reflect the sun light.





To avoid blinding effects of the vehicle drivers, especially during night-time or covered sky, the system is equipped with an environment light sensor and a LED brightness control with a resolution of 0,5% of the maximal brightness.

## 7.5 Display frequency

The update frequency of numeric LED display is identical with the measurement frequency of the radar detector. As long a moving object is detected its speed is updated all **1,5 seconds** on the numeric LED display. The last measured speed value is hold for about 3 seconds on the LED display.

The display cycle of 1,5 s has emerged as ideal in comprehensive tests. The driver perceives the display frequency after interviews not as too high and therewith not too flurry. In contradiction, the driver sees the displayed speed from a quite far distance, realizes that he is over speeding and slows down. On the display he (and the spectator) gets as a direct feedback the reduced speed displayed, let's say as reward and the driver passes the display with the correct speed. Characteristic is that the driver has enough time to develop a feeling for the right speed.

Hereby is the high distance range the decisive advantage. At a shorter distance range, the driver gets his over speeding displayed, but there is no time for a „dialogue“ between driver and display. The driver has no time to react and the feedback - the reward is missing as well.

## 7.6 Power supply and operating time

### 7.6.1 Accumulator version

For the power supply a 12 Volt lead gel battery pack with a capacity of 17 Ah is installed in a small plastic box on the backside of the housing.

The viasis has a discharge protection for the accumulator to prevent irreversible chemical decomposition of the battery electrolyte due to long time discharge below 10,7 Volt. The protection circuit disconnects the viasis from the battery when the voltage drops below 10,7 Volt and (re-)connects it when the battery voltage is 11,3 Volt minimum.

The operating time of the viasis relies essentially on the number of displayed speed values, the environment brightness and self evidently on the battery capacity. In bright sunlight the power consumption due to maximum LED brightness is maximal 11 Watt when displaying “188” on the numeric LED display. By night with minimum LED brightness level the consumption is less than 1 Watt for displaying “188”.

So the operating time of the viasis 3003 is at a display rate (relation between display on and off time) of 25%, with calculated 16 day and 8 night hours, for the 17 Ah battery about two weeks.

### 7.6.2 Mains supply 115/230 Volt AC version



**Attention: For viasis delivered as 115/230 Volt AC version do not remove or disconnected the buffer battery. The buffer battery delivers peak currents, filters mains distortions and ensures that the voltage level of the AC/DC power supply does not rise to illegal over voltage levels and blows the system fuses.**

Additionally the buffer battery allows the operation of the viasis at timely powered light poles and ensures an operation for several days if the mains line is switched off.

In rare cases with the viasis connected to a heavily distorted mains supply it might be necessary to install a harmonic filter to ensure proper system operation.



**Attention: Work at 115V/230V installations must be generally carried out by electro-technically trained personnel or specialized companies, according to the relevant technical regulations**

### 7.6.3 Viasis with photovoltaic solar support



**Attention: Never operate the Viasis with solar panel and disconnected main battery. Always connect the battery first before the solar panel.**

The solar charge module needs a buffer battery for proper operation and the clamp voltage of the solar module may rise in bright sun light to a destructive level for the electronic without connected lead-acid gel battery.

## 7.7 Operating temperature

The semiconductor components used in our production including the LED's are specified for industrial applications. That means an operating temperature range from  $-40^{\circ}$  to  $+85^{\circ}$  Celsius is guaranteed by the manufacturer.

The microwave transceiver is specified for an operating temperature range from  $-20^{\circ}$  to  $+70^{\circ}$  Celsius. Outside these limits the manufacturers give no guarantee for a faultless function.

## 7.8 Water protection

The industrial housing protection class is IP64 (compare EN 60529). IP64 means that the system is protected against intrusion of dust and the housing protected against water splashing from any direction. The housing is in any case sealed against rain water.

Another thing is the problem of humidity, because the housing has two small drillings ( $\varnothing$  2mm) at the housing bottom for pressure balancing. Strong temperature differences between a housing interior and the surrounding produce a low pressure situation in the housing interior. Slow pressure compensation with the intrusion of humid environmental air may settle down moisture on the surface of the interior housing walls, also at the inner side of the front pane. The housing has the two drill holes in the frame on the bottom side for pressure balancing and the drain of condensing water.

