

KarL4

Contactless Payment Terminal



Operating Manual

Version 2



General Safety Instructions

The KarL4 Contactless Payment Terminal must be connected only by a qualified electrician or technician.



Before installing the terminal, the vending machine must be disconnected from its operating voltage. To do this, please disconnect the corresponding connection from the battery and/or wall AC voltage.

Consult SECO if you want to make any changes or additions to the KarL4 Contactless Payment Terminal. The terminal contains components that can be damaged or destroyed by electrostatic discharge.



Only intervene in the unit in compliance with the relevant safety measures against electrostatic discharge (ESD) (according to EN 100015, Part 1).

Verify the supply voltage before powering the KarL4 Contactless Payment Terminal.

Regularly update the KarL4's software. Utilizing the latest version is the only way to deploy the latest features and maintain cybersecurity.

KarL4
Contactless Payment Terminal
Documentation (only valid for hardware version 1.3 and software version 1.14)

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1 ACCESSORIES

The following accessories are available for the “KarL4 Contactless Payment Terminal:”

Part Number	Description	Use	Photo
903-2004R	KarL4 contactless payment controller	Terminal electronics, including cellular modem	
903-0657R	KarL4 contactless payment Antenna Type C	NFC antenna for contactless payments	
921-0442R	Cable, KarL4-NFC antenna, 80 cm	Connecting cable between KarL4 and the NFC antenna	
921-0384R	Cable, KarL4-NFC antenna LEDs, 80 cm	Connecting cable between KarL4 LEDs in NFC antenna	
090-0995R	Antenna with cable, LTE/GSM 700-960/1700-2700 LC 150 cm	Mobile antenna for mounting behind glass (such as indoor vending machines)	
090-0899R	Antenna with cable, LTE/GSM 700-960/1575-2700 LC 200 cm	Mobile antenna for mounting on metal (such as on outdoor vending machines)	
0-0047	Mounting bracket, KarL4 controller	Bracket for mounting the KarL4 controller electronics on a wall	

Part Number	Description	Use	Photo
400-1662R	Mounting bracket, KarL4 with NFC antenna	Bracket for mounting terminal electronics on the NFC antenna unit	
400-2555R	Mounting bracket, KarL4 with NFC antenna	Bracket for mounting terminal electronics on the NFC antenna unit	
400-2788R	KarL4 drilling template for Sielaff SCvending machine antennas	Drilling template for mounting the antenna	
400-2577Ra	KarL4 antenna drilling template	Drilling template for mounting the antenna	
400-2843R	Mounting adapter for KarL4 NFC antenna Type C	Mounting plate for the NFC antenna in the TL Touch	
400-2814R	Mounting adapter for KarL4 NFC Antenne Type C	Mounting plate for the NFC antenna in the basic line	
903-0677R	KarL4 contactless payment test card	Necessary for carrying out the KarL4 self-test	

Table 1: Accessories

2 KARL4 VENDING MACHINE MODULE

The Karl4 vending machine module is a robust, vandalism-resistant contactless payment terminal for indoor and outdoor vending machines. With an internal processor, cellular radio, and other connectivity options, it is a standalone payment solution that does not require an external microprocessor running a payment software development kit with separate connectivity. Additionally, Karl4 is designed for industry-leading energy efficiency, facilitating battery-operated payment applications.

Karl4 is designed as an OEM solution. Utilizing the common Multidrop Bus (MDB) vending machine interface and containing its own network connectivity, the module can be installed in both existing and new vending machines.

Karl4 is our innovation for contactless payment with credit cards, including Mastercard, Visa, and girocard – depending on geographical deployment location. It is a terminal without a PIN pad (TOPP), and optionally allows also quick age verification in Germany. Karl4 uses Near Field Communication (NFC) for payment card data transmission.

Currently, Karl4 is certified for use as follows:

Geography	Payment Cards	Maximum Transaction	Certifications
Germany	girocard, smart cards according to ISO 14443 A&B, NFC	€50	
United States	Mastercard, Visa	\$50	PCI level 3, FCC

The Karl4 terminal electronics is housed in a robust plastic casing that can be installed on a suitable holder using the snap-on method. The NFC antenna is mounted separately from the electronics on the front of the vending machine. It may be mounted behind a glass front in certain scenarios.

Karl4 can be connected via MDB to a vending machine controller, and is backwards compatible with Karl2 and Karl3.

Connection via USB is possible but not yet enabled in software.

