MÜLLER ELEKTRONIK
A TRIMBLE COMPANY

Installation and operating instructions

SMART570

Version: V7.20210115

30322507-02-EN

Read and follow these instructions. Keep these instructions in a safe place for later reference. Please note that there might be a more recent version of these instructions on the homepage.

Company details

Document

Installation and operating instructions
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1 For your safety

1.1 Basic safety instructions

Please read the following safety instructions carefully before using the product for the first time.

- Before maintenance or repair to the tractor, always disconnect the connection between the tractor and the terminal.
- Before charging the tractor battery, always disconnect the connection between the tractor and the terminal.
- Before welding on the tractor or implement, always disconnect the power supply to the terminal.
- Do not make any unauthorized modifications to the product. Unauthorized modifications or use may impair safety and reduce the service life or operability of the unit. Modifications are considered unauthorized if they are not described in the product documentation.
- Follow all recognised safety, industrial and medical rules as well as all road traffic laws.
- Do not operate the terminal while driving in road traffic. Come to a standstill in order to use the unit.
- The product does not include any user-serviceable parts. Do not open the casing. If the casing is opened, its imperviousness can be changed.
- Read the operating instructions to the agricultural device which you want to control by using the product.

1.2 Intended use

The terminal is used to operate agricultural machinery equipped with ISOBUS job computers.

Intended use also includes compliance with the conditions for operation and repairs prescribed by the manufacturer.

The manufacturer cannot be held liable for any personal injury or property damage resulting from such non-compliance. All risk arising from improper use lies with the user.

All applicable accident prevention regulations and all other generally recognized safety, industrial, and medical standards as well as all road traffic laws must be observed. Any unauthorized modifications made to the equipment will void the manufacturer's warranty.

1.3 Layout and meaning of warnings

All safety instructions found in these Operating Instructions are composed in accordance with the following pattern:

	**⚠ WARNING** This signal word identifies medium-risk hazards, which could potentially cause death or serious physical injury, if not avoided.

	**⚠ CAUTION** This signal word identifies hazards that could potentially cause minor or moderate physical injury or damage to property, if not avoided.

NOTICE
This signal word identifies hazards that could potentially cause damage to property, if not avoided.

There are some actions that need to be performed in several steps. If there is a risk involved in carrying out any of these steps, a safety warning appears in the instructions themselves.

Safety instructions always directly precede the step involving risk and can be identified by their bold font type and a signal word.

Example

1. **NOTICE! This is a notice. It warns that there is a risk involved in the next step.**
2. Step involving risk.

2 About these Operating Instructions

2.1 Target group of these Operating Instructions

These Operating Instructions are intended for personnel entrusted with installing and operating the terminal.

2.2 Directional information in these instructions

All directional information in these instructions, such as “left”, “right”, “forward”, “back”, is relative to the movement direction of the vehicle.

2.3 Layout of operating instructions

The operating instructions explain step by step how you can perform certain operations with the product.

We use the following symbols throughout these Operating Instructions to identify different operating instructions:

Type of depiction	Meaning
1. **2.**	Actions that must be performed in succession.
⇨	Result of the action. This will happen when you perform an action.
⇨	Result of an operating instruction. This will happen when you have completed all steps.
☑	Requirements. In the event that any requirements have been specified, these must be met before an action can be performed.

2.4 Layout of references

If any references are given in these Operating Instructions, they appear as:

Example of a reference: [→ 7]

References can be identified by their square brackets and an arrow. The number following the arrow shows you on what page the section starts where you can find further information.

3 Product description

The SMART570 operating and display device complies with ISOBUS standard ISO 11783 and can be used as an Universal Terminal (UT) on all ISOBUS machines, regardless of manufacturer. The integrated ISOBUS functions are AEF certified.

The colour display of the SMART570 has a resolution of 640 x 480 pixels. The SMART570 offers a capacitive touch screen, a membrane keyboard and a rotary encoder for optimum operation of the connected implement. A total of 12 softkeys can be operated both via the membrane keyboard and via touch display. The latter supports the driver with text input by providing a complete keyboard on the screen. The rotary encoder enables rapid value changes for numerical inputs.

The SMART570 supports AUX-N functionality according to ISO 11783. The functions of connected AUX-N devices can be assigned to the keys of AUX-N operating device in a convenient editor.

