Installation and User's Guide

BASIC - Terminal

ISOBUS tractor terminal in accordance with ISO 11783

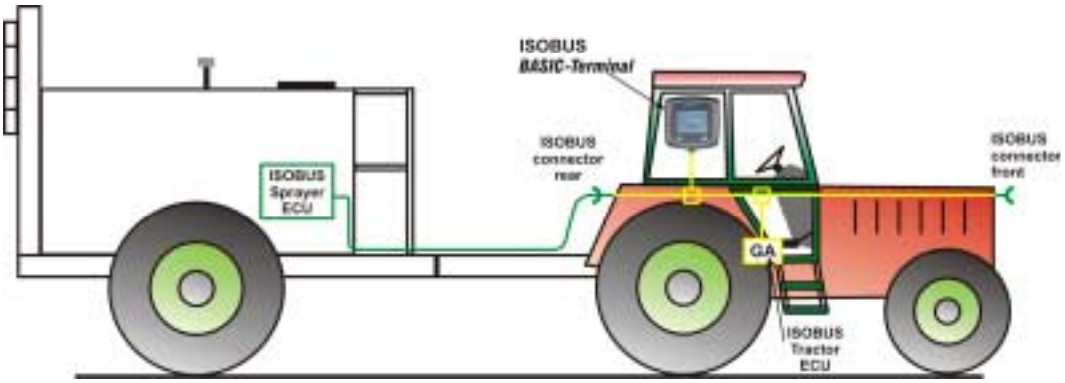
July 2004

Contents

1 Introduction

With the *BASIC - Terminal* you have an ISOBUS-Terminal at hand which we have developed to comply with the latest ISO standard. Over 10 years experience in the development of CAN-bus components has had considerable influence here. The *BASIC - Terminal* is for universal use on agricultural tractors and devices. In future there will be a rapid increase in the number of agricultural machines and devices equipped with ISOBUS-compatible job computers. This means that today already you are one step ahead with the *BASIC - Terminal*.

The ISO Standard 11783 specifies the transmitting medium, connecting sockets and the data exchange for the ISOBUS. This works on the basis of a CAN bus, which is also used in the motorcar and commercial vehicle industry. The ISOBUS regulates the data exchange between the control terminal, the job computers in the tractor and the attached or trailed machines. The compatibility of the ISOBUS devices, according to the **ISO Standard 11783**, is examined by independent testing institutes. The equipment is only awarded the ISOBUS certificate once examination has been successfully completed.



Diagr. 1-1 Basic configuration of the ISOBUS according to ISO Standard 11783

2 Safety instructions

2.1 Disclaimer:

The *BASIC - Terminal* is specified exclusively for agricultural use. The manufacturer takes no responsibility for any installation or application outwith this area.

The manufacturer does not accept liability for damage to persons or property resulting from unspecified use. In such cases all risks are the responsibility of the user.

Specified implementation also includes adhering to the operation and maintenance requirements stipulated by the manufacturer.

Relevant accident prevention regulations as well as other generally recognised safety, industrial health and road traffic rules are to be adhered to. In addition the manufacturer accepts no liability in cases where arbitrary modifications have been made to the device.

2.2 Safety measures

Warning!

Always pay attention to this symbol for references to important safety precautions.
It means attention! Become alert!
It is a question of your safety.

Read the user's guide before using the *BASIC - Terminal* for the first time.

Observe the following recommended precautions and safety instructions:

Observe the following recommended precautions and safety instructions.

Before using the *BASIC - Terminal* read and understand this guide. It is of equal importance that others operating this device also read und understand the manual.

During maintenance or when using a battery charger, switch off the power supply.

Never service or repair the device while the job computer is switched on.

Before welding on the tractor or on an attached machine, interrupt the power supply to the *BASIC - Terminal*.

Only use clear water or a damp cloth with a little glass cleaning agent to clean the *BASIC - Terminal*.

Operate the keys with your finger tips but avoid using fingernails.

Should any part of this guide remain incomprehensible after reading, contact the dealer or Mueller-Elektronik Service for further clarification before using the *BASIC - Terminal*.

Read carefully all safety instructions in the manual and the safety labels on the equipment. Safety labels must always be legible. Replace missing or damaged labels. Ensure that the current safety labels can be found on all new components. Your authorised dealer can supply you with spare labels.

Learn how to operate the *BASIC - Terminal* correctly. Nobody is to operate the machine without exact instructions.

Keep the *BASIC - Terminal* and the spare parts in good condition. Unspecified alterations can impair the function and/or safety and affect the life span of the machine.

2.3 Safety notice

For the subsequent installation of electrical and/or electronic components.

Present-day agricultural machines are equipped with electronic components and devices, whose function can be affected by electromagnetic emission from other devices. These influences can lead to endangerment for individuals when the following safety measures are not adhered to.

When subsequently installing electrical and electronic devices and/or components in a machine with a connection to the electrical system, the user must take sole responsibility for testing the installation for interference of the vehicle electronics or other components. This applies in particular to the electronic controls of:

- EHR,
- front lifting gear,
- power take-off shafts,
- motor and
- gears.

Above all it must be ensured that all subsequently installed electrical and electronic components comply with the current version of the EMC directive 89/336/EWG and carry the CE symbol.

