

TECHNICAL REFERENCE MANUAL

DS-VGPS-HSC V26-1



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2. About this document

2.1. Legend

The following symbols and formats will be used throughout the document.



Important

It gives you important information about the subject.
Please read carefully!



Hint

It gives you a hint or provides additional information about a subject.



Example

Gives you an example of a specific subject.

3. GPS based system for position, speed, and displacement measurement

3.1. Features

- Synchronized data acquisition combined with real time speed measurement
- Portable and rugged construction
- Insensitivity to road surface (can be used on mud offroad, water, snow, ice,...)
- Mark input for brake trigger switch

3.1.1. Speed sensor

- **100 Hz update rate for speed and distance output**
- Supports USB and CAN interface
- Supports differential GPS (SBAS) as standard function
- Online signal quality monitoring for standalone applications
- No calibration required

3.1.2. Clock output

- Output clock rate of up to 10 MHz
- One independent output frequency
- PPS accuracy of 100 ns
- Continuous synchronization to absolute GPS time
- Absolute long time stable

3.2. Specifications

DS-VGPS-HS/HSC	
NAVIGATION	
Standalone (horizontal positioning)	1.2 m
Standalone (vertical positioning)	1.8 m
SBAS (horizontal positioning)	0.8 m (WAAS, EGNOS 0.3 m)
SBAS (vertical positioning)	1.2 m (WAAS, EGNOS 0.5 m)
Omnistar (horizontal positioning) *	-
Omnistar (vertical positioning) *	-
RTK (horizontal positioning) *	0.02 m
RTK (vertical positioning) *	0.02 m
Velocity accuracy	0.02 m/s
Roll & Pitch accuracy (dynamic)	-

Heading accuracy (dynamic with GNSS)	-
Slip angle accuracy	-
Range	Unlimited
Hot start time	< 10 s
Output data rate	20/100 Hz
GNSS	
Supported navigation systems	GPS L1, L2* GLONASS L1, L2*
Supported SBAS systems	WAAS, EGNOS, MSAS, GAGAN, QZSS
ADDITIONAL FEATURES	
PPS output	✓
IRIG B DC output	-
Dual antenna heading	-
RTK positioning	✓
HARDWARE	
Interface	RS232 / USB, CAN, Analog, Digital
Operating voltage	9 to 36 V
Power consumption	250 mA @ 12 V
Operating temperatures	0 °C to 60 °C
Environmental protection	not IP rated
Input protection	Polarity & short overvoltage protection
Shock limit	MIL-STD 810 F
Dimensions	115 x 93 x 35 mm
Weight	740 g
INERTIAL SENSORS	
Accelerometer	-
Gyroscope	-
Magnetometer	-
Pressure sensor	-
APPLICATIONS	
Synchronization and timing with DewesoftX® DAQ	✓
Simple positioning	✓
Brake/Acceleration test	✓

Vehicle dynamics	-
Lane change	✓
Circle drive	✓
Chassis development	-
Advanced driver assistance systems testing	✓
Comfort testing	-
Pass by Noise	✓
FuSi	✓
Orientation of different object	-

*All navigation specifications are valid in open sky conditions

3.3. Device overview

The DS-VGPS-HSC offers a unique combination of a high dynamic GPS based speed sensor and a GPS synchronized time base generator. This combination allows completely synchronized data acquisition of multiple systems located inside and outside of moving vehicles.

The sensitivity of the analog speed and displacement output is free programmable. Due to the 100 Hz update rate the latency time is as low as 9 ms. Using the unique PPS sync technology the latency time of the digital interfaces (USB or CAN) are corrected online.

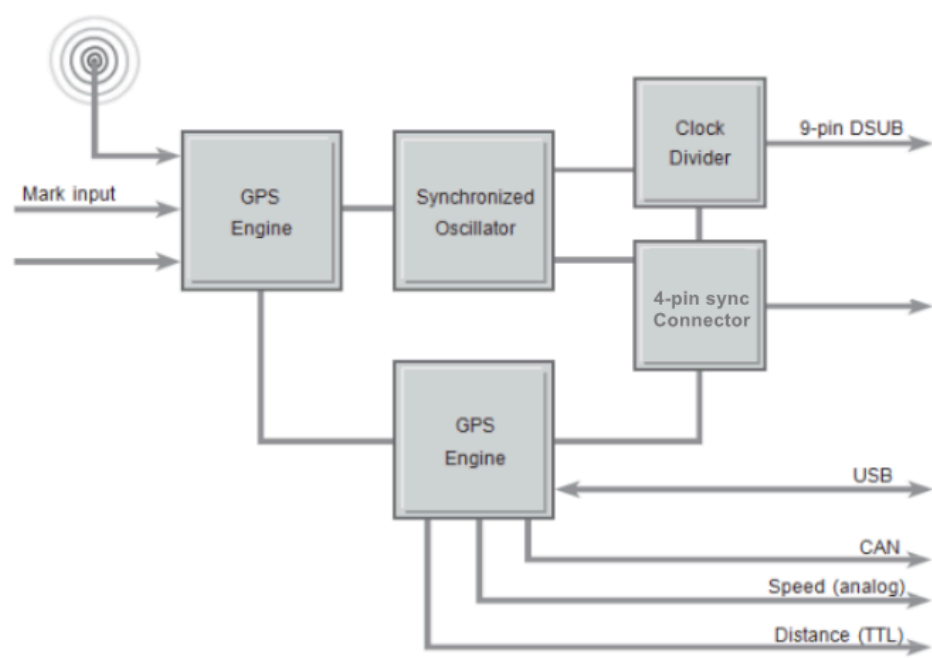


Image 1: VGPS HSC inputs and outputs

The base of any GPS receiver is precise time measurement. In addition to the position information a precise PPS (pulse per second) is generated by the GPS engine. This pulse is used to synchronize 80 MHz oscillators with software PLL (phase locked loop). The result is an ultra stable 80 MHz clock source which is completely free of drift over time.

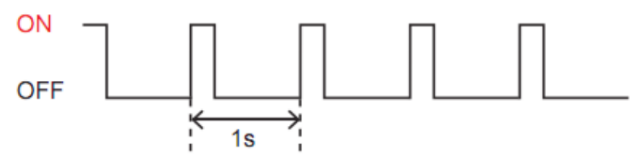
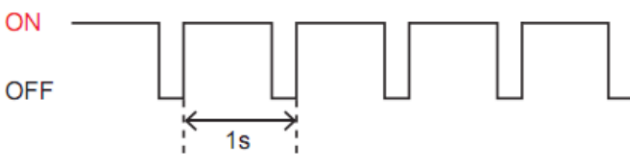
The communication to the host is provided over CAN or standard USB interface.

3.4. Functionality of the LEDs

3.4.1. Power (green)

The power LED is solid green when the DS-VGPS-HSC is in normal operation.

3.4.2. Status (red)

The red status LED indicates current status of device: At normal operation - when DS-VGPS-HSC is locked to the selected time source - it shortly blinks once a second.	 ON OFF 1s Image 2: LED Normal Operation
When the time source signal is missing (neither GPS or IRIG time code signal), the device automatically goes to flying-wheel operation. This is indicated by inverted blinking.	 ON OFF 1s Image 3: LED Missing Signal

3.5. Mounting the aerial

The aerial supplied with the VGPS is designed to be mounted magnetically on top of the vehicle in a horizontal plane. If the surface is not metallic, the aerial may be fixed by placing a piece of strong tape over the top of the aerial. The positioning of the aerial is critical to the correct operation of the VGPS.

Note: For correct operation, the aerial requires a metallic subsurface with a minimal diameter of 15 cm. This surface doesn't have to be ferromagnetic.

The aerial picks up the signals from up to 12 satellites which are all in different places in the sky. These satellites are not necessarily directly overhead, and can often be close to the horizon. Therefore it is best to mount the aerial in a way that the least amount of metal obscures the view of the sky. On a domed roof, place the aerial on the top of the dome. On an open car with a roll-over bar, place the aerial horizontally on the highest point of the roll-over hoop and tape the wire securely to the frame. Although

the VGPS can work with at least three satellites, its precision increases the more satellites it finds. If one satellite disappears over the horizon, or behind an object, there are other satellites still in view.