2.1 Variants

2.1.1 KarL4 Contactless Payment Terminal

As a rule, girocards are equipped with a contactless interface. For payment and age verification with such cards, it is sufficient to hold them in front of the NFC antenna.

The heart of the system is formed by the KarL4 payment terminal, which comes in a compact plastic housing and can be connected to a controller via USB (pending software release) or MDB.

The KarL4 contactless payment terminal consists of the KarL4 contactless payment controller and an NFC antenna.

The NFC antenna is designed to be mounted on the front of a metal vending machine housing.



Figure 1 – KarL4 contactless terminal

2.2 Vending Machine Interface

Communication with the vending machine control is via MDB (Multi Drop Bus).

The KarL4 is compliant with the latest MDB specification version 4.3 from July 2019, provided by the National Automatic Merchandising Association (NAMA) and located here:

<https://www.namanow.org/wp-content/uploads/Multi-Drop-Bus-and-Internal-Communication-Protocol.pdf>

KarL4 provides the MDB interface signals on a size-optimized connector and utilizes an external adapter cable to plug into the standard MDB connector.

In battery mode, the KarL4 activates the vending machine by placing a card on the NFC antenna or by inserting a card into the card reader module.

2.3 Specifications

Payment Card Interfaces	
Customer Card Contactless	ISO 18092 (NFC)
Data Transmission	
	Cellular radio (Quectel EG-91 series)
RTC & Tamper Protection	
	Battery buffered
Software Updates	
	Via cellular radio
Interfaces	
Vending Machine Controller	MDB/IPC Level 02/03 (optional USB)
Cellular radios	Europe: Quectel EG91 series US: Quectel EG91-NAX, FCC ID XMR2020008EG91NAXD
Cardholder	NFC antenna 4 LED status (green) Display Vending Machine Acoustic signal transmitter
Service technician	2 keys - service menu 2 LEDs for controller status (red / green) 1 LED modem status (green) 1 LED NFC status (red)
Extensions	
MDB Master	To connect to: MDB display, MDB bill validator MDB coin changer

Power Supply	
	8.0 to 42.5 VDC
Power Consumption	
Stand-By	typ. 2.5 mA (@ 13.8V)
Operation	typ. 125 mA (@ 13.8V)
Environmental conditions	
Operating Temperature	-25 to +70 °C
Humidity	Up to 100%
Dimensions	
Terminal Electronics	85 x 90 x 18 mm (LxWxH)
NFC Antenna	98 x 98 x 13 mm (LxWxH)
Battery	
Coin cell	Lithium Battery (CR2032)
Connectors	
MDB-Slave	JST S7B-PH-SM4-TB
MDB-Master	JST S6B-PH-SM4-TB
Card Reader	AMC170F-26POL
USB-OTG	USB Micro-AB
Antenna - NFC	MCX
LED NFC	JST SM12B-GHS-TB
Antenna - Cellular Modem	MMCX



Figure 3 – KarL4 Technical data

3 ABOUT CONTACTLESS PAYMENTS

Contactless payment describes payments using Near Field Communication technology (NFC). This kind of payment today is supported by most common payment cards, e.g. credit cards and also more localized solutions like the girocard in Germany (formerly EC card), state-of-the-art smartphones, and point-of-sale (POS) terminals. NFC technology, which makes secure contactless payment possible, is the linchpin for new applications that makes payment cards even smarter and more convenient.

- Just hold it close to the payment terminal and you're done!
- The payment process is reduced to seconds.
- Amounts of up to 50 Euros can usually be paid without PIN or signature in Europe.

Payment transactions that do not require the entry of a PIN are especially common in vending and ticketing machines due to the small amounts of money involved.

The easy payment process with a Terminal without PIN pad

The payment process is started by placing the card or smartphone on the NFC antenna. Payment is made without authorization. Neither a PIN nor a signature is required. The payment process is controlled by the risk management of the card, either offline or online. In the case of online payment, the card is checked beforehand via the bank's authorization system.

The KarL4 contactless payment terminal stores the data associated with each transaction, and passes it on online as quickly as possible for further processing by banking systems. As a rule, the cardholder's account is debited and the amount is credited to the dealer's account the day after the payment. The dealer's account is credited as a collective transfer of all the dealer's terminals and all transactions of a given day.

4 KARL4 CIRCUIT BOARD

4.1 Front

The vending machine module is equipped with 2 keys and 2 LEDs (red and green). This allows a service technician to see the operating status of the terminal and make adjustments if necessary.

