

User manual

Universal BD103 data logger

Code No. 99-97-1238 GB

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EC Declaration of Conformity



Big Dutchman

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In accordance with the EC directive:

- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Low Voltage Directive 2014/35/EU
- RoHS Directive 2011/65/EU



The product named below was developed, designed and manufactured in accordance with the above mentioned EC / EU Directives and under the sole responsibility of Big Dutchman.

Description	Universal BD103 data logger
Serial number and year of construction	According to the customer order no.

The following harmonised standards were applied:

- EN 55011 and EN 61000-4-20:2010 RFI field strength, RFI voltage
- EN 55014-1 Click disturbance voltage
- DIN EN 61000-4-4:2004: Electrical fast transient / burst immunity test
- DIN EN 61000-4-5:2005: Surge immunity test

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Overview of changes / updates

Name of chapter	Type of change / update	Product information / Code of the person in charge	Date of edition	Page

1	About this manual	1
1.1	Structure of the safety instructions	2
1.2	Supplier's documentation	2
2	Safety	3
2.1	General safety regulations	3
2.2	Operator's responsibility	5
2.3	Staff qualifications	5
2.4	Designated use	5
2.5	Ordering of spare parts	6
2.6	Safety instructions when operating electrical appliances	7
2.6.1	Protective-equipotential bonding (earthing) of the system	7
3	System description	8
3.1	Structure and function	8
3.2	Technical data	9
4	Electrical connection	10
4.1	Connection – power supply	10
4.2	Connection – sensors	11
5	Overview start screen	17
6	Settings	18
6.1	Input structures	19
6.2	Settings – Number of channels	20
6.3	Settings – Channel settings	20
6.4	Settings – Language	21
6.5	Settings – System date	21
6.6	Settings – System time	21
6.7	Settings – Data to USB	22
6.8	Settings – Restart	23
6.9	Settings – Software update	23
6.10	Settings – Decimal separator	24
6.11	Settings – About	25
7	Log	26
8	Factory settings	27

9 Cleaning28

10 Spare parts29

11 Accessories30

1 About this manual

Observe the instructions in this manual to ensure correct and safe use of the system.

Keep this manual safe for future use.

All persons assembling, operating, cleaning and servicing this system must be familiar with the contents of this manual.

These persons must always have access to the manual. Keep this manual in the immediate vicinity of the system for this reason.

Observe the comprised safety instructions!

If this manual is damaged or lost, request a new copy from **Big Dutchman**.

This manual is protected by copyright. The information and drawings included in this manual may not be copied without the manufacturer's consent, nor may they be misused or disclosed to third parties.

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1.1 Structure of the safety instructions

DANGER!

This indicates risks that will lead to personal injury resulting in death or to serious injuries.

WARNING!

This indicates risks that could lead to personal injury resulting in death or to serious injuries.

CAUTION!

This indicates risks or insecure procedures that could lead to moderate or minor injuries.

NOTICE!

This indicates notes preventing property damage and leading to an effective, economic and environmentally-conscious handling of the system.

1.2 Supplier's documentation

The supplier's documentation includes all instructions for components that are supplied by **Big Dutchman** but not manufactured by **Big Dutchman**, for example motors. These instructions are usually supplied with the respective component. If this is not the case or if the language of the corresponding country is not included, please request this documentation from **Big Dutchman** .

It is essential to observe the instructions in the supplier's documentation!

2 Safety

2.1 General safety regulations

Only work with suitable tools and observe the local accident prevention regulations.

 **WARNING!**

Live parts may be bare when performing different types of tasks. Touching live parts can lead to injuries caused by electric shock and short circuits.

- ▶ Set the main switch to "Off" before starting any repair or maintenance tasks.
- ▶ Secure the system against reactivation.
- ▶ Attach a fixed sign to indicate that maintenance and repair tasks are in process!
- ▶ Never touch bare electrical components.
- ▶ Equipment with bare electrical components must not be used by the operating staff.

Check safety and function control devices to ensure safe and accurate operation after carrying out any tasks.

Observe the regulations of local water distribution and power supply companies.

 **WARNING!**

Defective or disassembled safety devices can lead to serious injuries or to death!

- ▶ It is strictly forbidden to remove or put out of operation any safety device.
- ▶ If safety devices are damaged, immediately put the system out of operation. Lock the main switch in zero position and eliminate any damage.
- ▶ Make sure that all safety devices are properly mounted and function after work on the system has been completed and before putting the system into operation (again).

⚠ WARNING!

- ▶ Parts lying about on the system and in its vicinity can cause persons to stumble and / or fall and thus risk injuring themselves by contact with system components.
- ▶ Parts lying about in or on the components can lead to serious damage of the system.
- ▶ Never deposit objects (e.g. spare parts, replaced parts, tools, cleaning tools etc.) in the accessible areas of the system or in the surrounding areas after having worked on the system!
- ▶ **Before** putting the system into operation again, assure yourself that all loose or replaced parts have been removed from the system components!

⚠ DANGER!

Persons may be electrocuted or suffer serious electrical injuries if water from leaking hoses, seals and pipes reaches live parts.

- ▶ Disconnect the main power supply.
- ▶ Interrupt the main water supply.
- ▶ Only now may you enter the part of the house where large quantities of water have escaped.

i NOTICE!

Leaking hoses, seals and pipes can cause structural damage or destroy electrical systems by short circuits.

- ▶ Check regularly whether large quantities of water are escaping and eliminate the leaks as soon as possible.

⚠ WARNING!

Children must not access the system. The safety distances for the system are not designed for children. A risk of injury cannot be excluded, even for supervised children.

2.2 Operator's responsibility

The operator is subject to the legal obligations regarding occupational safety and is responsible for the staff's safety. All safety, accident prevention and environmental protection regulations applicable for the area of use of the system must be observed. The following is especially important:

The operator must clearly specify responsibilities for operation, maintenance and cleaning.

The operator must provide the staff with the necessary personal protective equipment.