Image 4: GPS antenna

3.6. Warm-Up time

When the VGPS is used for the first time, has been moved more than 200 km or not used for 10 hours (since last usage), it is recommended to perform a 'cold start'. To get the best performance from your VGPS in the future, perform this cold start in an open place with a good all round view to the sky. Allow the VGPS to map the satellites for at least 20 to 30 minutes. The VGPS builds up the 'Ephemeris' data on each satellite which is stored in a non-volatile memory, and means future satellite tracking is swift and stable. Once the VGPS has carried out a successful cold start, future satellite lock from power up will take between 15 seconds and 1 minute. Before going to test in a shady environment with tall objects or near to trees, allow the VGPS to settle in an open space for 5 to 10 minutes.

4. Scope of supply

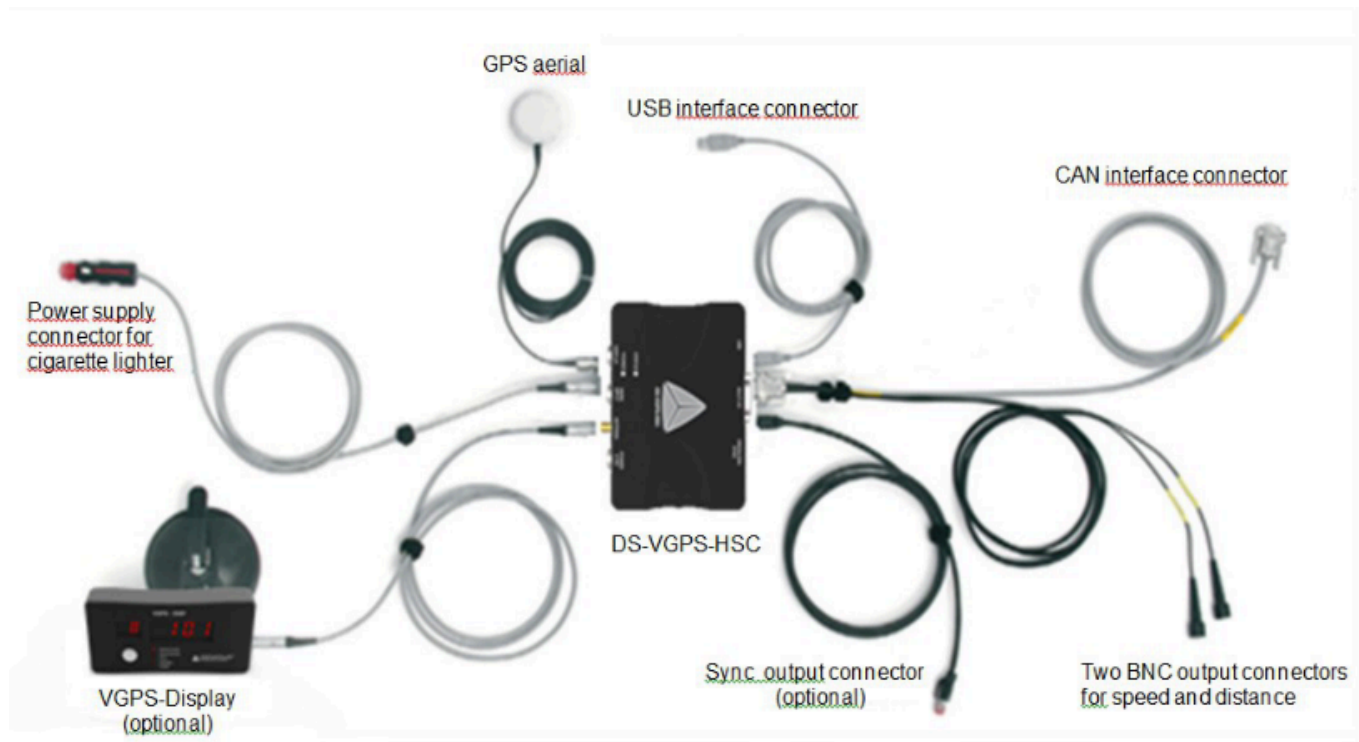


Image 5: Connections

5. Connection

5.1. Connector overview

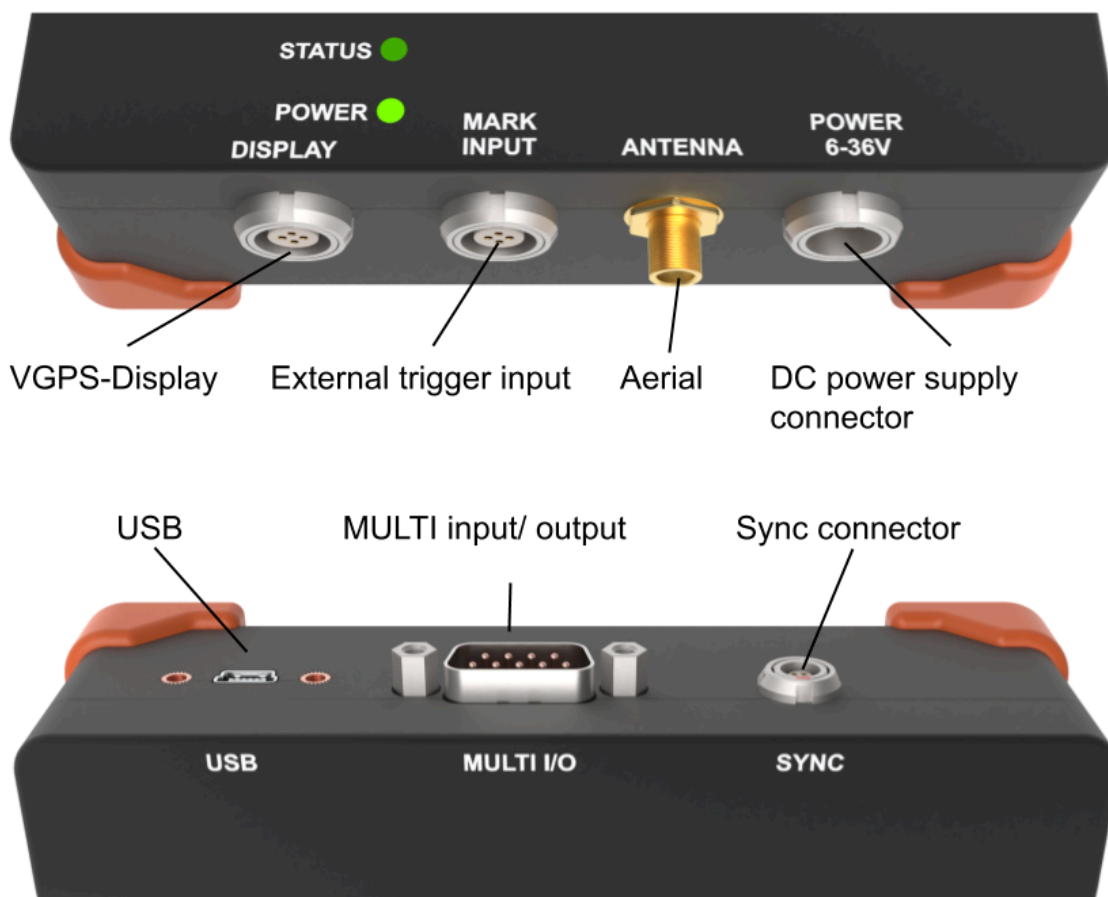


Image 6: Inputs

5.1.1. Aerial connector

Connect the GPS aerial to the SMA connector.

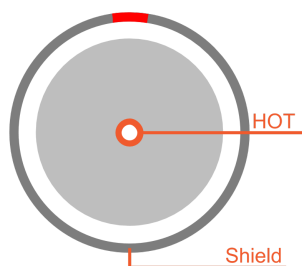


Image 7: SMA connector

5.1.2. MULTI I/O connector (DSUB-9 female)

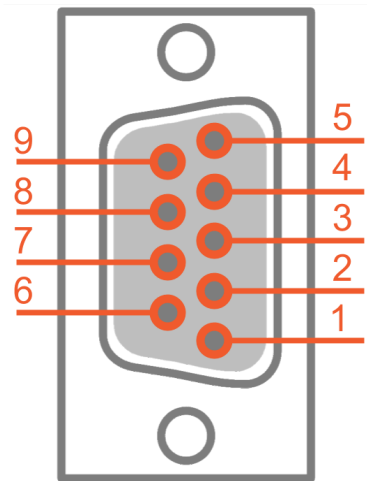


Image 8: MULTI I/O connector (DSUB-9 female)

Pin	Description
1	+5V 50mA supply
2	CAN-LOW
3	Scan clock out
4	Distance out
5	Analog speed output
6	PPS (pulse per second)
7	CAN-HIGH
8	DGND (Ground)
9	AGND (Ground)

5.1.3. USB connector

The Mini-USB interface connectors meet standard USB pin assignment.



