

CONFIGURATION MANUAL

(ENGLISH) (ORIGINAL VERSION)

FIRMWARE UPDATE

CANbus controllers

016-8000-031EN Rev. A





SBGuidance Auto I Rev. A I CAN

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Preface

This installation manual is intended for persons responsible for updating the SBG CANbus controllers. The manual contains important instructions that should be complied with when commissioning, operating and servicing the SBGuidance system.

This manual has been compiled with the utmost care. SBG Precision Farming assumes no responsibility for any errors or omissions in this document.

Any comments or questions can be sent to service-eu@ravenind.com.

SBG Precision Farming or any of its suppliers will accept no liability for physical or material damage caused whilst using the SBGuidance system.

The installed SBG system produces less than 70dB (A) noise.

This guide uses a number of concepts for extra attention to a few things:



Tip!:

Provides recommendations on how certain activities can be performed much easier.

Indicates that the machine can be damaged.



Please note!:

Indicates certain problems that the user should take note of.



Warning!:

Caution!:

Indicates a risk of injury.

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Disclaimer



Warning!:

Always switch off the tractor before installing or repairing hydraulic and electrical components of the SBGuidance system.



Warning!:

The safety instructions contained in the manuals of the tractor or implements must be complied with at all times.



Warning!:

It is strictly prohibited to use the SBGuidance system on public roads.



Warning!:

It is strictly prohibited to leave a driving vehicle unattended when the SBGuidance system is switched on. The driver is always responsible for the direction and course of the vehicle.



Warning!:

To prevent injury or fire, replace defective fuses only with fuses of the same type and Amperage.



Warning!:

The SBGuidance the operating system is not able to detect and avoid obstacles. If there is an obstacle in your path, you will always need to take action for it to be avoided.



Warning!:

Only allow authorized/qualified persons to operate the system. Authorized/qualified persons are defined as: persons who have read and understood the manual, have been given instructions by a product specialist, and who are both physically and mentally fit and able to operate the system.



Warning!

In case of system failure or breakdown switch of the tractor and disconnect the electrical power source to avoid further damage. Contact your dealer for further instructions on how to repair your system.



Warning!

The system contains moving parts! Make sure the immediate environment is clear of people before operating the system.



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Warning!

Always wear personal protective equipment when operating/adjusting/repairing the system outside of the tractor cab.



Caution!:

In order to prevent power surges from occurring, always start the machine first, before initiating the SBGuidance control system.



Caution!:

Only touch the touch-screen with your finger or by using a special touch-screen stylus/pen. Operating the touch-screen with sharp objects may cause permanent damage to the screen.



Caution!:

Always consult your supplier as to which products are best suited first before cleaning the touch-screen with chemicals or alcohol.



Please note!

If the terminal is not used for a long period, better remove the terminal from the tractor and store in a heated environment. This will extend the life span of the electronic components.



Please note!

To prevent theft, it is better to not let the terminal and GPS-antenna unattended in the tractor on the field.





1. Overview Controllers

This manual gives an overview of all SBG CANbus controllers (Table 1). A physical controller can be recognized on the CANbus as one or different functions. The installed firmware is defining the function of the controller. The active controllers with corresponding functions can be read out in the tab Flash of the CANTool configuration tool.

Furthermore, the controller update procedure is described.

Table 1 Overview SBG CANbus Controllers

Controller	Function	In tab Flash CANTool shown as
DynamIQ ISO / ISO Raven Steering Controller	<i>Terrain compensation module</i> ; measures Roll (lateral hanging), Pitch (forward hanging) en Yaw (heading)	When installed on tractor: • Innction: VEHICLE_DYNAMIC_STABILITY_CONTROL When installed on implement: • Innction: VEHICLE_DYNAMIC_STABILITY_CONTROL
DynamIQ	<i>Terrain compensation module</i> ; measures Roll (lateral hanging), Pitch (forward hanging) en Yaw (heading)	When installed on tractor:



STU	<i>Steering controller</i> ; responsible for controlling hydraulics and reading in sensors.	When installed on tractor:
Actuatorbox	SmartSwitch section control module; responsible for switching power for physical section valves (motor or solenoid)	⊕ ■ Function: MACHINE_CONTROL
	SmartSwitch section control feedback module: responsible for feedback to Mueller SprayControl S or UniControl S spraying computers	⊕ – ■ Function: MACHINE_CONTROL
EVC	<i>Electronic Valve</i> <i>Controller</i> ; is able to control an existing electronic valve of a tractor. Implement steering can be connected to this valve.	ঢ়ৣ ঢ় Function: IO_CONTROLLER
STU Slave	Steering controller Slave; responsible for controlling hydraulics of implement steering if the manifold is mounted on the SCV stack of the tractor.	戸··· ■ Function: IO_CONTROLLER



IO Controller DynamIQ (ISO)	Sensor input terrain compensation module; responsible for reading in different additional sensors.	When installed on tractor:
RCU	<i>Remote Control Unit,</i> is able to control a relay to perform an event.	두~ 📮 Function: IO_CONTROLLER



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2. Firmware update Controller other than DynamIQ ISO

The controller firmware can be updated by using the CANTool.

Use key combination SHIFT + SBGuidance to open the Configurator from the Loader application. Start SBGuidance Configurator and navigate to CAN > CANTool to open the CANTool (Figure 1).

Always check the CANTool version as shown in the upper menu bar first. The most recent CANTool version can be downloaded from www.sbg.nl > Dealer > Downloads > Installation & Service. In specific situations, a beta version of the CANTool is needed.

Choose the type of CAN-hardware to setup a connection with the CANbus (Figure 2).

On a Viper 4(+) field computer, choose *VIPER4* at Hardware Manufacturer and choose the correct *Hardware Channel*. If a 'Harness in-cab (Terminal) VPR4' (SBG19711-09) is used choose "1". If a 'Harness, In-cab VPR4 ISO' (11158000064) is used choose "2" and click *Initialize*.

On a GeoSTAR field computer choose *SBG-CAN* at Hardware Manufacturer, Hardware channel *1* and click *Initialize*.

Settings	Tools	Interfaces	Help		
		GPS		Þ	
		CAN		1	CANTool
		Modems	1	_`)∙	Firmware updates
		Data Ac	quisition		Raven Field Service Tool
		Micro-co	ontroller	-	
		ICE Con	trol Char	nnel	
					-

Figure 1 Open CANTool.

CANTool 1.21.89				
ile Tools Module	15			
ardware MyDevice	MyPartners Rx Tx	Flash		
Connection				
Hardware manufacture	e _	_		
SBG 🔽	Auto connect	Show CanFrames	Initialize	
Hardware channel:	Baudrate:	Msg Type:	T	
1 💌	250 KBit/sec 💌	Extended 💌	Terminate	
Information				
Select a Hardware and	a configuration for it. The	n click "Initialize" button		<u>~</u>
				Ţ
				×
Hardware Status	Hardware Info			v Clear
Hardware Status	Hardware Info			▼ Clear

Figure 2 CANTool tab Hardware.



On a GeoSTAR field computer, check the firmware version of the Terminal CAN-module, by clicking the *Hardware Info* button. Check the download page on the website for the most recent firmware and see the *Handleiding – Update terminal CAN-module* for the update procedure.



Please note!

Check the settings of the controller by starting SBGuidance or viewing the settings via the CANTool before updating the controller.

Next, in the tab MyDevice, behind Pre-selection choose *Diagnostic Service Tool* and Type: *Navtronics* (Figure 3) and click *Connect*.

Navigate to the tab Flash (Figure 4). Click *Refresh*. A list with active CANbus controllers is shown (Figure 4). Double click the function you would like to update. In Table 1, an overview of controllers and corresponding functions is shown.

Select the firmware file (*.srec), you wish to install, by clicking the ... button. Click *Flash* to start the update. After the update process is finished, click *Refresh* again and double click the controller to check the firmware version.