The mini tractor functionality completes the SMART570's range of functions. Speed and work position signals are evaluated and displayed in the form of a small dashboard.

The SMART570 is connected to the CAN bus via a cabled CPC connector.

3.1 Scope of delivery

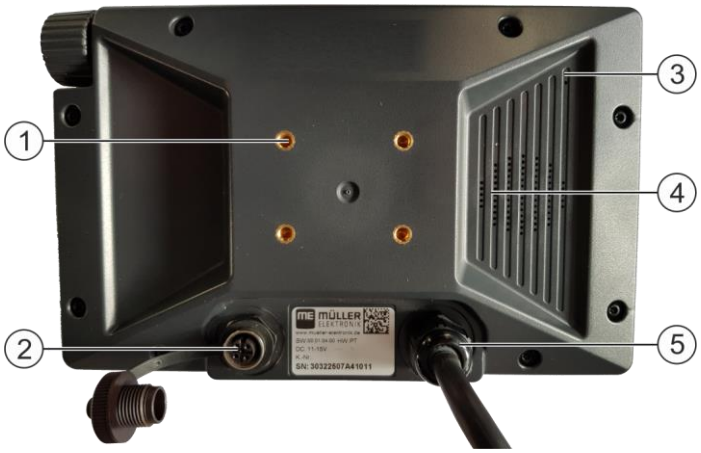
1	Terminal	4	Terminal plate
2	Bolts	5	Pipe bracket
3	Washer		

3.2 Front

Front view

1	Buttons on the casing	3	Function icons Depiction of an available function. The functions are executed when you press on the respective function button.
2	Rotary encoder	4	Screen content

3.3 Rear



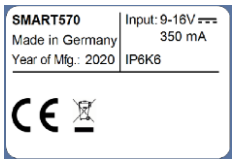
Rear view

1	Thread for the bracket screws	4	Speaker
2	Connection to the 7-pin signal socket	5	Connection to ISOBUS
3	Pressure compensation membrane (must never be covered)		

3.4 Rating plates

Abbreviations on the rating plate

Abbreviation	Meaning
HW	Hardware version
SW	Software version upon delivery
K-Nr	Customer number If the product was manufactured for an agricultural machinery manufacturer, the agricultural machinery manufacturer's item number will be shown here.
P/N	Müller-Elektronik item number
S/N	Serial number



Information on the rating plate

Entry	Meaning
SMART570	Name of the product
Made in Germany	Country of manufacture
Year of Mfg.	Year of manufacturing
Input	Operating voltage 9-16 V, ⎓ = DC voltage, current consumption 350 mA
IP6K6	Protection class according to ISO 20653

Symbols on the rating plate

The concept and design of the product as well as the model we put on the market comply with the applicable legal provisions of the EU.

When it has reached the end of its service life, please dispose of this product as electronic scrap in accordance with all applicable waste management laws.

3.5 EU declaration of conformity

Herewith we declare that the design and construction of this product and its identical variants, as well as the form brought onto the market by us, is in accordance with the relevant safety and health requirements of the EU Directive of Electromagnetic Compatibility 2014/30/EU. If alterations are made to the product without prior consultations with us, this declaration becomes invalid.

SMART570

Harmonised standards applied:	EN ISO 14982:2009
	(EMC Directive 2014/30/EU)

4 Installation

4.1 Mounting the terminal in the vehicle cab

Procedure

1. Screw the terminal plate onto the rear of the terminal: Always use all four screws supplied.

2. Unscrew the long bolt out of the pipe bracket:

3. Attach the two bracket components together:

4. Insert the long bolt through the assembled bracket:

5. Screw in the long bolt until the terminal is firmly attached.

⇨ You can now attach the terminal with the bracket on a round pipe (e.g. on the ME mounting bracket).

4.2 Connecting the terminal to the ISOBUS

When it is connected to the ISOBUS, the terminal is supplied with voltage and communication is possible with other ISOBUS components.

Procedure

1. Connect the connector cable to the basic vehicle harness or the ISOBUS In-Cab-Connector.
2. Screw in the connector tightly.

⇨ You have connected the terminal to the ISOBUS.

4.3 Connecting sensors to the terminal

The terminal can receive signals from the following sensors:

- Work position sensor
  Purpose:
  - Display of the work position on the start screen.
  - Transmission of the signal received through the signal socket to the ISOBUS.