Image 9: USB mini connector

Pin	Description
1	+5V
2	Data
3	Data +
4	Host cable identification
5	GND

5.1.4. VGPS – Display connector

To connect the external display to the DS-VGPS-HSC system.

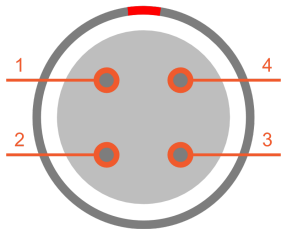


Image 10: VGPS display connector
EXG.1B.304.HLN

Pin	Description
1	+5V
2	GND
3	TXD
4	RXD

5.1.5. Mark input connector

Connects an external trigger source to the DS-VGPS-HSC system.

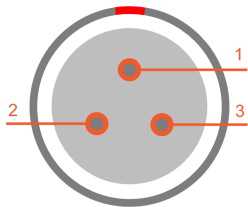


Image 11: Mark input connector: pin-out (3-pin LEMO female)
EXG-1B.303.HLN

Pin	Description
1	+9 to +36 VDC power supply
2	GND power supply
3	Signal

5.1.6. Power supply connector

Connects the DS-VGPS-HS system to an external DC power supply.

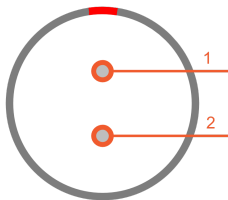


Image 12: Power supply connector (2-pin LEMO male)
EXJ.1B.302.HLD

Pin	Description
1	+9 to +36 VDC power supply
2	GND power supply

5.1.7. Sync connector

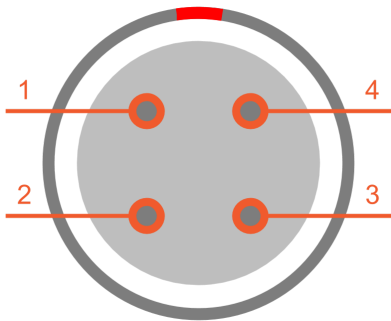


Image 13: Sync connector: pin-out (4-pin LEMO female)
Interface connector: EEG.00.304.CLL
Mating connector: FGG.00.304.CLAD27Z

Pin	Name	Description
1	CLK	Clock
2	Trigg	Trigger
3	GPS-PPS	GPS - PPS
4	DGND	Digital Ground

5.1.8. Cable for external power supply

Type of cable: LIYY 2x0.75, length: 2 m

Standard: (included)	L1B2f-CIG-2m + Power supply GND power supply FGJ.1B.302.CLLD42Z
Optional:	L1B2f-BAN-2m + Power supply GND power supply FGJ.1B.302.CLLD42Z
Optional:	L1B2f-L1B2m-2m + Power supply GND power supply FGJ.1B.302.CLLD42Z FGG.1B.302.CLAD52Z

Image 14: Cables for power supply

Optional: AC adapter

- different AC cable (depends on the country)