The operator is responsible for

- using the system in compliance with the designated use;
- ensuring that the system is only operated in an excellent state from the technical point of view and that maintenance intervals are observed;
- ensuring that his staff is trained to use the system;
- ensuring that operation instructions are prepared for the system.

2.3 Staff qualifications

Staff must consist of qualified persons who can be expected to perform their tasks reliably. Persons whose ability to respond is impaired, e.g. by alcohol, drugs or medication, must not work on the system. The operator is responsible for which persons he employs. **Big Dutchman** does not assume any liability for personal injury and property damage caused by insufficiently qualified staff.

2.4 Designated use

The universal BD103 data logger is a device that records values from different sensors for a long period of time. These data can be exported for further processing via internal or externally extended USB interfaces.

The **Big Dutchman** system may only be used for the purpose for which it is designated. Any deviating use is considered non-designated use. The manufacturer shall not be liable for any damage resulting from such non-designated use. The user alone bears the risk. The designated use also includes the exact compliance with operating, maintenance and assembly requirements of the manufacturer.

2.5 Ordering of spare parts

CAUTION!

For your own safety, use original **Big Dutchman** spare parts only. For third-party products that have not been released or recommended and for modifications (e.g. software, control units), judging whether there is a safety risk in connection with **Big Dutchman** systems is not possible.

NOTICE!

The exact description of the spare parts to be ordered can be found by means of the position number in the spare parts list.

Indicate the following when ordering spare parts:

- the code number and description of the spare part;
- the customer number or order number;
- the current supply, e.g. 230 / 400 V – 3 Ph – 50 / 60 Hz.

2.6 Safety instructions when operating electrical appliances

NOTICE!

Only persons qualified according to electro-technical regulations (e.g. EN 60204, DIN VDE 0100/0113/0160) may install and work on electric parts / assembly groups.

WARNING!

If an electric part is open, dangerous electric tensions are bare. Be aware of the danger and keep staff of other professions away from the danger zone.

NOTICE!

Do not install control devices directly in the house but in the service room to prevent corrosion caused by e.g. ammonia gas.

2.6.1 Protective-equipotential bonding (earthing) of the system

The system must be earthed professionally by the operator or a company commissioned by him at suitable points and according to the valid local guidelines and standards (e.g. IEC 60364-7-705 mod. 2006 / DIN VDE 0100-705: Low-voltage electrical installations – part 7-705: Requirements for special installations or locations – Agricultural and horticultural premises) for protective-equipotential bonding.

The earthing points must be connected with the foundation earth electrode.

The material required for earthing is not included in the Big Dutchman delivery.

3 System description

3.1 Structure and function

The universal BD103 data logger has up to 8 channels (1 channel in the standard version) with a power supply of 24 V and an analogue input of 0-10 V each. The logger is therefore suited for operation with a great number of typical 0-10 V sensors of many manufacturers. The data logger is equipped with a coloured 3.5" touch screen and installed in a housing with protection rating IP54. It is ideal for stand-alone operation as measuring and recording unit. This also means that the DOL53 ammonia sensor, for example, can be installed in many places in combination with the universal BD103 data logger as a "plug&play" solution without interfering with existing systems.



Figure 3-1: Universal BD103 data logger

Features:

- Data recording every 30 seconds for maximally the past 300 days
- Appropriate for electricity grids of 100 to 260 VAC with 50/60 Hz
- Touch screen with digital keypad
- Display of current and recorded values on the touch screen
- Traffic light system for the state of measured values
- Data export via USB port
- Can be used as an independent measuring station

The data logger is coded under the following numbers:

Code no.	Description
91-00-2996	Data logger universal 1-channel BD 103
91-00-2995	Data logger universal 8-channel BD 103

3.2 Technical data

Dimensions (L x W x H)	260 mm x 160 mm x 140 mm
Weight	1.850 kg
Protection rating	IP54
Operating temperature	0 °C...40 °C
Storage temperature	-20 °C...65 °C
Storage period	past 300 days
Data of PSU	
Supply voltage	100 – 260 VAC 50/60 Hz
Max. current output	1 A
Data of channels	
Power supply	24 VDC each
Analogue input	0-10 VDC each
Available current	max. 700 mA in total

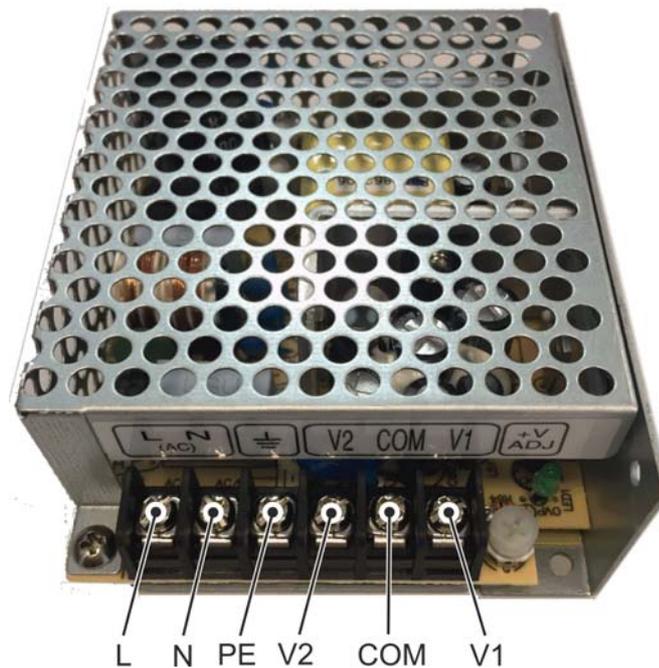
4 Electrical connection

WARNING!

Any connected tasks may only be carried out by authorized and qualified personnel and under consideration of local regulations (e.g. VDE)!

4.1 Connection – power supply

L = 230 V
N = Neutral
PE = Earthing
V2 = 24 V
COM = 0 V
V1 = 5 V



4.2 Connection – sensors

The Nano controller 103 is the control unit for the nano I/O series and can be connected to a touch screen. The controller is equipped with four relays, four digital and one analogue inputs, two CAN bus connections and one USB and Ethernet interface. The controller communicates with other module PCBs of the nano I/O series through CAN bus, connected by a ribbon cable.