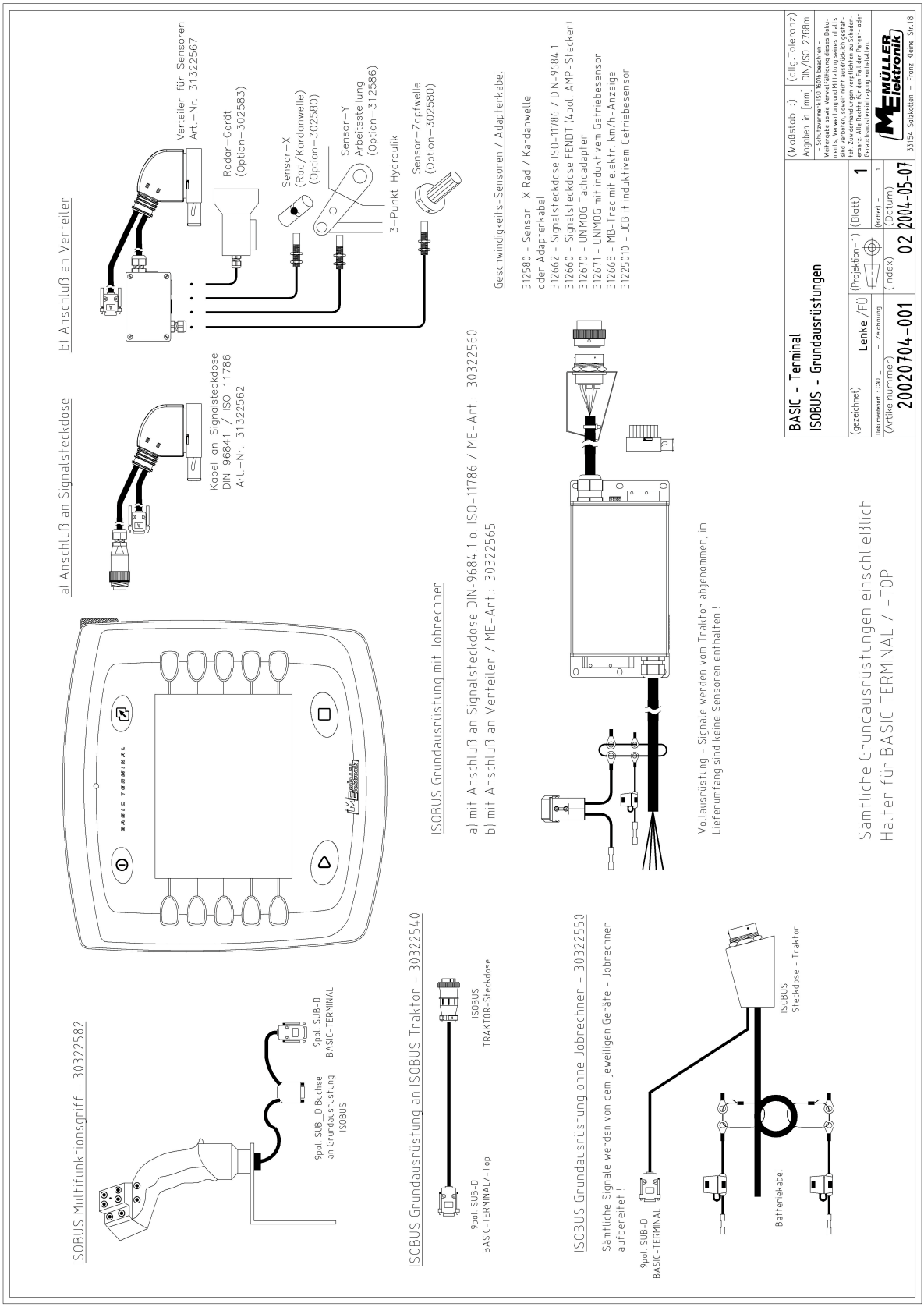
In addition the following requirements must be fulfilled when upgrading with mobile communication systems (e.g. radio, telephone):

- Only approved devices complying to national regulations (e.g. BZT approval in Germany) are to be installed;
- The device must be securely installed;
- The use of portable or mobile devices inside the vehicle is permissible only via a connection to a permanently installed outside antenna;
- The transmitting unit is to be installed in a position away from the vehicle electronics;
- An antenna should only be installed professionally ensuring that there is a good earth connection between the antenna and the vehicle chassis.

Please refer to the manufacturer's installation instructions for cabling and installation as well as the maximum current consumption.

3 Overview and initial installation

3.1 Overview



Diagr. 3-1 Overview

Diagr. 3-1 gives an overview for the *BASIC - Terminal* with multifunction grip and the basic equipment for various tractors.
The basic equipment supplies the *BASIC - Terminal* with voltage, makes the connection to the ISOBUS and, depending on the version, also includes the ISOBUS plug for the connection of machines. The basic configuration should be selected to correspond to the vehicle equipment in which the *BASIC - Terminal* is to be installed.

1. *BASIC - Terminal* **basic configuration for ISOBUS tractors (ISO 11783)**
   (Art. No.:303 225 40)
   To upgrade an ISOBUS tractor with the BASIC-terminal, a plug is specified in ISO 11783. In this case only a connecting cable is required to connect the terminal to the tractor bus and the voltage supply.

2. *BASIC - Terminal* **basic configuration <u>without</u> a tractor job computer**
   (Art. No.: 303 225 50)
   To upgrade tractors without signal input. The signal input (e.g. speed) comes in this case from the job computer on the attached machine. This configuration includes the connection to the *BASIC - Terminal*, the ISOBUS plug for the attached machines and the connection to the tractor's battery.

