Operating manual

FB-8

Remote Control

Information on the description

Foreword

In addition to meeting current standards and requirements, it is our objective to employ state of the art technology to provide the greatest possible protection to people, machines and the environment.

This description provides user information about the product, and enables the user to handle the product safely and efficiently.

How to use and store the description

To work safely with the product, it is necessary to observe the safety notes and action instructions. All persons working with the product must have understood the user information in this description and apply it conscientiously. The operator must fulfil his duty of care and ensure that all persons working with the product have read and understood the user information and are implementing it.

This description forms part of the product and must be accessible to all persons working with the product at all times.

Copyright protection

The contents, texts, drawings, pictures and other illustrations of this description are protected by copyright and subject to intellectual property rights. Any misuse is punishable by law.

Reproduction in whole or in part of this description is only permitted within the limits of the legal provisions of the copyright law. Any modification or shortening of the text is prohibited without the explicit written consent of LJU Automatisierungstechnik GmbH.

Trademarks

The popular names, trade names, production descriptions, etc. used in this description may constitute trademarks even without special designations and as such may be subject to legal requirements.

Disclaimer

The contents of this description have been checked for compliance with the product described. Nevertheless, it is not possible to rule out deviations, and therefore we cannot guarantee full compliance. Any necessary corrections are included in subsequent versions.

Limitation of liability

All information and notes in this description have been compiled taking into account the applicable standards and regulations, the state of the art and our many years of knowledge and experience.

LJU Automatisierungstechnik GmbH assumes no liability for damage and malfunctions during operation due to:

- Failure to comply with the description
- Non-intended use
- Use by untrained personnel
- Unauthorised alteration or modification
- Use of the product, despite negative transport inspection

Furthermore, LJU Automatisierungstechnik GmbH's warranty obligation will cease to exist in case of a failure to comply with the description.

Warning concept

This description contains notes that must be observed for your own personal safety and to avoid property damage. Notes regarding your personal safety are highlighted by a warning triangle; notes regarding property damage do not have a warning triangle.

When several hazard levels occur, the warning always refers to the highest level. If a warning of injury to persons is indicated with a warning triangle, the same warning might include an additional warning of property damage.

Signal words

Warnings are indicated using signal words based on hazard levels.

Signal word	Meaning
⚠ **WARNING!**	This combination of symbol and signal word indicates a possible dangerous situation that can result in death or serious injury if it is not avoided.
⚠ **CAUTION!**	This combination of symbol and signal word indicates a possible dangerous situation that can result in minor injury if it is not avoided.
❗ **NOTICE!**	This combination of symbol and signal word indicates a possible dangerous situation that can result in material damage if it is not avoided.
🌳 **ENVIRONMENT!**	This combination of symbol and signal word indicates a possible dangerous situation that can result in environmental damage if it is not avoided.

Hazard symbols

Warnings of the groups 'danger' and 'warning' are content-based. They are presented with clear danger symbols.

Warnings of the 'caution' group do not have a specific danger symbol.

Warning signs	Type of danger
	Warning – automatic start-up.
	Warning – dangers due to batteries.
	Warning – danger zone.

Structure of warnings

- ■ **SIGNAL WORD**
- ■ ↳ Type of danger and its source
- ■ ↳ Possible consequences, if not observed
- ■ ↳ Danger avoidance measures
- ■ ↳ Preventive measures

Arrangement of warnings

If warnings refer to an entire section, they are placed at the beginning of the section (e.g. chapter start).

If warnings refer to a specific action instruction, they are placed in front of the respective action instruction.

Suggestions and recommendations

In this description, the suggestions and recommendations are identified by the following symbol.


This symbol indicates important information to help you handle the product.

Text markup

Text	Markup	in front of
Continuous text		Descriptive text
Headers	1	Main section
	1.1	Second level subsection
	1.1.1	Third level subsection
	1.1.1.1	Fourth level subsection
Action instruction	**1.** ▶	Action in particular sequence
Action result	⇨	Result of an action
Unsorted list	■	First list level
Second list level	□	Second list level
Reference	⇘	A reference to further information

Arrangement elements
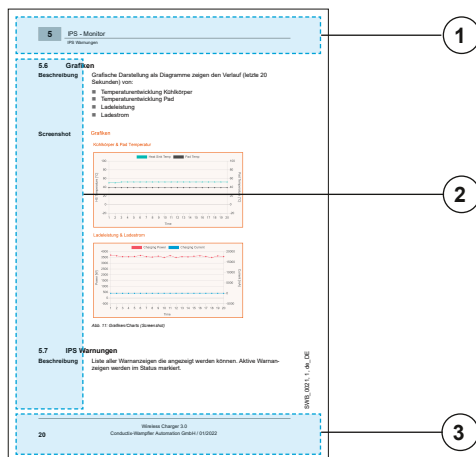
1   Header (nomenclature, section name, section number)
2   Margin column (icons, indicators and key points)
3   Footer (name, version date, page number)

Headers

The headers in the description serve as navigation aids. In this description, information follows the product life cycle.

Cross-references

This description has cross-references that lead to further information on the relevant topic (chapter number/page number).

Illustrations   The illustrations that accompany this description have been purposely selected. They are provided for basic understanding and may differ from the actual design. No claims shall be accepted for possible discrepancies.

BDA0018, 3, en_GB

Table of contents

1 General information

1.1 Revision history

Subject to changes

We reserve the right to make changes to the information present in this document, which result from our constant effort to improve our products.

Version	Date	Comment
1	11/2019	Basic version
2	03/2020	Text corrections
3	03/2021	Technical specifications for infrared transmission added
		Technical specifications for Bluetooth transmission added

1.2 Scope of delivery

Scope of delivery

Amount	Designation
1	FB-8 remote control
1	Battery (9 V block)
1	USB-C cable
1	Operating Manual (PDF)

1.3 Information about this document

This description is a component of the product. It contains important information and notes on using the product. It affects:

- Mechanical and electrical installation
- Commissioning
- Operation
- Maintenance and service

This description is to be kept within easy reach of all persons working on this product on their own responsibility at all times.

1.4 Applicable documents

The documents contained in the project documentation also apply if the device / system is part of a project-specific system plan.

Their own documentation applies to connected devices and components.

The following documents are considered part of the documentation. They are located at the end of this document or they are included as extra documents in the scope of delivery.

■   Device drawing

1.5   Warranty

The warranty only covers production defects and faulty components.

The manufacturer assumes no responsibility for damages caused during transport or unpacking. In no case and under no circumstances will the manufacturer be liable for defects or damages caused by misuse, incorrect installation or inadequate environmental conditions or from dust or corrosive substances.

Consequential damages are excluded from the warranty.

Should you have further questions regarding the warranty, please contact the supplier.

1.6   Customer service

Our service team is available to provide technical information.

You can find information about your relevant contact by phone, fax, e-mail or online.

Service forms

Service forms are available for download under www.conductix.com (www.ljuonline.de). Please send completed service forms to service.potsdam@conductix.com.

2 Safety instructions

This section contains information on all safety aspects for optimum protection of personnel and for safe operation without malfunctions.

To prevent dangers, these notes must be read and followed by personnel. Only then can safe operation be guaranteed.

Of course, all legally applicable general safety and accident prevention regulations must be complied with.

LJU Automatisierungstechnik GmbH assumes no liability for damage or accidents that were caused by non-observance of these safety notes.

2.1 Intended use

The FB-8 remote control is used exclusively to control LJU controls.

Intended use assumes compliance with all information in this manual.

Any use beyond the intended use or other ways of use are considered misuse and will void the warranty.

2.2 Foreseeable incorrect use

Any use that goes beyond this description is forbidden.

2.3 Personnel and qualifications

The product / system belonging to this description may only be handled by personnel qualified for the respective task. This is done taking into account the descriptions associated with the particular task, especially the safety and warning information contained therein.

Due to their training and experience, qualified personnel are able to recognize risks and avoid possible hazards when dealing with this product / system.

⚠ WARNING!

Injury hazard from insufficient qualification!
Improper handling can cause substantial bodily harm or material damage.

2.4   Safety devices

> ⚠ **WARNING!**
>
> **Danger to life from non-functioning safety devices!**
>
> Security devices ensure a maximum degree of safety during operation. Never override safety devices, even if they obstruct work processes. Safety can only be guaranteed if the safety devices are intact.
>
> - Before starting work, check whether the safety devices are fully functional and connected properly to the controller.
> - Report any faulty safety devices immediately.
> - Bring vehicles with defective safety equipment to a standstill immediately.
> - Get safety devices repaired immediately.

3 Transport and storage

3.1 Transport inspection

Check the delivery for completeness and transport damage upon receipt.

Proceed as follows in case of any apparent damage:

■ Refuse to accept the delivery or accept it only conditionally. Take note of the extent of the damage and write it down on the carrier's transport documents or delivery note.
■ Initiate a complaints process and report the incident to the supplier. If Conductix-Wampfler Automation is your direct supplier you will find our contact information in this document.

Claims for damages
Claim any defect as soon as it becomes apparent. Damages can only be claimed within the applicable claim periods.

3.2 Storage

NOTICE!

Storage or shutdown of electrical components
Damage to the components due to improper storage or shutdown.

■ Cover connections with protective caps.
■ Prevent mechanical loads.
■ Keep environmental conditions as specified in the technical information.

Storage temperature

4 Product description

Product description

The FB-8 remote control is used for manual remote control of LJU vehicle control systems. Both the remote control and the vehicle control systems are equipped with the corresponding LJU software and have an LJU infrared and/or Bluetooth interface.

The vehicle control system is addressed directly via infrared. In Bluetooth mode, it communicates with the vehicle via a DataCom stick (DCS) attached to the vehicle control system.
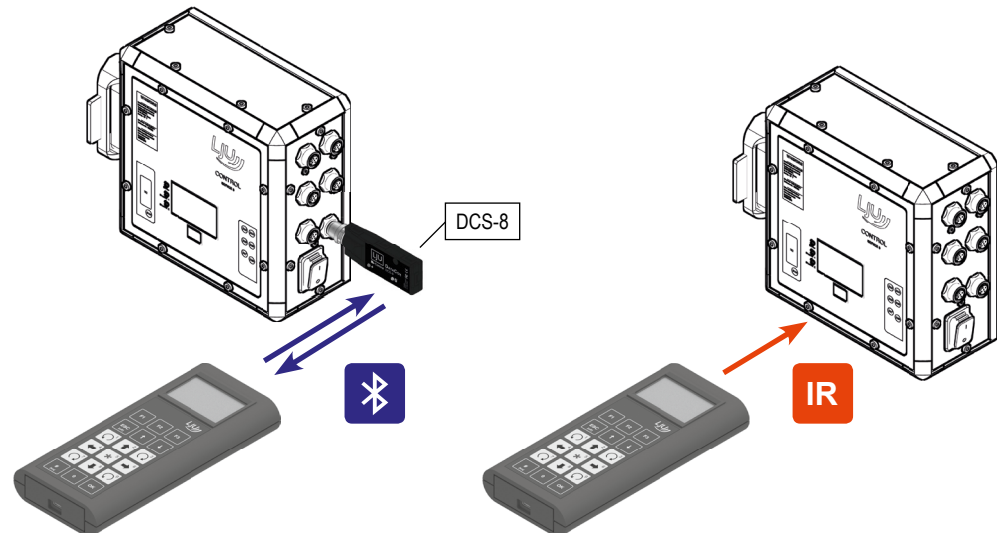
Fig. 1

Infrared communication is unidirectional. Data is only sent to the control system. Bluetooth communication is bidirectional. In this case, data can also be received from the control system or the DataCom stick.

Operation

One function of the remote control is to remotely control vehicle control systems in manual mode. ⮩ *Chapter 'Manual operation - manual mode' on page 73*

Before operating, select the vehicle with which you want to communicate. This clear assignment is important to exclude wrong commands and unplanned vehicle movements.

4.1 Structure

- The remote control consists of an impact-resistant plastic housing with a belt clip on the back.
- It has an LCD display and a membrane keypad.
- The transmitter diodes for IR transmission and the Bluetooth module are mounted on the front of the device.

■ The remote control can be connected to a computer via the USB-C port at the bottom of the housing.
■ Built-in batteries can be charged via the USB-C port.