## 7.9 Radio wave interference

Through the use of stereo-channel Doppler transceiver (radio wave transmitter and receiver) and an appropriate measure procedure with steady signal supervision the display of speed values caused by interfering radio waves of other systems can be excluded.

If the interfering signal is much stronger than the received radar signal of the viasis then the system stops operation. In such rare case you need to change the measurement place.

## 8 Maintenance

### 8.1 Cleaning the front window pane



**Attention: To clean a dirty front window pane use always a liquid antistatic detergent or an antistatic cleansing towel!**

Otherwise the transparent plastic front pane can be electrostatic charged up to several kilovolts (frictional electricity) especially when using dry paper or synthetic textile towels. The discharge pulse may destroy the semiconductor components in the microwave transceiver.

A damaged or destroyed microwave transceiver reduces the measurement distance range or leads to a complete failure of the measurement display.

### 8.2 Charging and testing the lead acid battery

The battery is discharged, if the voltage level drops below 10,7 Volt. The battery is separated below this level through the integrated low level discharge protection. Recharge the empty battery immediately to avoid irreversible chemical destruction.



**Attention: The batteries shall be stored only in loaded condition at dry locations!**

The self-discharging of our delivered batteries is with 0,1% (at 20°C) of the loaded capacity per day very low, so that charged batteries can be stored also for longer times (½ year) without any problems.

The battery voltage level can be checked under load condition at power on („188“ is displayed and the battery voltage value follows) and when you connect a laptop or PC and use the test function „*main battery*“, see also chapter 6.8, but without load. Is the battery voltage level below 11,3 Volt the viasis will not start operation.

For the battery loading you should use our automatic battery charger, which stops loading at the high level battery voltage of about 13,8 Volt. If you use a battery charger with no overload protection, it might destroy the battery chemically if a voltage level of 13,8 Volt is exceeded.

Reverse connection of batteries and charger are impossible with the viasis battery connectors which allow a plug in the coupling only in the correct way.



**Attention, if you use third party chargers:** When connecting the cables of the battery, take care of the right polarity! Connect the black minus pole of the charger to the black minus pole of the battery and the red plus pole of the charger to the red plus pole of the battery. Lead-acid gel batteries can be charged reverse and herewith destroyed. Additionally the next connection to the viasis will cause a short circuit and blow the fuse in such a case.

The time to load a completely empty 17 Ah battery with our battery chargers (load currents 2 Ampere) is approximately 10 hours to 90% of the battery capacity. The time to load the battery to full capacity (charger LED load control extinguishes) can be much longer.



### 8.3 Changing the battery

To withdraw the battery unfasten the cover brackets and open the cover of the battery box, placed on the backside of the viasis display system.

Remove the plug of the battery cable from the control panel socket, see illustration 8. Untighten the knurled nut above the turn bolt, turn the bolt aside and take out the battery. To install the battery proceed in reverse order.



**Attention: In case of two or more batteries – disconnect all empty batteries first before reconnecting the charged batteries. Otherwise the fuse(s) might be blown, due to the high current flow between empty and full batteries.**

**When you close the battery box cover take care not to press or cut the battery cable wires.**

### 8.4 Changing the fuse

In order to change the main fuse open the cover of the battery housing on the backside of the display system. The main fuse holder is placed in the upper right corner of the control panel. Replace the fuse with a mini 5 Ampere inert vehicle plug in type fuse.



**Attention: Replace the fuse by the same type. Using fuses with higher current values means in worst case a burned down system, if an electric internal short circuit occurs!**

### 8.5 Serial RS232 interface connector

The serial RS232 D-SUB socket is placed on the control panel in the battery box.

Only data receive and send line, signal ground line and shielding are connected by the interface cable. This means no hardware control (RTS, CTS, ....) for the data flow is supported.

The pin connections (scheme see table below) at the 9 pole D-SUB connector of the interface cable comply to the RS232C interface standard, used in almost every personal computer, laptop or palmtop. Should the communication be impossible even after correct setting of the interface parameter and the right serial port chosen, check the interface description of your computer manual. It might be necessary to exchange the RxD and TxD line at the D-SUB connector.