3. *BASIC - Terminal* **basic equipment <u>with</u> a tractor job computer**
   (Art. No.: 303 225 60)
   To upgrade tractors and signal input.
   There are 2 possible alternatives for the signal supply:
   a) Connection with an adapter cable to the existing signal plug on the tractor (DIN 9684.1 / ISO 11786)
   b) Equipping the tractor with sensors (km/h-gears, km/h-radar, cardan-shaft rpm and working position). With this configuration the tractor can be fitted with front and rear plugs.

The multifunction grip is an optional operating unit and is absolutely essential for machines with complex operation (e.g. field sprayer). It has 8 keys and a switch allowing up to 24 functions to be carried out quickly, exactly and without eye contact. The assignment of the keys is determined by the job computer and can be referred to in the Job Computer User's Guide. To connect the multifunction grip, remove the plug from the *BASIC - Terminal* basic equipment and connect the multifunction grip in its place. The basic equipment is then connected to the 9-pin socket on the multifunction grip (see chapter 3.2.2).

3.2 Initial operation

3.2.1 Mechanical installation in the cabin

First of all screw the bracket included in the delivery of the basic equipment on to the *BASIC - Terminal* (Diagr. 3-2).

Subsequently attach the terminal and the bracket to the basic console on the vehicle (Diagr. 3-3) and screw the wing screw tightly in the correct position. If possible tilt the terminal upwards so that the cabin windows don't reflect.

Diagr. 3-2 BASIC – Terminal bracket

Diagr. 3-3 BASIC - Terminal with bracket

Diagr. 3-4 Basic console

Diagr. 3-5 BASIC - Terminal with bracket and basic console

3.2.2 *BASIC - Terminal* connection

Attention!

If the *BASIC - Terminal* is to be connected to existing ISOBUS equipment, check first that they are compatible with ISO 11783.

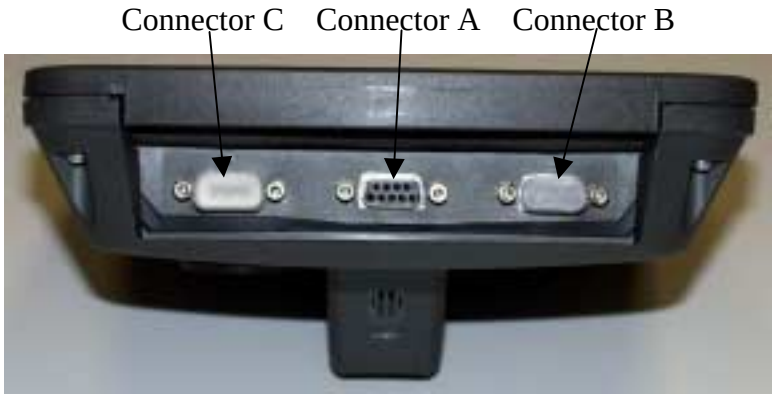
Basic equipment complying with the LBS standard (DIN 9684,2-5) has the same socket as the ISOBUS basic equipment. Data communication is however different and they are **not** compatible with the ISO standard (ISO 11783).

If the basic equipment complies with the standard, the *BASIC - Terminal* can be connected

The ISO-11783-compatible basic equipment from Müller-Elektronik is marked with a label (Diagr. 3-6) on the ISOBUS socket.

Diagr. 3-6 ISOBUS - Label

The connection for the basic equipment can be found at the bottom of the *BASIC - Terminal* (see Diagr. 3-7).



Diagr. 3-7 Connections at the bottom of the BASIC - Terminal

On delivery the connections B and C are sealed with dust caps. The 9-pin SUB-D plug included in the basic equipment is to be plugged into the middle socket (connection A) on the *BASIC – Terminal* and the plug screws securely tightened

Diagr. 3-8 BASIC - Terminal with connecting cables from the basic equipment

Attention: The multifunction grip, if used, is to be connected directly to the terminal and not to the basic equipment. The basic equipment is then connected to the 2nd plug on the multifunction grip (see Diagr. 3-9).

Diagr. 3-9 BASIC - Terminal with MFG connecting cable and connection for the basic equipment

3.3 Battery connection

Detailed assembly instructions are included with each basic equipment delivery.