Image 15: AC adapter

5.1.9. Cable for connecting VGPS to VGPS-Display (optional)

Type of cable: LIYCY 4x0.25 shielded, length: 2 m

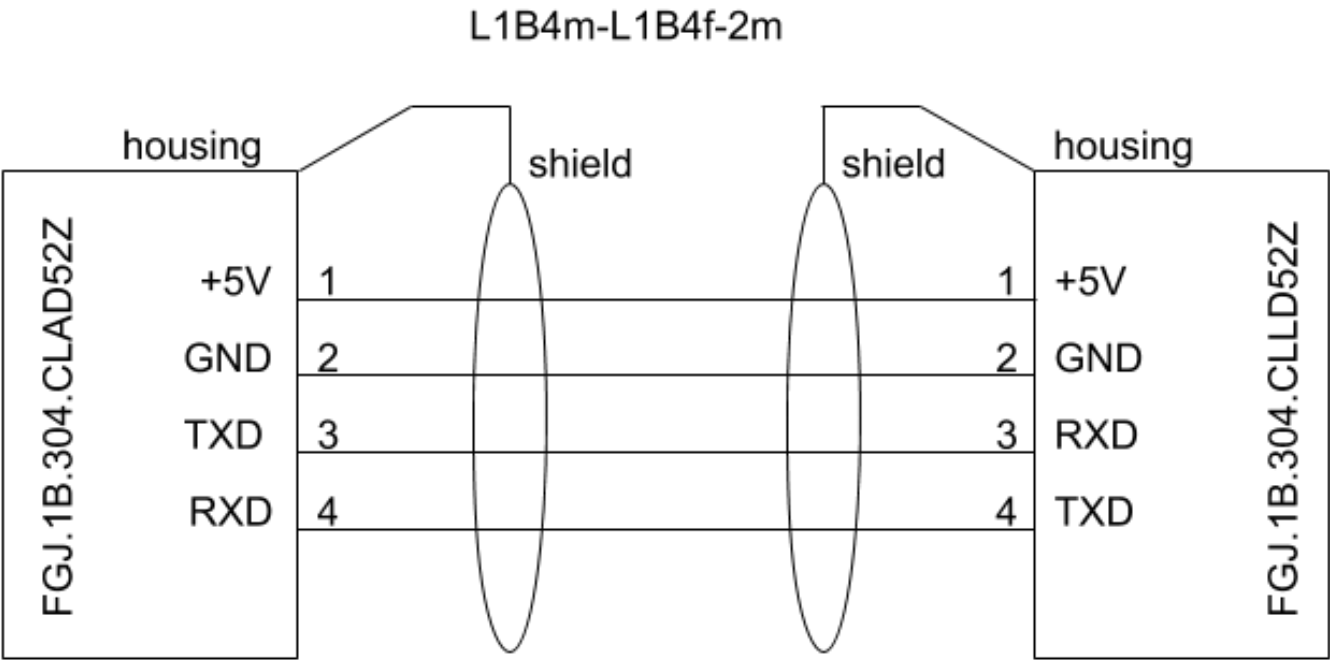


Image 16: VGPS display cable

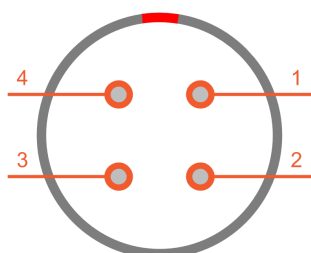


Image 17: FGJ.1B.304.CLAD52Z

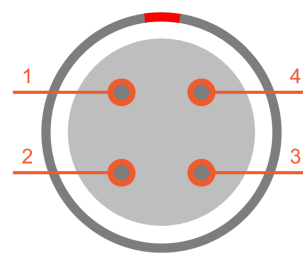


Image 18: FGJ.1B.304.CLLD52Z

5.1.10. Cable for connecting VGPS to CAN

Type of cable: LIYCY 2x0.25 shielded, length: 2 m

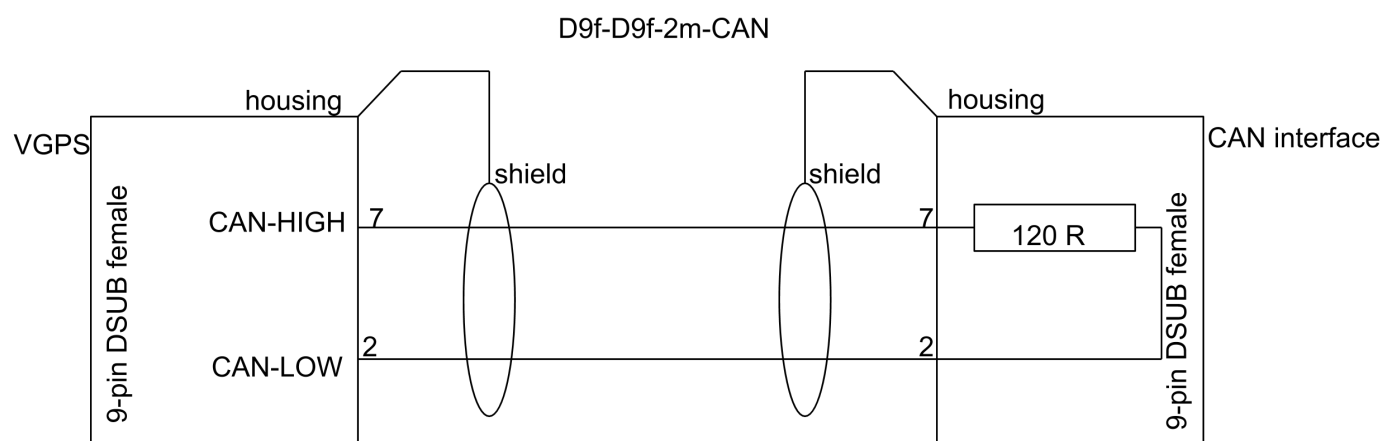


Image 19: VGPS to CAN cable

5.1.11. Output cable velocity and distance

Type of cable: RG-174, length: 2 m

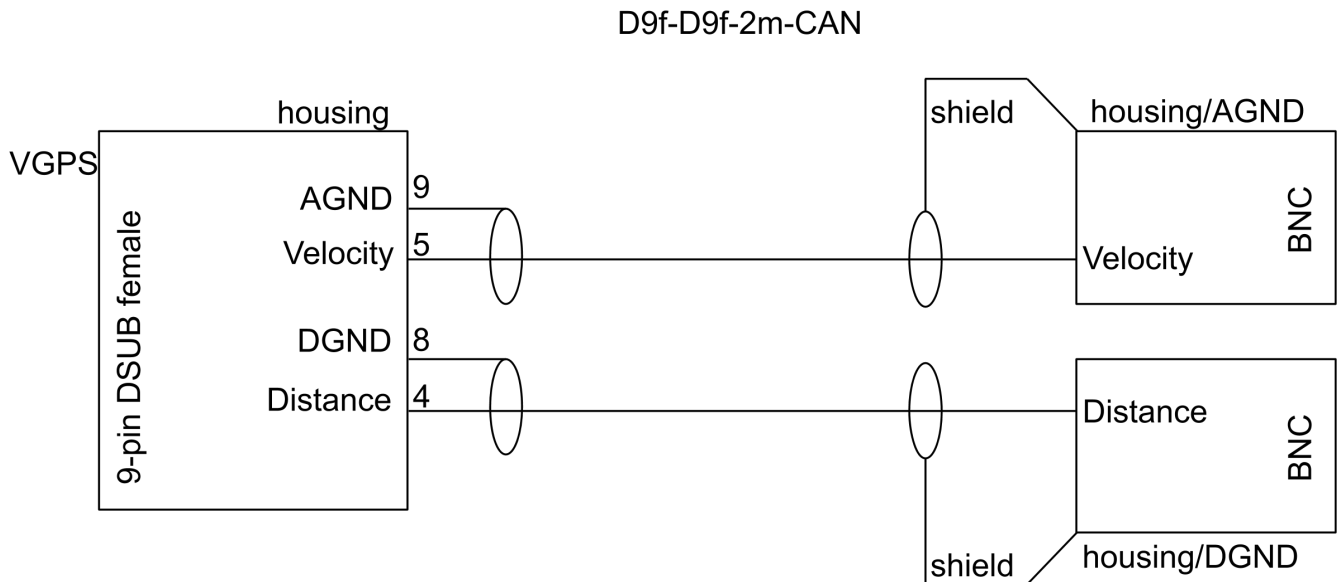


Image 20: DSUB9 to 2xBNC cable

5.2. Options

5.2.1. Brake trigger switch

(Available to purchase as an option)

The brake trigger is designed to be mounted on the brake pedal or the accelerator pedal and gives an indication when the pedal is pressed. The normal method of fixing is via rubber bands. The brake trigger can be used during a brake stop to determine the speed at which the brake pedal was pressed, and the braking distance from this point can be viewed. This switch can be connected directly to an input of the data acquisition system or to the DS-VGPS-HSC. The DS-VGPS-HSC will recognize the exact time of the switching point. A serial command with this time information will be transmitted to the data acquisition unit. DewesoftX® displays this event as a separate channel. This channel can be used during post processing to calculate the brake distance.



Image 21: Brake trigger switch

5.2.2. Digital display

The LED display is used to monitor various GPS parameters.

Display description:

Blinking middle dashes on all digits - the display is unable to communicate with the VGPS. Pressing and releasing the push-button on the front of the VGPS-Display switches the display to different modes. After pressing the push-button, the LED bedside mode changed to appropriate display mode.

	Mode 01: Number of satellites and velocity in mph.
	Mode 02: Number of satellites and velocity in kph.

 The image shows a black rectangular device with a red LED display. The display is divided into two sections: a smaller one on the left showing '17.' and a larger one on the right showing '11.59'. Above the display is the text 'VGPS - DISP'. Below the display is a list of measurement options with red dots: Speed [mph], Speed [km/h], Time, Heading, and Height. The 'Time' option is highlighted with a red dot. To the right of the list is the DEWESoft logo and the text 'measurement innovation'.	Mode 03: GPS UTC time reported by the satellites goes up in increments of 0.05 seconds. The format is hh.mm.ss. The base for the time is Universal Time Coordinate, derived from the atomic clocks on board the satellite and hence is extremely accurate.
 The image shows the same black rectangular device. The red LED display shows '8' in the left section and '16.3' in the right section. The 'Heading' option in the list below the display is highlighted with a red dot.	Mode 04: Heading in degrees. Number of satellites and heading of the vehicle relative to true North. Resolution: 0.1 degree
 The image shows the same black rectangular device. The red LED display shows '8' in the left section and '116.5' in the right section. The 'Height' option in the list below the display is highlighted with a red dot.	Mode 05: Number of satellites and height relative to the Datum WGS84 (approx. 50 meters below UK sea level). Resolution: 0.1 meters

6. Installation of the DewesoftX® measurement software

For optimal operation, we recommend that you install the latest version of DewesoftX®. If you already have DewesoftX® installed, please check if a newer version is already available. You can either check on the website under Support/Downloads/DewesoftX section or directly in software under the Options/Check for updates. In both cases the changelog is included

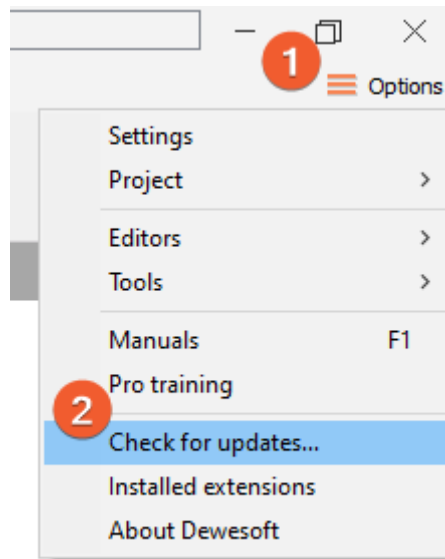


Image 22: Check for updates

6.1. Connecting the DS-VGPS-HSC to the DAQ-System

6.1.1. Synchronization to system with Clock and Trigger

To synchronize standard data acquisition systems a start trigger and the possibility of external clocking is required. This input needs to be connected to the output of the DS-CLOCK sync signals of the 9-pin DSUB female (signal Scan Clock Output and PPS).