If you have a computer with 25 pole DSUB serial interface connector, a ready-made adapter to the 9 pole DSUB connector of the interface cable can be purchased in computer trade shops or from us.

| pin | signal | description          |
|-----|--------|----------------------|
| 2   | TxD    | viasis transmit data |
| 3   | RxD    | viasis receive data  |
| 5   | GND    | Ground               |



## 8.6 Trouble shooting



- **No „188“ value displayed after power on**

Prove connection between battery clamps and control panel connector for intermittent cable wires. Are the connector/socket contacts deformed or corroded? Check the main fuse in the battery box. Control the battery voltage – are 11,3 Volt present at the connectors when connecting the battery?

If you are not successful, you have to send us the system back for repair.

- **„188“ does not disappear after power on**

Send us the system back for repair.

- **„188“ flashes after power on continuously**

Reason is probably an old or defective battery, which lost its energy storing capacity. Retry it with a new battery. If you do not succeed contact us.

- **No speed value appears during vehicle detection**

Has the viasis „free sight“ to the vehicles? Is the viasis straightened correctly (chapter 5 foll.)?

Are other high frequency wave radiating installations like high voltage lines, radar or radio antennas in the near surrounding?

Is the minimal or maximal displayed speed set correctly (see chapter 6.3.4.2)?

Is the Led display deactivated in the actual valid parameter set (see chapter 6.3.2.1)?

Is the measurement time limited in the time schedule of the currently valid parameter set (see also chapters 6.3.2 foll.).

Has the sensitivity of the radar been reduced (see chapter 6.3.7)?

If you don't succeed contact our technical support first.

- **Car speedometer and display value are not equal**

Car speedometers are not calibrated and show a remarkably higher speed than the real physical speed of a vehicle. To check the accuracy of the measured speed no car speedometer can be used, except it was calibrated by the manufacturer (what is not done for serial cars).

An exact check of the accuracy must be made with a calibrated reference system (with radar, laser, infrared or other optical methods) or a police car with calibrated speedometer.

If you have anyhow the impression that the displayed speed value is too low read chapter 5.1, 5.2 and 7.2 first.

If you don't succeed contact our technical support first.



- **Unmotivated speed values are displayed**

Are moving objects in the range of the detector, like crossing traffic, moving branches of trees, birds, bicycles, pedestrians and so on?

If you don't find any causes for the malfunction, contact us and send the system back.

- **The numeric LED display shows characters, which are not numbers**

The system has an internal defect, contact us and send it back for repair.

## 8.7 Transport damages



### Packing wrap damaged:

Unpack in presence of the delivering transport driver and let him confirm possible damages of the display system on the delivery notes.

### Packing wrap all right, packing contents damaged:

Inform the hauler immediately and demand for an inventory of the damaged display system, if possible tell the transport driver to note the damage.

***Important:*** Under all circumstances, to avoid the loss of compensation through the transport insurance or from the hauler, **inform the hauler within 24 hours**. The delivered systems have to remain in the same condition until the examination by the insurance took place.

## 8.8 Sending back/transport preparation/disposal

Before you send the system for repair contact our support. Sometimes systems do not operate due to parameter settings or other reasons, often we may also offer a less expensive transport way. Send parcels with „receiver pays cargo fees“ are not accepted.

### Error description:



For a faster treatment of your repair, please write us a short error description and name us a contact person for possible questions of our side.

### Packing wrap:



In order to lessen the risk of transport damages, the system should be send generally only in a **complete** original packing set. Every wrapping is usually used for maximal two ways. Although the cardboards may lose their mechanical stability, the foamed plastic bodies can be used more often. If you cannot store the packing material we are ready to take it back.

If the original packing set is fully or partly lost, the empty packing set can be ordered from us (only complete).

### Take-back and disposal of old systems:



We take back and dispose our systems free of cost. We disassemble the systems, sort the parts and materials, which are recycled or if possible reused. Send parcels with „receiver pays cargo fees“ are not accepted. Please mark the systems clearly 'for disposal'.