  Possible signal sources:
  - 7-pin signal socket on the sensor connection of the terminal.
  - An ISOBUS job computer.
- Speed sensor
  Purpose:
  - Display of the speed on the start screen.
  - Transmission of the signal received through the signal socket to the ISOBUS.

  Possible signal sources:
  - 7-pin signal socket on the sensor connection of the terminal.

5 Basic control principles

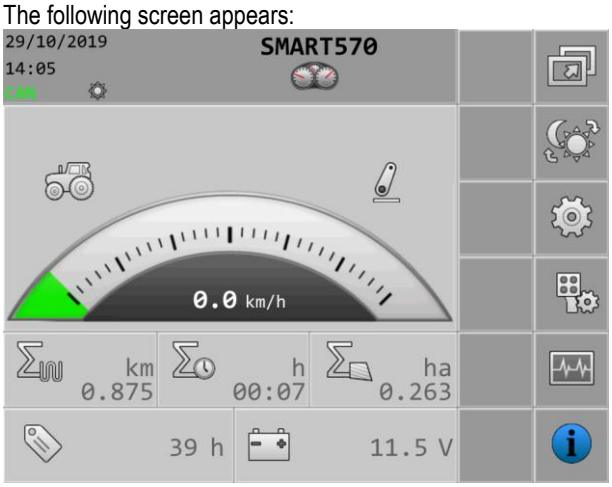
5.1 Initial start-up

For the initial start-up, you must switch on and configure the terminal.

Procedure

☑ The terminal is installed and connected to the ISOBUS.

1. - Start the terminal.
   - ⇨ The terminal will now be started.
   - ⇨ Each time the terminal is started, it checks whether unknown job computers are connected to the ISOBUS. If yes, the terminal then copies the information from the job computer. This can take a little while.
   - ⇨ If a joystick or other operating device is detected, you will be requested to confirm the button assignment [→ 16].
   - ⇨ The following screen appears:



   - ⇨ You can change the system settings through this screen.
2. Configure the system settings [→ 18].
3. Configure the speed sensor [→ 20].

⇨ You have configured the terminal.

5.2 Operating the terminal

The terminal can be operated either using the buttons on the casing and the rotary encoder or directly with the touch function of the screen.

All functions of the terminal can be executed using both operating methods.

5.2.1 Operating the terminal using the buttons and rotary encoder

Rotary encoder

The following functions can be executed with the rotary encoder:

Illustration	Action	Function
	Turning the rotary encoder	Moves the cursor up or down. Changes the value of a parameter.

Illustration	Action	Function
	Pushing the rotary encoder	Clicks on the marked line. Activates the marked parameter. Confirms the input.

Buttons

The following functions can be executed with the buttons on the casing:

Button	Designation	Function
	ON/OFF button	Pressing the button for 1 second: Switches the terminal on. Pressing the button for 2 seconds: Switches the terminal off.
	Cancel button	Sends a cancel signal to the job computer. Cancels the input of a value. The input box is exited and the previous valid value is restored. Acknowledges alarms.
	Enter button	Opens an input box. Confirms the input. Acknowledges alarms.
	Toggle button	Switches to a different app.
	Function buttons	Performs the respective function shown on the screen.

5.2.2 Operating the terminal using the screen

With the touch function of the screen, you can execute the following actions directly by pressing on the respective area of the screen:

- Executing of functions using the respective function icons.
- Selecting parameters.
- Changing values for individual parameters.

5.3 Changing parameters

5.3.1 Changing parameters using the screen

Procedure

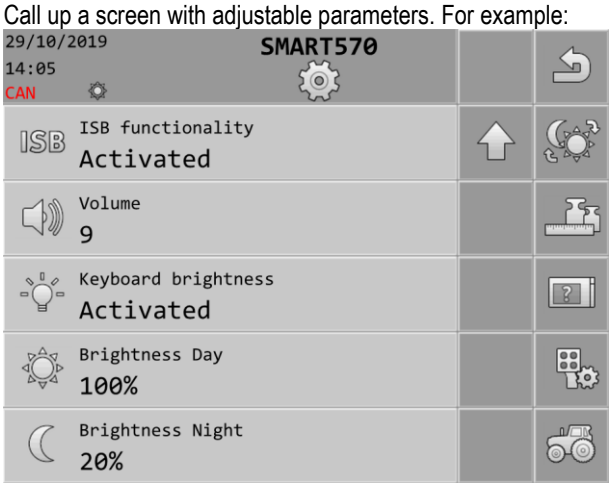
1. Call up a screen with adjustable parameters. For example:

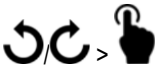
2. Press on the parameter that you want to change.
3. Change the value.
4.  - Confirm the input.