6.2. Configuration of DewesoftX® for the DS-VGPS-HSC

- Start DewesoftX®
- To unlock the GPS functionality in DewesoftX® the GPS has to be configured in the Hardware Setup screen (Settings → Hardware Setup)
- In the hardware setup window select 'GPS' and follow the instructions below:

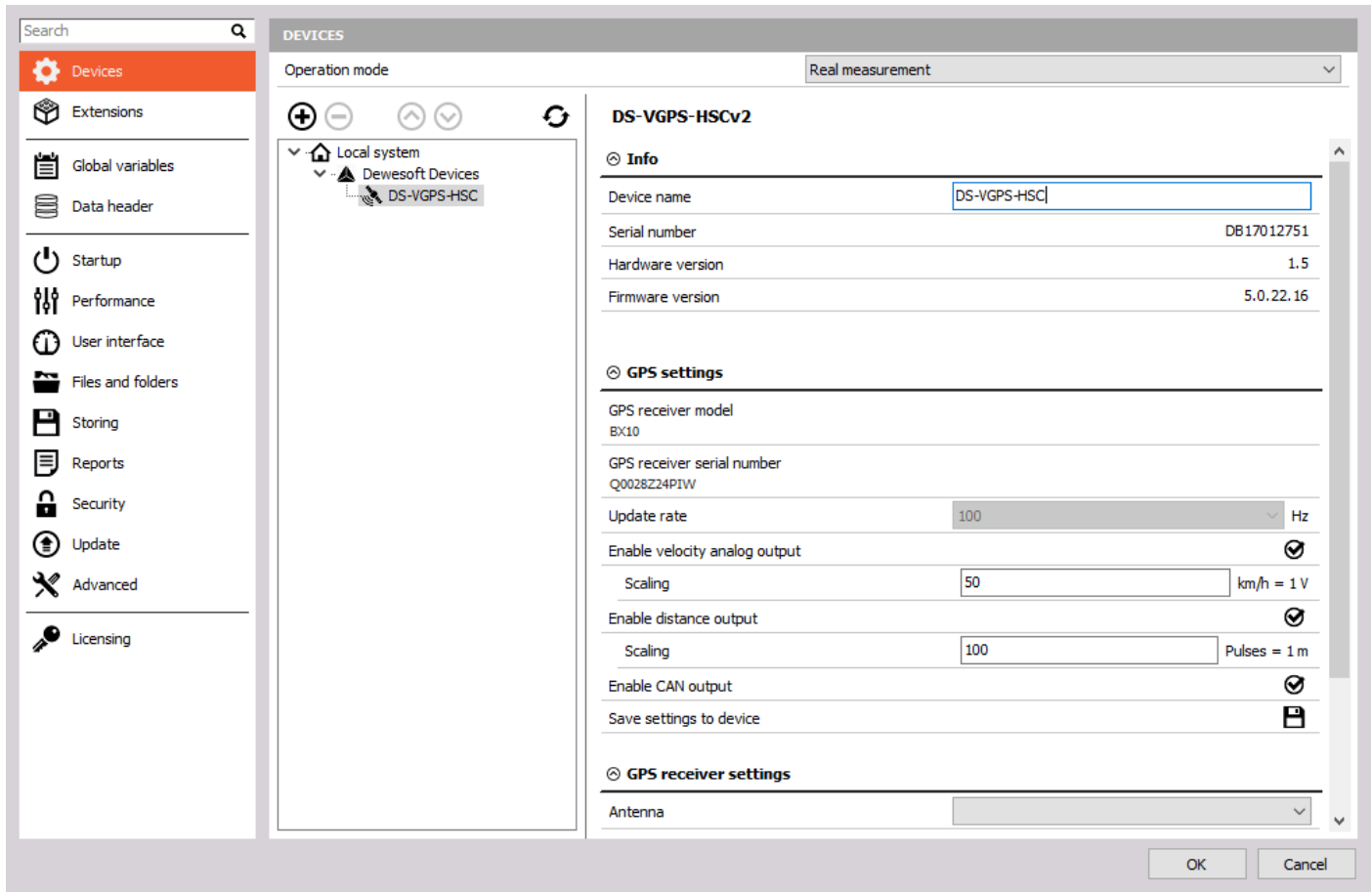


Image 23: DS-VGPS-HSC settings

GPS device

A list of the supported GPS systems. Select the **Dewesoft RS232 (Topcon/Javad/NVS)** GPS device. If it doesn't find the Model of receiver press the Refresh button or you have to switch COM port.

Firmware version

Shows the firmware version of the VGPS system.

Model

Shows the hardware version of the VGPS system.

Serial number

Serial number of the connected GPS sensor. Serial number is recorded to reconstruct the measurement conditions.

Reset receiver

The "Reset receiver" button will reset the internally used receiver. This function has no influence on all settings below.

Update rate (Hz)

Only option is a 100 Hz update rate.

Velocity analog output

The maximum value of the analog output coefficient can be set in this input field. The valid range is between 50 and 500 km/h.

Distance output

Here you can define the number of pulses per meter of the digital distance output. Measuring the frequency of this output also gives a high accuracy speed output. For example if this output is set to 500 pulses per meter a frequency of 1 kHz equals to 2 meters per second (or 7.2 km/h). Selectable ranges are from 10 to 1000 pulses per meter.

CAN output

By clicking on this screen, you enable CAN output. For CAN reading you can also use a .dbc file (DS-VGPSHSC.dbc), which can be found in the default 'Setup' folder of DewesoftX.

Messages													
Search		Rx Tx		View	Filter	5 messages		12 channels					
				Message	Rx / Tx	Import Export							
+	ARB.	Bits	Frequency	Used	C	R/T	Name	Description	Unit	Min	Value	Max	Setup
▲	12Ch	DLC = 1	0,0 Hz	Unused		Rx	PPS	-					Setup
■	12Ch	0 (8)	0,0 Hz	Unused		Rx	PPS	-		0		59	Setup
▲	120h	DLC = 8	0,0 Hz	Unused		Rx	Sats_Time_Latit	-					Setup
■	120h	0 (8)	0,0 Hz	Unused		Rx	Sattellites	-		0		12	Setup
■	120h	8 (24)	0,0 Hz	Unused		Rx	Time	-	s	0	0,00	86400	Setup
■	120h	32 (32)	0,0 Hz	Unused		Rx	Latitude	-		0	0,00000	9000	Setup
▲	12Eh	DLC = 8	0,0 Hz	Unused		Rx	Longit_Altit	-					Setup
■	12Eh	0 (32)	0,0 Hz	Unused		Rx	Longitude	-		0	0,00000	18000	Setup
■	12Eh	32 (32)	0,0 Hz	Unused		Rx	Altitude	-	m	0	0,000000	3000	Setup
▲	12Fh	DLC = 8	0,0 Hz	Unused		Rx	Vel_Status	-					Setup
■	12Fh	0 (16)	0,0 Hz	Unused		Rx	Velocity	-	km/h	-300	0,00	300	Setup
■	12Fh	61 (1)	0,0 Hz	Unused		Rx	DGPS	-		0	0	1	Setup
■	12Fh	62 (1)	0,0 Hz	Unused		Rx	East_West	-		0	0	1	Setup
■	12Fh	63 (1)	0,0 Hz	Unused		Rx	South_North	-		0	0	1	Setup
▲	130h	DLC = 8	0,0 Hz	Unused		Rx	Dist_Heading	-					Setup
■	130h	0 (32)	0,0 Hz	Unused		Rx	Distance	-	m	0	0,000	1000000	Setup
■	130h	48 (16)	0,0 Hz	Unused		Rx	Heading	-	deg	0	0,00	360	Setup

Image 24: CAN output

Receiver mode

The receiver supports receiving correction (differential mode) signals like WAAS (for the USA) or EGNOS (for Europe). It is recommended to enable differential mode to increase the accuracy of the absolute position.

6.2.1. Timing settings

Hardware setup

In addition to a high precision speed sensor the DS-VGPS-HSC is also a high precision timing source for synchronized data acquisition. In this operation mode the DS-VGPS-HSC generates the clock for the data acquisition system.

This operation mode needs to be enabled in the Settings of DewesoftX® (Settings → Devices):

Select External from the Timing device drop down menu. After that you select the PPS In, IRIG B DC out option.

