

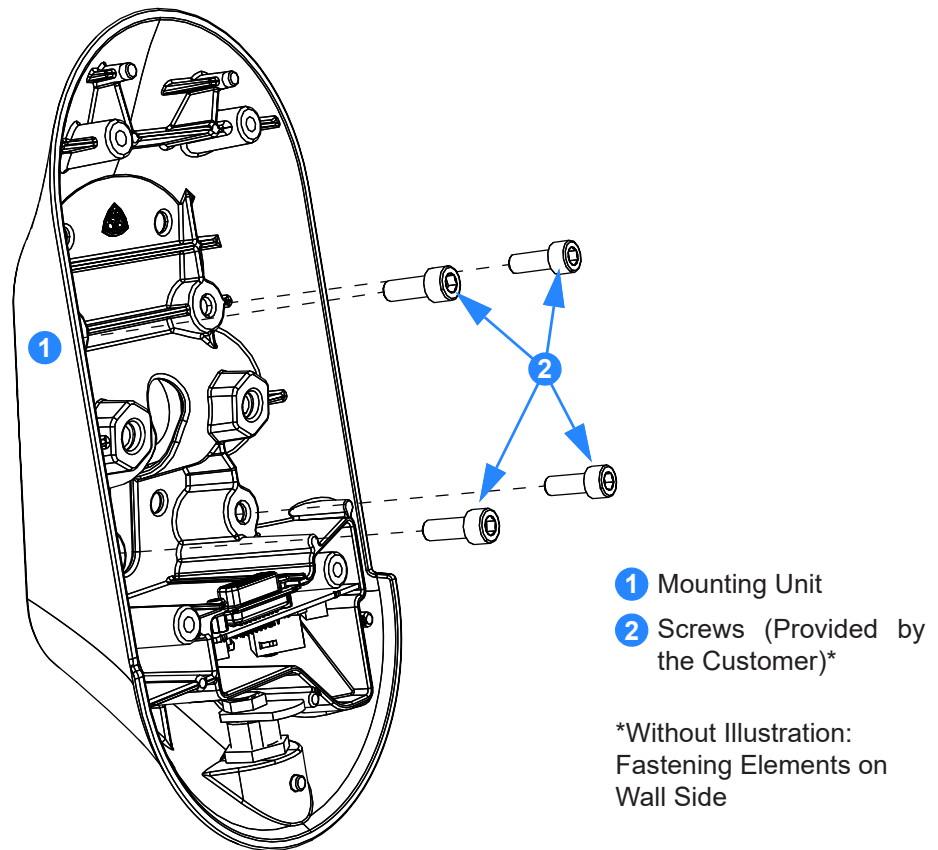


Figure 3-31 Attach Mounting Unit to Wall (Fastening Example)

Step 5 Loosen the two screws that fix the connection board (one turn is enough) and slide out the connection board, see **Figure 3-32**.

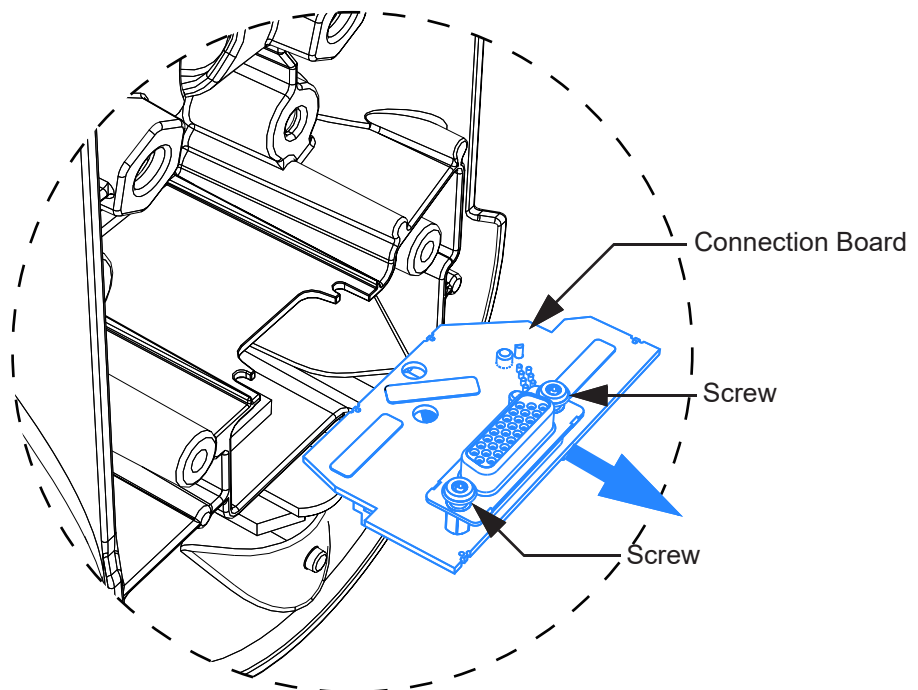


Figure 3-32 Slide out Connection Board

Step 6 Plug in the power/network cable to the connection board, see **Figure 3-33**.

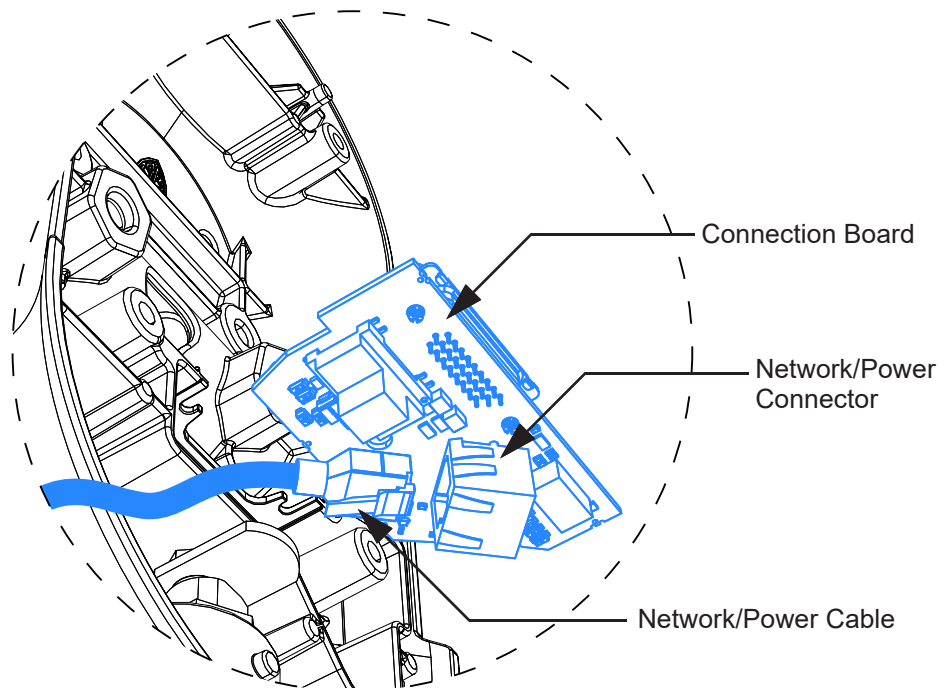


Figure 3-33 Cable Connection

Step 7 Secure the plug to the connection board with a cable tie see (**Figure 3-34**).