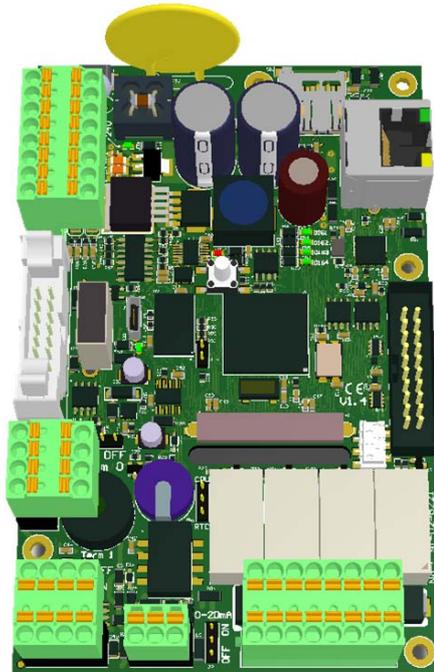
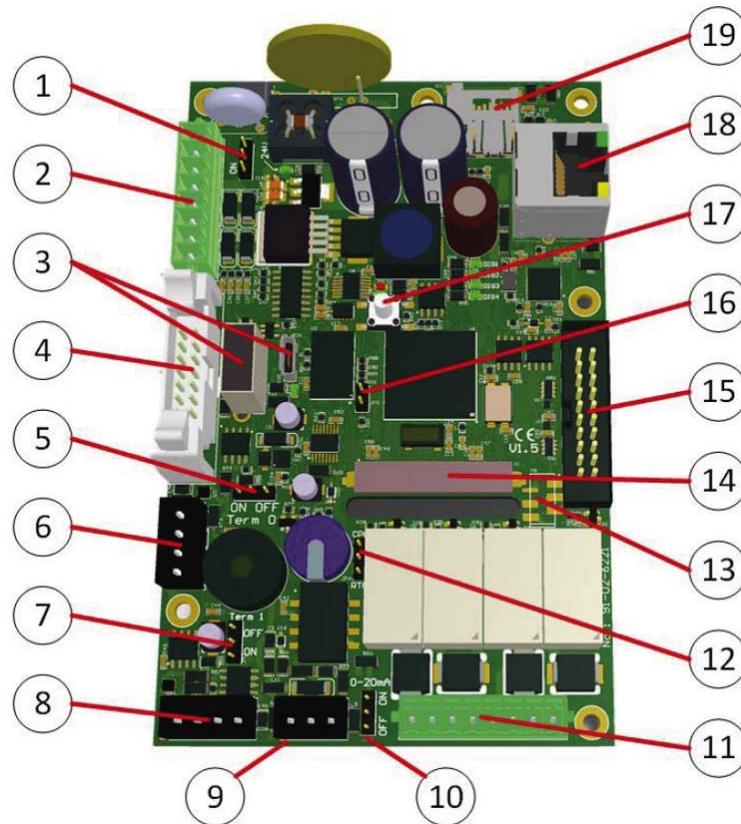


Figure 4-1: Nano controller 103

Technical specifications	
Code no.	91-02-6026
Dimensions (W x L x H)	83 mm x 130 mm x 26 mm
Supply voltage range	24 VDC +/- 20%
Current consumption	max. 0.30 A
Inputs	1 analogue input: 0-10 V or 0-20 mA (to be set with jumpers) 4 digital inputs: max. 30 VDC
Outputs	4 relays: 10 A at 125 VAC, 5 A at 30 VDC / 250 VAC
Ambient temperature	0 - 50 ?
Weight	0.350 kg