## 9 Viasis 3003 certification, conformity and compliance

### 9.1 CE-conformity viasis 3003

#### CE Declaration of Conformity

in accordance with the EC directives 2014/53/EC (RE) and 2011/65/EC (ROHS)

The manufacturer: Via traffic controlling GmbH  
Declares that the product: **viasis 3003 (COMPACT, MINI, PLUS, PLUS SMILE)**  
Intended purpose: Speed measurement system  
Type: Radio equipment                      Equipment class: 1

Complies with the essential requirements of article 3 of the RE (radio equipment) directive, when used for its intended purpose:

- Health and safety requirements pursuant to article 3.1a, according low voltage directive 2014/35/EU
- Protection requirements concerning electromagnetic compatibility article 3.1b, according electromagnetic compatibility directive 2014/30/EC
- Air interface of the radio systems pursuant to article 3.2

Harmonized standards applied:                      Other means of providing conformity with the essential requirements (standards, specifications):  
EN 60950-1:2006 + A11:2009 + A1:2010                      EN 62311 (VDE 0848-211): 2008-09  
EN 55022: 2011-12  
EN 61000-4-2/3/8 : 2009-12/2011-04/2010-11  
EN 50293: 2002-02  
EN 300440-1(V1.6.1)/-2(V1.4.1): 2010-08  
EN 301489-1/-3(V1.9.2/V1.4.1): 2011-09/2002-08

The system complies with directive 2011/65/EC (ROHS – restrictions on the use of hazardous substances).

Equipment marking:                      **CE 0682**

Address:                      Via traffic controlling  
Campusallee 1  
D-51379 Leverkusen  
Germany

Place and date:                      Leverkusen, 26 January 2016  
Name and signature:                      Dipl.-Ing. (FH) J. Geßler  
Senior engineer

### 9.2 Viasis 3003 CE compliance and notification

The viasis 3003 is tested according the applicable EN 300440 and EN 301489 test standards. A national notification according EC directive 2014/53/EC (RE) is for radio equipment class 1 not necessary, because these radio equipment operates in a EC wide harmonized frequency band (EC decision 2013/752/EU, band no. 70a, 24.15-24.25 GHz).

The system can be operated and placed on the market in the European Community, including Switzerland and Norway. Further radio licenses or approvals are not needed within the European Community and further legal limitations are yet not known.



### 9.3 CE-conformity Bluetooth module Laird 730-SA

## EU Declaration of Conformity

*BT730 / BT740*

|                        |                                                   |
|------------------------|---------------------------------------------------|
| Manufacturer:          | Laird                                             |
| Products:              | BT730 / BT740                                     |
| EU Directives:         | 1999/5/EC – R&TTE                                 |
|                        | 2006/95/EC – Low Voltage directive (LVD)          |
|                        | 2004/108/EC – Electromagnetic compatibility (EMC) |
|                        | 2014/30/EU – EMC                                  |
| Conformity Assessment: | Annex IV                                          |

**Reference standards used for presumption of conformity:**

| Article Number | Requirement                                                                          | Reference standard(s)                                           |
|----------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| 3.1a           | 2006/95/EC<br>Low voltage equipment safety                                           | EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013               |
|                | 2006/95/EC<br>RF Exposure                                                            | EN 62311:2008                                                   |
| 3.1b           | 2004/108/EC<br>Protection requirements with respect to electromagnetic compatibility | EN 301 489-1 v1.9.2 (2011-09)<br>EN 301 489-17 v2.2.1 (2012-09) |
| 3.2            | 1999/5/EC<br>Means of the efficient use of the radio frequency spectrum              | EN 300 328 v1.9.1 (2015-02)<br>EN 301 893 v1.8.1(2015-03)       |

**Declaration:**

We, Laird, declare under our sole responsibility that the essential radio test suites have been carried out and that the above product to which this declaration relates is in conformity with all the applicable essential requirements of Article 3 of the EU Directive 1999/5/EC, when used for its intended purpose.

|                                 |                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------|
| Place of Issue:                 | Laird<br>W66N220 Commerce Court, Cedarburg, WI 53012 USA<br>tel: +1-262-375-4400 fax: +1-262-364-2649 |
| Date of Issue:                  | August 2016                                                                                           |
| Name of Authorized Person:      | Thomas T Smith, Director of EMC Compliance                                                            |
| Signature of Authorized Person: |                                                                                                       |

Test reports, declarations for ROHS and REACH compliance for the BLUETOOTH module you will find on the manufacturer website <http://www.lairdtech.com/products/bt730-series>.