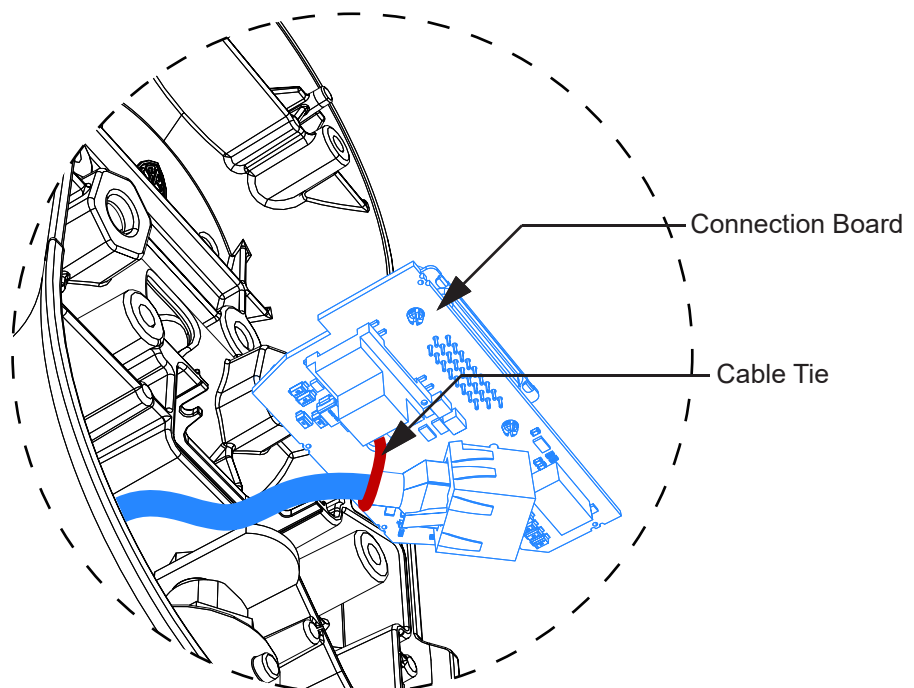


Figure 3-34 Cable Connection

Step 8 Slide the connection board back into the mounting unit and tighten the fixing screws.

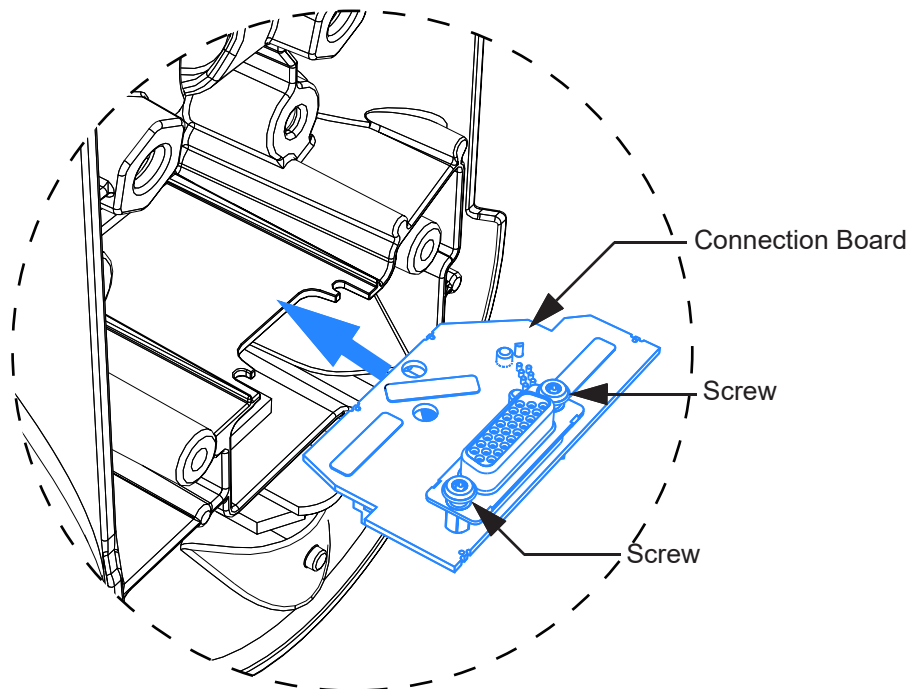


Figure 3-35 Slide out Connection Board

There are two different versions of the connection board. In the version with a DC/DC converter, care must be taken that the DC/DC converter has good contact with the thermal pad.

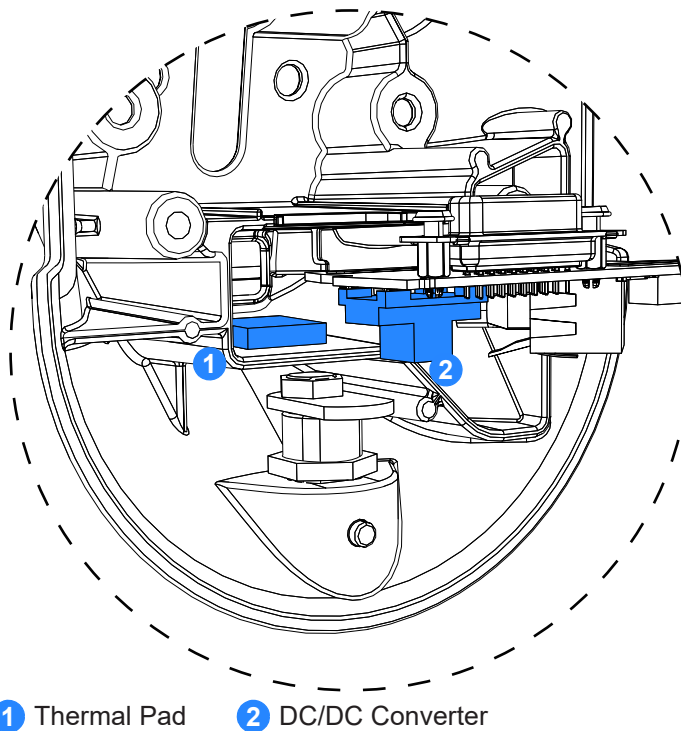
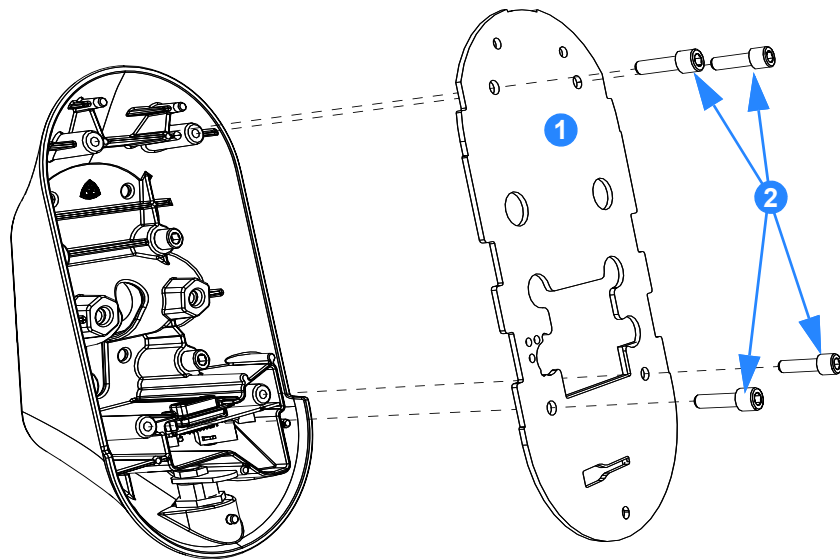