The arrangement of the keys, LEDs, and card slots is shown below:

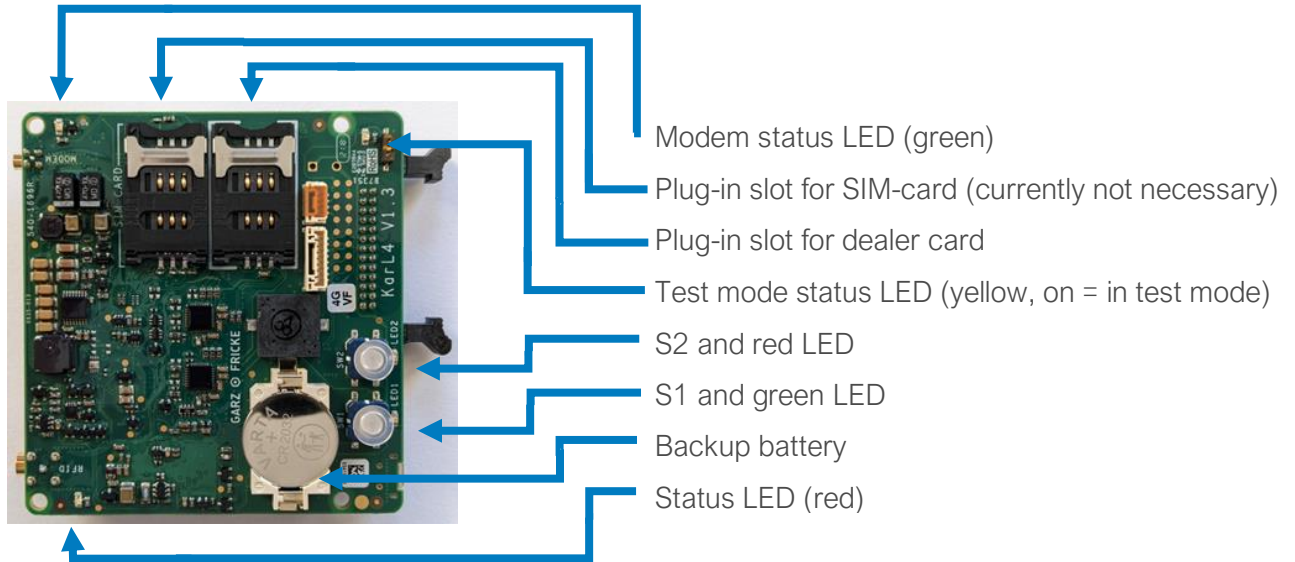


Figure 4 – Front view of Karl4

The system has two slots for chip cards: one slot for the dealer card and one slot for an optional SIM card for mobile communications. A SIM card is not required; each off-the-shelf Karl4 device is shipped with an activated SIM chip.

4.2 Back



Figure 4 – Back view of Karl4

KarL4 offers the following connection options to external components. The designations of the connections are stamped on the housing.

Name	Function	Ref #	# Pins	KarL4 connector	Mating connector
MDB-SLAVE	Connection to the vending machine for input power supply and for communication with the vending machine controller (via MDB)			JST S7B-PH-SM4-TB	
MDB-MASTER	Connection for MDB periphery (e.g., LCD)		12	JST S6B-PH-SM4-TB	
Antenna - NFC				MCX	
LED NFC				JST SM12B-GHS-TB	
MODEM	Connection to cellular antenna			MMCX	

“

5 ASSEMBLY

5.1 Installation of Terminal Electronics

The KarL4 terminal electronics are mechanically compatible with KarL2 and KarL3 payment terminals. Brackets that have already been installed can still be used.

- To upgrade an existing KarL2 or KarL3 payment terminal, disconnect all connection cables on the old terminal and remove the terminal electronics from the bracket.
- Insert the KarL4 terminal electronics into the bracket.
- Connect the MDB connection cable with KarL4.

Brackets available for the terminal electronics:

Bracket for wall mounting

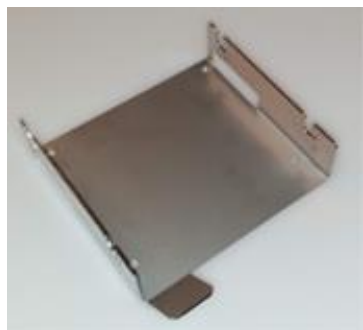


Figure 6 – Bracket for wall mounting

Bracket for mounting on contact unit



Figure 7 – Bracket for mounting on contact unit

5.2 Installing the NFC Antenna

The NFC antenna is suitable for installation behind a glass front as well as for mounting on the outer surface of a vending machine door. The antenna is fixed with four M4 screws. The length of the screws depends on the wall thickness of the vending machine door. The screws must not penetrate deeper than **5 mm** into the threaded bushes of the NFC antenna.