## 9.4 CE expertise M10 Quectel GSM/GPRS radio module



# Expertise

Expert Opinion of the Notified Body on the Conformity Assessment  
according to Article 10.5 of R&TTE Directive 1999/5/EC

**PHOENIX TESTLAB**  
EU Identification Number **0700**

Recognised by  Bundesnetzagentur

BNetzA-05-02/51-55

|                                                     |                                                                       |
|-----------------------------------------------------|-----------------------------------------------------------------------|
| Expertise No.                                       | 09-112059b                                                            |
| Certificate Holder                                  | Quectel Wireless Solutions Co.,Ltd                                    |
| Address                                             | Room 801, Building E, No 1618 Yishan Road,<br>Shanghai, China, 201103 |
| Product Description                                 | GSM/GPRS 850/900/1800/1900 Module<br>Evaluation Board                 |
| Brand Name / Model Name                             | Quectel /M10                                                          |
| Frequency Range                                     | GSM/GPRS 900/1800                                                     |
| Transmitted Power                                   | Max 2W                                                                |
| <b>Opinion on the Essential Requirements</b>        |                                                                       |
| Article 3.1a): Health and Safety                    | <b>No remarks</b>                                                     |
| Article 3.1b): Electromagnetic Compatibility        | <b>No remarks</b>                                                     |
| Article 3.2: Effective Use of the Radio<br>Spectrum | <b>No remarks</b>                                                     |
| <b>CE-marking</b>                                   |                                                                       |
| Marking Example (Class 1)                           | <b>CE 0700</b>                                                        |

This certificate is issued in accordance with the Directive 1999/5/EC of the European Parliament and the Council on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity dated 9<sup>th</sup> March 1999 and is only valid in conjunction with the following annex (2 pages).

Blomberg, 25 August 2009

Place, Date of Issue



Signed by Bernd Selck

Phone +49(0)5235-9500-24  
Fax +49(0)5235-9500-28  
notifiedbody@phoenix-testlab.de

PHOENIX TESTLAB GmbH  
Königswinkel 10  
D-32625 Blomberg, Germany  
www.phoenix-testlab.de

For the complete document with all attachments, please see the delivered CDRom in folder \Compliance\Quectel\_M10. For the list of applied test standards please refer to chapter 10.3.6.



## 9.5 Viasis 3003 FCC and IC compliance

The viasis 3003 speed display with integrated radar transceiver has been tested according FCC 15 rule 15.245 and IC standard RSS-210, issue 9, annex F.

For FCC and IC certification and test reports regarding the contained Bluetooth module Laird 730-SA, please see the delivered CDROM in folder \Compliance\Bluetooth\_Laird\_730-SA.

For FCC and IC certification and test reports regarding the optional contained GSM/GPRS module Quectel M10, please see the delivered CDROM in folder \Compliance\Quectel\_M10.

### Notice:

This device complies with Part 15 of the FCC Rules and with Industry Canada license-exempt RSS standard(s).

Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.



Changes or modifications made to this equipment not expressly approved by Via traffic controlling GmbH may void FCC and IC authorization to operate this equipment.

**NOTE:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



## 10 Annex

### 10.1 Viasis 3003 list of equipment

| Name/ article            | Description/specification                                                                                                                                                                                           |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Transport casing         | With two transport rolls, 3 solid metal handles, 4 butterfly lockers, outside double profile frame, inside fitting plastic foam, see also photo 1                                                                   |
| USB-RS232 adapter        | Adapter for the serial connection of RS232 devices to computer USB interfaces                                                                                                                                       |
| Spare battery 12V/ 17 Ah | 12 Volt, 17 Ah, weight 6 kg                                                                                                                                                                                         |
| Battery charger 2 A      | Automatic charger 12 Volt, 2 A, for 17 Ah Accumulator                                                                                                                                                               |
| viasis aluminum tripod   | Stable tripod collapsible with telescope pole, weight 10 kg, tripod ground diameter up to 2.4m, material eloxated aluminum, viasis mounting height up to 2.1m, transport measures: 30cm x 32cm x 166cm, see photo 2 |
| viasis steel tripod      | Robust, collapsible tripod with telescope pole, weight 12 kg, tripod ground diameter up to 1,7m, viasis mounting height up to 2,2 m.                                                                                |
| Pole fixation kit        | The 2 system holders are hanged-in the pole holder, mounted with high endurance steel ribbons with special theft protected closure, see photo 3.                                                                    |