Figure 3-36 DC/DC Converter

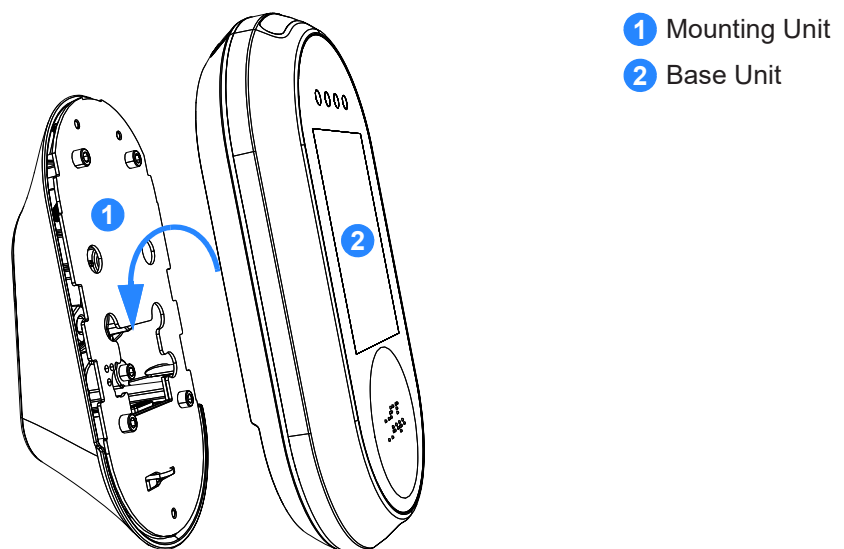
- Step 9** Put the interface plate on the mounting unit and fix it with four screws, see **Figure 3-37**.



- 1 Interface Plate with Seal
- 2 Cylinder Head Screw with Hexagon Socket M6x16

Figure 3-37 Mounting Interface Plate on Mounting Unit

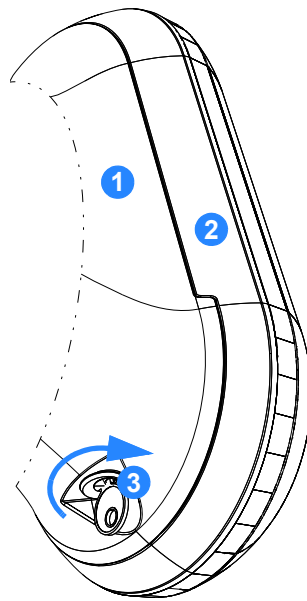
- Step 10** Put the base unit on the mounting unit, see **Figure 3-38**.



- 1 Mounting Unit
- 2 Base Unit

Figure 3-38 Slide Base Unit on Mounting Unit

Step 11 Lock the device as shown in **Figure 3-39**.



- ① Mounting Unit
- ② Base Unit
- ③ Lock

Figure 3-39 Lock

3.9.2 Vertical Pole Installation (Option)

The mounting unit of the FareGo Val OV|41 consists of two parts that are mounted together with four screws (**Figure 3-28**). The base unit covers all the electrical components. Two fix studs in the front part of the mounting unit will avoid twisting the FareGo Val OV|41 around the pole. The FareGo Val OV|41 base unit will be secured by a lock under the mounting unit.

Follow these steps to attach a FareGo Val OV|41.

- Step 1** Mark the upper edge of the FareGo Val OV|41 on the pole, see **Figure 3-40**.

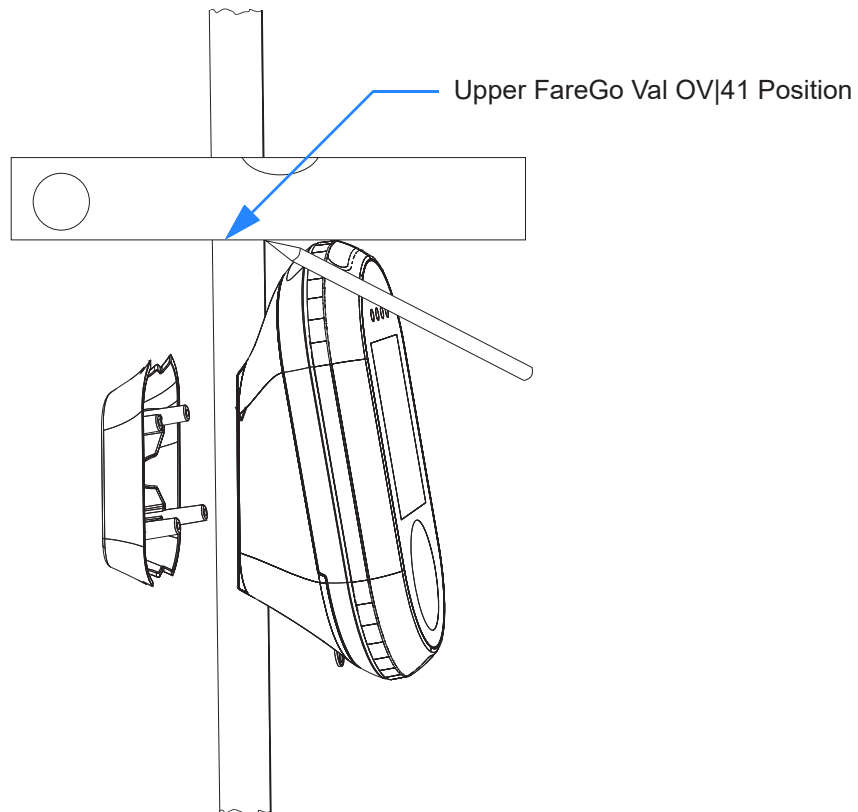


Figure 3-40 Marking Upper FareGo Val OV|41 Position

- Step 2** Clamp the drilling aid on the pole. The top hole of the drilling aid is located 97 mm (3.82") from the upper edge of the validator.