Pre-selection:	Diagnostic	Service Tool		
Туре	Nevtronics		-	
myDeviceType	Navtonics,	Diagnostic_Service_tool		
Source address:	144 🔮	90-00 E		
Self-configurable address	P			
Industry group:	0 3	GLOBAL	¥	
Device class:	0 3	NON, SPECIFIC	¥	
Device class instance.	0 3	Ξ		
Functions	129	ON_BOARD_DIAGNOS	10.3 Y	
Function instance:	10 3	3		
ECU instance:	0 3	Ξ		
Manufacturer code:	217	INAVIRONICS	*	
Idenity number.	0 -	E		



File Tools Modules		
ardware MyDevice MyPartners Rx Tx Flash		
	Sort by: Function	•
DeviceClass: SPRAYER	Expand All	
DeviceClassInstance: 0 Eculostance: 0	Collapse All	
Function: MACHINE_CONTROL	Refi	resh
FunctionInstance: 1 IdentityNumber: 14 IdentityNumber: AGBICULTURE	Show Parameters	
ManufacturerCode: NAVTRONICS	Flash Mode	
SelfConfigurableAddress: True SelfConfigurableAddress: True SelfConfigurableAddress: True Function: VEHICLE_DYNAMIC_STABILITY_CONTROL SelfConfigurableAddress: True	Type: S Status: SW version: 1. HW version: 3 BL version: 1.	CU alid 1.1
Tractor Implement		
File:	Fla	sh Device







Please note!

Check the settings of the controller by starting SBGuidance or viewing the settings via the CANTool.

STU

Check the settings via the CANTool and use the manual control (scrollbar) to test the steering.

DynamIQ

Check the Roll value in SBGuidance. The Roll value may fluctuate some hundredths of degrees while standing still.

Check the settings with the CANTool and choose *Restore defaults* if the DynamIQ firmware version was older than 1.0.0 before the update process was done. See the *Handleiding – Firmware update DynamIQ* as well.

SmartSwitch

Check in SBGuidance if the sprayboom is shown with the correct number of sections. Check the machine settings as well.



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3. Firmware update DynamIQ ISO

Due to the different operating systems installed on a Viper 4+ and a Viper 4/GeoStar, the update procedure of a DynamIQ ISO will be different.

3.1. Update DynamIQ ISO on Viper 4+

On the Viper 4+, the CANTool can be used to update a DynamIQ ISO. Take the following steps to perform the update:

- 1. Open the SBGuidance Configurator from the SBGuidance Loader (Shift + SBGuidance).
- 2. Go to Interfaces > CAN > CANTool (Figure 1).
- Choose the correct *Hardware Channel*. If a 'Harness in-cab (Terminal) VPR4' (SBG19711-09) is used choose "1". If a 'Harness, In-cab VPR4 ISO' (11158000064) is used choose "2" (Figure 5).
- 4. Click Initialize (Figure 5).
- 5. Go to tab MyDevice.
- 6. Select *Raven Field Computer* behind *Preselection* (Figure 6).
- 7. Click Connect.

File Tools Modules	
Hardware MyDevice MyPartners Rx Tx Flash	
Connection	
Hardware manufacturer:	
Viper4+ Vip	
Hardware channel: Aqudrate: Msg Type:	
1 25 KBit/sec Extended Terminate	
Information	
Select a Hardware and a configuration for it. Then click "Initialize" button	<u> </u>
	-
	Ŧ
Hardware Status Hardware Info	Clear
Hardware Status Hardware Info	Clear

Figure 5 CANTool – Hardware.

CANTool 2.0.20
File Tools Modules
Hardware MyDevice MyPartners Rx Tx Flash
Pre-selection: Raven Field Computer
Type: Ravon
myDeviceType: Raven_Field_Computer
Source address: 245 0xF5
Self-configurabe address:
Industry group: 2 AGRICULTURE
Device class: 0 NON_SPECIFIC
Device class instance: 0 *
Function: 128 NON_VIRTUAL_TERMINAL
Function instance: 31
ECU instance:
Manufacturer code: 151 🔹 RAVEN
Idenity number:
Connect
v2.0.20 Received frames: 1628 Error Frames: 0 Busload: 2.76%





- 8. Go to Flash.
- 9. Click Refresh.
- Double click *Function: VEHICLE_NAVIGATION.* Information about the DynamIQ ISO appears.
- 11. Click "..." (see red circle Figure 7).
- 12. Choose *HDD* (*vfat, sda1*) (Figure 9) An USB drive, depending on the type, can be visualized as *sda*, *sda0*, *sda1* or *sda2*.
- 13. Go to the correct folder on the USB drive and choose the correct *SGC.hex* file (Figure 8).
- 14. Click Open.
- 15. Click *Flash Device*. A window (Figure 10) appears.