Structure
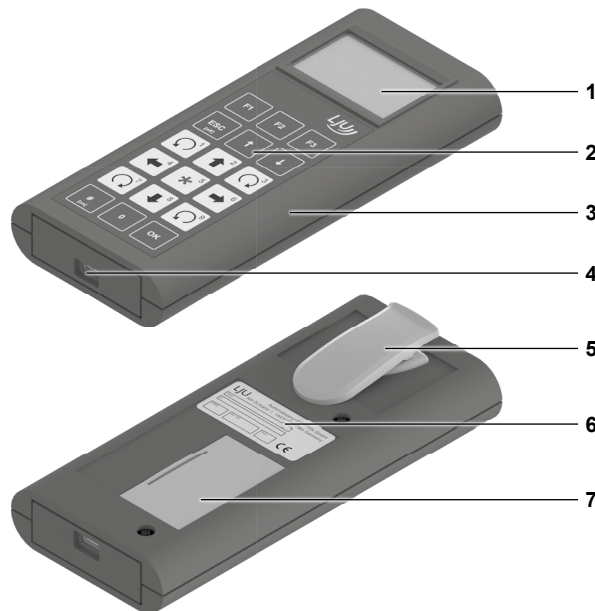
Fig. 2: FB-8

1 LCD display
2 Membrane keypad
3 Housing
4 USB-C interface
5 Belt clip
6 Type label
7 Battery compartment

4.2 Inserting the battery

The remote control is supplied with a 9 V block battery. Alternatively, the remote control can also be operated with an equivalent rechargeable battery. ⮡ *Chapter 'Operating the remote control with a rechargeable battery' on page 20*

When using a rechargeable battery, it can be charged by connecting a USB cable from the USB-C interface to the computer or my means of a charger.

> # NOTICE!
>
> **Setting the battery type**
>
> Incorrect settings may damage the remote control.
>
> ■ Set the charging switch in the battery compartment to the correct position.
> ■ Set the correct battery/rechargeable battery in the *[Energy]* menu.

> *Battery/rechargeable battery type settings*
> *The settings for the battery/rechargeable battery type are only visible to "Servicing" and "LJU" users.*

Inserting the battery

1. ▸ Open the cover on the back of the remote control.

2. ▸ Check that the switch is in the correct position for the type of battery used (⇖ *Chapter 'Battery type' on page 45*).

3. ▸ Insert and connect the battery. The same applies when using a rechargeable battery.

4. ▸ Close the battery compartment cover.
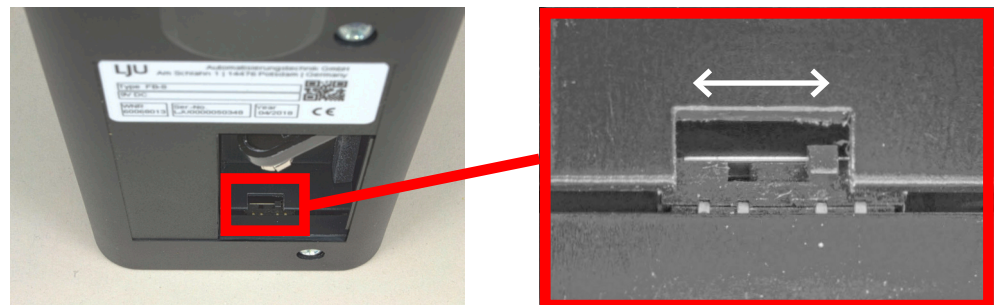
Charging switch

Fig. 3: Battery compartment with charging switch (right figure: Switch position in battery operation)

Left switch position	- Charging current flows / rechargeable battery is being charged
Right switch position	- Charging current is interrupted / switch position for non-rechargeable batteries

4.3 Operating the remote control with a rechargeable battery

Charging via USB

The integrated charging circuit is optimised for a 9 V block NiMH rechargeable battery. Li-Ion batteries can also be used as an alternative. ♺ *'Recommended rechargeable battery types' on page 20*

The connection in the remote control is short-circuit-proof and reverse polarity protected.

The battery can be charged from a USB host or a USB power supply (Dedicated Charging Port - DCP).

> **NOTICE!**
>
> **Deep discharge of the battery**
>
> If the **battery type** is set to **alkaline** in the remote control settings, it is not automatically switched off when the final discharge voltage falls below the set value.
>
> If a rechargeable battery is inserted instead of a standard battery and is allowed to deep discharge, the rechargeable battery may get damaged.
>
> ■ Check battery type in the settings
> ■ Do not deep discharge rechargeable batteries

Recommended rechargeable battery types

Tech-nology	Cells	Nominal voltage	Capacity	Remark
NiMH	7	8.4 V	250 mAh	
NiMH	7	8.4 V	≥ 200 mAh	Charging takes longer The charging status is displayed incorrectly
Li-Ion	2	7.2 ... 7.6 V		Factory setting Only with overload protection.

Prohibited battery type

Tech-nology	Cells	Nominal voltage	Capacity	Remark
NiMH	6	7.2 V		Overheating during charging

> ⚠ **CAUTION!**
>
> **Overheating during charging**
>
> NiMH batteries with 6 cells and a rated voltage of 7.2 V can become very hot during charging and lead to open flames.
>
> ■ Beware of heating
> ■ Beware of leaking liquids

4.4 Switching on and off

Switching on the device

To switch on the remote control, press and hold the ▪ *[#/on]* button until the Home screen appears. ↳ *Chapter 'Start screen' on page 27*

Switching off the device

To switch off the remote control, press and hold the ▪ *[ESC/[off]]* key until a switch-off message appears and the display goes blank.

You can set the time required to switch off the device individually.

[Configure] > [Energy] > [ESC holding time]

4.5 DataCom stick

The DataCom stick (Fig. 4) resembles a USB stick and is located on the LJU vehicle control systems (Fig. 5) in transport systems.
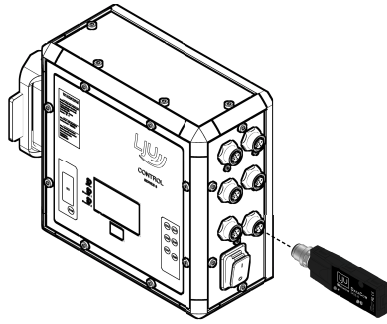
Fig. 4: DCS-8

Fig. 5: Control system with DCS-8

The DCS-8 DataCom stick is an electronic accessory for Series 8 LJU vehicle control systems.

The compact design of the DCS-8 includes:

- USB interface
- Bluetooth module
- Internal antenna
- Data storage

The data communication between the vehicle control system and the DCS-8 takes place via a USB 2.0 interface. If the DCS-8 is used, every vehicle controller is equipped with a DCS-8. The DCS-8 is connected to the vehicle control system via an M12 plug-in connection.

Wireless connections to the DCS-8 can be established with suitable LJU devices over a distance of up to 50 m. These are based on the Bluetooth 4.0 Low Energy Standard. The connection is set up in Advertise Mode. In other words, the DCS-8 as the master only establishes a connection to a device if its identifier corresponds with the identifier requested by the device. If the DCS-8 is not addressed, it operates as a receiver. The transmit function is disabled.

4.5.1 Vehicle address function

The vehicle number is stored in the DCS-8 When the control system is replaced, the DCS-8 is connected to the new control system. The stored vehicle number is transferred to the new controller.

4.5.2 Backup/storage function

Control system settings such as parameters, tables, software versions etc. are stored independently of the control system in the DCS-8, but in a vehicle-specific way. The data is transmitted automatically from the vehicle control system to the DCS-8 via the USB interface, and is stored in the DCS-8 belonging to the vehicle as a backup, where it is power failure-safe. All of the data that is needed to operate the vehicle is therefore immediately available after a vehicle control system has been replaced.

> ***Software of the control system***
>
> *The software of the vehicle control system is not stored on the DataCom stick.*

4.5.3 Log function

The DCS-8 records certain events (e.g. errors which have occurred) in a log. This log can be read out by connecting the DCS-8 to a PC with the DCS Configurator software.

4.5.4 Remote control function via Bluetooth

A vehicle can be remotely controlled with a LJU remote control with Bluetooth capability via the Bluetooth interface of the DCS-8.

4.6 Communication via Bluetooth

The DataCom sticks and remote controls must be preset for communication via Bluetooth. This is done with the DCS Configurator and FB Configurator programs.

All corresponding DataCom sticks and remote controls are grouped together within projects in the configuration programs. All Bluetooth identifiers are stored there as a whitelist. These whitelists are then imported in each of the other configurators.

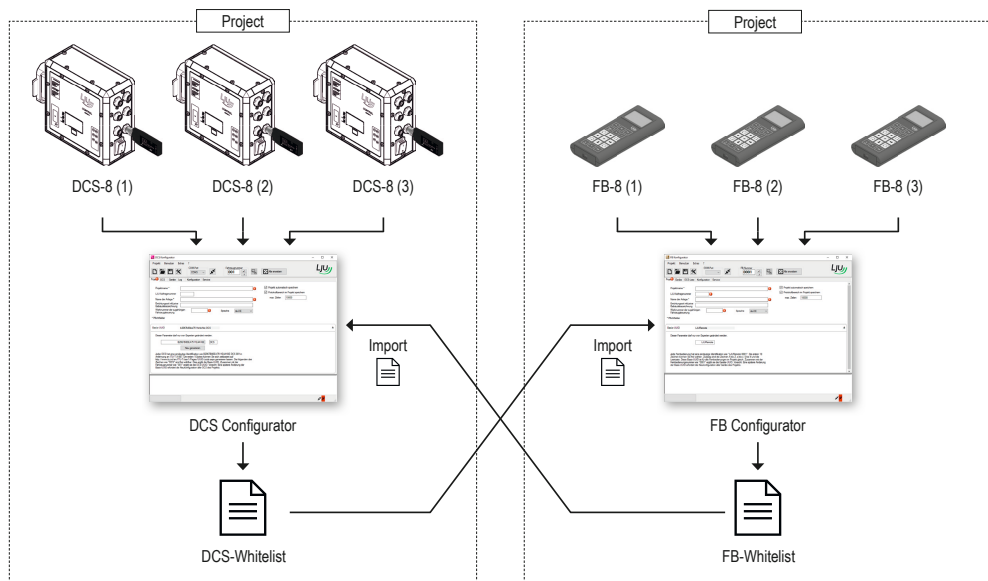After importing the whitelists, the DCS and remote controls are updated with this data.

Fig. 6: Whitelist import

UUID

For Bluetooth communication, identifiers or IDs are required. It is important that the identifier clearly identifies each device and that this is recognised by the communication partner. That is because the separate devices establish connections only to those devices whose identifier has been stored.

UUIDs (Universally Unique Identifiers) are used with important identifiers. These are time-dependent and chosen randomly, so that it is nearly impossible for them to be assigned twice.

Structure of the FB UUID

The remote control has a 14-byte long UUID.

The first 10 bytes are the Basic UUID. All remote controls of the project are based on a Basic UUID.

The last 4 bytes are specially assigned to each individual remote control.

Basic UUID										Remote control identifier			
1	2	3	4	5	6	7	8	9	10	11	12	13	14
10 byte										4 byte			

(28 digits)

Structure of the DCS UUID

The DataCom stick has a 16-byte long UUID.

The first 10 bytes are the Basic UUID. All DataCom sticks of the project are based on a Basic UUID.

The UUID identifier of a DataCom stick requires a special format: The first 20 characters are selected from the hexadecimal system. Then 3 freely selected characters, separated by spaces, and the 3-digit vehicle number complete the DCS UUID.

Basic UUID										DataCom stick identifier					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
10 byte										6 byte					
B2067B80EA7511E4A1BE										...	**DCS**		...	**001**	
Hexadecimal											freely select-able			Vehicle number	
(20*)										(1*)	(3*)		(1*)	(3*)	

* digits

In the remote control, the DCS UUIDs are stored in a whitelist.