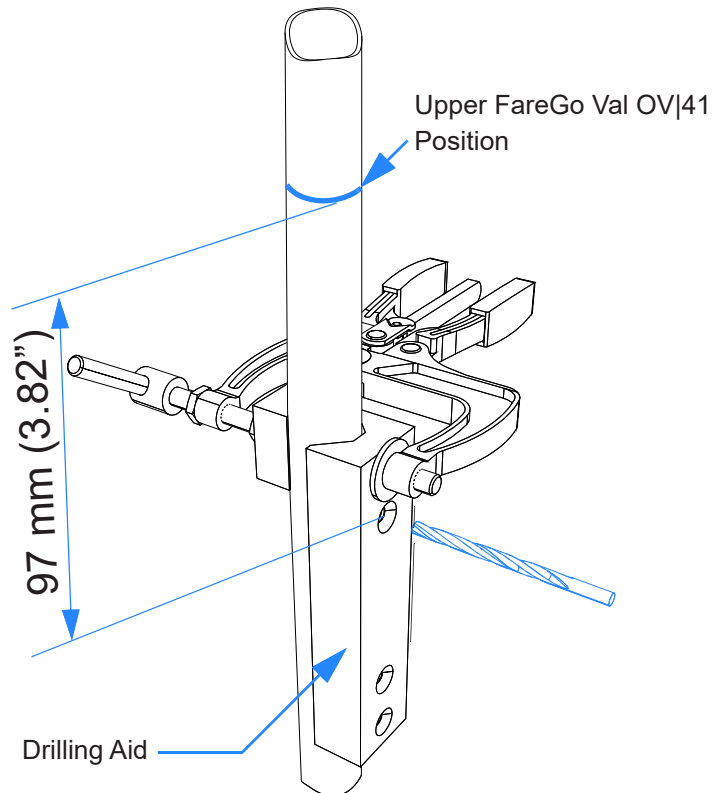


Figure 3-41 Marking Upper FareGo Val OV|41 Position

- Step 3** Drill the 5 mm (0.20") holes for the studs and the cut out for the cable into the pole (see **Figure 3-41** and **Figure 3-42**).
- Step 4** Expand the 5 mm (0.20") hole for the cable opening (middle hole) as needed for the existing cable with an appropriated drill.
- Step 5** De-burr all boreholes.

Wear safety glasses when drilling for eye protection!

Grip the drill firmly. If it sticks, it can twist in your hands and cause serious injury!

Use a trim along the sharp edges of the cable cut out to protect the wiring. This edge trim must comply with TÜV-SÜD-NRTL R/C QMFZ2 Plastics with a minimum Flame class HB.

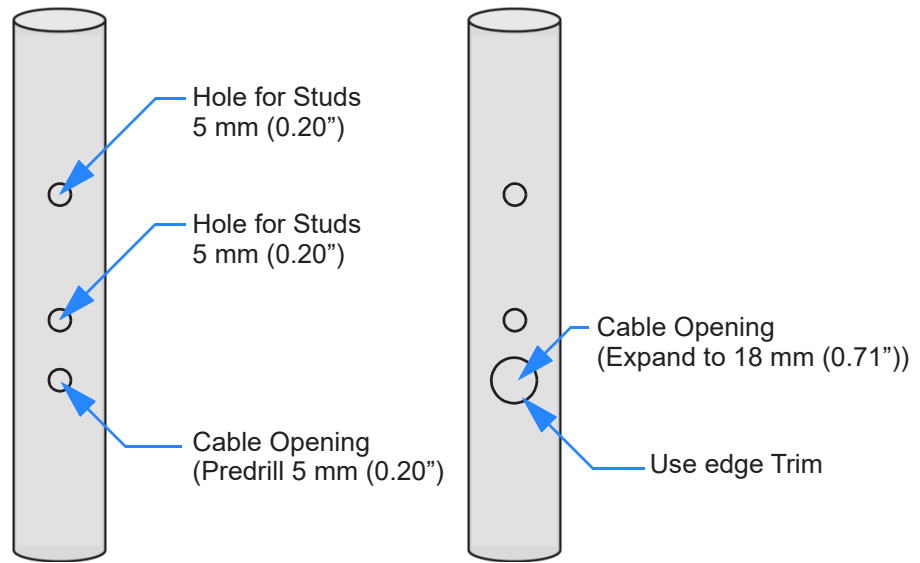


Figure 3-42 FareGo Val OV|41 Mounting Openings

- Step 6** Run the Power/Network cable through the pole and pull it out through the cable opening.
- Step 7** Place the FareGo Val OV|41 onto the pole by inserting the studs in the designated holes. The studs prevent the FareGo Val OV|41 from twisting on the pole (**Figure 3-44**).

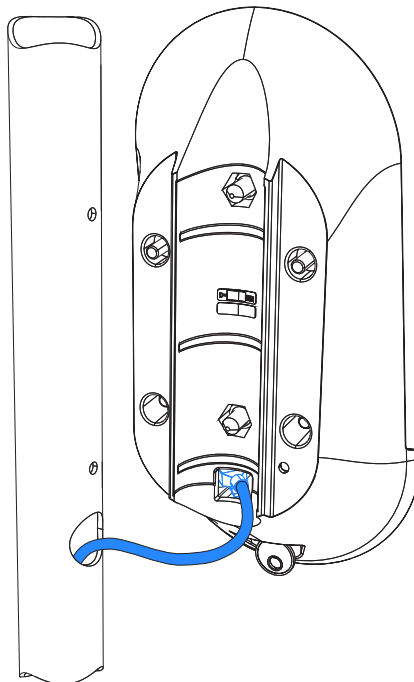


Figure 3-43 Cable Opening

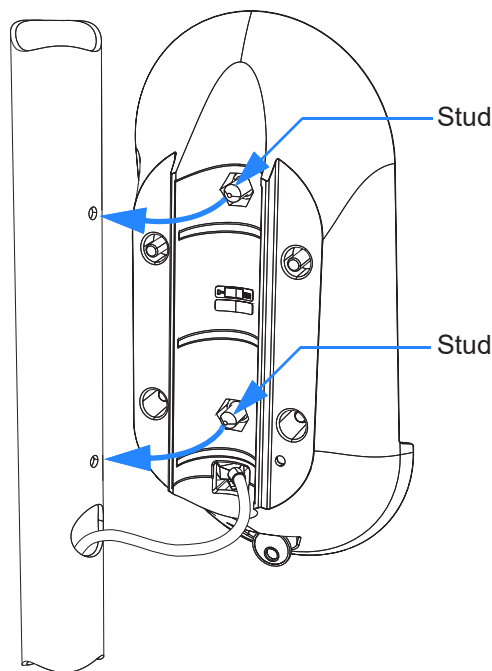


Figure 3-44 Pole Installation

All screws, except the two grub screws, must be secured with Loctite 243 (S&B Art. # 99002740).

- Step 8** Put the rear part of the mounting unit on the front part of the mounting unit around the pole and fix it with four screws (see **Figure 3-45**).