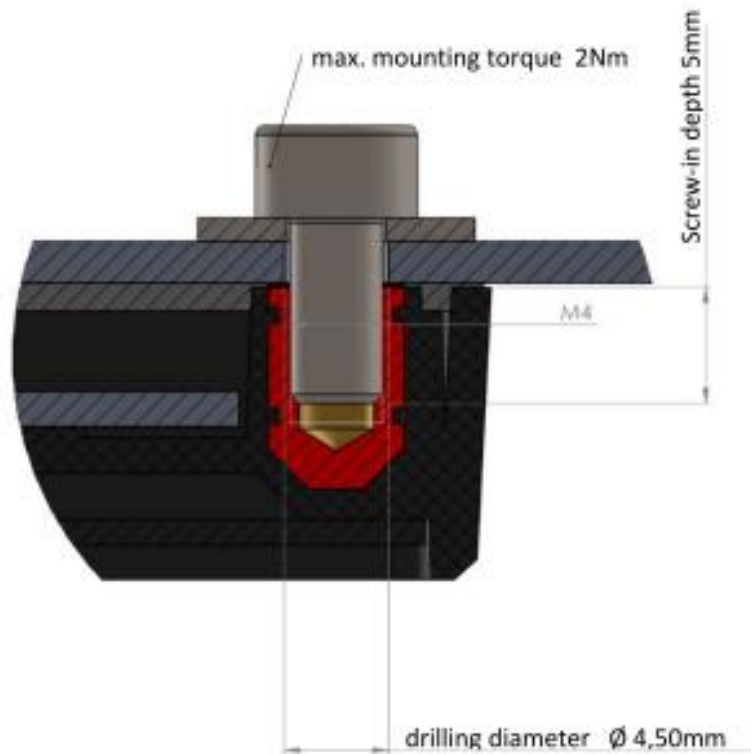


Figure 8 – NFC antenna

A length of 8 mm should generally suffice.

The screws are not included with the NFC antenna.

Appropriate holes (4x 5.5 mm and 1x 25 mm) must be drilled in the vending machine door for the fastening screws and for the cable feed-through. Two drilling templates are available to make this easier:

- KarL4 standard drilling template (Art. no. 400-2577Ra)
This template has the same outer diameters as the antenna itself and can therefore always be used, especially where only limited space is available for mounting the antenna.



Figure 9 – Standard drilling template

- Karl4 drilling template Sielaff SC (Art. no. 400-2788R)
This is a template specially designed for Sielaff SC vending machines. The contact edges to be used are the decorative panel and the advertising panel on the vending machine door. Using the template not only ensures the correct positioning of the holes in relation to each other but also the correct position of the antenna itself.



Figure 10 – Sielaff drilling template

After mounting the NFC antenna with the 4 screws, the various cables are connected and laid. The earthing lug of one of the antenna cables must be connected to the housing of the vending machine in an electrically conductive manner.

Finally, the label for operator guidance is attached to the front of the door.



Figure 11 – Front of vending machine door

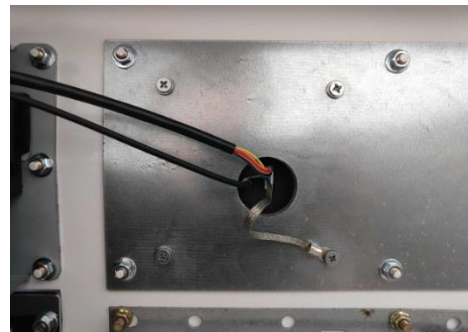


Figure 12 – Back of vending machine door

5.3 Installing the Mobile Antenna

Two different mobile antennae are available:

Planar antenna:

- For use outdoors
- For mounting on sheet metal
- Ideally, for mounting on the top of the vending machine housing

Adhesive antenna:

- For use indoors
- For mounting behind glass or plastic

6 KEYS AND LEDS

6.1 Key Function

The **S1** key (see Figure 4) takes you to the service menu and then to the next menu item. The menu item shown can be processed by pressing the **S2** key.

6.2 Significance of LEDS

The terminal operating status is indicated by the LEDS on the **S1** and **S2** keys (see Figure 4).