3.4 Initial switch-on

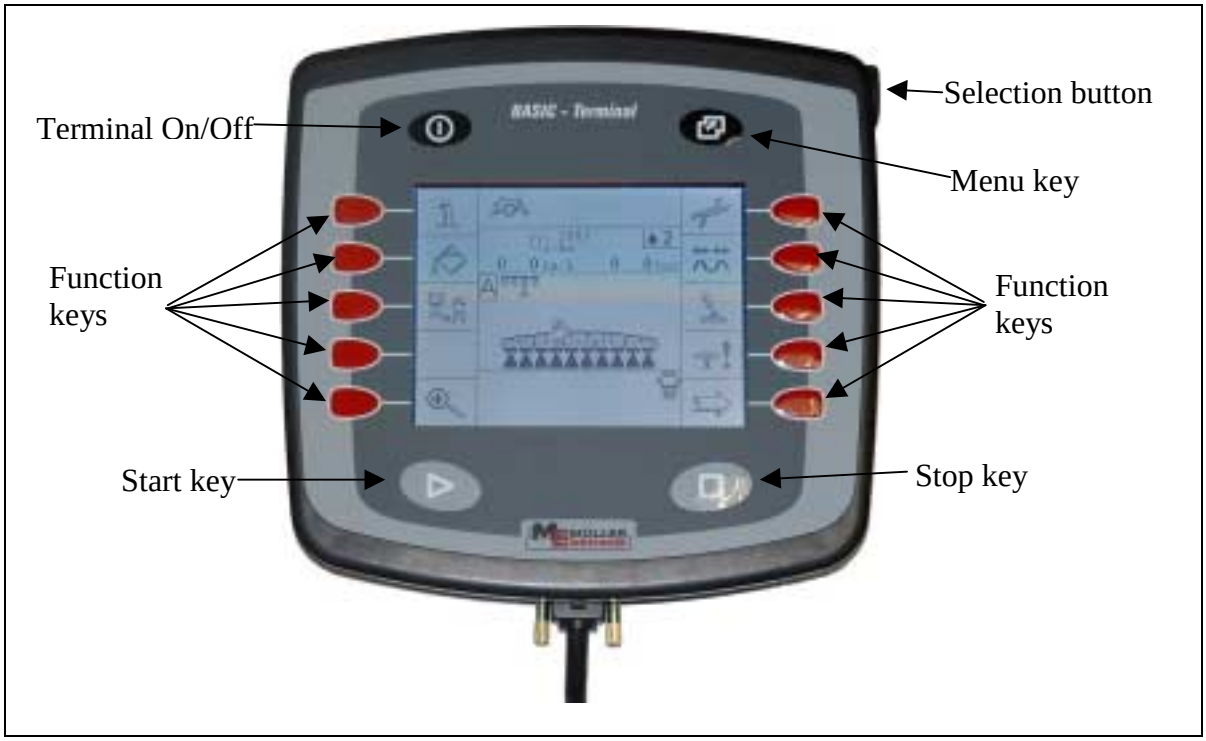
Once the *BASIC – Terminal* has been mechanically and electrically installed it is ready for initial operation. Switch-on varies according to the basic equipment:

If the basic equipment does not include the tractor job computer (Art. No.: 30322550), the terminal is switched on and off using the  key. The connected job computers (e.g. field sprayer) are also switched on and off in this way.

The basic equipment of the tractor job computer (Art. No.: 30322560) has an ignition connection to the vehicle. This is used to switch on the *BASIC – Terminal* when this basic equipment or the ISOBUS tractor basic equipment (Art. No.: 30322540) is used. If the *BASIC – Terminal* is not in use, it can be switched off with the key after starting.

4 Keyboard and monitor

The *BASIC – Terminal* is operated using 14 tactile keys (4 main and 10 function keys) and a selection button. Diagr. 4-1 illustrates the arrangement of the keys and the selection button.



Diagr. 4-1: *BASIC – Terminal* **operating elements**

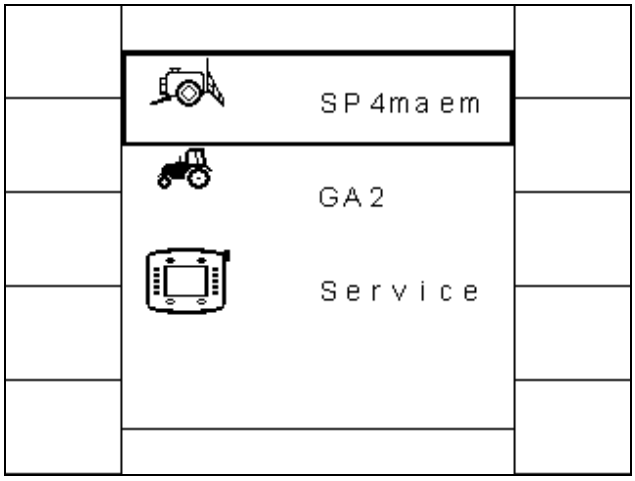
4.1 Main keys

4.1.1 "On/off" key

The key  is used to switch the *BASIC – Terminal* on and off. To switch on, press the  key briefly. To switch off, the  key has to be kept pressed until the terminal switches off (about 2 seconds).

4.1.2 "Menu" key

The selection menu on the *BASIC – Terminal* is displayed when this key  is pressed. The service menu or one of the connected job computers can be selected for the display. If no changes are to be made, the original status is restored by pressing the  key once again.



Diagr. 4-2 Selection menu (field sprayer is selected)

The selection button is used to select individual menu options. The current selection is marked by a black frame. The selection button is turned to move the frame on to another option. Once the correct option is marked, it can be activated by pressing the selection button. The frame disappears and the selected job computer or service menu appears on the monitor.

In the case of an alarm with one of the connected job computers, an "A" is displayed in the selection menu between the symbol and the name of job computer in question...

4.1.3 "Start" key

This key  can be assigned any function made available by the job computer.

4.1.4 "Stop" key

This key  can be assigned any function made available by the job computer.

4.2 Selection button

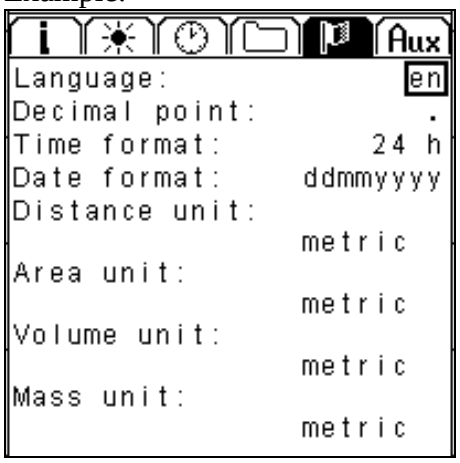
Diagr. 4-3 Selection button

The selection button at the right upper corner of the terminal is for navigating in menus and for entering and altering data.