5.3.2 Changing parameters with the rotary encoder

Procedure

1. Call up a screen with adjustable parameters. For example:



2.  - Select the parameter that you want to change.
3.  - Change the value.
   Please note that for text inputs or number inputs with more than 3 digits, the values can only be changed directly with the touch function of the screen
4.  - Confirm the input.

5.4 Using the joystick

If an AUX-2 operating device (e.g.: joystick) is detected, an overview of the configured button assignment is shown every time the terminal is started.

Procedure

☑ You have started the terminal.

1. The button assignment will be loaded.
2. The following message appears: “Confirm or discard the AUX button assignments in the following screen."
3.  - Confirm.
   ⇨ A screen with the current button assignment appears.
4. Check whether the displayed button assignment is correct.
5.  - Accept the button assignment or  discard the button assignment.

6 Configuration of the terminal

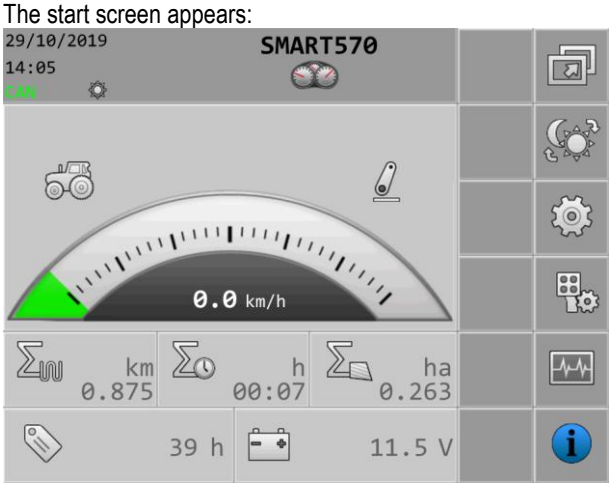
From the start screen of the terminal, you can configure different terminal parameters and functions.

The individual parameters can be configured at several points.

If parameters are greyed out, they cannot be changed. They only serve as information.

Procedure

1. - Start the terminal.
   ⇨ The start screen appears:



2. Configure the desired parameters.

6.1 App selection

On this screen, you can switch between different apps, for example, between the terminal and a connected job computer or joystick.

Path

On the start screen, press:

Controls

The following function icons appear on the screen:

Function icon	Meaning
	Switches back to the previous screen.

6.2 Brightness mode

You can change the brightness mode while working.

Path

On the start screen, press:

The mode that is currently activated can be seen by the respective icons on the screen:

-  - Day mode is activated.
-  - Night mode is activated.

6.3 System settings

You can change the different basic system settings on this screen.

Path

On the start screen, press:

Controls

The following function icons appear on the screen:

Function icon	Meaning
	Switches back to the previous screen.
	Changes the brightness mode.
	Switches to the format and unit settings.
	Switches to the terminal settings.
	Switches to the AUX device settings.
	Switches to the vehicle settings.
	Scrolls to the previous page of the screen.
	Scrolls to the next page of the screen.

Parameter

The following parameters can be configured on this screen:

Parameter	Meaning
Date	Current date.
Time	Current time.
Time zone	Current time zone.
User language	Operating language for the terminal. The selection list shows all of the languages that are supported by at least one connected job computer or the terminal. If the terminal supports the language selected here, it will be activated in this language. Otherwise, the terminal will be activated in the language defined as the “System language”.
System language	Alternative language for the terminal.
ISB functionality	Status of the ISB functionality.

Parameter	Meaning
	When this parameter is activated, the connected job computer switches to safe mode when the ON/OFF button () is briefly pressed. Moreover, an alarm message appears.
Volume	Volume of the terminal.
Keyboard brightness	Activation/deactivation of the keyboard illumination.
Brightness Day	Brightness value for the screen and keyboard (if activated) in day mode.
Brightness Night	Brightness value for the screen and keyboard (if activated) in night mode.