5 Function description

5.1 Keypad

The keypad is divided into different areas:
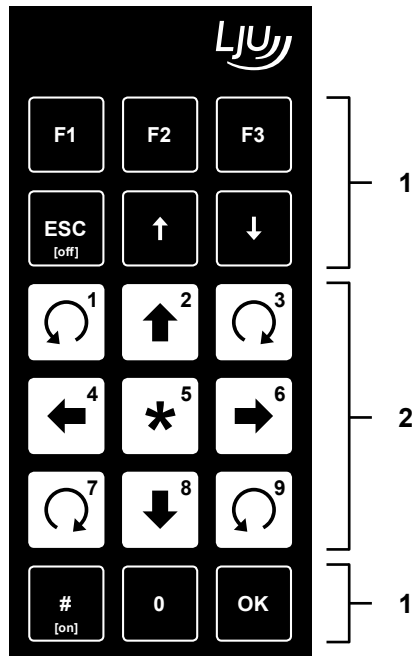
Fig. 7: Membrane keypad of the remote control

1   Keys for basic handling of the remote control
2   Keys for vehicle movement in manual mode

The black keys are intended for basic handling, such as switching on and off, and moving through the main menus and configuration settings.

The colour-coded keys on a white background make the handling of the production technology areas clearly visible. These keys are mainly intended for controlling the movement of vehicles.

F1	F2	F3
■ Context-dependent ■ Opens in the main menu: *[Configuration]*	■ Context-dependent ■ Opens in the main menu: *[Vehicle selection]*	■ Context-dependent ■ Opens in the main menu: *[Read/Write]*
ESC [off] ■ Cancels the current operation and returns to the parent level ■ Switch-off	**↑** ■ Switches to the menu item above in the menu	**↓** ■ Switches to the menu item below in the menu
↻¹ *[1]* ■ project-related	↑² *[2]* ■ Lift ■ or project-related	↻³ *[3]* ■ project-related
←⁴ *[4]* ■ Backwards movement ■ or project-related	*⁵ *[5]* ■ Switches to manual mode ■ Changes the speed of the movement	→⁶ *[6]* ■ Forwards movement ■ or project-related
↻⁷ *[7]* ■ project-related	↓⁸ *[8]* ■ Lower ■ or project-related	↺⁹ *[9]* ■ project-related
# [on] ■ Switches to automatic mode ■ Switch on	**0** *[0]*	**OK** ■ Confirms the selected menu item

5.2   Handling

5.2.1   Start screen

The LJU logo appears on the display after switching on the remote control and during the booting process. The main menu then appears; the remote control is now ready for operation.

Fig. 8: View the main menu of the remote control, with vehicle connected

1 Communication method display
2 Dialogue/process display
3 Battery/rechargeable battery display (charge level)
4 Dialogue field
5 Display for action during operation
6 [F1]: Configuration menu
7 [F2]: Vehicle selection menu
8 [F3]: Read/Write menu

5.2.2 Vehicle number crossed out

If the remote control communicates via Bluetooth while no vehicle control system is connected, the last connected vehicle control system is crossed out in the start screen.

Fig. 9: BT mode set, there is no connection to a vehicle control system

1 Dialogue field: no vehicle connected

5.2.3 Underlined menu item

An underlined list entry shows the selection that was last saved.

Fig. 10: Example: Bluetooth is currently the selected communication method

1   Dialogue field: Bluetooth selected

5.2.4   Menu item in brackets

If a selection is currently unavailable, it will be shown in square brackets on the remote control display. If you select this list entry and confirm it with ⊡ *[OK]*, you will receive an explanation and, if necessary, suggestions for activation.
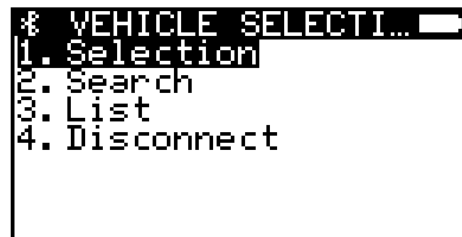
Fig. 11: The [Disconnect] list entry is currently not available because no vehicle is connected.

5.2.5   Cursor

In the submenus, the desired menu items are selected via the ⬆ *[⇑]* or ⬇ *[⇓]* push buttons and then confirmed with ⊡ *[OK]*. The black bar, which can be moved up and down using the arrow keys, indicates the position of the cursor. Alternatively, you can directly press the desired menu digit on the keypad for one-digit menu items.

Fig. 12: Cursor selection on [vehicle number]

5.2.6 Save

Non-volatile memory

All basic settings are stored in the "non-volatile memory".

If you have made changes and saved them in the respective menu item, you will be asked whether you want to transfer the data to the "non-volatile memory" when exiting the menu.

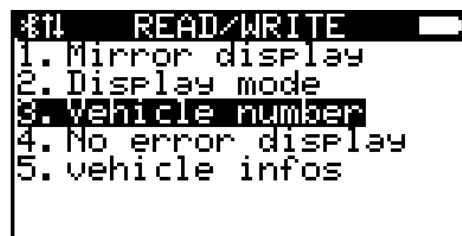If you confirm by means of the dialogue key ⌐ ✓ ⌐, this data will also be available after switching the remote control off and on again.

Volatile memory

If you abort an operation using the dialogue key or the ⌷ *[ESC]* key, the data is stored in volatile memory until you switch off the remote control. When the remote control is switched on again, the parameters are reset to the state before the changes were made.

5.2.7 Context-dependent function keys

Some special functions are available for the ⌷ *[F1]*, ⌷ *[F2]* and ⌷ *[F3]* keys depending on the context. The following table gives an overview.

⌐ ➔ ⌐ - Selects the *[Configuration]* menu.

⌐ ☌ ⌐ - Selects the *[Vehicle selection]* menu.

⌐ ▤ ⌐ - Selects the *[Read/Write]* menu.

⌐ ← ⌐ - Moves the cursor to the left.

⌐ → ⌐ - Moves the cursor to the right.

⌐ ✓ ⌐ - Confirms the dialogue/process.

⌐ ✗ ⌐ - Aborts the dialogue/process.

⌐ +6 ⌐ - Goes to the next page.

⌐ −6 ⌐ - Goes to the previous page.

⌐ ⟳ ⌐ - Updates an entry.

The following illustrations show the function key assignments using display examples:

Fig. 13: Start screen display

1 [F1] *[F1]* = Configuration menu
2 [F2] *[F2]* = Vehicle selection menu
3 [F3] *[F3]* = Read/Write menu

Fig. 14: Communication method selection

1 [F3] *[F3]* = Confirm the dialogue
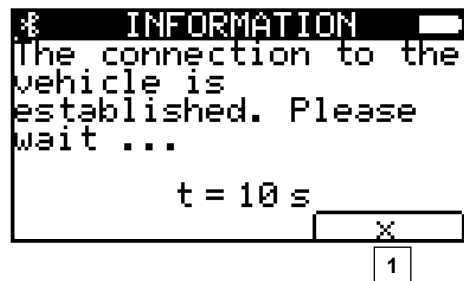
Fig. 15: Information dialogue

1 [F3] *[F3]* = Cancel the dialogue
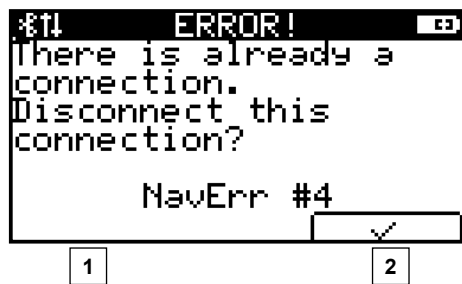
Fig. 16: Information dialogue – error message

1 [F1] = Confirm the dialogue
2 [F3] = Cancel the dialogue

Fig. 17: Vehicle selection – search

1 [F1] = Clear the dialogue
2 [F3] = Confirm the dialogue
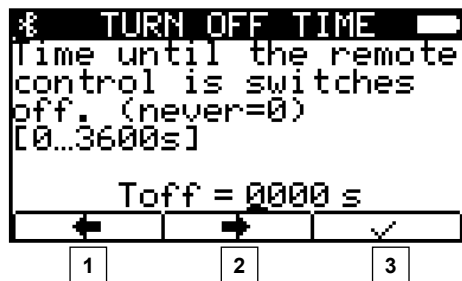
Fig. 18: Configuration menu – switch-off time

1 [F1] = Move cursor to the left
2 [F2] = Move cursor to the right
3 [F3] = Confirm the dialogue
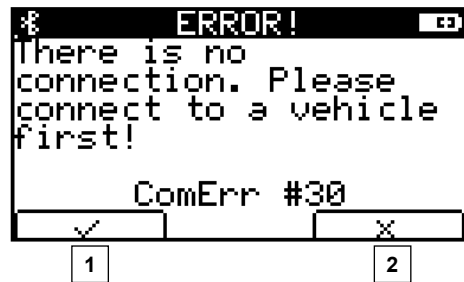
Fig. 19: Information dialogue – error message

1   [F1] *[F1]* = Leads directly to the vehicle selection
2   [F3] *[F3]* = Confirm the dialogue
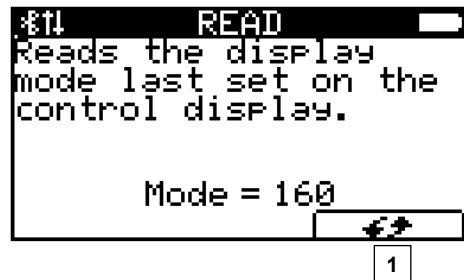
Fig. 20: Read menu item

1   [F3] *[F3]* = Update, re-read the values

5.2.8   Main menu

The currently/last selected vehicle is displayed together with its name directly beneath the heading. When connecting via Bluetooth, the UUID number of the counterpart (Fig. 21/1) is also displayed.

The middle area shows you the commands currently sent to the DataCom stick (Fig. 21/2).

Fig. 21: Start menu with command "Fast movement to the right"

1   Connected vehicle
2   Process
3   Star = command for fast process

With all commands, you have the option to choose between slow or fast speed (Fig. 21/3).

- If you press the ⟨∗⟩ *[∗]* key longer, the star symbol (Fig. 21/3) appears permanently on the left-hand side of the display. During this time, a fast speed is automatically selected until you release the lock by pressing the button again, thus clearing the star.
- Another way to increase the speed without having previously locking the star is to press the command and star keys simultaneously. This also locks the star and moves it from the centre to the left of the display. Now you can release the star key; the speed is set to fast.
- If the key ⟨∗⟩ *[∗]* is not pressed or the star is not locked, you send a slow command.

✱ 5	■ Modifies the speed. ■ Switches to manual mode. ■ Error reset on the control system.
# [on]	■ Switches to automatic mode. ■ Error reset on the control system.

➡ 6	■ Move forwards.
	  ☐ ➡⁶ → slowly
	  ☐ ∗⁵ + ➡⁶ → fast

⬅ 4	■ Move backwards.
	  ☐ ⬅⁴ → slowly
	  ☐ ∗⁵ + ⬅⁴ → fast

⬆ 2	■ Lift
	  ☐ ⬆² → slowly
	  ☐ ∗⁵ + ⬆² → fast

⬇ 8	■ Lower
	  ☐ ⬇⁸ → slowly
	  ☐ ∗⁵ + ⬇⁸ → fast

↻ 1
↻ 3
↻ 7
↻ 9
	■ Movement types are controlled depending on the project (e.g. pushing, twisting, etc.)
	  ☐ ↻¹ / ↻³ / ↻⁷ / ↻⁹ → slow movement
	  ☐ ∗⁵ + ↻¹ / ↻³ / ↻⁷ / ↻⁹ → fast movement

5.3 Menu structure

The menu structure of the remote control is divided into 3 main areas, which can be selected using the function keys ▪ *[F1]*, ▪ *[F2]* and ▪ *[F3]*.

FB-8 menu structure

Configuration

1 - Language

2 - Communication

3 - Energy

4 - Service

5 - Debug [1]

Vehicle selection

1 - Select

2 - Search

3 - List

4 - Disconnect

5 - BT via IR [1]

6 - Append to WL [1]

7 - Delete WL [1]

Read / write

1 - Mirror display

2 - Display mode

3 - Vehicle number

4 - No error display

5 - Vehicle information

6 - Vehicle type [2]

7 - Forced manual mode [2]

8 - Command code [1]

[1] only with "LJU" user right

[2] only with "Maintenance" or "LJU" user rights

6 Menu - Configuration

In the *[Configuration]* menu, you can change all settings individually with regard to language, communication, energy and service.

To access the configuration menu, press the ▪ *[F1]* function key below the ⌐━━ᴄ⌐ symbol in the main menu.

Alternatively, you can create a project in the **FB Configurator** program. Settings and all communication partners, such as remote controls and DataCom sticks, are stored in lists.