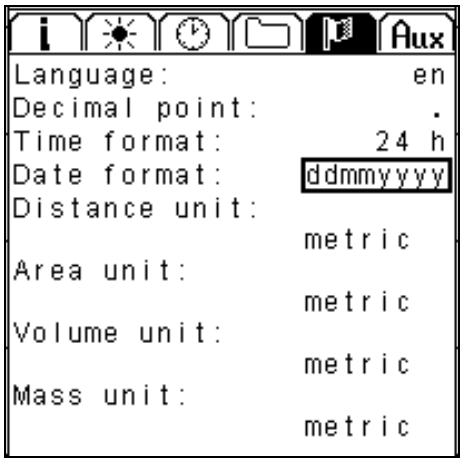
4.2.1 Navigation in menus

Within a menu (e.g. "country settings" menu) the cursor can be moved to the required position by turning the button. Once the cursor is in the correct position the menu option can be called up by pressing the selection button briefly.

Example:



Diagr. 4-4 Country settings cursor in starting position (language)

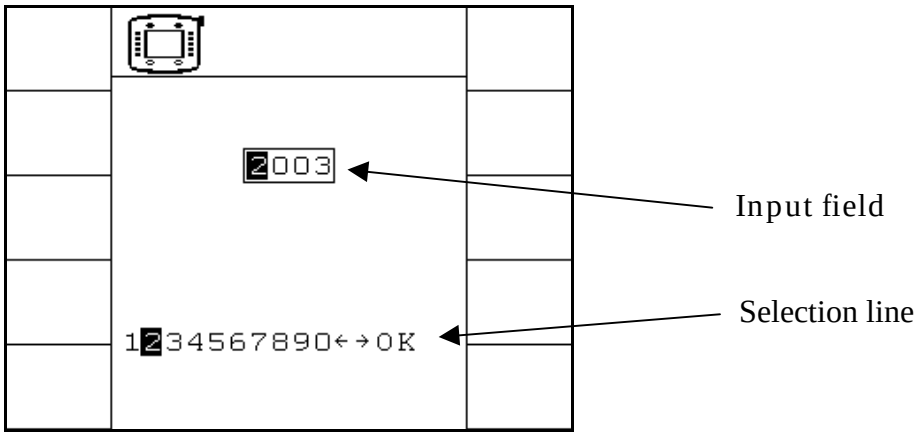


Diagr. 4-5 Country settings cursor on data format

In Diagr. 4-4 and Diagr. 4-5 you can see the country settings menu. When a menu is selected, the cursor (see Diagr. 4-4) is on the entry at the top. With every turn of the button it moves on one entry, either upwards or downwards depending on the direction the button is turned. At the end of the list it jumps back to the top. Once the cursor is at the required position (e.g. as in Diagr. 4-5), the selection button can be pressed to branch out to a further menu or to the input mask. In the case of a selection menu, the option required is selected by turning the selection button and confirmed by pressing it. The procedure for data input is described in chapter 4.2.2.

4.2.2 Data input

Data input is called up by selecting a value in a selection menu (see Chap. 4.2.1). The input mask then appears on the monitor.



Diagr. 4-6 Input mask

The input field is displayed at the top of the screen and is marked by a frame in which the maximum number of positions is shown. The first position inside the frame has a dark background. This is the cursor marking the current input position.

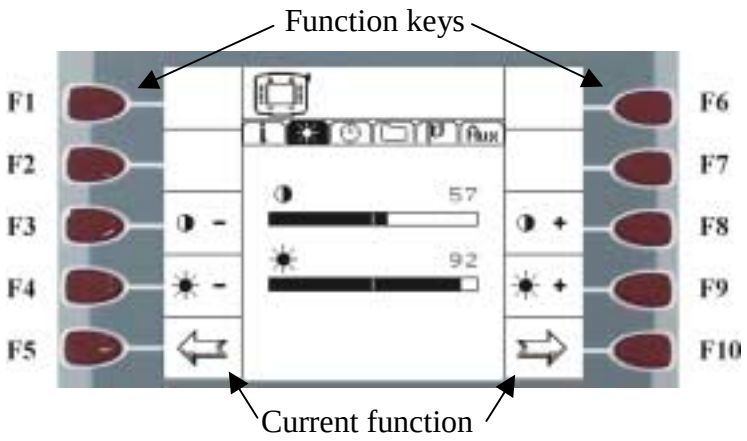
The selection line can be seen on the bottom half of the screen. The numbers and navigation symbols which can be used for the current input field are displayed. In Diagr. 4-6 e.g. the number entry is illustrated. This means that only the numbers 0 – 9, the characters <-, -> and ok are displayed. Text input is also possible. A cursor can also be found in the selection line. At the start of input both cursors display the same number (see Diagr. 4-6). The selection button is pressed briefly if changes are not required at this position. The cursor in the input field moves one position to the right and the cursor in the selection line marks the corresponding number. To change the value here, the position of the cursor in the selection line can be changed by turning the selection button. The new value is then transferred to the input field by pressing the selection button and the cursor moves a position further to the right. Once all numbers have been entered in the input field, the cursor jumps to OK in the selection line. Input is terminated by pressing the selection button once more.

Both arrows can be used to move the cursor in the input field.

Important! Input can be interrupted by pressing the key. The original value is then restored.

4.3 Function keys

5 function keys are arranged both to the right and left of the monitor. The function of these keys is determined by the menu currently displayed on the monitor. It is always the function displayed in the current menu directly beside the key which is being carried out. In the illustration below, for example, brightness is being reduced using the F4 key and increased with the F9 key etc. Where a field is empty, the key has no function in this menu.