Red LED	Green LED	Significance
Off	Off	Idle state, terminal is switched off
Off	On	Terminal ready for operation, no errors
On	On	Firmware signature successfully checked, update active
Flashing	Off	Terminal out of order, Firmware signature incorrect
Flashing	On	Terminal out of order, tampered

The status of the mobile connection is indicated by a green LED in the area of the mobile antenna connection:

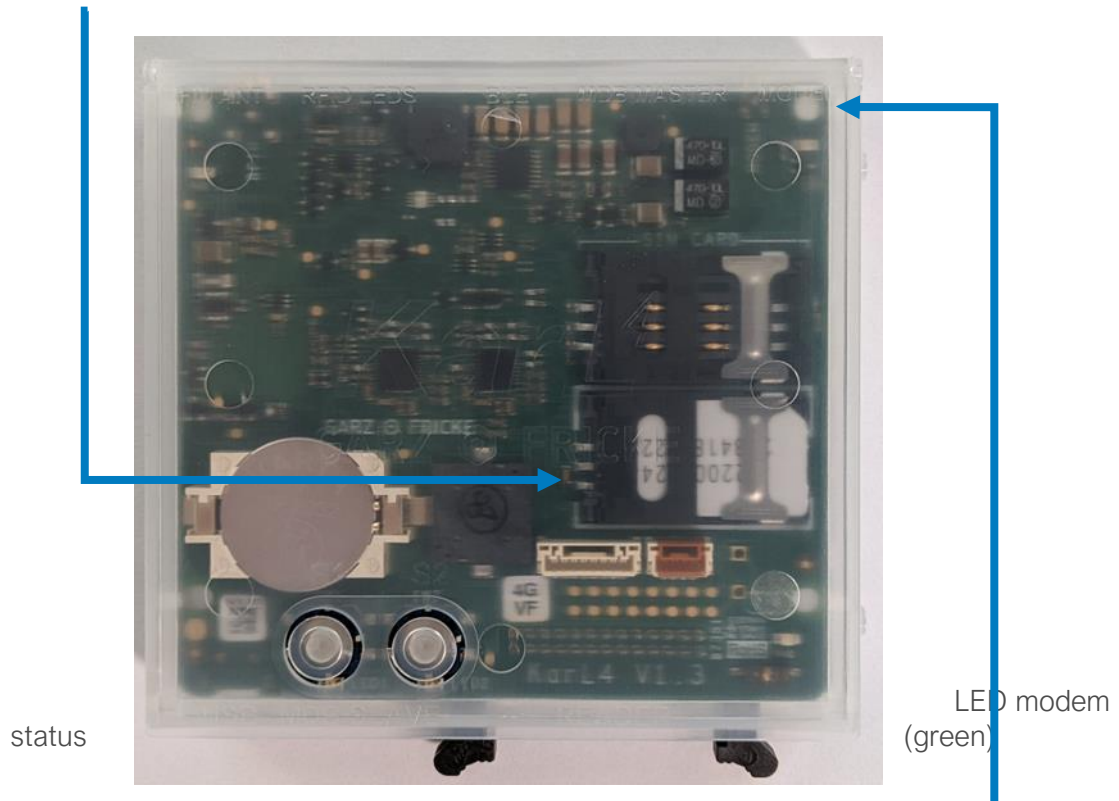
LED modem status	Significance
Off	Modem switched off
Flashing fast	Network search
Flashing, off longer than on	Modem is registered in network

The status of the NFC reader is indicated by a red LED in the area of the NFC antenna connection:

LED NFC	Significance
Off	Operational
On	Overcurrent protection tripped

7 GETTING STARTED

- A SIM card is not required as the KarL4 is fitted with a SIM chip.



- Connect the NFC antenna
- Connect the cellular antenna
- Connect to other devices, such as MDB devices
- Switch on the vending machine
- Cellular connection is established if it beeps twice after switching on and the green modem status LED is on longer than it is off.
- Start telemetry via the KarL4 service menu. This will assign a terminal ID to the unit, load an EMC configuration, and update it if necessary.

- Check the position of the debug switch:
The debug switch is required for development and functional tests after production. When deployed in a product, this switch must be in the “off” position so that the KarL4 does not utilize unnecessary power. The adjacent yellow LED must not light up; being lit indicates the switch is in the on (debug) position.