Photo 1: Transport casing



Photo 2: viasis tripod



Photo 3: Pole fixation kit



## 10.2 Technical Specifications<sup>1</sup> viasis 3003

|                                        |                                   |                                                                                    |
|----------------------------------------|-----------------------------------|------------------------------------------------------------------------------------|
| <b>Doppler-radar:</b>                  | Transmit frequency                | 24.165 GHz                                                                         |
|                                        | Emitted output power              | < 100 mW (EIRP)                                                                    |
|                                        | Beam width (at 3dB points)        | 11° horizontal, 17° vertical                                                       |
|                                        | Measurement angle                 | < 5°                                                                               |
|                                        | Speed display range               | 5 ... 199 km/h                                                                     |
|                                        | Accuracy                          | ± 2 % ± 1 digit                                                                    |
|                                        | Distance range                    | > 120 m                                                                            |
|                                        | Detection mode                    | uni- or bidirectionnel                                                             |
| <b>Numeric LED display:</b>            | AllInGaP High Power LED           | 2 ½ digits                                                                         |
|                                        | Exposure angle                    | 15°                                                                                |
|                                        | Colors (EN12368, DIN6163-5)       | Yellow, 585-597 nm<br>Red, 613-631 nm<br>Green 489-508 nm<br>White (x/y 0.35/0.38) |
|                                        | Brightness reduction (by aging)   | < 10 %                                                                             |
|                                        | Lifetime                          | > 10 years                                                                         |
|                                        | Letter size LED digits            | 300 mm                                                                             |
|                                        | Readability                       | > 150 m                                                                            |
|                                        | Letter size LED digits            | ca. 1,5 s                                                                          |
|                                        | Hold time                         | 3 s                                                                                |
| <b>Integrated Led warning symbols:</b> | Led circle diameter               | 300 mm                                                                             |
|                                        | Digit-/symbol height              | 190 mm                                                                             |
|                                        | Readability                       | 120 m                                                                              |
| <b>Fixed text:</b>                     | Letter height                     | 100 mm                                                                             |
|                                        | Readability                       | 80 m                                                                               |
| <b>Data memory:</b>                    | Flash FIFO ring store             | 2/4/8 megabyte                                                                     |
|                                        | Write cycles/data retention       | 100000 / 20 years                                                                  |
| <b>Serial Data interfaces:</b>         | RS232 standard/connector          | RS232C, V24/DSUB 9 pole socket                                                     |
|                                        | Data transfer parameter           | 8 data-, 1 stop-, no parity                                                        |
|                                        | Data transfer speed               | 115200 Baud                                                                        |
|                                        | Data output                       | ASCII, 1k xmodem and ymodem                                                        |
|                                        | Bluetooth radio modem             | see chapter 10.2.4                                                                 |
|                                        | USB host interface/connector      | USB 2.0, USB-B socket                                                              |
|                                        | USB client interface/connector    | USB 2.0, USB-A socket                                                              |
| <b>Power supply:</b>                   | Rechargeable lead-gel accumulator | 12 Volt / 17 Ah                                                                    |
|                                        | Electrical peak power             | 11 Watt                                                                            |
|                                        | Operating time 17 Ah battery      | 2 weeks                                                                            |
|                                        | Battery voltage level control     | 10.8V till 15 V, 0.1 V resolution                                                  |
|                                        | Car fuse                          | 5A inert, ISO8820-3 type F                                                         |

<sup>1</sup> Subject to technical change.



**Real time clock**

**backup battery:** Minimum lifetime 7,5 years  
 Plug in 3V Lithium button cell CR2430

**Housing:** W x H x D in mm 640 x 548 x 185<sup>1</sup>  
 Weight (without battery) 12 kg  
 Material frame Aluminum  
 Front window pane Makrolon  
 Protection class IP64, see chapter 7.8  
 Fixation 2 x 35 mm C profile rails