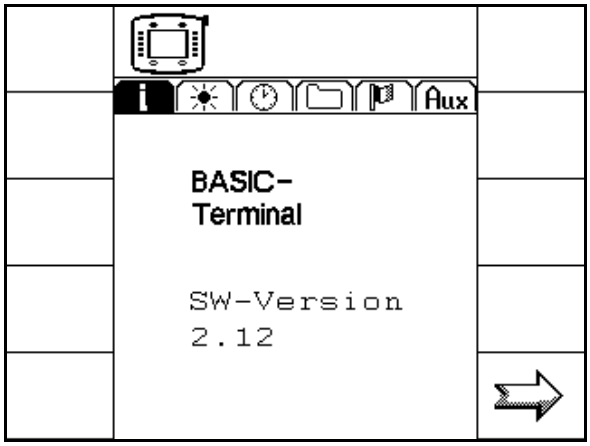


Diagr. 4-7 Example of function keys: "Monitor adjustment"

5 Service Menu

All *BASIC – Terminal* relevant information and settings are displayed in the service menu and if necessary altered. The sub-menus are explained in this chapter.

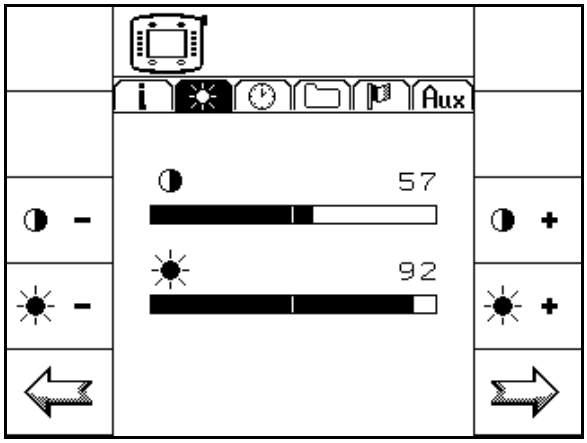
5.1 Information



Diagr.5-1: Menu option "Information"

The version of the terminal software is displayed in this menu. Press the function key ⇨ to move on to the contrast menu.

5.2 Menu option "monitor adjustment"



Diagr. 5-2 Menu option "monitor adjustment"

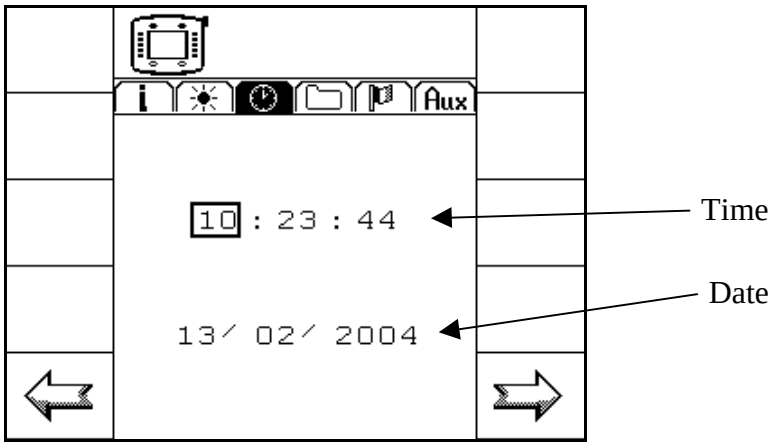
The current settings for contrast and brightness are displayed in this menu.

Contrast is reduced with the function key and increased using the function key.

Brightness is reduced with and increased with.

The key switches back to the "information" menu. The "clock setting" menu is displayed using the key.

5.3 Clock setting

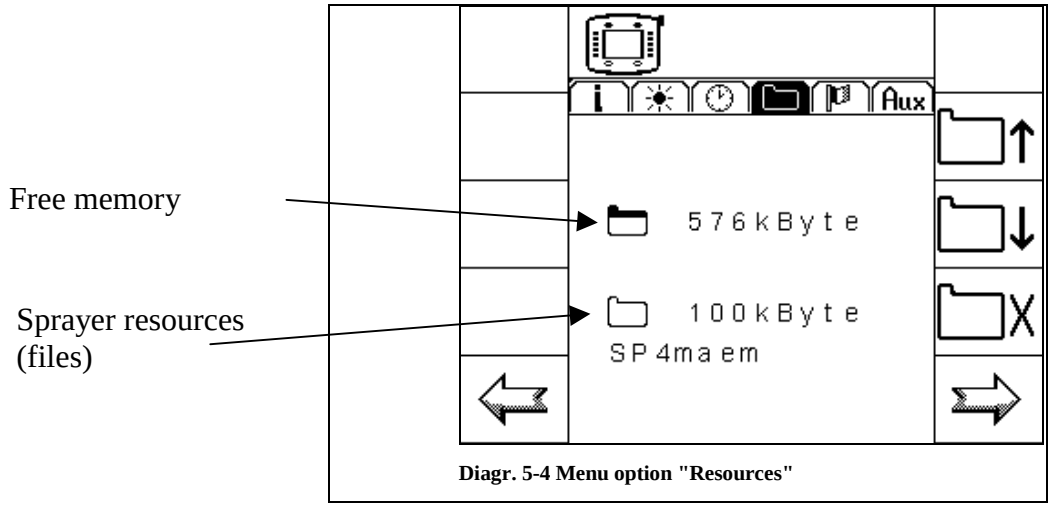


Diagr. 5-3 Menu option "clock setting"

The current input position is marked by a black frame. This can be adjusted by turning the selection button. Once the required position has been reached, input is activated by pressing the selection button (see chapter 4.2.2). When all numbers have been entered, acknowledge with OK. The "clock setting" menu appears again with the updated value.