Incorrect switch position: Switch on right, yellow LED lights up:

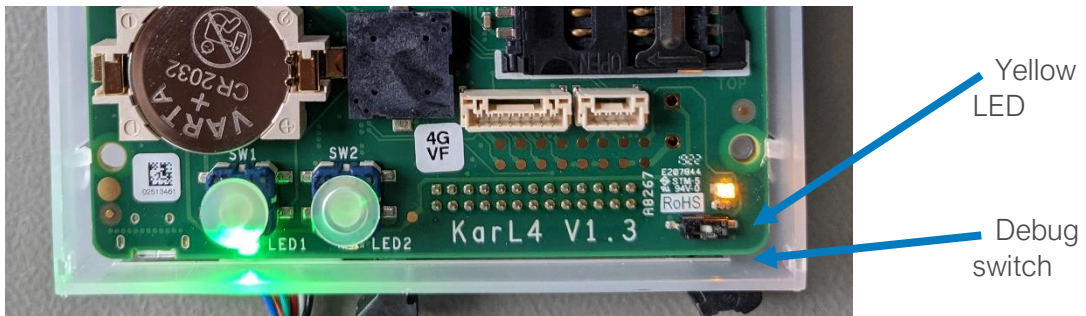


Figure 14 – Incorrect switch position

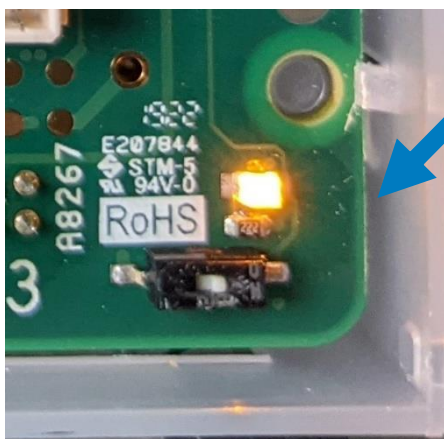


Figure 15 – Enlarged view of the incorrect switch position

Correct switch position: Switch on left, yellow LED does not light up:



Figure 16 – Correct switch position

7.1 Functional Test without Test Card

- Check via the KarL4 service menu whether the machine has received a terminal ID (display machine data).
- The machine is in the basic state, in sleep mode in battery operation, and in idle mode in mains operation:
 - Place the girocard on the NFC antenna.
 - A battery-operated vending machine is activated.
 - The maximum sales price is reserved and is available for a sale.
 - Cancel the transaction by pressing the return key.
 - The reserved amount is cancelled.

8 MAINTENANCE

8.1 Battery/Coin Cell

The coin cell battery on the KarL4 is necessary for maintaining the date and time as well as for protecting the digital keys. Changing the battery must always be done with another source of power enabled to the KarL4 payment terminal. Such power sources include:

- Power provided to the KarL4's MDB port
- The battery plugged in.

8.2 Software Updates

SECO automatically provides software updates to each Karl4 payment via SECO's terminal management system. Updates are provided via the cellular modem and immediately installed. The terminal operator does not need to take any action for maintaining Karl4 software.

However, it is possible to search for and perform updates manually via the service menu:

Check for new software	Find updates. S1 – Next menu item S2 – Start update search
---------------------------------------	--

9 SERVICE MENU

Pressing the

S1

 key or opening the machine door takes you to the service menu. Information is shown on the display of the vending machine and settings can be made.

The keys generally have the following functions:

S1	Access to the service menu after opening the door
	Calling up the next menu item within the respective menu
	Acceptance of a value edited with S2
	In editing mode, switch to the next editable value
	In submenu, press and hold to exit the submenu
S2	Switching from the service menu to editing mode
	Changing values in editing mode
	At the end of the main menu, call up the service menu again

In the service menu, each menu item can be accessed using the two keys and – if provided – the corresponding menu item can be changed.

The individual menu items of the service menu are also accessed automatically. This happens at intervals of 5 seconds, after which the next menu item is called up.

After the last menu item has been called up, the service menu is automatically closed if no user entries are made. If the service menu has been exited by the automatic switch-off when the door was open, the service menu can be called up again by pressing the

S1

 key.