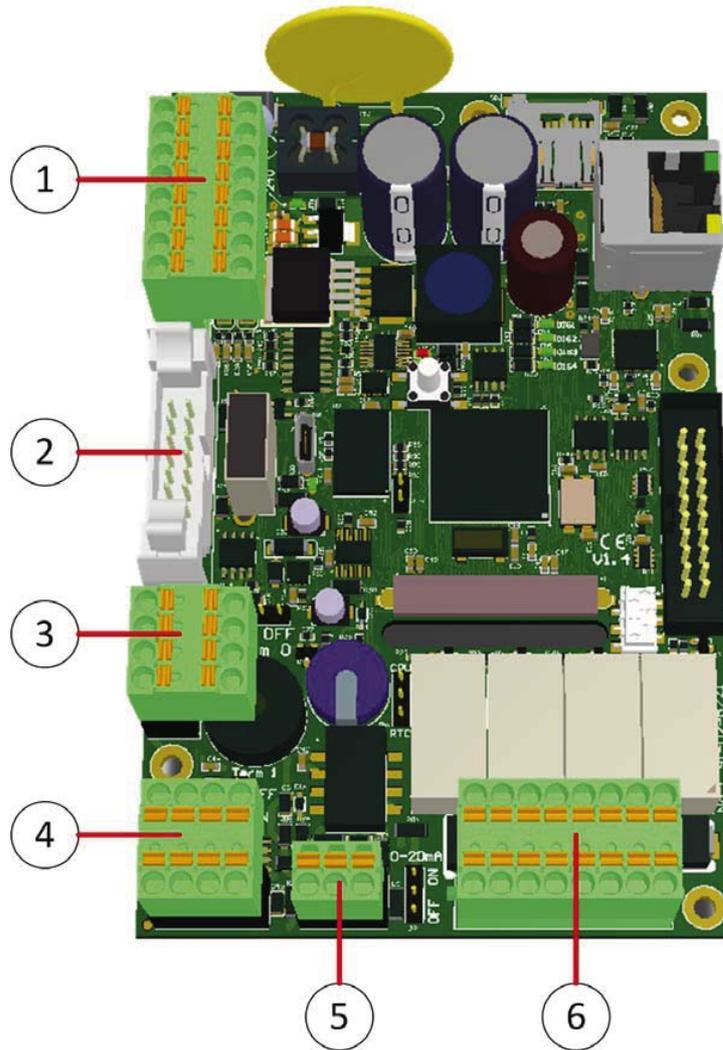
Description of connections and jumpers



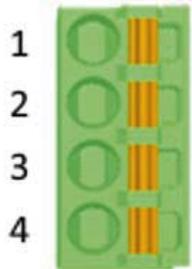
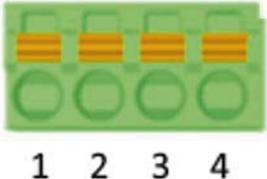
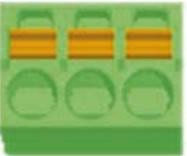
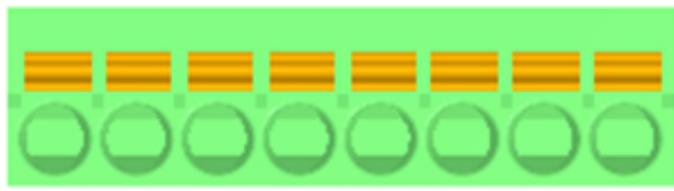
Pos.	Description
1	<p>Jumper – galvanic isolation</p> <p>Jumper OFF: no galvanic isolation</p> <p>Jumper ON: digital signals are galvanically isolated</p>
2	<p>Connection power supply and digital inputs</p> <p>+24 V / GND and 4 digital inputs</p>
3	<p>USB ports</p> <p>Purpose depends on application</p>
4	<p>Connection power supply and CAN bus</p> <p>Power supply +24 V / GND and CAN bus 0/internal (max. length of the ribbon cable: 2 m)</p>
5	<p>Jumper – termination CAN bus 0 (internal)</p> <p>OFF: terminating resistor is turned off</p> <p>ON: terminating resistor is turned on</p>

Pos.	Description
6	Connection CAN bus 0: Connection for CAN bus 0 (internal)
7	Jumper – termination CAN bus 1 (external) OFF: terminating resistor is turned off ON: terminating resistor is turned on
8	Connection CAN bus 1 – galvanically isolated Connection for CAN bus 1 (external)
9	Connection analogue input 0-10 V / 0-20 mA with power supply
10	Jumper – analogue input Jumper ON: 0-20 mA Jumper OFF: 0-10 V
11	Connection relay Connection for relay
12	Jumper – Real Time Clock (RTC) ON: internal RTC active OFF: external RTC active
13	Connection RS 232 For development purposes
14	Connection touch screen Connection of the touch screen
15	Connection application programming interface JTAG Connection of the JTAG API
16	Jumper boot loader To program the controller via USB, set jumpers and restart the controller.
17	Push-button Reserved for service purposes
18	Ethernet interface Not equipped in standard version
19	MicroSD slot Purpose depends on application

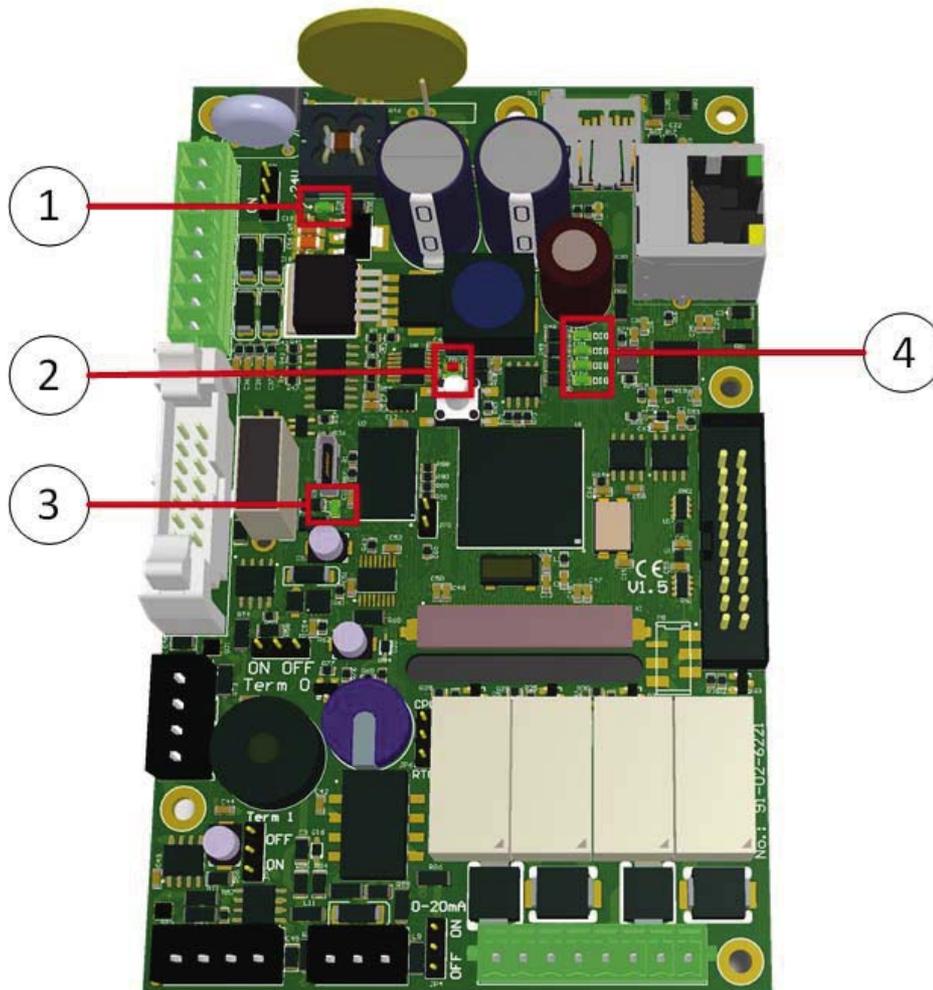
Connection nano controller



Pos.	Description	
1	Connection +24 V/GND and 4 digital inputs	
		+24 V = power supply +24 VDC GND = power supply 0 V GND digital = 0 V digital input Digital input 1 Digital input 2 GND digital = 0 V digital input Digital input 3 Digital input 4