**Operating**

**temperature range:** -20° ... +70° Celsius

**10.2.1 Supplementary data – viasis PLUS version**

**Housing:** W x H x D in mm 845 x 640 x 185<sup>1</sup>  
 Weight without battery 16,5 kg

**Power supply:** Electrical peak power 18 Watt  
 Operating time 17 Ah battery 1-2 weeks

**LED matrix:** uni-/ or bicolor 2 lines with 1/2 x 8 x 48 LED  
 Line distance 50 mm  
 Line dimensions W x H in mm 100 x 500

**10.2.2 Supplementary data – viasis PLUS SMILE version**

**Housing:** W x H x D in mm 845 x 640 x 185<sup>1</sup>  
 Weight without battery 16 kg

**Power supply:** Electrical peak power 14 Watt  
 Operating time 17 Ah battery 2 weeks

**LED fixed text:** Height text > 100 mm  
 Diameter circle symbols 285 mm

**10.2.3 Supplementary data – viasis MINI version**

**Housing:** W x H x D in mm 640 x 425 x 185<sup>1</sup>  
 Weight without battery 12 kg

**Power supply:** Electrical peak power 11 Watt  
 Operating time 17 Ah battery 2 weeks

**Fixed text:** Text height 110 mm

---

<sup>1</sup> Housing measures: Width and Height without installations (Handle, hinges,...), depth including battery box



### 10.2.4 Technical Data - Bluetooth modem

|                                    |                                           |
|------------------------------------|-------------------------------------------|
| Bluetooth modem type               | Laird BT730-SA (integral ceramic antenna) |
| Bluetooth standard                 | Version 2.0 / SPP                         |
| Bluetooth class                    | I / 18 dBm                                |
| Range (free field)                 | > 100m                                    |
| Data transfer rate                 | > 75 kBaud in y-modem transfer            |
| Current consumption at 12V supply: |                                           |
| - Not connected, standby           | 0,5 mA                                    |
| - Active connection                | 12 mA                                     |
| - Receive/Transmit operations      | 22 mA typical                             |
| Operation temperature range        | -40° C to +85° C                          |
| Compliance                         | CE, FCC, IC                               |

## 10.3 Technical data optional components

### 10.3.1 Technical data – Control panel USB

|                                  |                     |
|----------------------------------|---------------------|
| USB host (computer) connector    | USB - B socket type |
| USB client (USB-stick) connector | USB - A socket type |
| USB client supply voltage        | 5 Volt              |
| USB client supplied current      | 100 mA              |
| USB standard/specification       | USB 2.0             |

### 10.3.2 Technical data – 115V/230V mains supply

|                                        |                                          |
|----------------------------------------|------------------------------------------|
| Nominal input voltage                  | 115V~ or 230V~                           |
| Minimal/maximal input voltage          | 90 V~ / 264 V~                           |
| Range 50 Hz mains frequency            | 47Hz to 63Hz                             |
| Protection connector plug/-coupling    | IP67 (dust sealed, waterproof)           |
| Max. current/poles/ground contact code | 16 A, 3 pole, 2L+PE, 6h, blue color code |
| Plug-/coupling standard                | EN 60309, IEC 60309 (CEE 17)             |



### 10.3.3 Technical data – solar module

|                              |                                    |
|------------------------------|------------------------------------|
| Solar module technology      | polycrystalline photovoltaic cells |
| Dimensions in mm             | 690 x 690 x 36                     |
| Nominal power                | 50 Watt <sup>1</sup>               |
| Nominal-/Open clamp voltage  | 12V= / 21,7V=                      |
| Weight without/with fixation | 6.3kg / 13.3kg                     |

### 10.3.4 Technical data – low voltage relays

The relay board(s) and connector terminals are placed in an add-on housing on the viasis back plate. Information to connection schema, cable gland, etc. see manual sisrelais\_216\_e.pdf. In total 2 relay boards with 7 relays can be controlled by the viasis.

|                                   |                                                |
|-----------------------------------|------------------------------------------------|
| Maximal assembly per board        | 7 mono stable changeover contact relays (SPDT) |
| Terminal connections              | 4 x 3 (open, close, common contact)            |
| Max. switched voltage and power   | 400V~/150V=, 2000VA/192W                       |
| Max. switched current             | 10A~/10A=                                      |
| Dielectric strength (1 minute)    | 1 kV/5kV between contacts/contact to coil      |
| Isolation transient over voltages | 10000 VAC (for 1.2 x 50µs)                     |
| Max. on/off switch time           | 10ms/5ms                                       |
| Contact material                  | Gold plated silver-alloy                       |
| Minimal switch load               | 10 mA @ 5VDC                                   |