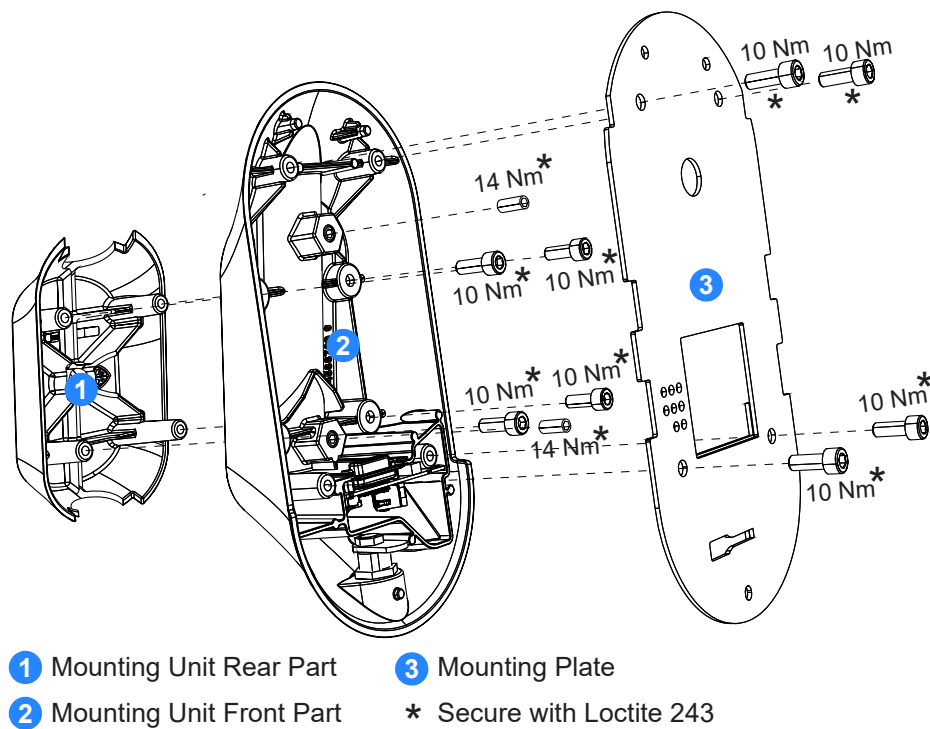


Figure 3-45 Mount the Mounting Unit

- Step 9** Loosen the two screws that fix the connection board (one turn is enough) and slide out the connection board.

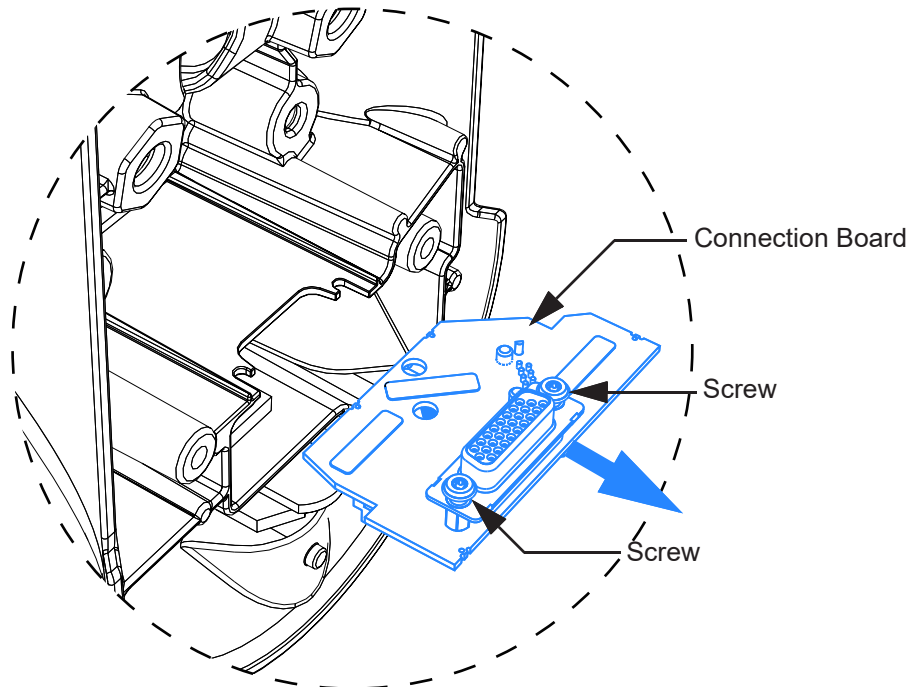


Figure 3-46 Slide out Connection Board

Step 1 Plug in the cables to the connection board, see **Figure 3-47**.

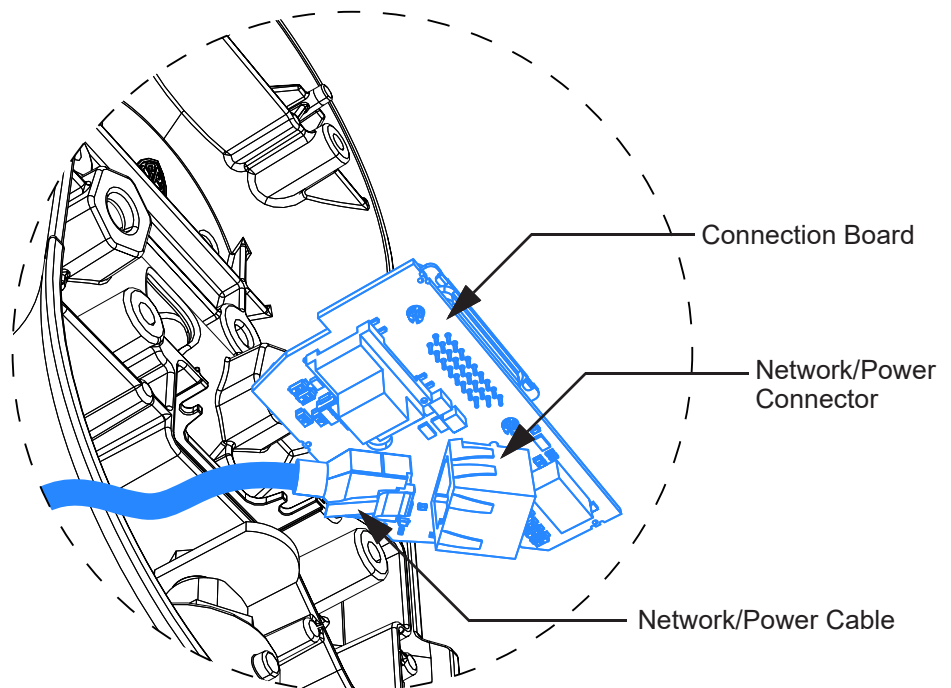


Figure 3-47 Cable Connection

Step 2 Secure the plug to the connection board with a cable tie, see **Figure 3-48**.

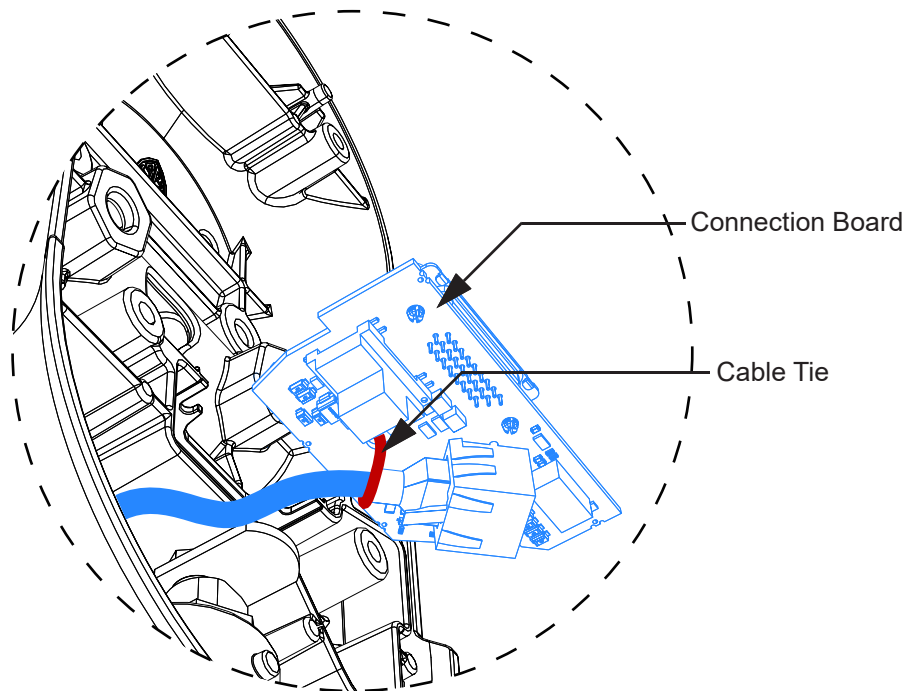


Figure 3-48 Cable Connection

Step 3 Slide the connection board back into the mounting unit and tighten the fixing screws.