> *FB Configurator*
>
> *It is recommended to use the FB Configurator program to configure several remote controls.*

Within these projects, the DCS lists are transmitted to the remote controls, whereas the device or FB lists are transmitted to the DataCom sticks of the vehicle control systems in further steps. These are now in so-called "whitelists" in the remote control.

> *Reference*
> 📖 *SWB_0013_FB Configurator*
>
> *This document is part of this description and is available for download at www.ljuonline.de.*

Menu structure

Configuration

1 - Language

2 - Communication

3 - Energy

4 - Service

5 - Debug [1]

[1] only with "LJU" user right

Settings according to communication method

Configuration menu	Infrared	Bluetooth	
		connected	disconnected
Language	+	+	+
Communication	+	+	+
Energy	+		+

Configuration menu	Infrared	Bluetooth	
		connected	**discon-nected**
Energy profile	+		+
Manual	+		+
Bluetooth			+
TX Power			+
RX Sensitivity			+
Search Duration			+
Search Interval			+
Conn. Time-out			+
Auto Disconnection			+
Brightness	+	+	+
Contrast	+	+	+
Lighting duration	+	+	+
Switch-off time	+	+	+
Energy saving mode	+	+	+
High power	+	+	+
ON hold time	+	+	+
ESC hold time	+	+	+
Bootloader info	+	+	+
Firmware info	+	+	+
Hardware info	+	+	+
Bluetooth info	+	+	+
Manufacturer info	+	+	+
Keypad test	+	+	+
Factory settings	+	+	+
User administration	+	+	+
Password entry	+	+	+

6.1 Language

You can choose between the following system language:

- German
- English

After changing the language, all displays will change automatically.

6.2 Communication

You have the choice between 2 infrared modes with different transmission speeds or Bluetooth.

The infrared interface provides one-way, unidirectional communication. Only data can be sent to the control system.

Data can be sent to and received from the DataCom stick via the Bluetooth interface.

Selecting the communication method

Select the desired communication method in the *[Communication]* menu.

Fig. 22: FB-8 display - Configuration menu - Communication menu item

In each display mode, the current communication method is displayed in the upper left area.

1		IR - Infrared with 9,600 bps = slow infrared
2		IRDA - Infrared with 62,500 bps = fast infrared
3		Bluetooth
4		IR & IRDA (mixed mode)

ℹ️ ***IR & IRDA***

If this mode is selected, data is transmitted alternately at 9,600 and 62,500 bps. This enables the control of control systems with different reception rates without having to switch between slow and fast infrared.

6.3 Energy

Set energy consumption settings or display view settings.

ℹ️ *If a vehicle control system is connected to the remote control, the [Energy] menu item cannot be selected.*

To change the remote control configurations, terminate the connection from the vehicle control system.

Menu structure   **Energy**

1 - Energy profile

2 - ON hold time

3 - ESC hold time

4 - Battery type [1]

[1] only with "Maintenance" or "LJU" user rights

6.3.1 Energy profile

Menu structure   **Energy profile**

1 - Manual

2 - Energy saving mode

3 - High power

Energy profile   The following sub-items are available for selection in the *[Energy profile]* menu item:

Manual   - Individual setting options.

Energy saving - Factory default settings to reduce energy consumption.
mode

High power   - Some settings are set for increased energy consumption, for example to obtain better transmission power or longer standby times.
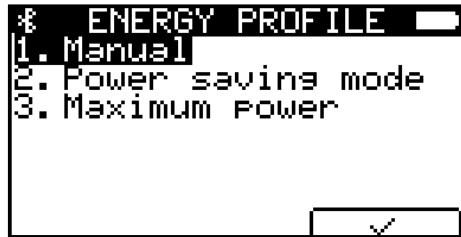
Fig. 23: Energy menu - Energy profile menu item

Battery running time

High setting values decrease the battery running time.

Energy profile presets

	High power	Energy saving mode
Switch-off time	1800 s	600 s
Lighting duration	600 s	10 s
Brightness	100%	30%
Contrast	50%	50%
Bluetooth transmit power	4 dBm	0 dBm
Bluetooth receiving sensitivity	-95 dBm	-95 dBm
Bluetooth search duration	10 s	10 s
Bluetooth search interval	60 s	10 s
Bluetooth connection time-out	60 s	10 s
Bluetooth automatic disconnection	never	30 min

6.3.1.1 Manual energy profile

Menu structure **Manual energy profile**

1 - Bluetooth

2 - Brightness

3 - Contrast

4 - Lighting duration

5 - Switch-off time

You can change the following settings in the *[Manual]* energy profile:

Bluetooth	- Bluetooth settings
Brightness	- Display brightness
Contrast	- Display contrast
Lighting duration	- Illumination duration until the display illumination switches off if no key is pressed
Switch-off time	- Switch-off time until the remote control switches off if no key is pressed

Bluetooth

Fig. 24: Bluetooth menu item

You can select the transmission power with which the Bluetooth module sends the data from the remote control to the DataCom stick of the vehicle control system.

Depending on the ambient situation, it is recommended to set the transmission power *[TX Power]* and receiving sensitivity *[RX Sensitivity]* to the highest values in order to ensure a good stable connection.

TX Power	- -23 dBm, -6 dBm, 0 dBm, 4 dBm
	(At -23 dBm, the transmission distance is reduced to approx. 50 cm.)
RX Sensitivity	- -89 dBm, -95 dBm
	(The lower the value, the higher the receiving sensitivity.)

TX Power / RX Sensitivity

It is recommended not to change the preset values.

In the menu items *[Search Duration]*, *[Search Interval]*, *[Conn. Time-out]* and *[Auto Disconnection]*, you can individually define the search times for suitable counterparts as well as the abortion of the respective process.

Search Duration - 0 ... 255 s (4.25 min)

                0=Search duration extends for an unlimited period of time.

Search Interval - 0 ... 255 s (4.25 min)

                0=Search interval extends for an unlimited period of time.

Conn. Time-out - 0 ... 255 s (4.25 min)

                0=No connection attempt is aborted due to a time-out.

Auto Disconnec- - 0 ... 255 min (4.25 h)
tion

                0=Automatic disconnection is deactivated.

Brightness

You can adjust the brightness individually. The larger the value, the brighter the display backlight is selected.

0%   - No backlight

100% - Maximum backlight
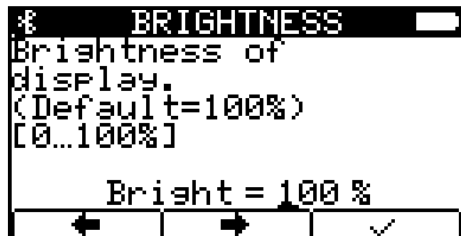
Fig. 25: Brightness menu item

Contrast

You can adjust the amount of contrast between the background and font individually. The contrast between light and dark is greatest at 50 %. If the value is less than 50 %, the entire display turns brighter. If the value is greater than 50 %, the display turns darker. At 100%, the display turns black, i.e. there is no longer any contrast between the font and background colours.

Fig. 26: Contrast menu item

Contrast: low

Contrast: high

**Lighting dura-
tion**
After pressing a button, the remote control starts a timer that controls the display's backlight duration.

If the illumination duration is greater than 0, the lighting is reduced to 60% of the currently set brightness after a set time (before the timer elapses). After the timer elapses, the illumination switches off completely.

0 s   - The backlight stays on indefinitely.

600 s - The backlight switches off after 10 min.
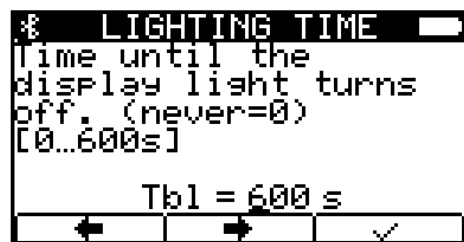
Fig. 27: Illumination duration menu item

Switch-off time
After pressing a button, the remote control starts a timer that determines the time until the remote control is switched off when the remote control is not in use.

If the switch-off time is greater than 0 and no key is pressed, the remote control switches off automatically after the timer has elapsed.

0 s   - The remote control does not switch off.

3600 s - The remote control switches off after 1 h.

Fig. 28: Switch-off time menu item

6.3.2 ON hold time

Specify how long the ■ *[#]* key must be pressed before the remote control switches on.

0 ms — Remote control switches on immediately.

3000 ms — The ON key must be kept pressed for 3 s to switch on.
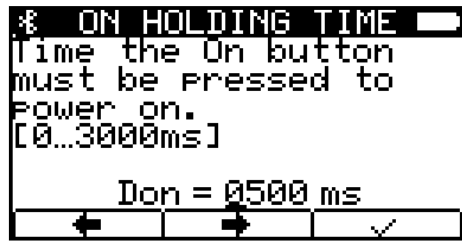
Fig. 29: 'ON hold time' menu item

6.3.3 ESC hold time

Specify how long the ■ *[ESC]* key must be pressed before the remote control switches off.

500 ms — The ESC key must be kept pressed for 0.5 s to switch off.

3000 ms — The ESC key must be kept pressed for 3 s to switch off.
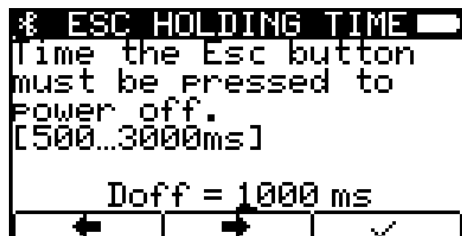
Fig. 30: 'ESC hold time' menu item

6.3.4 Battery type

The battery symbol appears in the upper right corner of the remote control display. Here you can see the charge level: The more black fields you see, the lower the charge level.

Never mix rechargeable batteries with non-rechargeable batteries.

To charge a battery inside the remote control, you can use the USB cable connected to the computer or charger.

Make sure that the switch at the bottom of the battery compartment is in the correct position. ⇲ *'Charging switch' on page 19*

NOTICE!

Setting the battery type
Incorrect settings may damage the remote control.

◾ Set the charging switch in the battery compartment to the correct position.
◾ Set the correct battery/rechargeable battery in the *[Energy]* menu.

Battery/rechargeable battery type settings
The settings for the battery/rechargeable battery type are only visible to "Servicing" and "LJU" users.

6.3.5 Charge level

If the battery or rechargeable battery has reached a critically low charge level, a message appears indicating that the battery needs charging.

This message appears at a charge level of ≤5%. Connect the charging cable or replace the battery promptly. The message disappears automatically as soon as the charge reaches 10%.
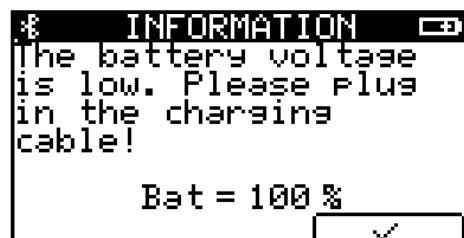
Fig. 31: Battery voltage too low

6.4   Service

Menu structure   **Service**

1 - Bootloader info [1]

2 - Firmware info [1]

3 - Hardware info [1]

4 - Bluetooth info [1]

5 - Manufacturer info [1]

6 - Keypad test

7 - Factory settings

8 - User administration [2]

[1] only information, no setting options

[2] only with "Maintenance" or "LJU" user rights

6.4.1   Bootloader info

The following information is displayed:

BV   - Version number

Date - Compilation date

Time: - Compilation time

6.4.2   Firmware info

The following information is displayed:

BV   - Version number

Date - Compilation date

Time - Compilation time

Updating the firmware
Only update the firmware after consulting LJU.

6.4.3 Hardware info

The following information is displayed:

Rev   - Device type

WNR   - Remote control item number

LPN   - Circuit board number

SNR   - Remote control serial number

Prod   - Production date

Bat   - Current battery voltage

Battery type - Currently set battery type

6.4.4 Bluetooth info

The following information is displayed:

Stack   - Stack version of the Bluetooth interface

Firmware - Firmware version of the remote control's Bluetooth module

FB UUID   - UUID of the remote control

DCS UUID - UUID of the DataCom stick

6.4.5 Manufacturer info

The following information is displayed:

◼ Information about the manufacturer of the remote control.

6.4.6 Keypad test

You can use the keypad test to check the function of each individual key. When a key is pressed, the assignment is displayed under `key = (#)`.

To exit the test: Press and hold down any key except *[ESC]*.