Pos.	Description	
2	Connection power supply and CAN bus Ribbon cable 2 x 7 poles If the nano controller 103 is connected to the power supply and the CAN bus via the ribbon cable, this replaces the connection of the power supply to connection "1", and of the CAN bus to "3".	
3	Connection terminal CAN bus 0 (internal) 	1: CAN Low 2: CAN High 3: CAN Shield 4: CAN Ground
4	Connection terminal CAN bus 1 (external) 	1: CAN Low 2: CAN High 3: CAN Shield 4: CAN Ground
5	Analogue input (0-10 V / 0-20 mA) with power supply 	1: GND 2: Analogue input (0-10 V / 0-20 mA) 3: +24 VDC power supply
6	Relay connection terminals C1 S1 C2 S2 C3 S3 C4 S4 	
	C 1-4: COM connection terminal relay 1-4 S 1-4: Make-contact connection terminal relay 1-4	

Light-emitting diodes (LEDs) / Nano controller 103



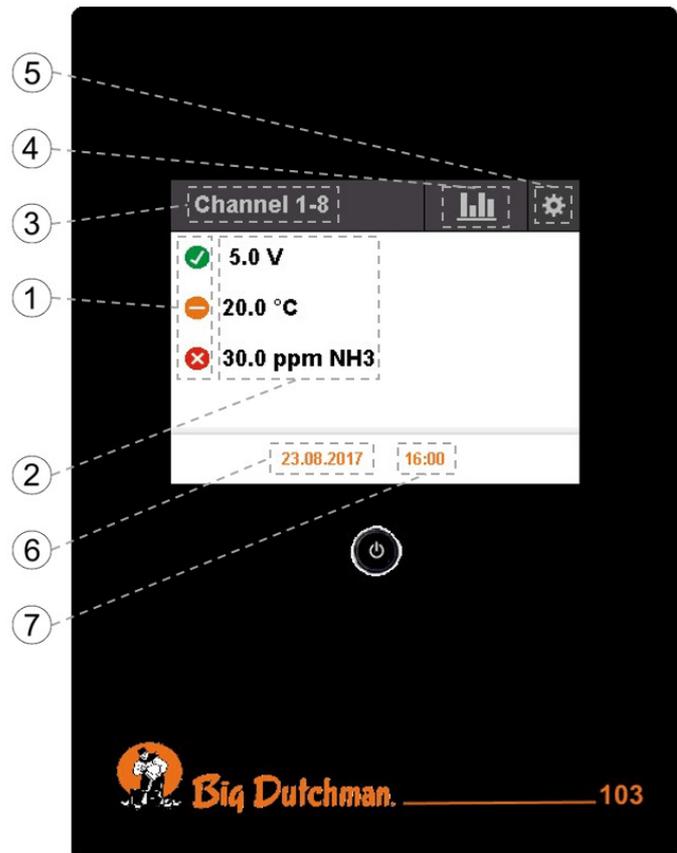
Pos.	Description	Colour	Description
1	LED power supply	green	Lit: power supply OK
2	Error LED	red	Lit: error occurred
	Status LED	green	Flashing: processor operating / OK
3	LED power supply USB port	green	Lit: power supply at USB port OK
4	Digital input LED 1	green	Lit: digital input active
	Digital input LED 2	green	Lit: digital input active
	Digital input LED 3	green	Lit: digital input active
	Digital input LED 4	green	Lit: digital input active

5 Overview start screen

The start screen shows the values measured by the sensors. From the start screen, you can reach the Log  and the Settings  .

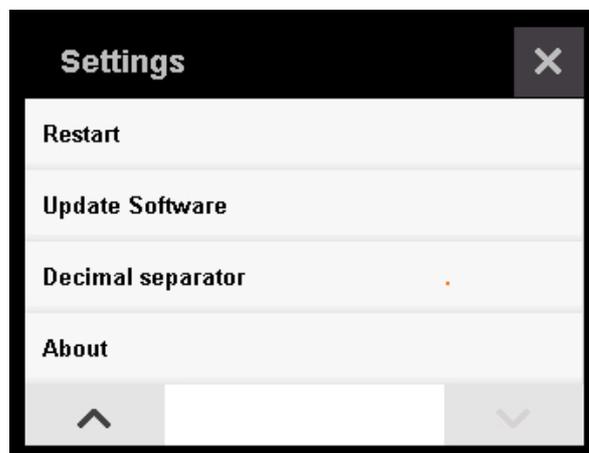
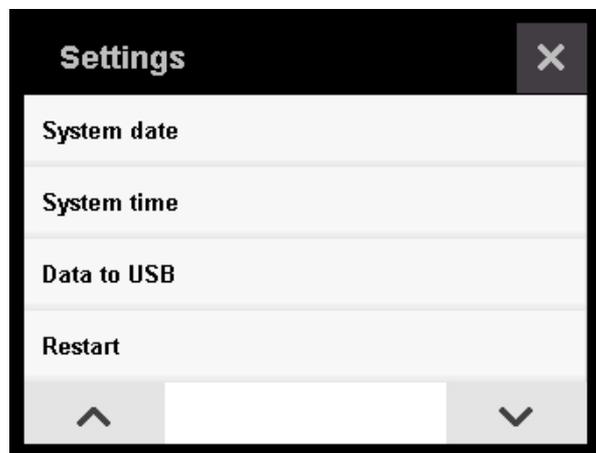
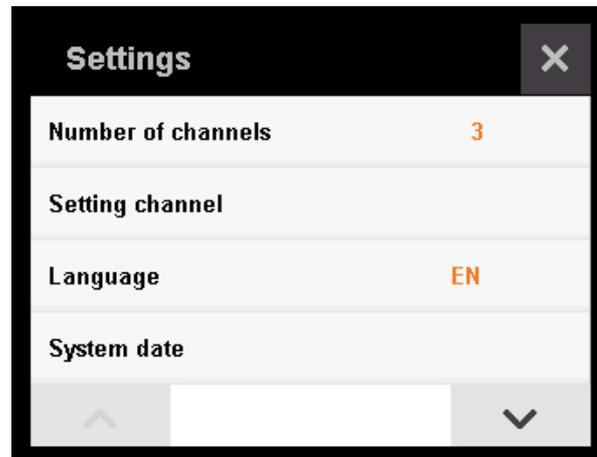
Additionally, you can switch between the different input cards .