6.3.1 Formats and units

On this screen, you can change different format and unit settings for the terminal.

Path

On the start screen, press:

 >  .

Controls

The following function icons appear on the screen:

Function icon	Meaning
	Switches back to the previous screen.
	Changes the brightness mode.
	Scrolls to the previous page of the screen.
	Scrolls to the next page of the screen.

Parameter

The following parameters can be configured on this screen:

Parameter	Meaning
Hour format	Time of day format for the terminal.
Date format	Date format for the terminal.
Decimal symbol	Decimal symbol for the terminal.
System of units	Unit system in which the terminal is operated. Metric - Sets the units to the metric system. Imperial - Sets the units to the imperial system. US - Sets the units to the US system. Custom - The units can be configured individually.

6.3.2 Terminal

On this screen, you can define how the terminal should identify itself and react on the bus.

Path

On the start screen, press:

 >  .

Controls

The following function icons appear on the screen:

Function icon	Meaning
	Switches back to the previous screen.
	Changes the brightness mode.

Parameter

The following parameters can be configured on this screen:

Parameter	Meaning
Function ISO VT	Activates and deactivates the login of the VT functionality through the ISOBUS interface.
Instance ISO VT	If there are multiple terminals on the ISOBUS, each terminal can be assigned with an instance number. The instance number serves to assign job computers to terminals.
Number of navigation buttons	With "1", the terminal uses button 12 for displaying the next function icons, if the job computer want to display more than 12 function icons at the same time. With "2", the terminal uses button 12 for displaying the next function icons and button 11 for displaying the previous function icons.

6.3.3 Vehicle

On this screen, you can configure the following sensors:

- Work position sensor
- Speed sensor

Path

On the start screen, press:

 >  .

Controls

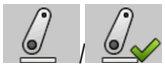
The following function icons appear on the screen:

Function icon	Meaning
	Switches back to the previous screen.
	Changes the brightness mode.

Function icon	Meaning
	Calls up the screen for calibrating the speed sensor.
	Calls up the screen with the counters.

Parameter

The following parameters can be configured on this screen:

Parameter	Meaning
Speed signal	Source for the speed signal. Sensor - A speed sensor is connected to the terminal. The work screen displays the icon:  . CAN-Bus - The speed signal is received through the CAN bus.
Pulses per 100 m	Number of impulses sent by the speed sensor over a distance of 100m. (Only appears when "Sensor" is selected as the speed signal.)
Work position signal	Source for the work position signal. Sensor - A work position sensor is connected to the terminal. The start screen displays the icon:  CAN-Bus - A work position signal is received through the CAN bus. No selection - A work position signal was not selected.
Working width in m	Current working width.

Calibrating the speed sensor

When calibrating the speed sensor, you determine the number of pulses sent by the sensor over a distance of 100m.

If the number of pulses is known, the terminal can calculate the current speed and transmit it to the connected job computer.

Procedure

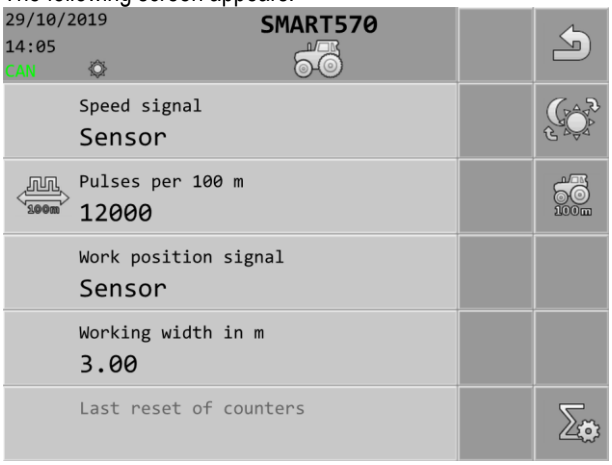
To calibrate the speed sensor:

☑ The terminal is connected to the tractor signal socket.

☑ In the "Speed signal" parameter, the "Sensor" value is selected.

1. Measure and mark a distance of 100 m. The ground must correspond to the field conditions. The distance should therefore lead over a meadow or a field.
2. Position the vehicle with connected implement at the beginning of the marked distance.
3.  >  - Open the vehicle screen.