> *ESC key*
>
> *Hold this button pressed for longer to switch off the remote control.*

6.4.7 Factory settings

When the remote control is reset to factory settings, all setting options are reset to the values shown in the table ↻ *Tab. Table 'Factory settings' on page 48*.

When resetting, the whitelist is also deleted and the FB UUID is set to 0.

↻ *Chapter 'Factory settings' on page 48*

```
╔══════════════════════════╗
║ ❊  FACTORY RESET    ▭ ║
║Should the remote         ║
║control configuration     ║
║and whitelist be          ║
║reset to factory          ║
║default?                  ║
║  ┌──────┐      ┌──────┐  ║
║  │  ✓   │      │  ✗   │  ║
║  └──────┘      └──────┘  ║
╚══════════════════════════╝
```
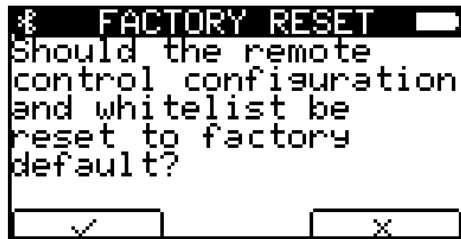
Fig. 32: Factory setting menu item

Battery type factory settings

When the remote control is reset to factory settings, the battery type is set to "Alkaline".

NOTICE!

Deep discharge of the battery

If the **battery type** is set to **alkaline** in the remote control settings, it is not automatically switched off when the final discharge voltage falls below the set value.

If a rechargeable battery is inserted instead of a standard battery and is allowed to deep discharge, the rechargeable battery may get damaged.

- Check battery type in the settings
- Do not deep discharge rechargeable batteries

Factory settings

Setting	Value range
System language	German
Communication mode	Bluetooth
Switch-off time [1]	0
Illumination duration [1]	0
Brightness [1]	100%
Contrast [1]	50%

Setting	Value range
ON hold time	500 ms
OFF hold time	1,000 ms
Bluetooth transmission power [1]	4 dBm
Bluetooth receiving sensitivity [1]	-95 dBm
Energy mode	Manual
Bluetooth search duration [1]	10 s
Bluetooth search interval [1]	10 s
24984Bluetooth connection time-out	10 s
Bluetooth automatic disconnection	10 s
User	User
Battery type	Alkaline

[1] must only be modified in *[Manual]* mode

Tab. 1: Factory settings

6.4.8 User administration

The *[User administration]* menu item shows the users. These have different user and access rights.

Fig. 33: User administration menu Item

The change from User to Maintenance requires a password entry.

If an wrong password is entered, you will not be allowed to enter it again. If you want to re-enter your password, the timer dialogue must remain open until the time elapses, otherwise the timer is interrupted and will start over again when the password entry window is opened. This procedure is intended to prevent the password from being entered by trial and error. Switching off the remote control does not speed up the timer either.

Password for "Maintenance"

The password for "Maintenance" user mode can be requested from LJU.

Password for "LJU"

The "LJU" user mode is reserved for LJU service staff.

User rights

Configuration menu	User	Servicing	LJU
Language	+	+	+
Communication	+	+	+
Energy	+	+	+
Energy profile	+	+	+
Manual	+	+	+
Bluetooth	+	+	+
TX Power	+	+	+
RX Sensitivity	+	+	+
Search Duration	+	+	+
Search Interval	+	+	+
Conn. Time-out	+	+	+
Auto Disconnection	+	+	+
Brightness	+	+	+
Contrast	+	+	+
Lighting duration	+	+	+
Switch-off time	+	+	+
Energy saving mode	+	+	+
High power	+	+	+
ON hold time	+	+	+
Battery type		+	+
ESC hold time	+	+	+
Bootloader info	+	+	+
Firmware info	+	+	+
Hardware info	+	+	+
Bluetooth info	+	+	+
Manufacturer info	+	+	+
Keypad test	+	+	+
Factory settings	+	+	+

Configuration menu	User	Servicing	LJU
User administration	+	+	+
Password entry		+	+

Vehicle selection menu	User	Servicing	LJU
Vehicle selection (Bluetooth)	+	+	+
Selection (Bluetooth)	+	+	+
Search	+	+	+
List	+	+	+
Disconnect	+	+	+
Vehicle number (infrared)	+	+	+

Read/Write menu	User	Servicing	LJU
Read/Write	+	+	+
Mirror display	+	+	+
Display mode	+	+	+
Read	+	+	+
Write	+	+	+
Vehicle number	+	+	+
Read	+	+	+
Write	+	+	+
No error display	+	+	+
Read	+	+	+
Write	+	+	+
Vehicle information	+	+	+
Vehicle type		+	+
Read		+	+
Write		+	+
Unrestrained manual mode		+	+
Read		+	+
Write		+	+

6.5 Debug

Diagnostic tool which may be used exclusively by LJU personnel.

This action is reserved for [LJU] users only.

NOTICE!

Unauthorised access to software

Unauthorised access or modification to the device software can lead to a total failure of the device.

7   Menu - Vehicle selection

The functions in the Vehicle selection menu are only available for communication via Bluetooth.

Menu structure

Vehicle selection

1 - Select

2 - Search

3 - List

4 - Disconnect

5 - BT via IR [1]

6 - Append to WL [1]

7 - Delete WL [1]

[1] only with "Maintenance" or "LJU" user rights

Settings according to communication method

Vehicle selection menu	Infrared	Bluetooth	
		connected	disconnected
Vehicle selection (Bluetooth)		+	+
Selection (Bluetooth)		+	+
Search			+
List		+	+
Disconnect		+	
Vehicle number (infrared)	+		

To access the *[Vehicle selection]* menu, press the *[F3]* ⎡ ᗡᗡ ⎤ key under the ▪ symbol in the main menu.

Fig. 34: Vehicle selection menu, when no vehicle is connected

7.1 Select

To connect a vehicle, select a vehicle from the *[Selection]* menu. Use the dialogue keys [◀] and [▶] to move the cursor or select the counterpart directly using the numeric keys on the remote control. Press [✓] to confirm your selection.
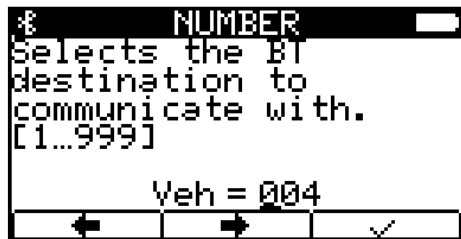
Fig. 35: Selection menu item

The connection to the selected vehicle is established.
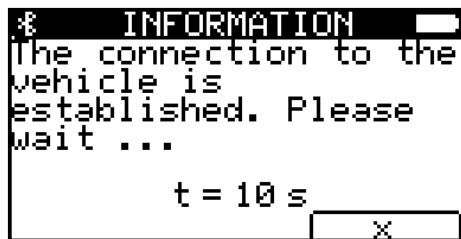
Fig. 36: connecting

If a connection cannot be established, a time-out error message appears. Make sure that the desired DataCom stick is selected and within range of the remote control.
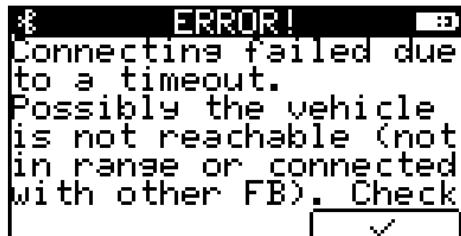
Fig. 37: connection failed

7.2 Search

If no vehicle is connected or if you do not know the vehicle number, you can display all Bluetooth-enabled vehicles entered in the whitelist within your reception range via the *[Search]* menu item. Use the arrow keys to select the vehicle and confirm your selection with [✓].

Fig. 38: Vehicle selection menu, when vehicle is connected

In Bluetooth mode, only one counterpart can be selected. If a vehicle is already connected, an error message appears.
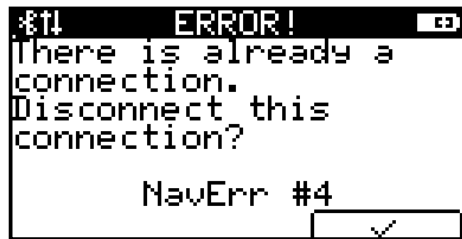
Fig. 39: Error NavErr #4

7.3 List

The *[List]* menu item shows all vehicles stored in the whitelist, regardless of whether they are already connected or not. The whitelist is generated via the entry in the *[project]*.

Mark the desired vehicle by moving the arrow keys and confirm your selection with ⟦ ✓ ⟧.

Fig. 40: List menu item

If a vehicle is already connected, an error message appears indicating that a connection already exists.

7.4 Disconnect

The *[Disconnect]* menu item enables you to disconnect a connected vehicle.

With ⌐ ✓ ⌐ you confirm the disconnection, with ⌐ ✗ ⌐ the connection remains active.


```
*↑↓    DISCONNECT    ▭
Should the connection
to the current
vehicle really be
disconnected?


     ✓              ✗
```
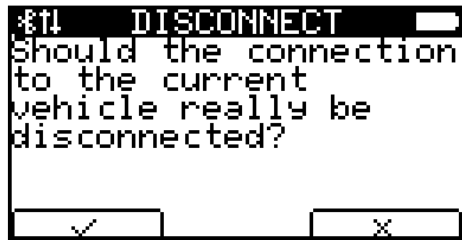
Fig. 41: Disconnect menu item

If no vehicle is connected, the menu item is enclosed in square brackets. If you select the item, an error message appears. Press the symbol keys ⌐ ⚓ ⌐ or ⌐ ✓ ⌐ or 🔲 *[ESC/off]* to return to the previous menu.

ⓘ ***Automatic disconnection***
When the remote control is switched off, it is automatically disconnected from the vehicle. Each time the remote control is switched on, it must be reconnected to the vehicle control system in Bluetooth mode. This safety precaution is intended to prevent improper operation and unwanted connections.

7.5   BT via infrared

This function sends a special command to the control system via IR/IRDA. The remote control stays in Bluetooth mode. The control system forwards the command to the DataCom stick. This generates a temporary UUID which is entered in the whitelist.

After sending the command 5 times, the remote control tries to establish a connection to the DataCom stick.

ⓘ *This action is reserved for [LJU] users only.*

7.6   Appending to WL

All DataCom sticks found via the search function are included in the whitelist of the remote control.

ⓘ *Manual changes to the whitelist of the remote control must be synchronised with the project settings in the FB Configurator.*

This action is reserved for [LJU] users only.

7.7   Deleting a WL

The entire whitelist stored in the remote control will be deleted.

Manual changes to the whitelist of the remote control must be synchronised with the project settings in the FB Configurator.

This action is reserved for [LJU] users only.

Every user can delete the whitelist from the remote control using the FB Configurator program.

7.8   Vehicle selection via infrared

If infrared is selected as the communication mode, the vehicle is addressed by entering its vehicle number.

⚠ WARNING!

Selecting vehicle number "000" in infrared mode

Serious injury and damage to property may result from carelessly moving the vehicle or lifting and lowering loads.

If the vehicle number "000" is selected in infrared mode, **all** vehicles in the transmission range of the remote control are controlled.

■ Make sure there are no people in the danger zone before using the remote control, moving the vehicle or lifting and lowering loads.
■ Operate the vehicle remotely only when it is in the line of sight.

8   Menu - Read/Write

In the *[Read/Write]* menu, data is either read from a vehicle control system or sent to a vehicle control system.

"Read/Write" only via Bluetooth

If your remote control is connected to the vehicle control system via infrared, the menu items under [Read/Write] cannot be selected.