- 1 = State of measured value
- 2 = Measured value
- 3 = Selection of input card
(8 channels per card)
- 4 = Log
- 5 = Settings
- 6 = Date
- 7 = Time



6 Settings

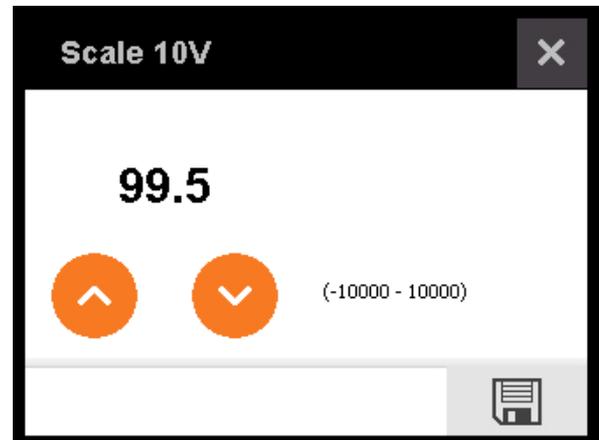
Tap on the gear icon  on the start screen to open the settings menu. Use the arrows   to reach all settings options.



6.1 Input structures

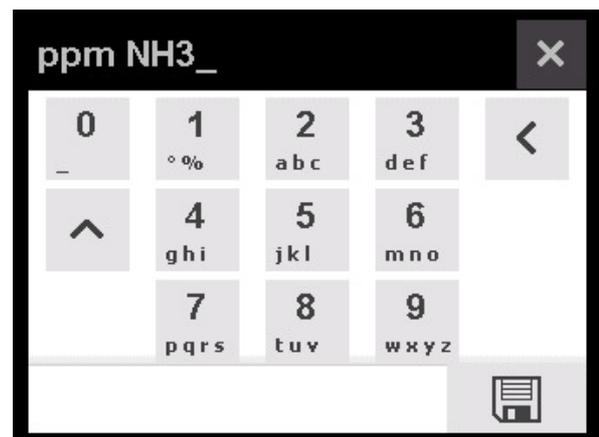
Inputs can be made in two ways for the data logger. Always tap on the X  to return to the previous menu without saving the input, and on the floppy disk icon  to return to the previous menu with saving the input.

For the input option shown on the right, press and hold an arrow button to change values quickly. Tapping on the arrows changes the values slowly.



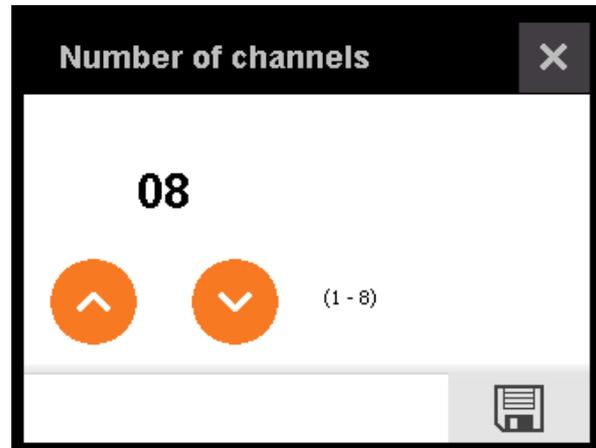
When using the keypad, select the desired symbol by tapping as many times as necessary on the correct field. Select the numbers by pressing and holding the respective field.

Select upper/lower case letters by tapping on , and delete by tapping on .



6.2 Settings – Number of channels

Tap on **Settings**  > **Number of channels** to set the number of configured channels. The data logger is equipped with one channel in the standard version. The logger can also be ordered with eight channels. Check each case individually before extending the number of channels.



6.3 Settings – Channel settings

Tap on **Settings**  > **Setting channel** to configure the settings of a channel. Tap on the channel's name (top left corner) to select the channel you want to edit. Tap on the pen icon  to rename the channel. The scale for 0 V and for 10 V can be assigned values between -10,000 up to + 10,000. Enter the unit using a the keypad. The levels are used to set the state of the measured value on the start screen. When level 1 is exceeded, the state changes from green  to orange . When level 2 is exceeded, the state is displayed in red .

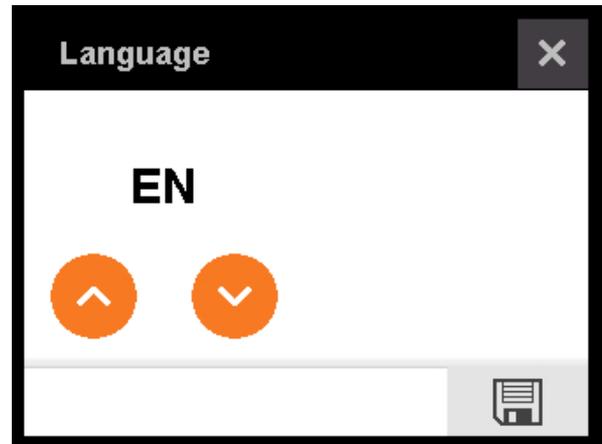
Humidity			
Scale 0V	0.0		
Scale 10V	100.0		
Unit	% rH		
Level 1	0		

Humidity			
Scale 10V	100.0		
Unit	% rH		
Level 1	80		
Level 2	90		

6.4 Settings – Language

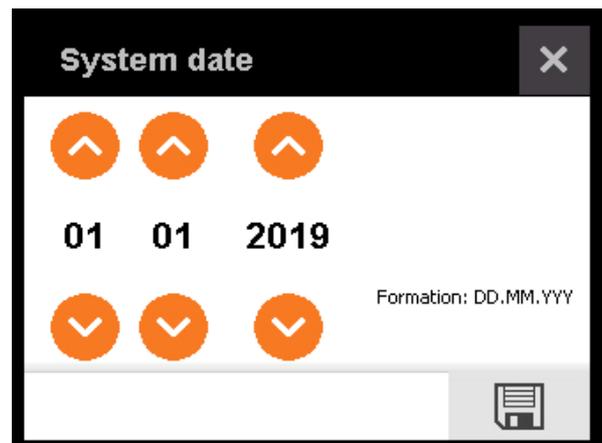
Tap on Settings  > Language to select the language.