9.1 Service Menu - Main menu

Karl4 Service 1.14.0.5021	Information on terminal software version. S1 – Next menu item S2 – N/A If no key is pressed, the system switches to the next menu item after 5 seconds. Applies for all menu items.
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Deviceinfo show	Display submenu for information about the machine. Contains information on terminal time, terminal ID, serial number, machine number, and dealer card. S1 – Next menu item S2 – Switch to the device data submenu
Mobile Net Info start	Show information about the mobile connection. Contains information on the service provider, signal strength, and IMSI. S1 – Next menu item S2 – Switch to the mobile info submenu
Telemetry start	Start telemetry manually. Telemetry is used to transmit cash register and configuration data as well as for remote maintenance through updates or configurations. S1 – Next menu item S2 – Starts telemetry. See telemetry
Check for new software	Find updates. S1 – Next menu item S2 – Start update search. See telemetry
Day Close start	Start day closing manually. S1 – Next menu item S2 – Starts day closing. See day closing
EMV-Diagnosis start	Start EMC diagnosis manually. Tests NFC antenna and MDB connection. S1 – Next menu item S2 – Starts EMC diagnosis. See EMC diagnosis
Net.-Diagnosis start	Start EMC diagnosis manually. Tests the mobile connection. S1 – Next menu item S2 – Starts network diagnosis. See network diagnosis
END --> SW1 CONTINUE --> SW2	End of main menu. S1 – Exit menu S2 – Start at beginning

9.2 Machine Data Submenu

9.2.1 Terminal Time

Terminal Time: 00:00 01.01.2022	The current time and date are shown. S1 – Next menu item S2 –
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9.2.2 Terminal ID

Terminal-ID: 0000000000000001	Display if a terminal ID is available. S1 – Next menu item S2 –
Terminal-ID: not set	Display if a terminal ID is not available. S1 – Next menu item S2 –

9.2.3 Serial Number

Serial number: 1000000000000000	The serial number is shown. S1 – Next menu item S2 –
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9.2.4 Vending Machine Number

Machine No. 0000000000100000	The vending machine number is displayed if available. S1 – Next menu item S2 –
Machine No. not available	Display if no vending machine number is available. S1 – Next menu item S2 –

9.2.5 Dealer Card

DC-No:0000055149 expiry: 12/2024	If a dealer card is present, its number and expiry month are displayed. S1 – Next menu item S2 –
Dealer Card not	Display if no dealer card is available. S1 – Next menu item S2 –

9.2.6 End of Menu

END --> SW1 CONTINUE --> SW2	End of submenu. S1 – Exit menu. Back to main menu S2 – Start at beginning
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9.3 Mobile Data Submenu

9.3.1 Mobile Status

The current mobile status is displayed. Possible:

- No network

- Network search
- Logged in
- Roaming
- Login rejected
- Unknown (error)

Mobile Net Stat. No Network	Mobile status: no network available. Unable to find a network. S1 – Next menu item S2 –
Mobile Net Stat. Network Search ams	Mobile status: network search. Searching for a network. S1 – Next menu item S2 –
Mobile Net Stat. regist. in LTE	Mobile status: logged in. The network technology used is also displayed. Possible: GSM, GPRS, LTE S1 – Next menu item S2 –
Mobile Net Stat. Roaming LTE	Mobile status: logged into foreign network (roaming). The network technology used is also displayed. Possible: GSM, GPRS, LTE S1 – Next menu item S2 –
Mobile Net Stat. Reg. denied	Mobile status login rejected. Login to a mobile network was rejected. S1 – Next menu item S2 –
Mobile Net Stat. unknown (XX)	Unknown mobile status/Error. Contains the mobile status error code in brackets. S1 – Next menu item S2 –

9.3.2 Provider

Mobile Net Prov. Name of Provider	Name of mobile provider is displayed, if available. S1 – Next menu item S2 –
Mobile Net Prov. Not available	Display if mobile provider is missing/invalid. S1 – Next menu item S2 –

9.3.3 Field Strength

Mobile Net Sig. -100dBm	Field strength of mobile network is displayed, if available. S1 – Next menu item S2 –
Mobile Net Sig. Not available	Display if mobile network is missing/invalid. S1 – Next menu item S2 –

9.3.4 IMSI

Mobile Net IMSI 00000000000000011	The IMSI is shown. S1 – Next menu item S2 –
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9.3.5 End of Menu

END --> SW1 CONTINUE --> SW2	End of submenu. S1 – Exit menu. Back to main menu S2 – Start at beginning
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9.4 Telemetry/Update Search

The update search is a special form of telemetry and is therefore not explained separately.

9.4.1 Telemetry Started

Telemetry started	Telemetry has been started. This display disappears automatically. During the telemetry/update search, there are further screen outputs. If successful, continue with telemetry.
	S1 – S2 –

9.4.2 Telemetry Start Failed

Telemetry start failed	Unable to start telemetry.
	S1 – Next menu item. Main menu S2 –

9.4.3 Telemetry Successful

Telemetry successful	Telemetry was carried out successfully.
	S1 – Next menu item. Main menu S2 –

9.4.4 Telemetry Status

During telemetry, various screen outputs appear. These are listed as follows:

Telemetry running	Telemetry is active. No specific task is executed.
Telemetry Rcv Lst XXX	EVA-DTS list XXX is received.
Telemetry Snd Lst XXX	EVA-DTS list XXX is being sent.
Telemetry Rcv File YYY	File YYY is received.
Telemetry host unavailable	Unable to reach host.
Telemetry error: 0xHH	Telemetry failed with error code 0xHH.
Telemetry contact declined	The telemetry has been rejected.