Menu structure

Read/Write

1 - Mirror display

2 - Display mode

3 - Vehicle number

4 - No error display

5 - Vehicle information

6 - Vehicle type [1]

7 - Forced manual mode [1]

8 - Command code [2]

[1] only with "Maintenance" or "LJU" user rights

[2] only with "LJU" user right

Settings according to communication method

Read/Write menu	Infrared	Bluetooth	
		connected	discon- nected
Read/Write	+	+	+
Mirror display		+	+
Display mode	+	+	
Read		+	
Write	+	+	
Vehicle number	+	+	
Read		+	
Write	+	+	
No error display	+	+	
Read		+	
Write	+	+	

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Read/Write menu	Infrared	Bluetooth	
		connected	**discon-nected**
Vehicle information		+	
Vehicle type	+	+	
Read		+	
Write	+	+	
Unrestrained manual mode	+	+	
Read		+	
Write	+	+	

8.1 Mirror display

In the *[Mirror display]* menu item, you can show the display of the vehicle control system connected to the remote control in the display of the remote control.
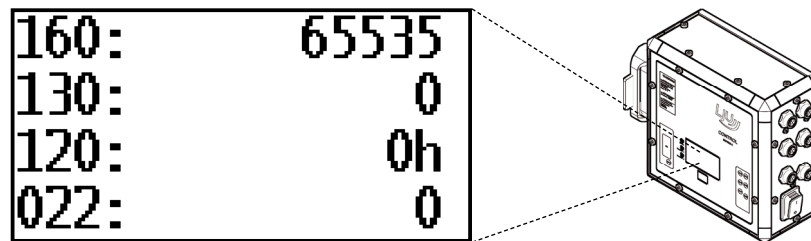

Fig. 42: FB-8 - Display screenshot - Mirror display menu item

8.2 Display mode

The display mode refers to the numbering of the respective status information shown in the display. The display can be configured using the numbering.

(e.g.: Display mode 002 shows the set speed)

values are shown in **decimal** or **hexadecimal** format.

■ Decimal values can be read directly.
■ Hexadecimal values are indicated by a "h" behind the value and must be converted for calculation.
  If multiple lines of the legend apply, the bits are added.

Selecting the display mode

The *[Display mode]* menu item is used for diagnostics and checking purposes. You can specify what the control system display should show.

Press the [✓] key to confirm the selection and the [✗] key to cancel the operation.

Fig. 43: Menu item Display mode via Bluetooth communication
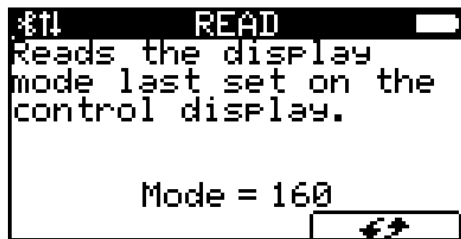

Fig. 44: Display mode menu – Read menu item
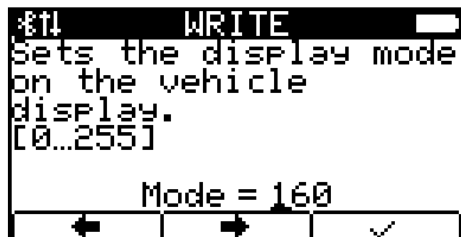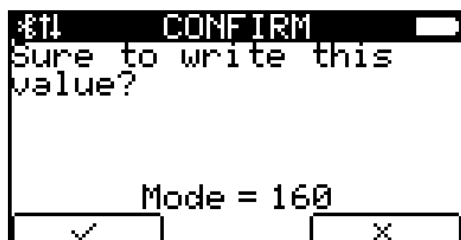

Fig. 45: Display mode menu – Write menu item

Fig. 46: Write menu item, confirm change

Information on display modes

You can find further information on display modes in the documentation of the vehicle control system.

8.3 Vehicle number

> ### ⚠ WARNING!
>
> **Selecting vehicle number "000" in infrared mode**
>
> Serious injury and damage to property may result from carelessly moving the vehicle or lifting and lowering loads.
>
> If the vehicle number "000" is selected in infrared mode, **all** vehicles in the transmission range of the remote control are controlled.
>
> ■ Make sure there are no people in the danger zone before using the remote control, moving the vehicle or lifting and lowering loads.
> ■ Operate the vehicle remotely only when it is in the line of sight.

The *[Vehicle number]* menu item allows you to define the numbers in the vehicle control system or to read them from the control.
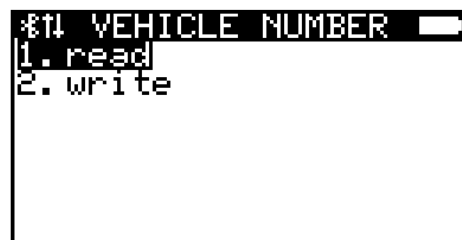

Fig. 47: Vehicle number menu item
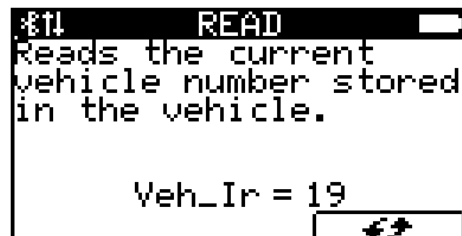
Fig. 48: Vehicle number menu – Read menu item
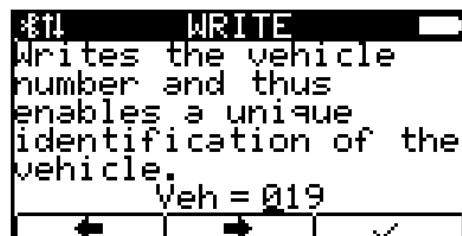
Fig. 49: Vehicle number menu – Write menu item
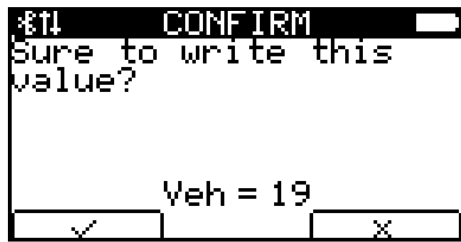
Fig. 50: Write menu item, confirm change

8.4 No error display

In the *[No error display]* menu item, you have the option of deactivating the error display.

Fig. 51: No error display menu item
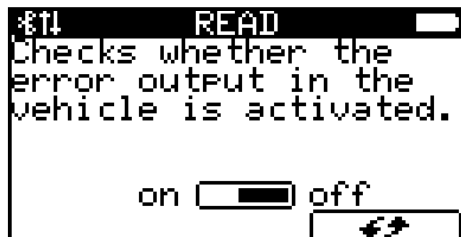
Fig. 52: No error display menu – Read menu item

Move the black bar of the display in the *[Off]* direction and confirm the setting with ⌐ ✓ ⌐. To reconfirm, a prompt will appear asking you whether you really want to write this value. Press ⌐ ✓ ⌐ to apply the setting or ⌐ ✗ ⌐ to cancel the operation.
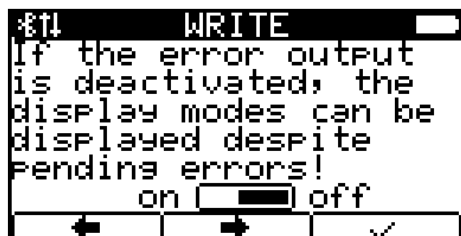
Fig. 53: No error display menu – Write menu item
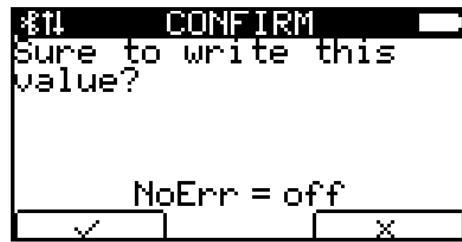
Fig. 54: Write menu item, confirm change

8.5 Vehicle information

In the *[Vehicle Info]* menu item you can view all relevant vehicle data. Use the arrow keys to scroll through the individual pages of the menu.

FZN   - Vehicle number

SNR   - Serial number of the vehicle control system

WNR   - Item number of the vehicle control system

Objective - Vehicle stop point (index on target position table or direct position)

Type   - Vehicle parameter - Vehicle type

Ext   - Vehicle parameter - Extended vehicle type
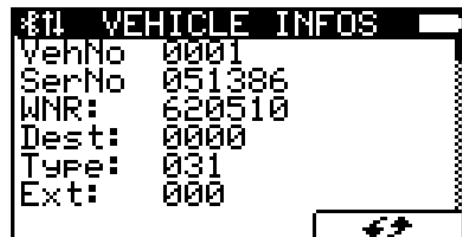
Fig. 55: Vehicle info menu item, first page

8.6 Vehicle type

The menu item *[Vehicle type]* shows in the menu sub-item *[Read]* which vehicle type is stored in the control.

It can be changed in the *[Write]* menu sub-item.

This action is reserved for [Servicing] and [LJU] users only.

8.7 Unrestrained manual mode

In the menu *[Forced Manual Mode]*, you decide whether the vehicle control system should be in Forced Manual Mode or not. In the *[Read]* menu item, the activation is checked, whereas in the *[Write]* menu item, you can activate/deactivate the forced manual mode.

Forced manual operation enables manual control of the vehicle control system despite error messages, and deactivates locking induced by switches or sensors.

This process is necessary to resolve critical situations that have occurred between various vehicle control systems.

This action is reserved for [Servicing] and [LJU] users only.

9 Examples of use

9.1 Communication via infrared

The remote control and the vehicle control can communicate via infrared using 2 transmission speeds (↳ *Chapter 'Communication' on page 38*).

1. ▸ Press the ▪ *[#]* button to switch on the remote control. Make sure that the vehicle control system is also switched on.

2. ▸ Press ⌐──⌐ to enter the *[Configuration]* menu.

3. ▸ Use the ▪ *[⇡]* and ▪ *[⇣]* arrow keys to select the *[Communication]* sub-item and press the *[OK]* remote control key to confirm your selection.

4. ▸ In the submenu, use the ▪ *[⇡]* and ▪ *[⇣]* arrow keys to select one of the two IR speeds and press ⌐ ✓ ⌐ or *[OK]* to confirm your selection.

5. ▸ Press *[ESC]* several times to return to the main menu.

6. ▸ Press ⌐ ✓ ⌐ to apply the changes in the non-volatile memory, i.e. the changes remain available when the remote control is switched on again, or press ⌐ ✗ ⌐ if you want the change to only stay until the FB is switched off.

⇨ Communication via infrared is selected.

9.2 Controlling the vehicle control system via infrared

The communication between remote control and vehicle control via infrared requires a direct optical connection. Make sure that there are no obstacles between the communication partners.

1. ▸ Select communication via infrared (↳ *Chapter 'Communication via infrared' on page 65*).

2. ▸ If necessary, save the change in the non-volatile memory to ensure that communication via infrared stays even after switching the system off and on again.

3. ▸ Return to the Home screen and press ⌐ ⊞ ⌐ to enter the Vehicle selection menu.

4. ▸ You are taken directly to the selection display, where you can enter the number of the vehicle you wish to control.

You can use ⌐ ← ⌐ and ⌐ → ⌐ to determine the position of the digit to be entered.

⚠ WARNING!

Selecting vehicle number "000" in infrared mode
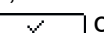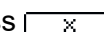
Serious injury and damage to property may result from carelessly moving the vehicle or lifting and lowering loads.

If the vehicle number "000" is selected in infrared mode, **all** vehicles in the transmission range of the remote control are controlled.

- Make sure there are no people in the danger zone before using the remote control, moving the vehicle or lifting and lowering loads.
- Operate the vehicle remotely only when it is in the line of sight.

---

5. ▸ Confirm your selection with ⌐ ✓ ⌐.

9.3 Communication via Bluetooth

1. ▸ Press the ▪ *[#]* button to switch on the remote control. Make sure that the vehicle control systems are also switched on.

2. ▸ Press ⌐ ▬◣ ⌐ to enter the *[Configuration]* menu.

3. ▸ Use the ▪ *[↑]* and ▪ *[↓]* arrow keys to select the *[Communication]* sub-item and press the ▪ *[OK]* remote control key to confirm your selection.

4. ▸ In the submenu, select the *[Bluetooth]* menu item and confirm your selection with ⌐ ✓ ⌐ or ▪ *[OK]*.

5. ▸ Press the ▪ *[ESC]* key several times to return to the main menu.

6. ▸ Press ⌐ ✓ ⌐ to apply the changes in the non-volatile memory, i.e. the changes remain available when the remote control is switched on again, or press ⌐ ✗ ⌐ if you want the change to stay only until the FB is switched off.

⇨ Communication via Bluetooth is selected.

9.4 Connecting to the DataCom Stick via Bluetooth

A direct connection between remote control and vehicle control is not possible via Bluetooth. Therefore, communication passes through the interface of the DataCom stick.

1. ▸ Select communication via Bluetooth (↳ *Chapter 'Communication via Bluetooth' on page 66*).

2. ▸ If necessary, save the change in the non-volatile memory to ensure that communication via Bluetooth stays even after switching the system off and on again.

3. ▸ Return to the home page.