⇨ The following screen appears:



4.  - Open the calibration screen.

⇨ The following screen appears:

5.  - Start the calibration.
6. Drive straight ahead over the marked distance.
7. Stop after 100 m.
8.  - Terminate the calibration.

⇨ The number of impulses appears on the “Counted impulses” line.

9.  - Save the result.

⇨ You have calibrated the speed sensor.

Counters

You can change different counter data on this screen.

Path

On the start screen, press:

Controls

The following function icons appear on the screen:

Function icon	Meaning
	Switches back to the previous screen.
	Resets all counters, except for the operation hours, back to 0.

Parameter

The following parameters can be configured on this screen:

Parameter	Meaning
Applied area in ha	Applied area since the last counter reset.
Applied distance in km	Applied distance since the last counter reset.
Working time in h	Working time since the last counter reset.
Service hours	Time during which the terminal was in operation.
Last reset of counters	Date of the last counter reset.

6.4 Button assignment for AUX operating devices

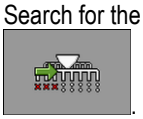
The terminal offers you the possibility of assigning the functions of an ISOBUS job computer to the buttons of the joystick. To do so, the ISOBUS job computer and the joystick must fulfil the Auxiliary 2 specification requirements from the ISOBUS standard.

The configuration screen for the button assignment is structured as follows:

1	Indicates that the respective functions must be assigned exclusively to a certain button. Some job computers allow the assignment of multiple functions to one button; in this case, this icon is hidden.	4	Link symbol between the job computer and joystick
2	Icon for the job computer	5	Selected joystick
3	Job computer function	6	Assigned button

Procedure

☑ The joystick and ISOBUS job computer are connected.

1. On the start screen, press: 
2.  - Select whether you want to make the assignments directly by pressing the buttons on the joystick or through the terminal.
   ⇨ In the upper area of the screen, you can see the assignment mode:
    - Assignment is performed directly by pressing the buttons on the joystick.
    - Assignment is performed through the terminal.
3.  - Optionally, you can delete all of the current button assignments.
4. Search for the job computer function that you want to assign to a button, for example:  .
5. If the function has not yet been assigned to a button, select the joystick to which you want to assign the function, for example:  .
6. Press on the current button assignment, for example:  . If there is no button assignment yet for the function, press:  .
7. Select the desired new button assignment, for example:  .
8. Repeat this procedure for all desired assignments.
9.  - Exit the screen to save the assignments.

⇨ You have completed the assignments and can now operate the machine with the joystick.

6.5 Diagnostics

On this screen, you are given diagnostics information regarding the terminal.

Moreover, the screen shows detailed information on the devices connected to the bus.

Path

On the start screen, press:

Controls

The following function icons appear on the screen:

Function icon	Meaning
	Switches back to the previous screen.
	Switches to the screen with the diagnostics data for the connected devices.

Function icon	Meaning
	Switches to the screen for deleting object pools.

Parameter

The following parameters can be configured on this screen:

Parameter	Meaning
Supply voltage	Current supply voltage.
Operating temperature	Current processor temperature.
Available/used memory	Currently free and used memory. If there is no more available memory, you must delete one or more object pools.
Speed impulses	Currently measured speed impulses per minute.
Work position sensor	Current impulses that are being transmitted by the work position sensor.

6.5.1 Diagnostic of connected devices

On this screen, you can find detailed information on all of the devices connected to the bus.

Path

On the start screen, press:

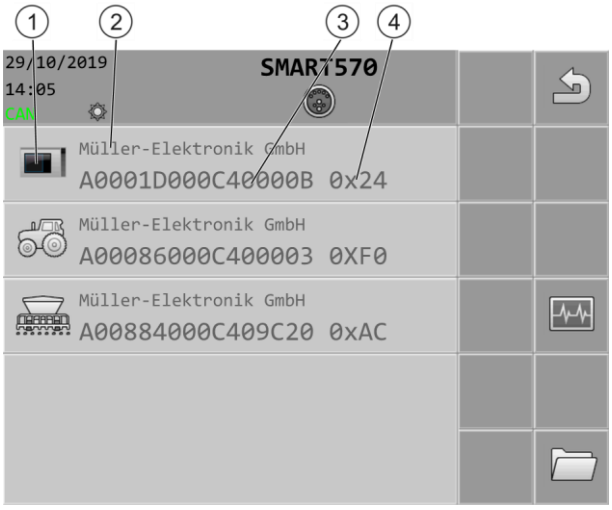
 >  .