The default languages of the logger are English and German.



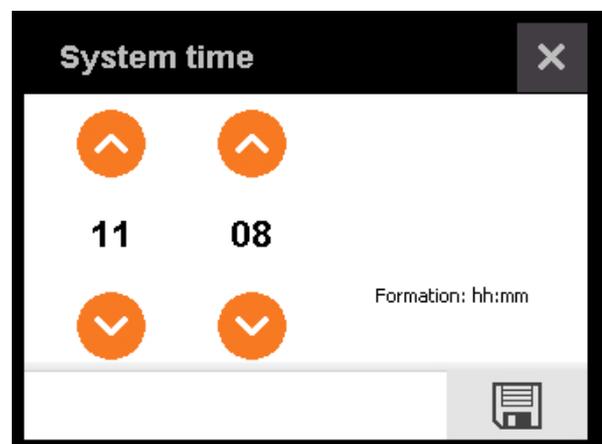
6.5 Settings – System date

Tap on Settings  > System date to set the date (dd/mm/yyyy).



6.6 Settings – System time

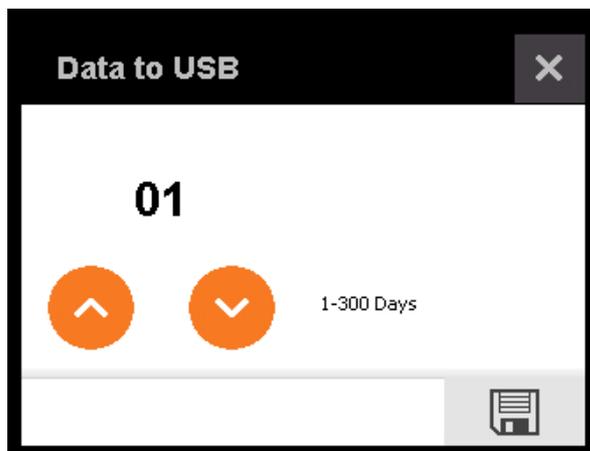
Tap on Settings  > System time to set the system time (hh/mm).



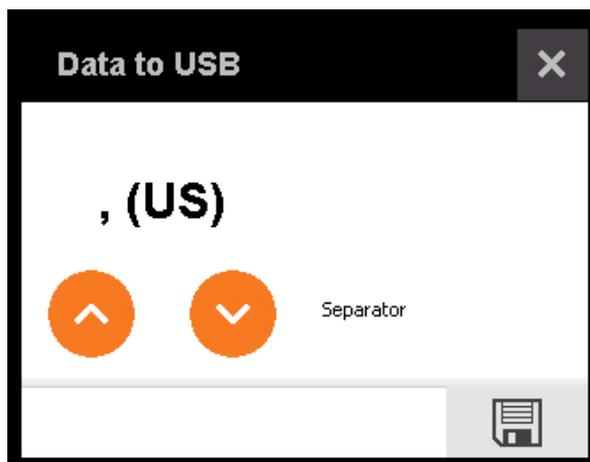
6.7 Settings – Data to USB

Use this menu to transfer the measured values using the USB port in the box. The USB port is located at the back of the display. Select the number of past days whose values you want to transfer. The maximum number of days is 300. An Excel file in CSV format is created for each day. The data are recorded every 30 seconds.

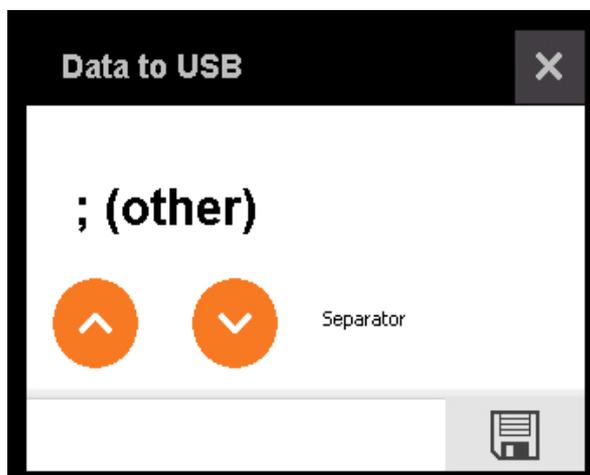
Tap on Data to USB and select the number of days you want to transfer.



Tap on the floppy disk icon  to save. A question regarding the separator in the CSV file appears. The separator is responsible for sorting the data into columns. In American systems, the default separator is the comma (,), in other systems, the semicolon (;).



Tap on the floppy disk icon  to export the file to the USB flash drive.



6.8 Settings – Restart

Tap on Settings  > Restart to reboot the logger.

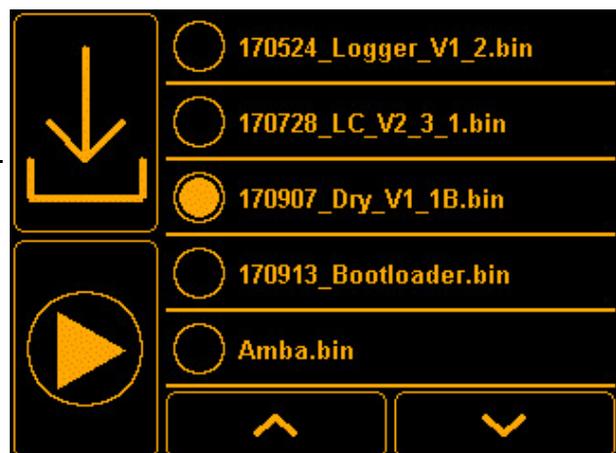
6.9 Settings – Software update

Use this menu to update the software using a USB flash drive bootloader and the USB port. The USB port is located at the back of the display. Tap on Settings  > Update Software to start the bootloader.