⇨ Since there is still no connection between the remote control and the DataCom stick, the vehicle number is crossed out in the dialogue field of the display.

4. ▸ Press ⌑ on the Home screen to enter the Vehicle Selection menu. The *[Disconnect]* menu item cannot be selected in the display because no DataCom stick is connected yet.

```
※ VEHICLE SELECTI...▭
1. Selection
2. Search
3. List
4. Disconnect
```
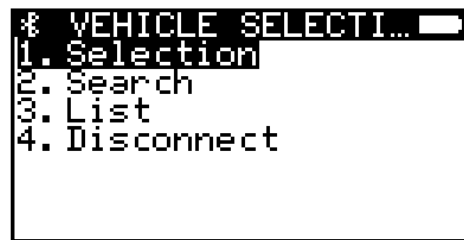
Fig. 56: No DataCom stick connected yet

5. ▸ Use the arrow keys ⬆ [⇧] and ⬇ [⇩] to select the *[List]* menu item so that all DataCom sticks stored in the whitelist are shown.

Fig. 57: All DataCom sticks from Whitelist displayed

⇨ If not all stored DataCom sticks are within range of the radio connection, select the *[Search]* menu item to display the DataCom sticks available for connection.

Fig. 58: All DataCom sticks that are within range

If you know the specific vehicle number, you can select it directly via the *[Selection]* menu item.
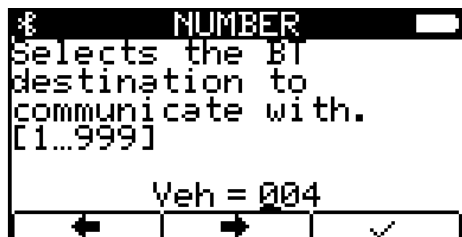
Fig. 59: Enter vehicle number

You can use [⬅] and [➡] to determine the position of the digit to be entered.

6. ▸ Select a DataCom stick with the arrow keys ⬆ [⇧] and ⬇ [⇩] and confirm your selection with [✓].

7. ▶ The display shows information telling you that the connection is being established.

⇨ You can recognise an existing connection by the fact that the *[Selection]*, *[List]* and *[Disconnect]* menu items can be selected in the *[Vehicle selection]*, but the *[Search]* menu item cannot be selected.

```
❋↑↓ FAHRZEUGAUSWAHL ▭
1.Auswahl
[2.Suche]
3.Liste
4.Trennen
```
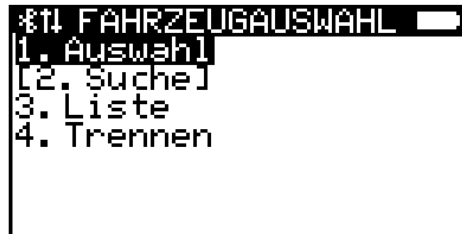
Fig. 60: Remote control connected to DataCom stick

8. ▶ Press *[ESC] [ESC]* to return to the main menu.

⇨ The name of the connected vehicle now appears in the dialogue field of the start screen.

```
❋↑↓    CONTROL    ▭
VehNo: DCS 004
```

Fig. 61: Vehicle number displayed in the dialogue field

9.5 Change vehicle (DataCom stick)

The remote control allows you to select all vehicle control systems stored in the whitelist.

If you want to connect your remote control to another vehicle control system, proceed as follows:

▶ Press [⚭] on the Home screen to enter the *[Vehicle Selection]* menu. You have the following options for connecting to another DataCom stick:

⇨ ■ *[Select]*
If you know the specific vehicle number, you can select it directly via the *[Selection]* menu item.
■ *[List]*
In the *[List]* menu item, show all DataCom sticks stored in the whitelist in order to select the desired DataCom stick.

[Select]

1. ▶ Use the arrow keys ⬆ *[↑]* and ⬇ *[↓]* or the numeric key *[1]* on the remote control to select the menu item "Selection" and confirm your selection with ⬚ ✓ ⬚.

2. ▶ Use the ⬚ ← ⬚ and ⬚ → ⬚ function keys to move the cursor, and enter the desired remote control number using the numeric keys on the remote control.

```
✳       NUMBER      ▭
Selects the BT
destination to
communicate with.
[1…999]

     Veh = 004
   ←   |   →   |   ✓
```
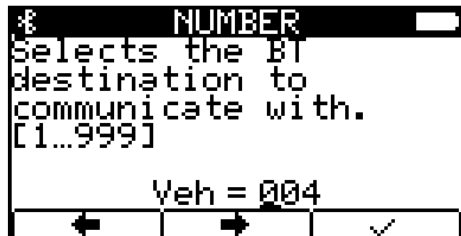
Fig. 62: Enter vehicle number

3. ▶ Confirm your selection with ⬚ ✓ ⬚.

4. ▶ An error message appears because the remote control is already connected to another vehicle control system. Besides the message, you are also asked whether you want to disconnect the connection.

```
✳↑!      ERROR!     ▭
There is already a
connection.
Disconnect this
connection?

     NavErr #4
             |   ✓
```
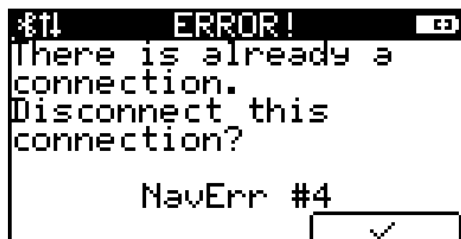
Fig. 63: Error message NavErr #4: Vehicle already connected

5. ▶ Press the function key on ⬚ ✓ ⬚ to disconnect the existing connection.

   ⇨ The new connection is established.

   You are taken back to the *[Vehicle selection]* menu.

[List]

1. ▶ Use the arrow keys ⬆ *[↑]* and ⬇ *[↓]* or the numeric key *[3]* on the remote control to select the menu item *[List]* and confirm your selection with ⬚ ✓ ⬚.

   ⇨ The whitelist is displayed.

2. ▶ Use the arrow keys ⬆ *[↑]* and ⬇ *[↓]* to select the desired DataCom stick and confirm your selection with ⬚ ✓ ⬚.

3. ▶ An error message appears because the remote control is already connected to another vehicle control system. Besides the message, you are also asked whether you want to disconnect the connection.

FB-8

4. ▸ Press the function key on ⌐ ✓ ¬ to disconnect the existing connection.

⇨ The new connection is established.

You are taken back to the *[Vehicle selection]* menu.

10 Moving a vehicle

10.1 Safety instructions

> ### ⚠ WARNING!
>
> **Moving the vehicle manually**
>
> Serious injury and damage to property may result from carelessly moving the vehicle or lifting and lowering loads.
>
> - ■ Make sure there are no people in the danger zone before using the remote control, moving the vehicle or lifting and lowering loads.
> - ■ Operate the vehicle remotely only when it is in the line of sight.

> ### ⚠ WARNING!
>
> **Automatic start-up of the system**
>
> Death or serious injuries!
>
> If the vehicle control system is in automatic mode or is being switched to automatic mode, an automatic start-up of the system is to be expected at any time.

> ### ⚠ WARNING!
>
> **Automatic start-up**
>
> Danger posed by unintended activation of the control system and start-up of motors and drive units.
>
> Risk of crushing limbs, catching and dragging of loose items of clothing due to moving machine parts
>
> - ■ No persons in the danger zone of moving system parts
> - ■ Deactivate automatic start-up
> - ■ Only activate control system under supervision
> - ■ If necessary, disengage the drive.
> - ■ If necessary, disconnect the vehicle from voltage.
> - ■ Keep clear of moving system parts.
> - ■ Do not reach into the running machine.
> - ■ Wear tight-fitting work clothes.
> - ■ Pay attention to optical and acoustic warning equipment.

⚠ WARNING!

Selecting vehicle number "000" in infrared mode

Serious injury and damage to property may result from carelessly moving the vehicle or lifting and lowering loads.

If the vehicle number "000" is selected in infrared mode, **all** vehicles in the transmission range of the remote control are controlled.

- ▪ Make sure there are no people in the danger zone before using the remote control, moving the vehicle or lifting and lowering loads.
- ▪ Operate the vehicle remotely only when it is in the line of sight.

10.2 Manual operation - manual mode

⚠ CAUTION!

Observe the safety notes!

Ⴇ *Chapter 'Safety instructions' on page 72*

In Manual mode, you can control the vehicle control system manually using the remote control.

1. ▸ Connect the remote control to the vehicle control system via Bluetooth or use the IR communication channel.

2. ▸ Press the ⁎ *[*]* key.
   - ⇨ ▪ The vehicle control system receives a command that stops all automatic sequences.
     - ▪ Now, the vehicle control reacts exclusively to the commands of the remote control.
     - ▪ The vehicle control system moves the vehicle in spite of any faults.

⚠ WARNING!

Moving the vehicle manually

The vehicle control system moves the vehicle in manual mode in spite of any faults.

ℹ️ *Manual mode is necessary if, for example, faults occur in the automatic sequence.*

∗ 5	■ Modifies the speed. ■ Switches to manual mode. ■ Error reset on the control system.
# [on]	■ Switches to automatic mode. ■ Error reset on the control system.
➡ 6	■ Move forwards. □ ➡⁶ → slowly □ ∗⁵ + ➡⁶ → fast
⬅ 4	■ Move backwards. □ ⬅⁴ → slowly □ ∗⁵ + ⬅⁴ → fast
⬆ 2	■ Lift □ ⬆² → slowly □ ∗⁵ + ⬆² → fast
⬇ 8	■ Lower □ ⬇⁸ → slowly □ ∗⁵ + ⬇⁸ → fast
↻ 1 ↻ 3 ↻ 7 ↻ 9	■ Movement types are controlled depending on the project (e.g. pushing, twisting, etc.) □ ↻¹ / ↻³ / ↻⁷ / ↻⁹ → slow movement □ ∗⁵ + ↻¹ / ↻³ / ↻⁷ / ↻⁹ → fast movement

10.3   Automatic mode

> ⚠️ **CAUTION!**
>
> **Observe the safety notes!**
> ↳ *Chapter 'Safety instructions' on page 72*

In order to reintegrate the vehicle control system into the automatic sequences, manual mode must be deactivated.

→ Press the ▪ *[ESC]* key.

⇨ A command is sent to the vehicle control system, which returns it to the automatic sequences of the central computer.

11 Connection with the FB Configurator

The FB Configurator program is used to synchronise the FB-8 remote control and the DCS-8 DataCom-Stick of the vehicle control system.

- The remote control can be configured on the PC. Here you can select the communication method or configure display settings. The current remote control settings can be read out.
- The program captures the remote controls used in the project and exports them for transmission to the DataCom stick.
- Tests are made available in a service area to test the functionality of the remote control.

If the remote control is connected to the FB Configurator, various settings can be adjusted on the remote control.

- Project settings (whitelist, etc.)
- Configuration (hardware)
- Firmware update

1. Use the USB-C cable to connect the remote control to the computer on which the FB Configurator is open.

⇨ If the remote control is switched off, it will be activated.

2. Follow the software description to synchronise the remote control data with the project and vice versa.

12 Maintenance

Remote control maintenance

Mechanical stresses on the remote control may lead to device failure. Therefore check for damage at regular intervals.

Connections

- ■ Check for loose connections
- ■ Check cable insulation

Display and infra-red reception range

- ■ Remove soiling

Cleaning the remote control

Materials:
- ■ Dry microfibre cloths
- ■ Alcohol-free cleaning cloths

- ■ Switch off remote control
- ■ Remove rechargeable battery

⊳ Remove soiling

13 Disposal

If no return or disposal agreements exist, the individual components are to be properly dismantled and then separated and disposed of pursuant to current regulations or taken for recycling.

The device comprises electric and electronic components. Separate and dispose of them according to applicable provisions.

Follow the hazardous materials directive, in particular the regulations on handling hazardous materials.

♻ Materials designated for recycling are to be disposed of as per the respective recycling procedure.

13.1 Disposal of batteries and rechargeable batteries

The device contains batteries or rechargeable batteries. Dispose of them according to the national regulations currently in force.

ENVIRONMENT!

Environmental damage from batteries/rechargeable batteries!
Batteries or rechargeable batteries may contain harmful substances which may pose a threat to the environment or your health unless stored or disposed of properly.

The symbol of a crossed-out dustbin on batteries and rechargeable batteries indicates that they must be disposed of separately.