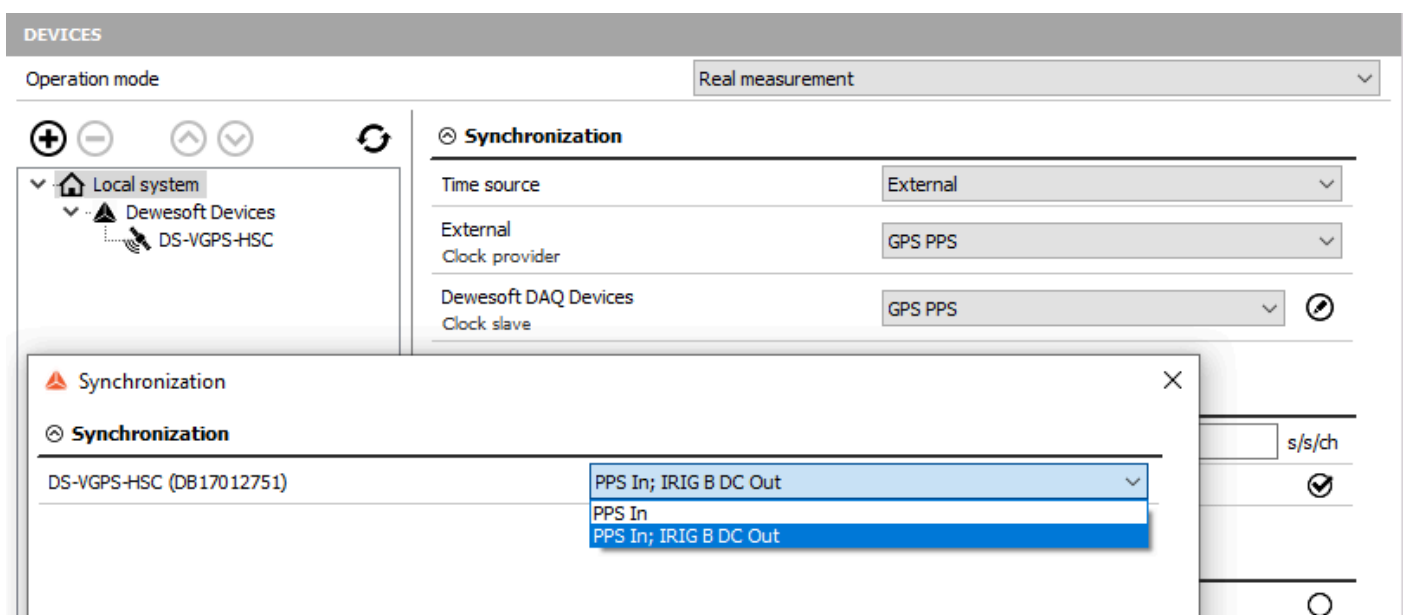


Image 25: Synchronization settings

Correction limit

For synchronizing the internal oscillator with the PPS signal at least 4 satellites are required. If the GPS signal is lost during acquisition the DS-VGPS-HSC continues sourcing the data acquisition system with a precision clock source. Without synchronizing to the GPS signal, the oscillator may drift. Therefore the absolute time synchronization can't be guaranteed anymore. However, as soon as the GPS signal is available again, the VGPS-HSC recognizes a possible drift and tries to correct this inaccuracy. If the drift during the free-run time is higher than 100ms, a new data file is automatically generated with exact time stamping.

As soon as the timing device is selected, DewesoftX® automatically sets the data acquisition hardware to external clocking for receiving the sample frequency out of the DS-VGPS-HSC. In addition to this each measurement starts synchronized with the PPS signal. The time information of the data file is taken from GPS-time rather than local PC time.

The actual time from the DS-VGPS-HSC is shown at the right top corner.

Green watch: The number of used satellites is equal or greater then the minimum number of satellites
Red watch and Sync Lost indicator: The number of used satellites is lower than the min number of satellites.

The time next to the clock symbol is the GPS time used for the timestamp and clock generation.

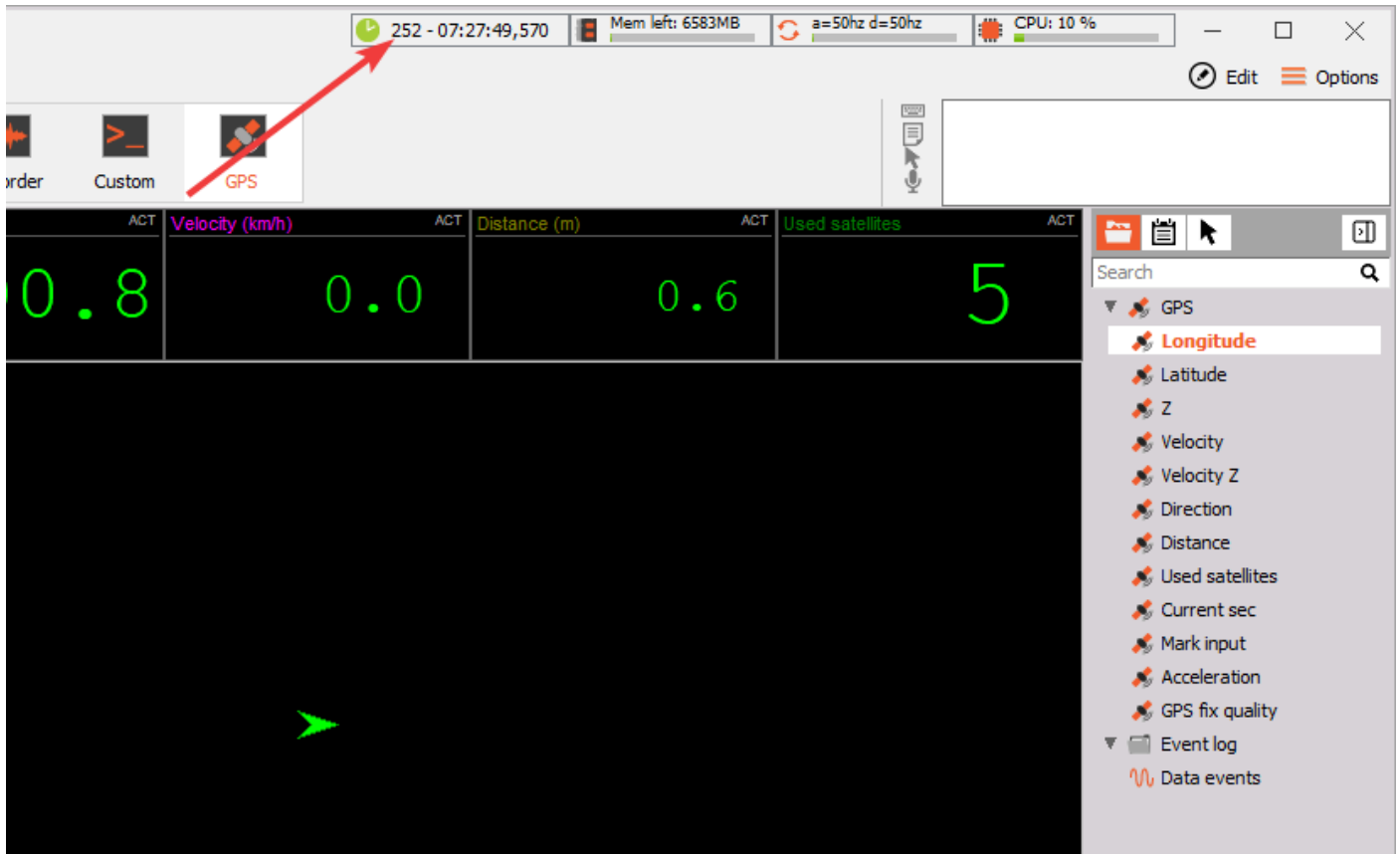


Image 26: GPS screen

6.3. Channel setup

When you are finished in the hardware settings, click on the 'Ch. setup' button and select 'GPS'.

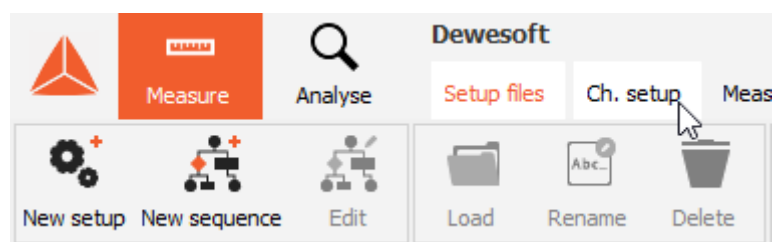


Image 27: Channel setup

The screenshot below shows the channel setup screen of the DS-VGPS-HSC. In the column *ON/OFF* you can select the channels for storing during the measurement. The default channel names are displayed in the column *NAME*. You can change them with a double click on it. Beside the channel names the actual value is displayed.