#### Attention:

|  |                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>- Relays shall not be used to switch inductive or capacitive loads, see chapter 10.3.4. If these loads are switched sparking occurs while the mechanical contacts are opened or closed, what will destroy the contacts surface in short time.</b></p> <p><b>- The gold plating of the relays evaporates at high switching power, afterwards the relay cannot be used to switch small signals reliably anymore.</b></p> |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 10.3.5 Technical Data – MOSFET power transistors

The MOSFET power transistor boards and connector terminals are placed in an add-on housing on the viasis back plate. Information to connection scheme, cable glands, etc. see manual sisrelais\_216\_e.pdf. In total 2 boards with 7 MOSFET high current transistors can be controlled by the viasis.

<sup>1</sup> Currently used module type and power may change, please ask.



|                                    |                                 |
|------------------------------------|---------------------------------|
| Maximal assembly per board         | 4 p-ch MOSFET power transistors |
| Max. switched voltage (UGS @ 25°C) | 20 Volt DC                      |
| Maximal current (ID @ 25°C)        | 74 Ampere DC                    |
| Maximal switch power (Ptot @ 25°C) | 200 Watt                        |
| Inner resistance (RDSon)           | 0,02 Ohm                        |
| Switching times (ton/toff)         | < 200 ns                        |
| Switch protection                  | Reverse diode Source-Drain      |

**Hints:**

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none"> <li>- MOSFET power transistors do not provide galvanic isolation between viasis electronic and switched load, but have no wear parts as relays have.</li> <li>- MOSFET power transistors switch inductive and capacitive loads without being damaged.</li> <li>- The MOSFET power transistors can additionally be controlled with an environment brightness dependent PWM (pulse width modulated) signal. Therefore they are appropriate for supplementary customer specific external LED displays.</li> </ul> |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**10.3.6 Technical Data - GSM/GPRS radio module and SIM card slot**

|                                               |                                                                                                                                                                                                 |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type of radio module                          | Quectel M10                                                                                                                                                                                     |
| Transmit frequencies quad band                | 850/900/1800/1900 MHz                                                                                                                                                                           |
| Maximal transmit power                        | 2W @ 850/900 MHz, 1W @ 1800/1900 MHz                                                                                                                                                            |
| CSD data transfer speed                       | maximal 14,4 kBaud                                                                                                                                                                              |
| GPRS multislot class and mobile station class | Slot 12/10/8 / Class B                                                                                                                                                                          |
| GPRS data transfer speed                      | maximal 85,6 kBaud (up- and downlink)                                                                                                                                                           |
| Data protocols and -interfaces                | PPP, TCP/IP, HTTP, FTP, SMS, MMS, FAX                                                                                                                                                           |
| SIM card slot standard                        | Mini-SIM ISO/IEC 7810:2003 – ID-000                                                                                                                                                             |
| CE test and product standards                 | EN301489-7 V1.3.1:2005 (EMC)<br>EN301489-1 V1.8.1:2008 (EMC)<br>EN301511 V9.0.2 (GSM radio spectrum)<br>ETSI TS 151010-1 V1.8.0 (Mobile stations)<br>EN60950-1 :2001+A11 :2004 (Electr. safety) |
| Compliance                                    | CE, FCC, IC                                                                                                                                                                                     |
| GSM/GPS combined antenna type                 | Siretta Tango 19                                                                                                                                                                                |
| GSM antenna gain                              | 2dBi@ 900 MHz / 1 dBi@1900MHz                                                                                                                                                                   |
| Operating temperature range                   | - 45° C to +85°C                                                                                                                                                                                |





### 10.3.7 Technical Data – GPS module

|                                       |                                           |
|---------------------------------------|-------------------------------------------|
| GPS module                            | Quectel L70, L1 band receiver 1575,42 MHz |
| Power consumption during position fix | 20 mA @ 12V (with active GPS antenna)     |
| Position fix time (TTFF)              | < 35 s (optimal satellite reception)      |
| Position accuracy                     | < 2,5 meter (CEP)                         |
| Operating temperature range           | -45° C to +85°C                           |