The following applies to consumers in European countries:

■ Batteries and rechargeable batteries, whether marked with the crossed-out dustbin symbol or not, must be disposed of separately.
■ You are legally obliged to return used batteries and rechargeable batteries.
■ Do not dispose of batteries and rechargeable batteries in the household waste.
■ Take batteries and rechargeable batteries to communal battery collection points or ask a professional company to dispose of them.
■ Used batteries and rechargeable batteries supplied by us can be returned to us for proper disposal. Send the used batteries and rechargeable batteries with sufficient postage paid in advance to:
  ♦ *Chapter 'Customer service and addresses' on page 85*

14   Technical Data

Data	Value	Unit
Width x height x depth with holder	171 x 77 x 35	mm
Weight (including battery)	245	g
Operating temperature range	10 ... 50	°C
Storage temperature (without battery)	-10 ... 50	°C
Relative humidity (non-condensing)	<80	%
Protection class	IP40	
Power supply via USB	5 (4.75-5.25)	V DC
Power supply via battery	8.4	V DC
Power supply via rechargeable battery (NiMH) [1]	8.4	V DC
Current consumption in energy saving mode (energy profile) at 8.4 V	10.8	mA
Current consumption at maximum power (energy profile) at 8.4 V	41.3	mA
Power consumption in energy saving mode (energy profile) at 8.4 V	90.7	mW
Power consumption at maximum power (energy profile) at 8.4 V	346.9	mW
Battery type (on delivery)	9 V block (Varta, type 4922)	

Infrared data transmission

Data	Value	Unit
Signal transmission functional principle	Infrared radiation	
Slow infrared transmission rate	9600	bit/s
Fast infrared transmission rate	62500	bit/s
Wavelength	850	nm
Radiant power	240	mW
Minimum range	6	m
Typical range	10	m
Radiation angle	±20	°

Modulation type 1 (slow infrared):

- Transmission frequency: 125 kHz
- Bit-coded frequency-shift keying at 9600 bit/s

Modulation type 2 (fast infrared):

- IrDA
- Bit-coded infrared single pulses with a pulse width of 1 μs at 62500 bit/s

Bluetooth data transmission

Data	Value	Unit
Signal transmission functional principle	Radio transmission	
Maximum transmission range	30	m
Typical transmission range (industrial environment)	15-20	m

15   Faults

We apologise for any problems that may occur with our product. Possible errors and their causes are explained in the following section. Please inform us if you are still unable to determine the cause of the error.

Trouble-shooting

Fault description	Cause	Remedy
Remote control does not start	Rechargeable battery is discharged	Charge the battery
	Faulty display	Contact LJU Service.
Rechargeable battery does not charge	Faulty rechargeable battery	Replace rechargeable battery
	Charging current of the USB port too low	Use another USB port
	Charging switch in battery compartment in wrong position	Check/change switch position
Remote control does not charge / No communication with computer	Connection cable is not connected	Check connection cable
	Faulty connection cable	Replace connection cable
	Driver not installed	Install driver
	Several remote controls connected to the hub	Disconnect other USB connections
	Remote control is not detected by PC	Check entries in the device manager
Remote control only starts until the bootloader loads	Error when importing the firmware or firmware is missing	Re-install firmware
	Faulty bootloader	Contact LJU Service.
Display does not work after starting	Display is not recognised at start-up or is defective	Contact LJU Service.
Rechargeable battery does not fully charge	Rechargeable battery capacity no longer sufficient	Replace the rechargeable battery
	Rechargeable battery type used is not recommended	Use suitable rechargeable battery type
	Incorrect rechargeable battery type specified in energy settings.	Check/change settings
Rechargeable battery gets very warm when charging	Rechargeable battery capacity no longer sufficient	Replace rechargeable battery

Fault description	Cause	Remedy
Rechargeable battery gets very warm when charging	Wrong rechargeable battery type set	Check the selection switch in the remote control Check settings in the *FB Configurator*
	Standard battery was used instead of a rechargeable battery	Check the selection switch in the remote control Check settings in the *FB Configurator*
	Incorrect rechargeable battery type specified in energy settings.	Check/change settings
No Bluetooth connection established	Bluetooth deactivated in remote control settings	Activate Bluetooth
	DCS/FB UUID is invalid	Check project settings in the *FB Configurator*
	DCS is not listed in the whitelist of the remote control	Use *FB Configurator* to add the DCS to the remote control whitelist
	Remote control is not listed in the whitelist of the DCS	Use *DCS Configurator* to add the remote control to the DCS whitelist
	Transmission and reception power is too low	Check transmission and reception power in the remote control settings
	Transmission path disturbed	Reduce distance to receiver Remove sources of interference
	Bluetooth module was not initialised at start-up	Check details in the *'Bluetooth Info'* menu
	Auto-time-out has disconnected Bluetooth	Check energy settings
No infrared connection established	Dirt in front of infrared unit on the remote control	Remove soiling
	Dirt in front of infrared unit on the receiver	Remove soiling
	Infrared function deactivated	Activate infrared function
	Transmission disrupted	Establish optical contact Decrease distance Check angle of incidence

Fault description	Cause	Remedy
No infrared connection established	Wrong vehicle number selected	Change vehicle number
	"Fast" or "Slow" infrared not set	Check settings
Menu entries not available	Missing user rights	Change user
Menu dialogue cannot be confirmed	Serious problem cannot be solved via *[Confirm]*. Internal problem is further repeated.	Contact LJU Service.
Keypad not working	Fault in the membrane keypad	Perform a keypad test with *FB Configurator*
Inaccurate keystroke	Fault in the membrane keypad	Perform a keypad test with *FB Configurator*
Keypad test with *FB Configurator* fails	Faulty keypad	Contact LJU Service.
DataCom-Stick (DCS) not found	DCS not listed in the whitelist of the remote control	Check whitelist with *FB Configurator*
	DCS not within range	Change distance
	Receiving sensitivity (RX) too low	Increase receiving sensitivity

16   Customer service and addresses

Customer service

Our service team is available to provide technical information.

- ■ **Conductix-Wampfler Automation - Service**
  Phone: +49 331 887344-15 | Fax: +49 331 887344-19
  E-mail: service.potsdam@conductix.com

> ***Service forms***
>
> *Service forms are available for download under www.conductix.com (www.ljuonline.de).*
>
> *Please send completed service forms to service.potsdam@conductix.com.*

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17 Glossary

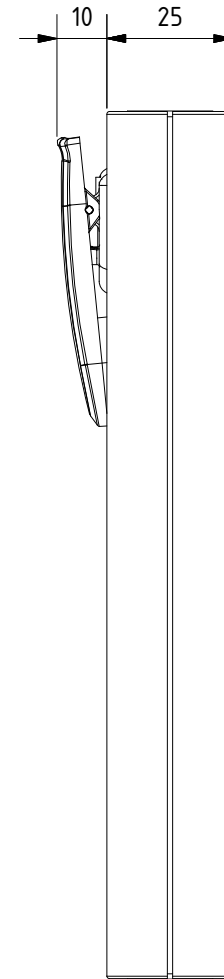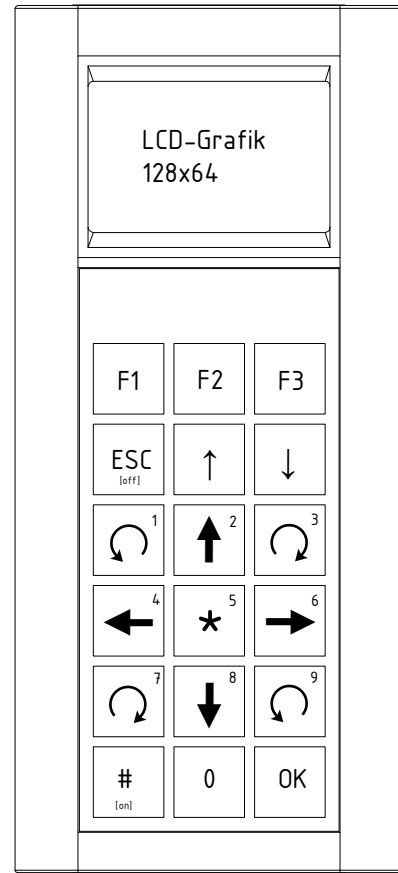|	
Bluetooth	Radio technology for transmitting and receiving information at close range
COM port	COM = asynchronous serial interface, port = communication port of an operating system, connection point for remote control or DataCom stick in the FB Configurator program
DataCom-Stick (DCS)	Similar to a USB stick; plugged in to the vehicle control system of driverless transport systems; establishes radio contact between vehicle and remote control, information storage about vehicles and the transmission of vehicle software to the vehicle control system
FB Configu-rator	Program for configuration and communication between the FB-8 remote control and vehicle control system
Infrared	One-sided transmission (sending) of information using wavelengths that vary between 880 and 950 nm.
Project	All data for configuration and communication between the FB and vehicle control system are stored together
UUID	Short for "Universally Unique Identifier": a unique identifier used for the communication between the FB-8 remote control and DCS-8 DataCom stick.
Whitelist	List of all DataCom sticks saved in FB-8.

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Appendix

A   Device drawing

USB Type C

10 25

77

171

LCD-Grafik
128x64

F1 F2 F3

ESC [off]   ↑   ↓

↻1 ↑2 ↻3

←4 ∗5 →6

↻7 ↓8 ↻9

[on]   0   OK

Automatisierungstechnik GmbH
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Type

Ix:

WNR   Ser.No.   Year   C E

for 9V Block
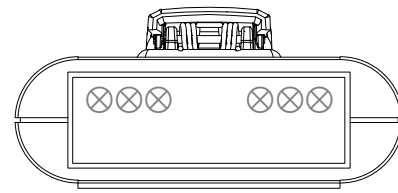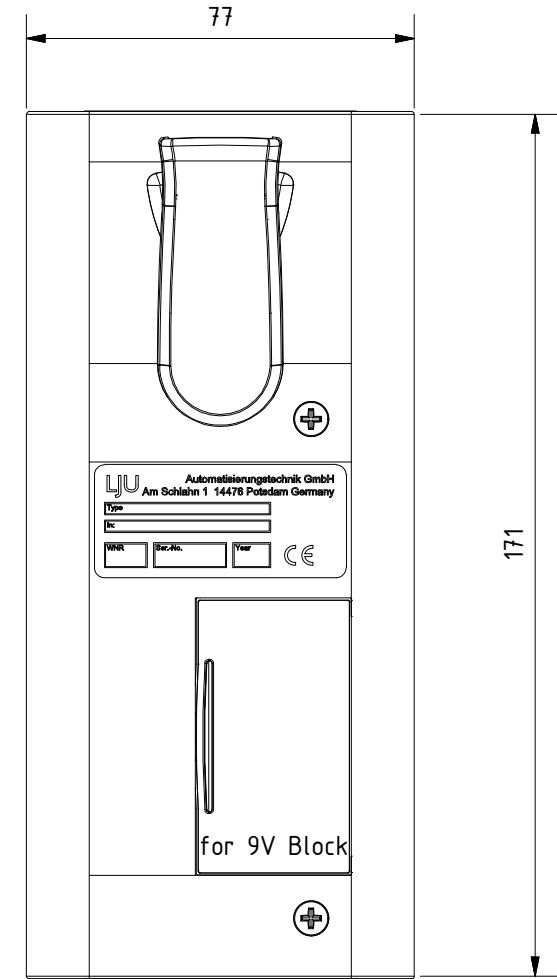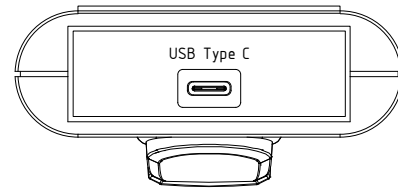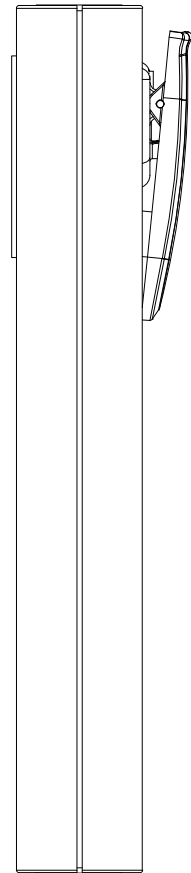
D	USB type and layout keyboard			03.07.2018	Schleussner
Index	Revision			Date	Name