Hardware MyDevice MyPartners Rx Tx Flash	
Generation: VEHICLE_NAVIGATION Generation: VEHICLE_NAVIGATION Generation: VEHICLE_NAVIGATION Generation: VEHICLE_NAVIGATION	Sort by: Function
DeviceClass: NON_SPECIFIC DeviceClassInstance: 0	Expand All
Eculinstance: 0 Function: VEHICLE_NAVIGATION	Collapse All Refresh
HunctionInstance: 0 IdentityNumber: 65690	Show Parameters
IndustryGroup: AGHICULI UHE ManufacturerCode: RAVEN SelfConfigurableAddress: True	Flash Mode
	Type:
	SW version:
	HW version:
	BL version:
Tractor Implement	
File:	Flash Device

Figure 7 CANTool – Flash.

Look in:	My Computer
Recently used	HDD (none, mmcblk0p1) HDD (none, root) HDD (vfat, sda1) Personal
Desktop	
Personal	
My Computer	



Look in:	Release
Recently used	SGC_Standard_v1_0_0_69.hex SGC_Standard_v1_0_0_83.hex SGC_Standard_v1_0_0_85.hex SGC_Standard_v1_0_0_89.hex
Desktop	
Personal	
My Computer	



- 16. Click on *Flash Device* in the Raven ISO Programmer (Figure 10). The *Status* will change to *BL_ERASING* and to *BL_PROGRAMMING*. Wait for the *Status* to indicate *BL_COMPLETE_ACK*, the update is finished now.
- 17. Shut down the Raven ISO Programmer tool.
- 18. Take the following steps to check the firmware version of the DynamIQ ISO:
 - a. Go to MyDevice.
 - b. Click Disconnect.
 - c. Choose behind *Pre-selection* for *Navigation Controller (Tractor)* or *Navigation Controller (Implement)* depending on the use of a DynamIQ ISO tractor or implement.
 - d. Click Connect.
 - e. Go to MyPartners.
 - f. Click Add behind IMU DynamIQ on.
 - g. Check software version (Figure 11).
- 19. Shut down the complete system. After shut down, start it again. The system should be ready to use.



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3.2. Update DynamIQ ISO Viper 4 or GeoStar

To update a DynamIQ ISO module on a Viper 4 or GeoStar, installing a special version of the Raven Service tool, called Raven Field Service Tool is required. This tool is available on the SBG website. Furthermore, SBGuidance version 4.1.57 or higher and CANTool 2.0.24 or higher are required to use this tool.

- Check the SBGuidance software. This version should be 4.1.57 or higher, if required, update the software with the Update Manager (see user manual Update Manager to do this).
- 2. Click "Shift + SBGuidance" to open the SBGuidance Configurator.
- 3. Go to Interfaces > CAN > CANTool.
- 4. Select the correct Hardware manufacturer and Hardware channel (see Chapter 2).
- 5. Click *Initialize*.
- 6. Go to *MyDevice*.
- 7. Select *Raven Field Computer* behind *Preselection* (Figure 12).
- 8. Click Connect (Figure 12).
- 9. Wait for 6 seconds. The DynamIQ ISO update mode is activated now.
- 10. Click Disconnect.
- 11. Shut down the CANTool.

CANTool 2.0.20	×
File Tools Modules	
Hardware MyDevice MyPartners Rx Tx Flash	
Pre-selection: Raven Field Computer	>
Type: Raven	
myDeviceType: Raven_Field_Computer	
Source address: 245 • 0xF5	
Self-configurabe address:	
Industry group: 2 AGRICULTURE	
Device class:	
Device class instance:	
Function instance: 31	
ECU instance: 0	
Manufacturer code: 151 🔹 RAVEN	
Idenity number: 0	
Connect	
v2.0.20 Received frames: 1628 Error Frames: 0 Busload: 2.76%	

Figure 12 CANTool – MyDevice.

🖌 SBGui	dance	Configurator 4.2.30			
Settings	Tools	Interfaces Help			
		GP5			
		CAN		CANTool	
		Modems	۰,	Firmware updates	
		Data Acquisition		Raven Field Service Tool	
		Micro-controller			

Figure 13 SBGuidance Configurator - Open Raven Field Service Tool.



Figure 14 Raven Field Service Tool - Error message.