Attention: The display format for the time and the date are set in the country setting menu.
The key switches back to the monitor adjustment menu. Press the key for the resources menu (see chap. 5.4).

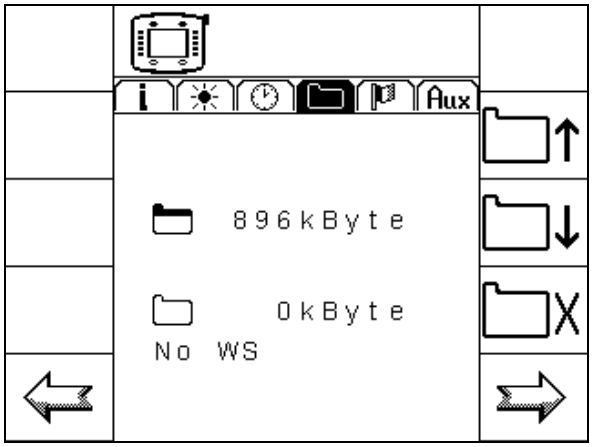
5.4 Resources



Diagr. 5-4 Menu option "Resources"

The resources (files) which have been stored on the *BASIC – Terminal* by the individual job computers and are no longer required can be deleted. This makes room for resources from other job computers.

The current free memory is displayed on the top half of the monitor and below it is an existing file with name and memory. Using the keys  and  the list of files can be leafed through. The current file displayed is deleted, when the  key is pressed. If there are no files on the terminal, the following display appears as in Diagr. 5-5.

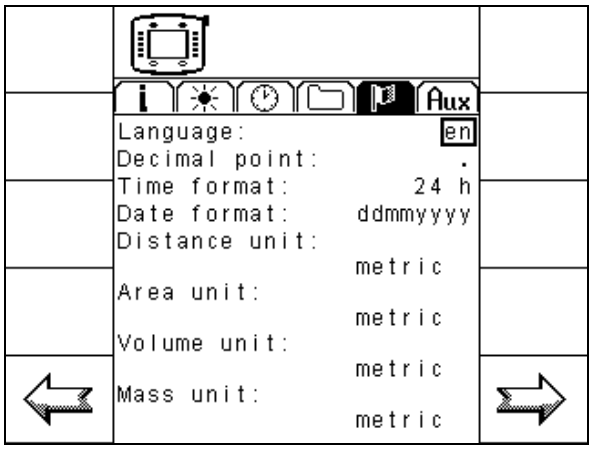


Diagr. 5-5 Resources (no memory assigned)

The  key switches back to the clock setting menu. With the  key the country setting menu is displayed.

5.5 Country settings

In this menu the country specific settings are entered. These settings affect the menu display format on the *BASIC – Terminal* .



Diagr. 5-6 Menu option „country settings"

Following settings are possible:

Language:

Selection	***Definition***
de	German
en	English
fr	French
nl	Dutch

Tab. 5-1: Languages

Decimal separators:

Selection	***Definition***
,	Decimal separator "Comma"
.	Decimal separator "Full stop"

Tab. 5-2: Decimal separators

Time format:

Selection	***Definition***
24 h	24 hour clock
12 h	12 hour clock

Tab. 5-3: Time format

Date format:

Selection	*Definition*
ddmmjjjj	Day 2 digits; month 2 digits; year 4 digits Ex.: 20 / 10 / 2003
ddjjjjmm	Day 2 digits; year 4 digits ; month 2 digits Ex.: 20 / 2003 / 10
mmjjjjdd	Month 2 digits; year 4 digits ; day 2 digits Ex.: 10 / 2003 / 20
mmddjjjj	Month 2 digits; day 2 digits; year 4 digits Ex.: 10 / 20 / 2003
jjjjmmdd	Year 4 digits; month 2 digits; day 2 digits Ex.: 2003 / 10 / 20
jjjjddmm	Year 4 digits; day 2 digits; month 2 digits Ex.: 2003 / 20 / 10

Tab. 5-4: Date format

Length and area units:

Selection	*Definition*
metrical	Metrical units of measurement
imperial	Imperial units of measurement, as used in Great Britain.

Tab. 5-5: Length and area units

Volume units:

Selection	*Definition*
metrical	Metrical units of measurement
imperial	Imperial units of measurement, as used in Great Britain
US	USA-specific units of measurement

Tab. 5-6: Volume units

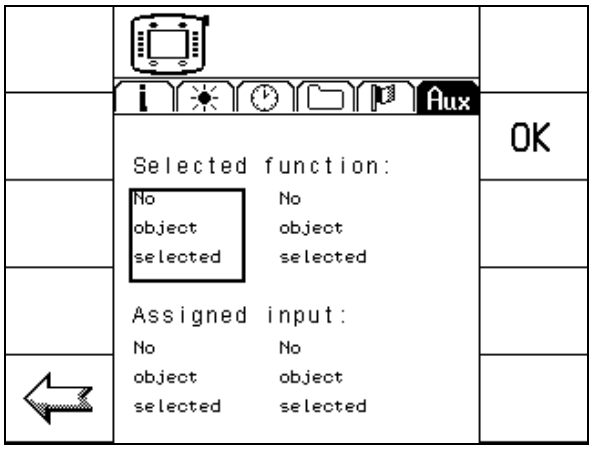
Weight units:

Selection	*Definition*
metrical	Metrical units of measurement
imperial	Imperial units of measurement, as used in Great Britain.
tons/pounds	USA-specific units of measurement

Tab. 5-7: Weight units

Press the ⇦ key to switch back to the resources menu. With the ⇨ key, the auxiliary keys menu is displayed.