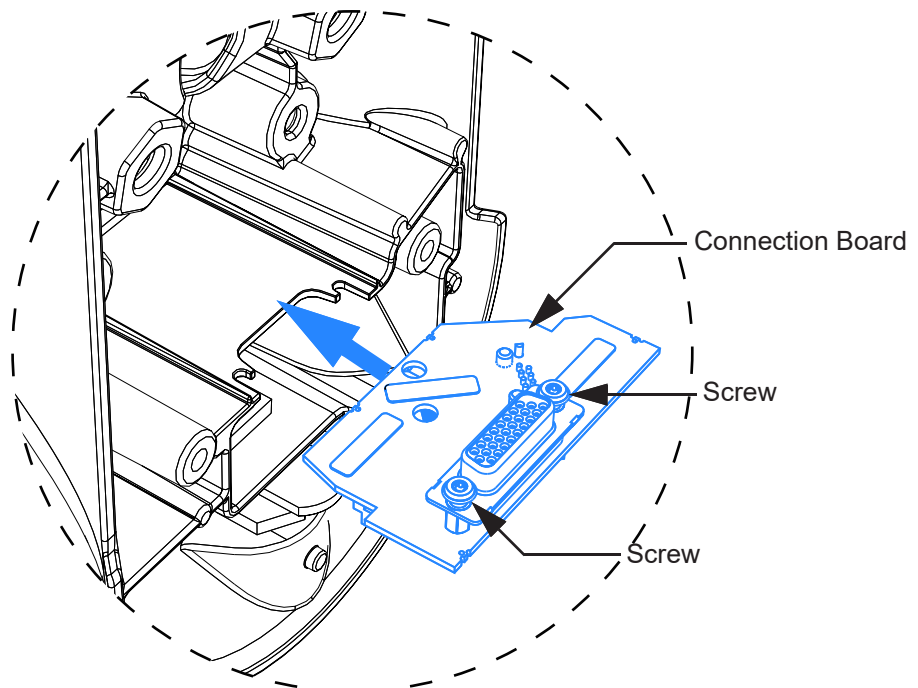
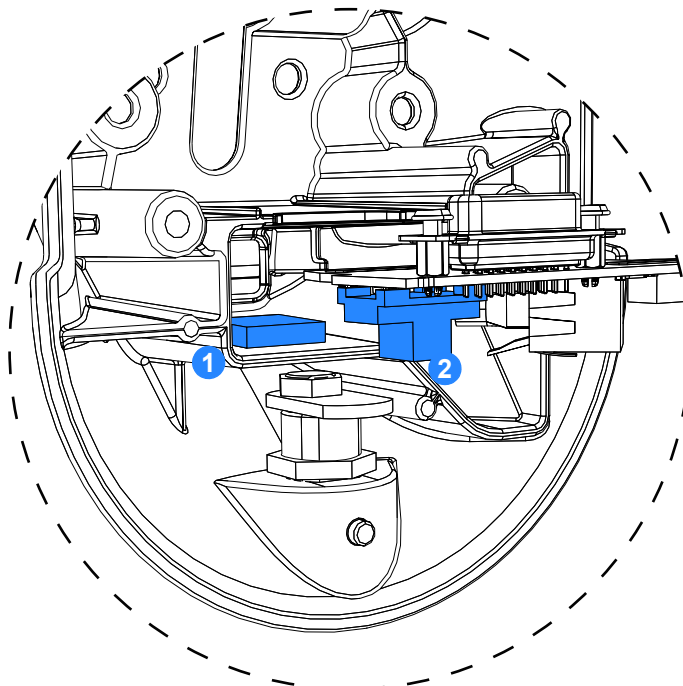


Figure 3-49 Slide out Connection Board

There are two different versions of the connection board. In the version with a DC/DC converter, care must be taken that the DC/DC converter has good contact with the thermal pad.



1 Thermal Pad 2 DC/DC Converter

Figure 3-50 DC/DC Converter

Step 4 Put the mounting plate on the mounting unit front part and fix it with four screws, see **Figure 3-45**.

Step 5 Put the base unit on the mounting unit, see **Figure 3-51**.

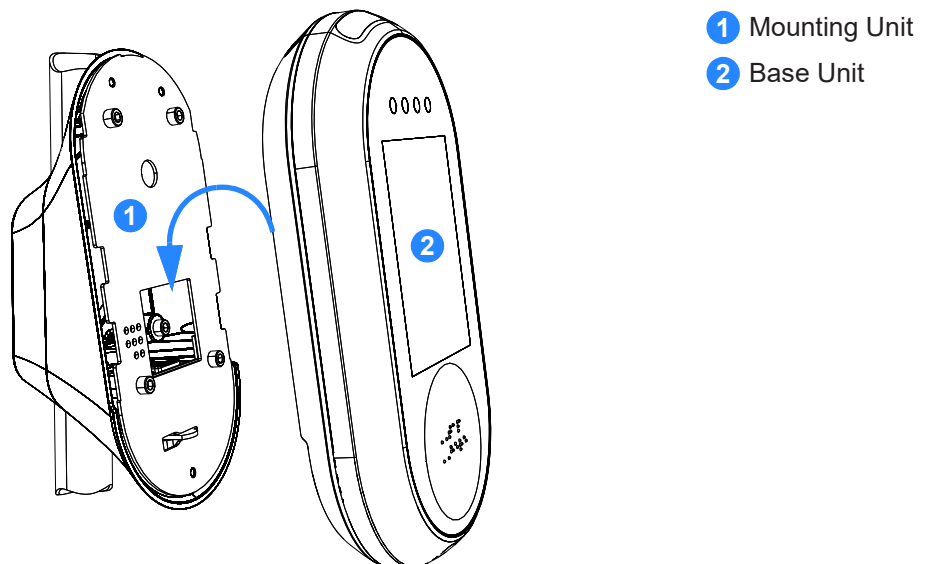


Figure 3-51 Slide Base Unit on Mounting Unit

Step 6 Lock the device as shown in **Figure 3-52**.