During startup of the bootloader, the USB flash drive is detected and the firmware files (bin files) the flash drive contains are listed. The files **must** be located in a folder called "bin" in the root directory of the flash drive (flash drive:/bin/). If the folder contains more than five files, use the arrow buttons up  and down  to navigate. If you are in the top element, tap on the arrow button up  to scan the flash drive again for files. If the logger does not detect the flash drive at all, remove it and insert it again. Continue reading the flash drive (arrow button up ).

If the expected files are displayed, select them by tapping on the correct radio button . If no file is selected, the install button  is greyed out.

When a file is selected, the button turns yellow and becomes active.



An active installation process is indicated by the text "Install...". After successful installation, this text disappears and the file selection is reset.

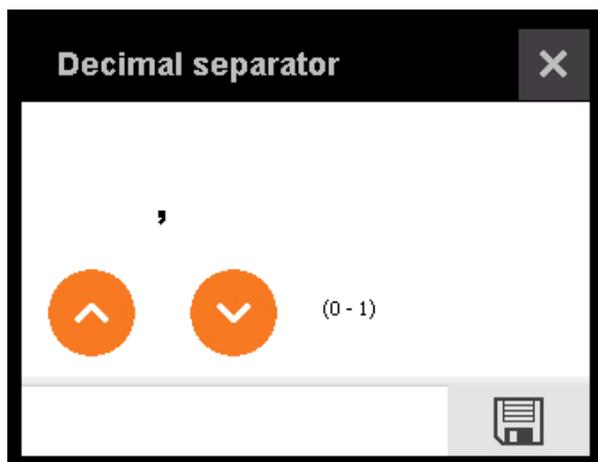


Tap on the play button  to start the application. This restart may take up to three seconds.



6.10 Settings – Decimal separator

Tap on Settings  > Decimal separator to select the logger's decimal separator. This separator is used internally and in the exported CSV file from the time of change.



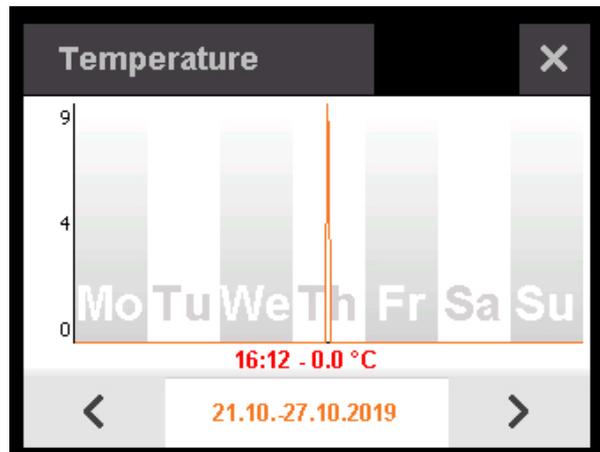
6.11 Settings – About

Tap on Settings  > About to see the current version.



7 Log

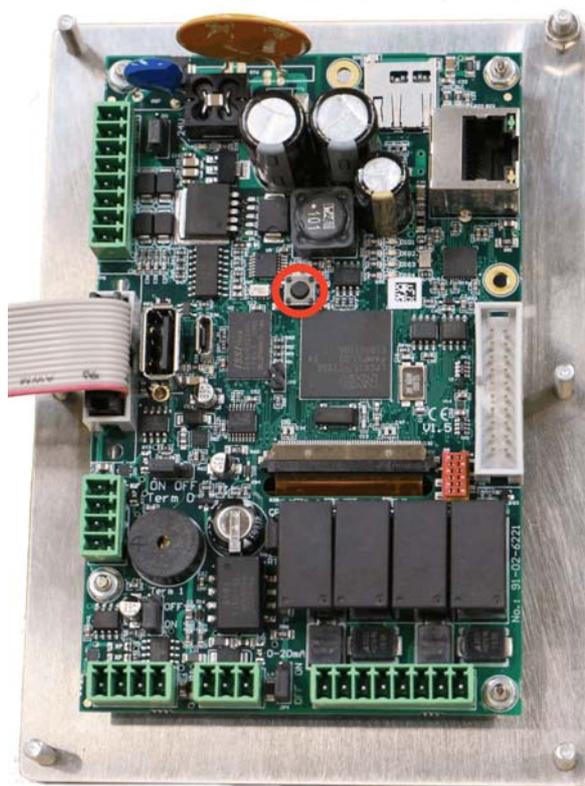
The **Log**  shows the measured values of the current week. Switch between weeks using the arrow buttons , . The log is always displayed for one channel only. Select the desired channel **Temperature** by tapping on the button. Tap anywhere on the screen inside the diagram to select a time.



8 Factory settings

Resetting the software to factory settings:

1. Disconnect the device from the power supply.
2. Press the push-button (marked **red** in the image) and hold.
3. Reconnect the device to the power supply.
4. After the device has started, release the push-button. The software should now be back to factory settings.



9 Cleaning

Clean the exterior of the data logger with a damp cloth in case it is dirty.



NOTICE!

Make sure that the data logger is not damaged by a high-pressure cleaner.

10 Spare parts

Code no.	Description	1 channel	8 channels
91-02-6233	Base computer 103 Nano controller incl. housing	Yes	Yes
83-14-2185	Mounting plate for Vikon V15 and light control	Yes	Yes
99-30-3914	Power supply dual 5/24 V 35 W 2.2 A input 100-240 VAC 50/60 Hz NW SNT RD-35B	Yes	Yes
91-02-6235	Nano I/O, power module	no	Yes
91-02-6208	Nano I/O, analogue in 8	no	Yes
91-02-6239	USB socket for housing installation BD 103 incl. cable IP65	optional	optional

11 Accessories

As an optional extra, the USB port can be led to the outside if data are to be saved on a regular basis.

Code no.	Description
91-02-6239	USB socket for housing installation BD 103 incl. cable IP65