5.6 Auxiliary keys



Diagr. 5-7 Menu option "Aux"

With this menu it is possible to assign functions to keys which can be configured as required. The standard specifies that operating devices can allow function keys and job computer functions to be configured as required.

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Procedure:

1. Bring the cursor to the 1st entry in the mask (Diagr. 5-7) and press the selection button. A selection menu appears listing all available job computers.
2. Select the required job computer and confirm.
3. Select the 2nd entry in the mask (Diagr. 5-7). A selection menu appears displaying all functions possible with the job computer selected under 2.
4. Select the required function and confirm.
5. Select the 3rd entry in the mask (Diagr. 5-7). A list of operating devices with keys which can be freely assigned is displayed.
6. Select the required operating device and confirm.
7. Select the 4th entry in the mask (Diagr. 5-7). A list of the available keys is displayed.
8. Select the required key and confirm. The assignment for a function is completed.

For further links start again at step 1. If a function has already been assigned to a key, this is displayed in the fields "operating device" and "key" once the job computer and the function have been selected. These entries can be changed as required.

6 Appendix

6.1 Connections

The *BASIC – Terminal* has three connections, A, B and C.

Diagr.6-1: *BASIC-Terminal* connections

Connection A (CAN-ISO)

Pin	Signal
1	CAN_L
6	-Vin *)
2	CAN_L *)
7	CAN_H *)
3	CAN_GND *)
8	CAN_EN_out
4	CAN_H
9	+Vin
5	CAN_EN_in

Tab. 6-1: CAN connection allocation

+Vin and –Vin serve the voltage supply. The signals marked with *) correspond to CiA allocation (CAN in Automation).
The signals CAN_L and CAN_H are connected internally and are for looping through the CAN Bus.
When CAN_EN_in is put on the voltage (= +Vin), the terminal can be switched on. When switched on, the terminal delivers the distribution voltage (minus 1.2V) with maximum 140mA on CAN_EN_out for the supply of the terminator networks.

The connections B and C are not in use at present and so for this reason are covered with dust shield caps ex factory.

6.2 Technical data

Operating voltage:	10 - 24 V
Operating temperature:	0 – 50 °C
Storage temperature:	-20 – 70 °C
Weight:	1.3 kg
Measurements (L x B x H):	220 x 210 x 95 mm

Tab. 6-2: Technical data

6.3Glossary

Term	Definition
Bus	Bus means that different devices (terminal, job computer etc.) are generally connected to one another by a network. Only data packets (messages) which can be accessed by all participants are sent here. Each message is labelled in such a way that each BUS participant can recognise if it is intended for him. In this case he evaluates it.
CAN-Bus	Principally a network existing of two cables. CAN means “Controller Area Network” and was developed by Bosch for use in industrial plants and the motorcar industry. This form of data bus is particularly suited to use in agriculture as it has little susceptibility to faults
ISO 11783	International standard, which specifies the connections and data exchange for tractors as well as attached and trailed agricultural machines. This standard has been developed further from the European LBS standard (DIN 9684.2-5) and forms the basis for an internationally co-ordinated system for agricultural engineering.
ISOBUS	ISOBUS is the name for the international interface for tractors and attached implements. **ISOBUS** is composed of **ISO** and **BUS**. **ISO**, because the transmitting medium, the plug and socket connection and the data exchange are specified in the ISO standard 11783. **BUS**, because the transmitting medium is a data bus (CAN-Bus).
ISOBUS tractor	A tractor is an ISOBUS tractor when it is equipped with a terminal and the basic ISOBUS configuration. This means that ISOBUS-compatible machines can be connected and accessed.
Function keys	Function keys are keys on the terminal set up beside the monitor. The current key function (soft key) is displayed on the terminal.
Mask	Masks are where the various job computer functions are depicted on the terminal monitor. Within the mask information from the job computer and the assignment of the function keys are displayed.
Terminal	The terminal is the output and operating unit in the tractor cabin. It makes the connection between the driver and the machine. The data of the connected machines are displayed on the terminal. By means of function keys, all functions can be carried out.
Basic equipment	The basic equipment constitutes the link between the terminal and the tractor. By means of the basic equipment the voltage supply and the ISOBUS are attached to the terminal. Depending upon the type of tractor and its equipment, the basic equipment also consists of the battery cable and the ISOBUS socket.
Soft key	The soft key is the current function of a function key. It is displayed on the monitor beside the function key.
Job computer	The job computer is the brain of the machine, being responsible for all functions. All control functions are carried out here and controlled. Sensor values are measured and sent for display to the terminal. Commands which are entered on the terminal by the operator are converted here to switching signals and so controlled, e.g. hydraulic valves. The ISOBUS cable connects the job computer to the tractor. The cables on the sensors and actuators are connected (if necessary by means of a cable harness or distributor) to the job computer.
Cursor	The cursor indicates the current position in a data input or selection menu. It marks the value which is being altered.
Resources	Resources are graphic objects made accessible by the job computer. Their

Term	Definition
	purpose is to display the functions, input, output etc. on the terminal. The first time the terminal is connected to a new job computer, the resources are loaded and stored there. Due to storing, a reboot is not necessary. The resources remain stored on the terminal until they are deleted by the user.

List of diagrams

List of tables