- 12. Go to Interfaces > CAN > Raven Field Service Tool (Figure 13).
 - a. If you cannot click *Raven Field Service Tool*, go to section 3.3 to install the Raven Field Service Tool.
 - b. If you get a "Raven Field Service Tool .NET Framework" error message (Figure 14), go to section 3.4 to update the .NET Framework.
- 13. Go to Interfaces > CAN > Raven Field Service Tool (Figure 13).
- 14. Select the correct Hardware Manufacturer and the correct Hardware Channel.
- 15. Click Connect (Figure 15).
- 16. Click on "..." (see the red circle in Figure 15).
- 17. Select the latest correct (*SGC.hex*) firmware version on the USB Drive, and Click *open*.
- Right click on the device with the correct SN number. This SN number is shown on the ISO Steering Controller
- 19. Cick *Program* (Figure 16). The update will start. Wait until the update is finished.
- 20. Click Disconnect.
- 21. Shut down the Raven Field Service Tool.
- 22. Open the CANTool.
- 23. Click Initialize.
- 24. Go to *MyDevice* and Choose behind *Pre-selection* for *Navigation Controller (Tractor)* or *Navigation Controller (Implement)* depending on the use of a DynamIQ ISO tractor or implement.
- 25. Click *Connect*. Now the DynamIQ ISO is set to the correct SBG settings.
- 26. Click Add behind IMU DynamIQ.
- 27. Check software version (Figure 17).
- 28. Shut down the complete system, after shut down, start it again. The system should be ready to use.



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Figure 16 Raven Field Service Tool.







3.3. Install Raven Field Service Tool

In case the Raven Service Tool is not installed on the Viper 4 or GeoStar field computer. Take the following steps to install the Raven Field Service Tool:

- On a laptop, paste the *install-rfst-1.2.0.exe* file (available on the SBG website) on your USB Drive.
- 2. In the SBGuidance Configurator, go to *Tools* > *Windows Explorer*.
- 3. Open your USB drive and double click the *install-rfst-1.2.0.exe* executable. An update wizard occurs (Figure 18).
- 4. Press on Next.
- 5. Press on Install (Figure 19).
- 6. Press on *Finish* (Figure 20). The Raven Field Service Tool will open now.
- 7. Go back to step 13 of section 3.2.



Figure 18 Raven Field Service Tool installation.





📳 Setup - Raven Field Servio	ce Tool		
	Completing the Raven Field Service Tool Setup Wizard		
	Setup has finished installing Raven Field Service Tool on your computer. The application may be launched by selecting the installed icons.		
	Click Finish to exit Setup.		
	☑ Launch Raven Field Service Tool		
	Finish		

Figure 20 Raven Field Service Tool Installation.





3.4. Update .NET Framework

In case the correct .NET Framework is not installed on the Viper 4 or GeoStar field computer. Take the following steps to update .NET Framework:

- On a laptop, paste the *dotNetFx40_Full_x86_x64.exe* file (available on the SBG website) on your USB Drive.
- 2. In the SBGuidance Configurator, go to *Tools* > *Windows Explorer*.
- Open your USB drive and double click the *dotNetFx40_Full_x86_x64.exe* executable. The software starts extracting files (Figure 21). This can take a couple of minutes.
- 4. In the next screen (Figure 22) select *I have read and accept the license terms* and press on *Install.* The installation process starts now and will take about 6 minutes.
- 5. Press Finish (Figure 23).
- 6. Go back to step 13 of section 3.2.



Figure 21 .NET Framework installation.

Microsoft .NET Framework 4.5.2						
.NET Framework 4.5.2 Setup Please accept the license terms to	continue.					
MICROSOFT SOFTWARE SU	JPPLEMENTAL LICENSE TERMS	s 🔺				
.NET FRAMEWORK AND ASSOCIATED LANGUAGE PACKS FOR MICROSOFT WINDOWS OPERATING SYSTEM						
Microsoft Corporation (or based on where you live, one of its affiliates) licenses this supplement to you. If you are licensed to use Microsoft Windows operating system software (the "software"), you may use this supplement. You may not use it if you do not have a						
Download size estimate:	0 MB					
Download time estimates:	Dial-Up: 0 minutes Broadband: 0 minutes					
	Install	Cancel				

Figure 22 .NET Framework installation.



Figure 23 .NET Framework installation.