Controls

The following function icons appear on the screen:

Function icon	Meaning
	Switches back to the previous screen.
	Switches to the diagnostics screen of the terminal.
	Switches to the screen for deleting object pools.

The following information can be found on the screen:



1	Symbol for the respective device type	3	ISO name
2	Manufacturer	4	CAN bus address

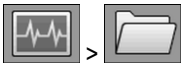
6.5.2 Deleting the object pool

Each job computer that is connected to the ISOBUS copies the images, texts and other objects used in its software onto the terminal. These files are collectively referred to as object pool.

Since the memory on the terminal is limited, it is sensible to delete the object pools for job computers that are not in use.

Procedure

To delete an object pool:

1. On the start screen, press:
    >
2. Select the device for which you want to delete files from the terminal memory.
3.  - Delete the files.
    - Alternatively, delete all of the object pools at the same time.
   ⇨ A message appears.
4.  - Confirm.

6.6 Information

On this screen, you are given information regarding the terminal.

Path

On the start screen, press:

Controls

The following function icons appear on the screen:

Function icon	Meaning
	Switches back to the previous screen.

Parameter

The following parameters can be configured on this screen:

Parameter	Meaning
Product name	Product name of the terminal.
Item number/serial number	Item number and serial number of the terminal.
Hardware version	Terminal hardware version.
Software version	Currently installed software version on the terminal.
Firmware version	Currently installed firmware version on the terminal.

7 Technical specifications

7.1 Technical specifications of the terminal

Operating voltage	9 – 16 V, ⎓
Ambient temperature	-20 – +55 °C
Storage temperature	-30 – +85 °C
Weight	Approx. 850 g without bracket
Dimensions (W x H x D)	212 mm x 135 mm x 44 mm
Ingress protection code	IP6K6 in accordance with ISO 20653
EMC	In accordance with ISO 14982
ESD protection	In accordance with ISO 10605
Current consumption	Approx. 350 mA
Processor	32 Bit STM F767 216 MHz
RAM	16 MB
Boot-Flash	18 MB
Operating system	RTX
Display	5.7“ VGA (640 x 480 px) colour screen with capacitive dual touch
Additional operation	Rotary encoder and membrane keyboard
Housing	PC-ABS

7.2 Pin assignment

7.2.1 9-pin CPC connector

Pin	Signal	Meaning
1	ECU_PWR	Supply +12 V
2	CAN_L_In	CAN Input
3	CAN_L_Out	CAN Output
4	CAN_H_In	CAN Input
5	CAN_H_Out	CAN Output
6	TBC_PWR	Ignition Input
7	ECU_PWR	Supply +12 V
8		Not connected
9	ECU_GND	Ground

7.2.2 5-pin M12 connector

Pin	Signal	Meaning
1		Not connected
2	DI_In1	Speed sensor input
3		Not connected
4	GND	Ground
5	DI_In2	Work position sensor input

8 Appendix

8.1 Updating the terminal

Procedure

When you want to update the software on the terminal, proceed as follows:

☑ You have a new software version for installation.

☑ You have the Downloadmanager 2 software on your PC and you have connected the PC to the terminal.
or
You have connected a Downloadbox to the terminal.

☑ You have no other ISOBUS components connected to the ISOBUS.

☑ The terminal is switched off.

1. Start the Downloadmanager 2, if you use it with the PC.

2.  +  - Press these buttons simultaneously and hold to start the download mode.

3.  - Press and hold this button until the logo appears on the screen.

4.  /  - In Downloadmanager 2, select the terminal.

5.  - Mark the terminal.
⇨ An “X” appears in front of the terminal.

6.  - Open the folder with update files.

7.  - Navigate to the folder containing the update file.

8.  /  /  - Select the update file.

9.  - Start the update.

10. Wait until the update has been completed. Do **not** switch off the terminal during this time.

11.  - Return to the list of devices.
⇨ The new software will be loaded.

12.  - Switch off the terminal.

13.  +  - Restart the terminal. Press and hold the buttons for about 3 seconds.
⇨ The terminal reinitializes.

⇨ You have completed the update.