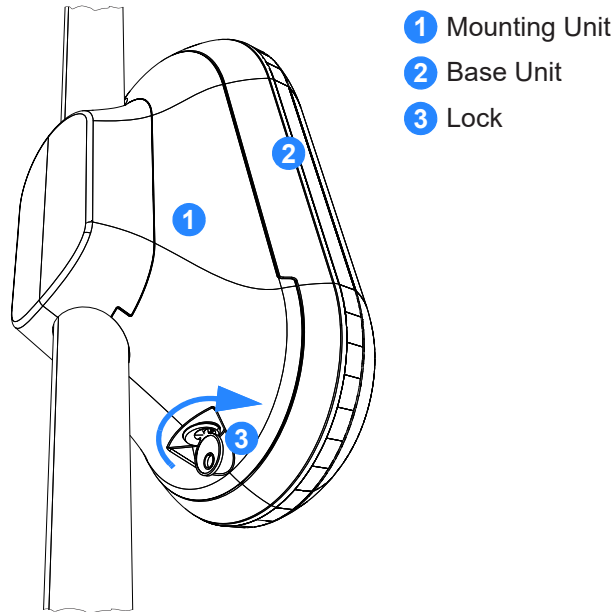


Figure 3-52 Lock

3.9.2.1 Securing the Mounting Unit Variant 2

There is a second variant for securing the assembly unit and drilling the holes in the support rod. With this variant, the assembly unit is attached using blind rivet nuts.

Only the part that differs from the variant described above is described in this section.

Step 1

Clamp the drilling aid (S&B item no. 0387103) onto the rod. The upper hole of the drilling aid is located 93 mm (3.66") from the upper edge of the validator. However, it is easier to use the upper edge of the drilling aid as reference edge. Here the distance to the upper edge is 54 mm (2.13").

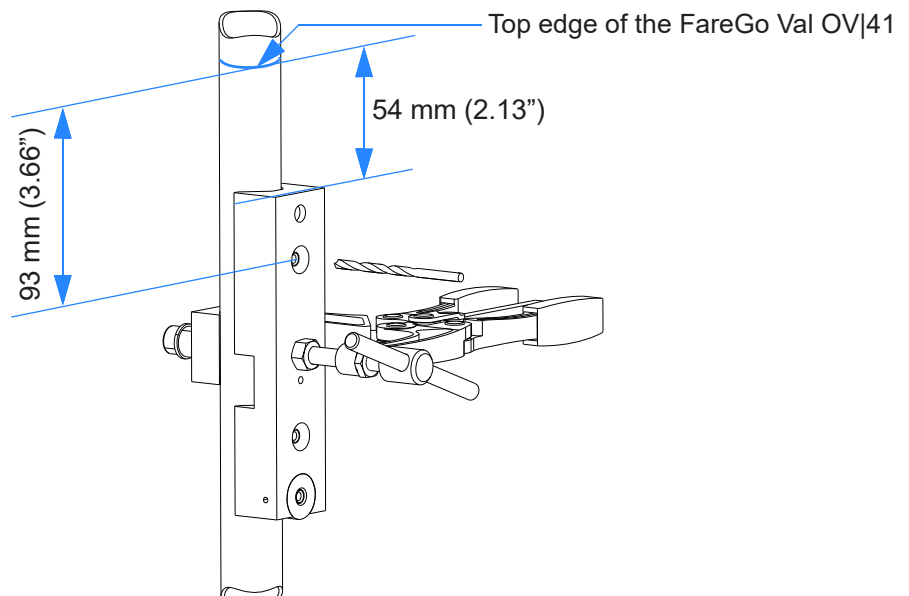


Figure 3-53 Position drilling aid

Step 2

Drill the 5 mm (0.20") holes for the pop rivet nuts and the cutout for the cable in the rod (see **Figure 3-54** and **Figure 3-57**).

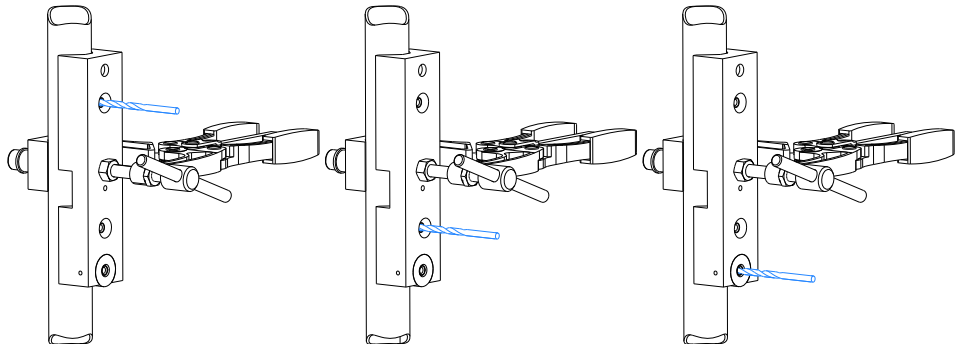


Figure 3-54 Pre-drilling

Step 3 Enlarge the 5mm (0.20") blind bid nut holes (top two holes) to 9mm (see **Figure 3-55** and **Figure 3-57**).

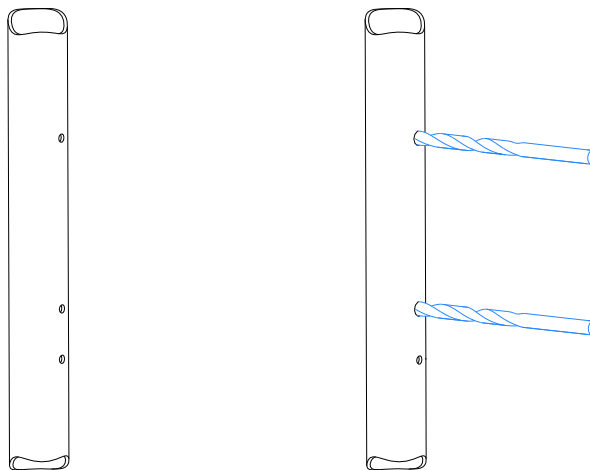


Figure 3-55 Drilling for blind rivet nuts

Step 4 Enlarge the 5mm (0.20") cable entry hole (bottom hole) as needed for the existing cable using a suitable drill bit (see **Figure 3-56** and **Figure 3-57**).

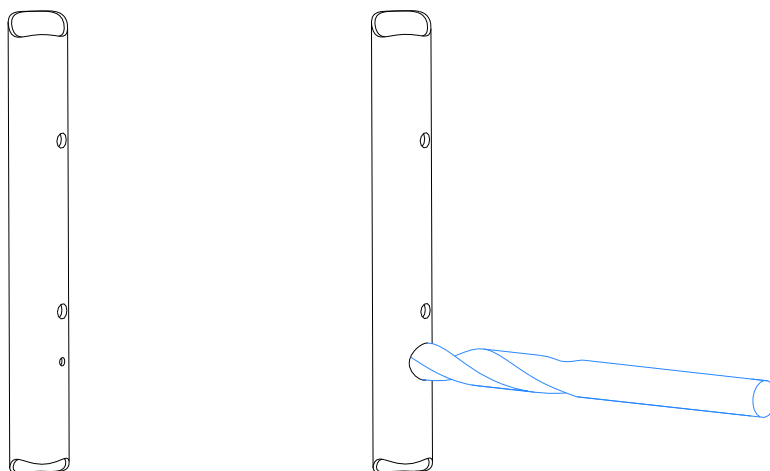


Figure 3-56 Drilling for cable entry

Step 5 Deburr all drill holes.

Wear goggles to protect your eyes when drilling!

Hold the drill firmly. If it gets stuck, it can twist in your hands and cause serious injury!

Use a border around the sharp edges of the wire cutout to protect the wiring. This edge trim must correspond to TÜV-SÜD-NRTL R/C QMFZ2 plastic with at least flame class HB.