ID	Used	C	Name	Description	Value	Unit	Setup
1	Used		Longitude	-	15°3,249' E	'	Setup
2	Used		Latitude	-	46°10,307' N	'	Setup
3	Used		Z	-	341,66	m	Setup
4	Used		Velocity	-	0	km/h	Setup
5	Used		Velocity Z	-	0,95728	m/s	Setup
6	Used		Direction	-	95,197	deg.	Setup
7	Used		Distance	-	3,2	m	Setup
8	Used		Used satellites	-	5	-	Setup
9	Used		Current sec	-	7:26:08,68	-	Setup
10	Used		Mark input	-	0	-	Setup
11	Used		Acceleration	-	0	m/s ²	Setup
12	Used		GPS fix quality	-	Standalone	-	Setup

Image 28: GPS setup

- X absolute: Longitude component of position in degrees, minutes and fraction of minutes
- Y absolute: Latitude component of position in degrees, minutes and fraction of minutes
- Z: Altitude in meters above sea level
- Velocity: Speed over ground (vector of all 3 dimensions)
- Velocity Z: Speed in the Z direction
- Direction: True track over ground
- Distance: Integration of speed for getting the displacement (Only speed levels above 0.5 km/h are used to calculate the distance)
- Used satellites: Numbers of satellites used for calculation of position and speed
- Current sec: This channel counts the seconds since midnight UTC
- Mark input: Indicates an event at the mark input by changing the level from 0 to 1
- Acceleration: Based on the GPS velocity the acceleration is calculated automatically
- GPS fix quality: To recognize in which mode the receiver is (Standalone, DGPS, RTK)

The circle at the right gives an overview of the satellites in view of the GPS receiver and which of them are used from the receiver. The color of the shown satellites indicates the signal strength of them. From gray to dark green which is the strongest density. Satellites shown in the center of the circle are directly above the GPS-aerial. Satellites shown at the border of the circle are near the horizon.

The field <PPS sync> changes the color from gray to green depending if the appropriate feature is available at the moment.

The PPS sync is used for hardware synchronization to analog channels. This will eliminate the time shift caused due to calculation time of the GPS receiver and of the data transfer time of the RS-232 port.

6.4. Measurement

Now you are ready for measuring. Clicking the “Measure” button opens the measurement screen.

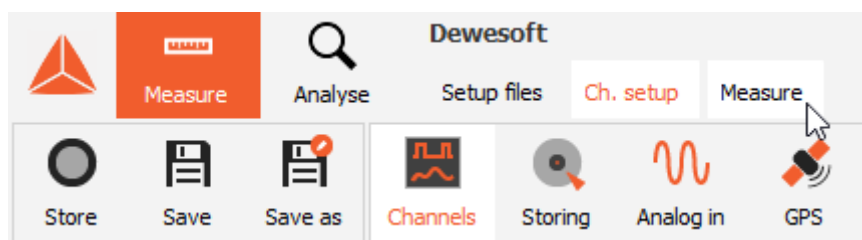


Image 29: Measurement

With the “Store” and “Stop” button in the recorder you can control the measurement manually.

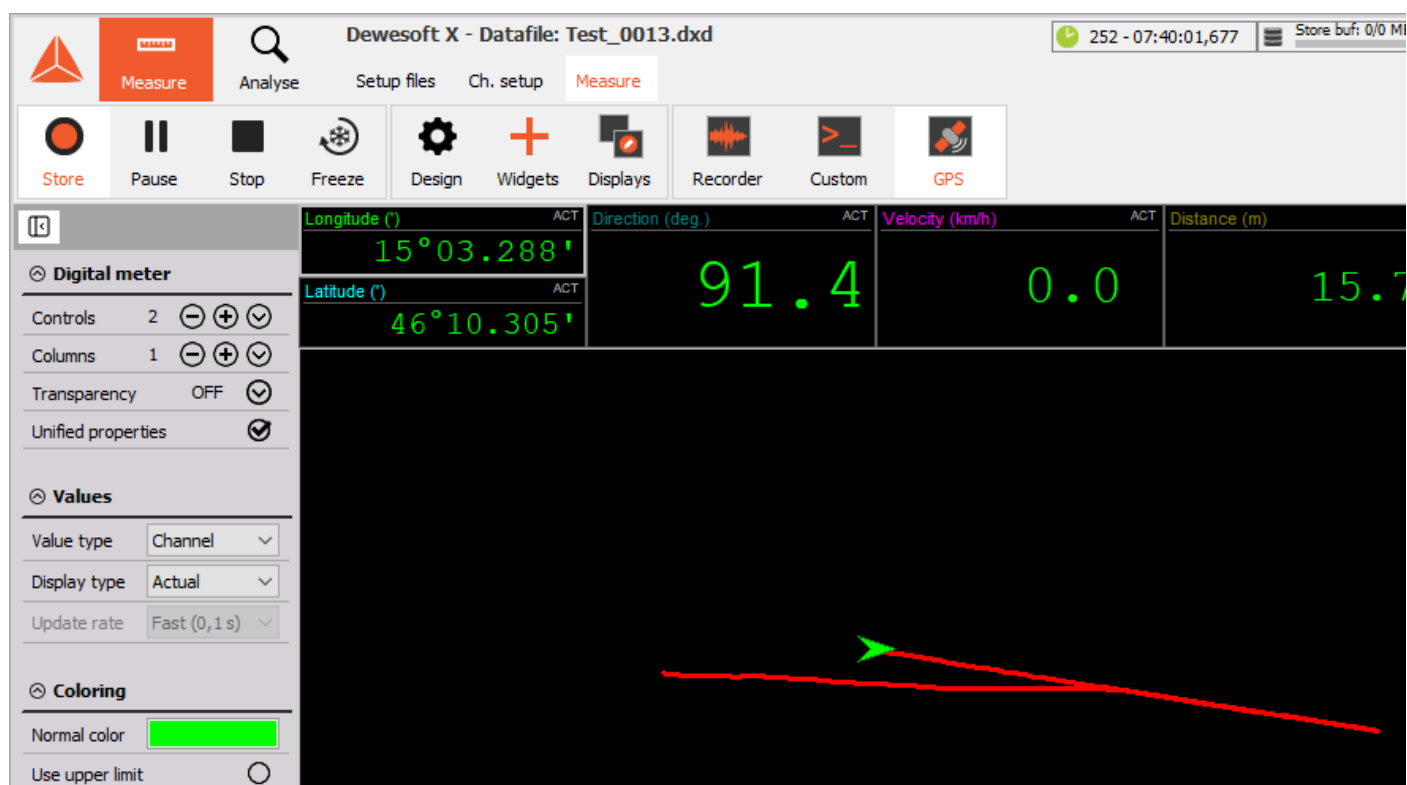


Image 30: Recording the measurement

6.5. Analysis

After measurement you can analyze the stored data. One click on the “Analysis” button gives you the possibility to choose a recorded data file and analyze it.

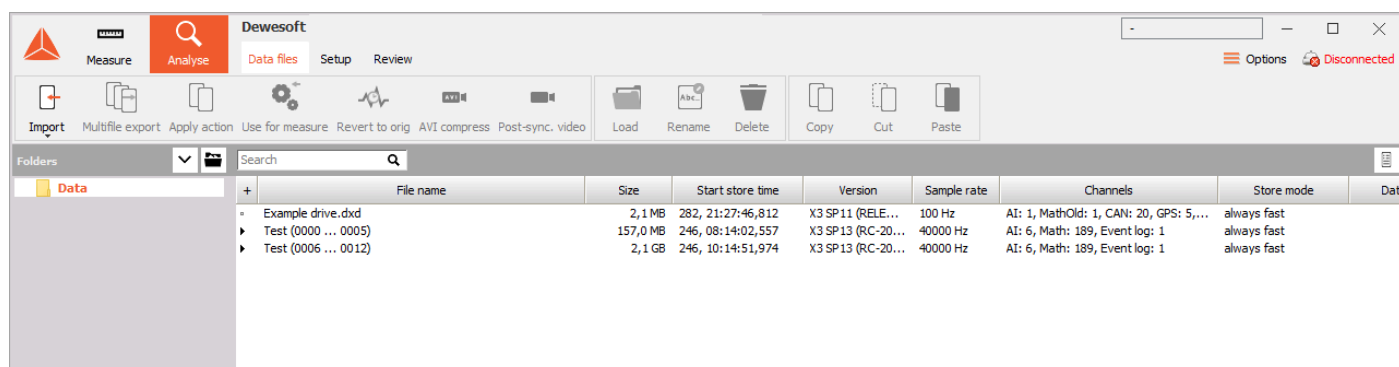


Image 31: Data files

Use the cursor functions to zoom in/out, cut out and print out. With the “Export” function you can export data to other applications, like Excel, Word etc.

Find details about DewesoftX® in the *DewesoftX® Software User's Manual*.

7. Warranty information

Notice

The information contained in this document is subject to change without notice.

Note:

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The copy of the specific warranty terms applicable to your Dewesoft product and replacement parts can be obtained from your local sales and service office. To find a local dealer for your country, please visit <https://dewesoft.com/support/distributors>.