Telemetry update started	An update was started.
Telemetry update invalid	The update found is invalid and will not be carried out.
Telemetry Upd. n. readable	The update found could not be read. No update will be carried out.
Telemetry version too old	The update found is too old. No update will be carried out.
Telemetry successful	The telemetry session carried out was successfully completed

10 ERROR MENU

After opening the vending machine door or after pressing the **S1** key, a self-test is carried out in KarL4. To be tested:

- Triggering hardware security
- Terminal ID configuration
- Buffer battery voltage
- Digital connection to NFC antenna
- Connection to mobile network
- Data connection
- Presence of dealer card (only if youth protection is activated by VMC)
- Validity of dealer card
- Result of last day closing
- Result of last telemetry
- Outstanding transactions in memory (only if hardware security has been triggered)

If an error is detected,

KarL4
malfunction

automatically starts the error menu. This is followed by a display of the errors found. Each error found is displayed for a maximum of 5 seconds. After that, the next error is displayed, or the error menu is closed. The error menu can also be controlled manually via the S1 key:

- | | | |
|-------------------------|---|-----------------------|
| S1 press briefly | → | move on to next error |
| S1 keep pressed | → | error menu is closed |

The following error messages can be displayed:

Fatal Error replace KarL4	Hardware security has been triggered. The unit must be sent in.
Terminal ID not set	Terminal ID is not set. Please perform telemetry. If the error persists, please contact support.

Replace coin battery	Replace the buffer battery. Please leave the unit connected to 12 V or 24 V.
NFC Antenna not present	NFC antenna could not be detected. Please check the digital cable between the antenna and the terminal electronics.
Modem not registered	No connection to the mobile network. Please check the mobile antenna and field strength.
Modem, no data connec.	No connection to the mobile data network.
Dealer Card miss. or invalid	Dealer card could not be detected. Please check whether the card is inserted correctly and in the correct slot.
Dealer Card expired	Dealer card has expired, please replace it.
Dealer Card X days valid	Dealer card expires in X days.
Day Closing failed	The last day closing was faulty.
Telemetry rejected	Contacting the telemetry server was rejected, please contact support.
Telemetry failed	No successful telemetry has been performed within the last 48 hours.
Open transac. present	The hardware security has triggered and there are still outstanding transactions in the memory that can no longer be submitted. The unit must be sent in.

11 ERROR NUMBERS

The KarL4 works internally with error numbers. In the event of an error, some of these also appear within the display messages generated by the terminal. The following error numbers are possible within the display messages:

Error nr.	Meaning
0x1100	Host message error
0x1101	CRC in host message wrong
0x1102	Host message too short
0x1103	Type of host message wrong
0x1104	Host message answer unequal successful
0x1105	Bitmap in Host message missing
0x1200	Communication error
0x1201	No connection
0x1202	Error while closing connection
0x1203	Broadcasting error
0x1204	Receiving error
0x1205	Timeout
0x1206	Configuration faulty
0x3000	EMV-error
0x3001	Tag unknown

In all cases, it is usually a fault with the mobile network provider or the payment service provider. Either try to execute the function again at a later time or contact the support.

12 REGULATORY CERTIFICATIONS

The KarL4 contactless payment terminal includes a pre-certified cellular modem and an NFC interface with custom-designed antenna.

12.1 FCC ID Information

KarL4 is assigned FCC ID 2ALZB-PN5180.

KarL4 includes the following emitters:

- Near field communication (NFC) radio implemented with and NXP PN5180 controller and a custom antenna
- Quectel LTE cellular modem model EG91-NAX with FCC ID XMR2020008EG91NAXD

12.2 FCC disclaimer

This device complies with Part 15 of FCC Rules. Operation is subject to following two conditions:
(1) This device may not cause harmful interference, and



- (2) This device must accept any interference received including interference that cause undesired operation.

CAUTION: Any changes or modifications to the equipment not expressly approved by the party responsible for compliance could void user's authority to operate the equipment. This equipment has been tested and found to comply within the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a different circuit from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help