7.1. Calibration

Every instrument needs to be calibrated at regular intervals. The standard norm across nearly every industry is annual calibration. Before your Dewesoft data acquisition system is delivered, it is calibrated. Detailed calibration reports for your Dewesoft system can be requested. We retain them for at least one year, after system delivery.

7.2. Support

Dewesoft has a team of people ready to assist you if you have any questions or any technical difficulties regarding the system. For any support please contact your local distributor first or Dewesoft directly.

Dewesoft d.o.o.
Gabrsko 11a
1420 Trbovlje Slovenia

Europe Tel.: +386 356 25 300

Web: <http://www.dewesoft.com>

The telephone hotline is available Monday to Friday from 07:00 to 16:00 CET (GMT +1:00)

7.3. Service/repair

The team of Dewesoft also performs any kinds of repairs to your system to assure a safe and proper operation in the future. For information regarding service and repairs please contact your local distributor first or Dewesoft directly on <https://dewesoft.com/support/rma-service>.

7.4. Restricted Rights

Use Slovenian law for duplication or disclosure. Dewesoft d.o.o. Gabrsko 11a, 1420 Trbovlje, Slovenia / Europe.

7.5. Printing History

Version 2.0.0, Revision 217 Released 2015 Last changed: 23. July 2018 at 16:54.

7.6. Copyright

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8. Safety instructions

Your safety is our primary concern! Please be safe!

8.1. Safety symbols in the manual



Warning

Calls attention to a procedure, practice, or condition that could cause the body injury or death



Caution

Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.

8.2. General Safety Instructions



Warning

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. Dewesoft d.o.o. assumes no liability for the customer's failure to comply with these requirements.

All accessories shown in this document are available as an option and will not be shipped as standard parts.

8.2.1. Environmental Considerations

Information about the environmental impact of the product.

8.2.2. Product End-of-Life Handling

Observe the following guidelines when recycling a Dewesoft system:

8.2.3. System and Components Recycling

Production of these components required the extraction and use of natural resources. The substances contained in the system could be harmful to your health and to the environment if the system is improperly handled at its end of life! Please recycle this product in an appropriate way to avoid unnecessary pollution of the environment and to keep natural resources.



This symbol indicates that this system complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). Please find further information about recycling on the Dewesoft web site www.dewesoft.com

Restriction of Hazardous Substances

This product has been classified as Monitoring and Control equipment and is outside the scope of the 2002/95/EC RoHS Directive. However, we take care of our environment and the product is lead-free.

8.2.4. General safety and hazard warnings for all Dewesoft systems

Safety of the operator and the unit depend on following these rules.

- Use this system under the terms of the specifications only to avoid any possible danger.
- Read your manual before operating the system.
- Observe local laws when using the instrument.
- DO NOT touch internal wiring!
- DO NOT use higher supply voltage than specified!
- Use only original plugs and cables for harnessing.
- You may not connect higher voltages than rated to any connectors.
- The power cable and connector serve as Power-Breaker. The cable must not exceed 3 meters, the disconnect function must be possible without tools.
- Maintenance must be executed by qualified staff only.
- During the use of the system, it might be possible to access other parts of a more comprehensive system. Please read and follow the safety instructions provided in the manuals of all other components regarding warning and security advice for using the system.
- With this product, only use the power cable delivered or defined for the host country.
- DO NOT connect or disconnect sensors, probes or test leads, as these parts are connected to a voltage supply unit.
- Ground the equipment: For Safety Class 1 equipment (equipment having a protective earth terminal), a non-interruptible safety earth ground must be provided from the mains power source to the product input wiring terminals.
- Please note the characteristics and indicators on the system to avoid fire or electric shocks. Before connecting the system, please read the corresponding specifications in the product manual carefully.
- The inputs must not, unless otherwise noted (CATx identification), be connected to the main circuit of category II, III and IV.
- The power cord separates the system from the power supply. Do not block the power cord, since it has to be accessible for the users.
- DO NOT use the system if equipment covers or shields are removed.
- If you assume the system is damaged, get it examined by authorized personnel only.
- Adverse environmental conditions are Moisture or high humidity Dust, flammable gases, fumes or dissolver Thunderstorm or thunderstorm conditions (except assembly PNA) Electrostatic fields, etc.
- The measurement category can be adjusted depending on module configuration.
- Any other use than described above may damage your system and is attended with dangers like short-circuiting, fire or electric shocks.
- The whole system must not be changed, rebuilt or opened.
- DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until the safe operation can be verified by service-trained personnel. If necessary, return the product to Dewesoft sales and service office for service and repair to ensure that safety features are maintained.
- If you assume a more riskless use is not provided anymore, the system has to be rendered inoperative and should be protected against inadvertent operation. It is assumed that a more riskless operation is not possible anymore if the system is damaged obviously or causes strange

noises. the system does not work anymore. the system has been exposed to long storage in adverse environments. the system has been exposed to heavy shipment strain.

- Warranty void if damages caused by disregarding this manual. For consequential damages, NO liability will be assumed!
- Warranty void if damage to property or persons caused by improper use or disregarding the safety instructions.
- Unauthorized changing or rebuilding the system is prohibited due to safety and permission reasons (CE).
- Be careful with voltages >25 VAC or >35 VDC! These voltages are already high enough in order to get a perilous electric shock by touching the wiring.
- The product heats during operation. Make sure there is adequate ventilation. Ventilation slots must not be covered!
- Only fuses of the specified type and nominal current may be used. The use of patched fuses is prohibited.
- Prevent using metal bare wires! Risk of short circuit and fire hazard!
- DO NOT use the system before, during or shortly after a thunderstorm (risk of lightning and high energy over-voltage). An advanced range of application under certain conditions is allowed with therefore designed products only. For details please refer to the specifications.
- Make sure that your hands, shoes, clothes, the floor, the system or measuring leads, integrated circuits and so on, are dry.
- DO NOT use the system in rooms with flammable gases, fumes or dust or in adverse environmental conditions.
- Avoid operation in the immediate vicinity of high magnetic or electromagnetic fields, transmitting antennas or high-frequency generators, for exact values please refer to enclosed specifications.
- Use measurement leads or measurement accessories aligned with the specification of the system only. Fire hazard in case of overload!
- Do not switch on the system after transporting it from a cold into a warm room and vice versa. The thereby created condensation may damage your system. Acclimatise the system unpowered to room temperature.
- Do not disassemble the system! There is a high risk of getting a perilous electric shock. Capacitors still might be charged, even if the system has been removed from the power supply.
- The electrical installations and equipment in industrial facilities must be observed by the security regulations and insurance institutions.
- The use of the measuring system in schools and other training facilities must be observed by skilled personnel.
- The measuring systems are not designed for use in humans and animals.
- Please contact a professional if you have doubts about the method of operation, safety or the connection of the system.
- Please be careful with the product. Shocks, hits and dropping it from already- lower level may damage your system.
- Please also consider the detailed technical reference manual as well as the security advice of the connected systems.
- This product has left the factory in safety-related flawlessness and in proper condition. In order to maintain this condition and guarantee safety use, the user has to consider the security advice and warnings in this manual.

EN 61326-3-1:2008

IEC 61326-1 applies to this part of IEC 61326 but is limited to systems and equipment for industrial applications intended to perform safety functions as defined in IEC 61508 with SIL 1-3.

The electromagnetic environments encompassed by this product family standard are industrial, both indoor and outdoor, as described for industrial locations in IEC 61000-6-2 or defined in 3.7 of IEC 61326-1.

Equipment and systems intended for use in other electromagnetic environments, for example, in the process industry or in environments with potentially explosive atmospheres, are excluded from the scope of this product family standard, IEC 61326-3-1.

Devices and systems according to IEC 61508 or IEC 61511 which are considered as “operationally well-tried”, are excluded from the scope of IEC 61326-3-1.

Fire-alarm and safety-alarm systems, intended for the protection of buildings, are excluded from the scope of IEC 61326-3-1.

9. Documentation version history

Revision number: 46 Last modified: Tue 18 Aug 2026, 13:00

Version	Date	Notes
1.0.0	25-02-2014	☒ initial revision
V20-1	24-09-2020	Template update
V20-2	12-10-2020	Updated renders
V21-1	23-02-2021	Minor style corrections.
V23-1	19-05-2023	CAN output correction
V23-2	19-09-2023	Open sky conditions added in technical specifications
V26-1	18-8-2026	Dsub 9 connector pinout fixed