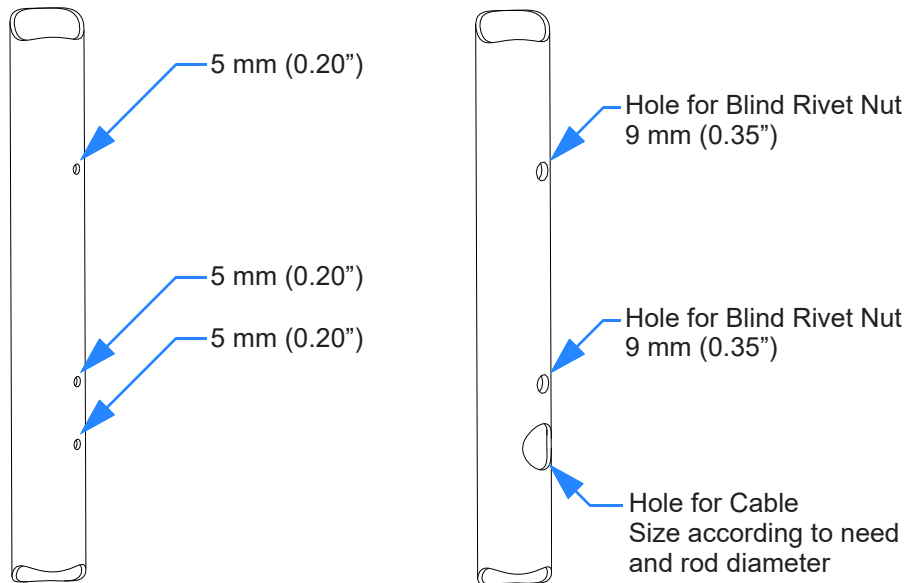


Figure 3-57 Mounting holes

Step 6 Install the blind rivet nuts with rivet nut pliers. Observe the instructions of the pliers and rivet nut manufacturer.

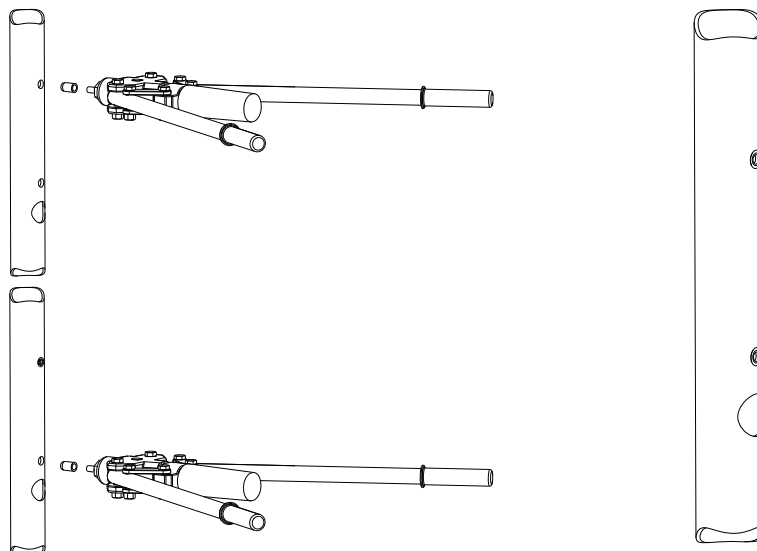


Figure 3-58 Assembly of Blind Rivet Nut

Step 7 Feed the power/data cable out through the cut-out on the back of the mounting unit to the front.

Step 8 Attach the front part of the mounting unit to the rod with the two washers and the two countersunk screws (see **Figure 3-59**)

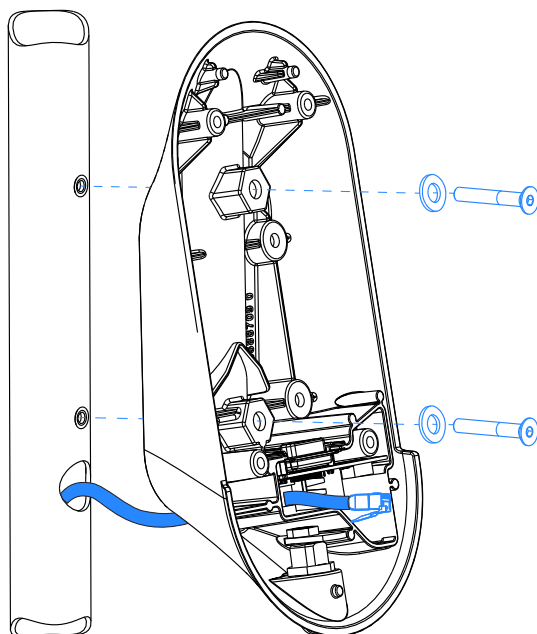


Figure 3-59 Fixing the assembly unit

Further assembly is carried out as described in **Chapter 3.9.2**.

In vehicles where a power/network cable has already been routed from the factory, the lower drill bushing can be removed from the drilling aid. This allows the drilling aid to be clamped onto the rod without any problems (see **Figure 3-60**).

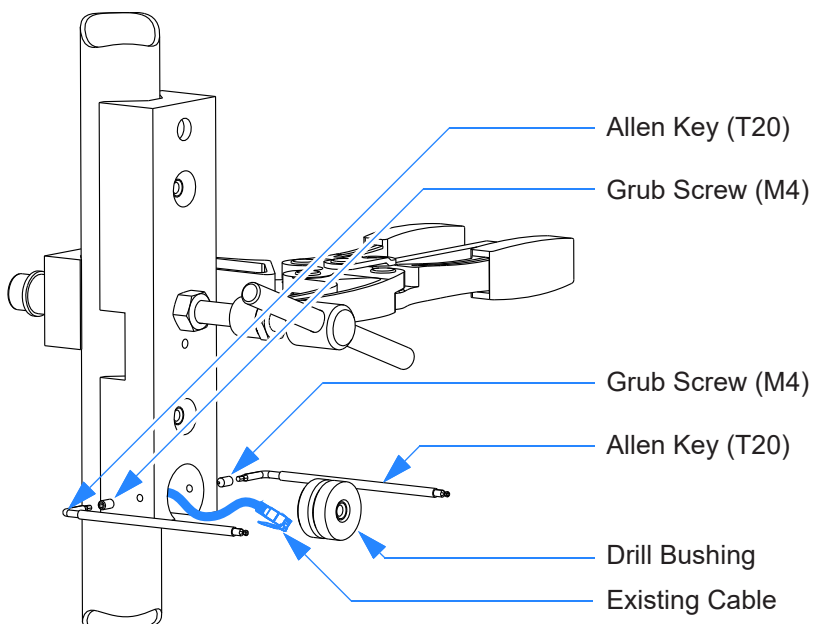


Figure 3-60 Remove the lower drill bush

3.9.3 Horizontal Pole Installation (Option)

The steps of the horizontal installation are nearly the same as the steps for the vertical installation. The difference between these two installation methods are explained here.

Follow these steps to attach a FareGo Val OV|41.

Step 1 Mark the left outer edge of the FareGo Val OV|41 on the pole, see **Figure 3-61**.

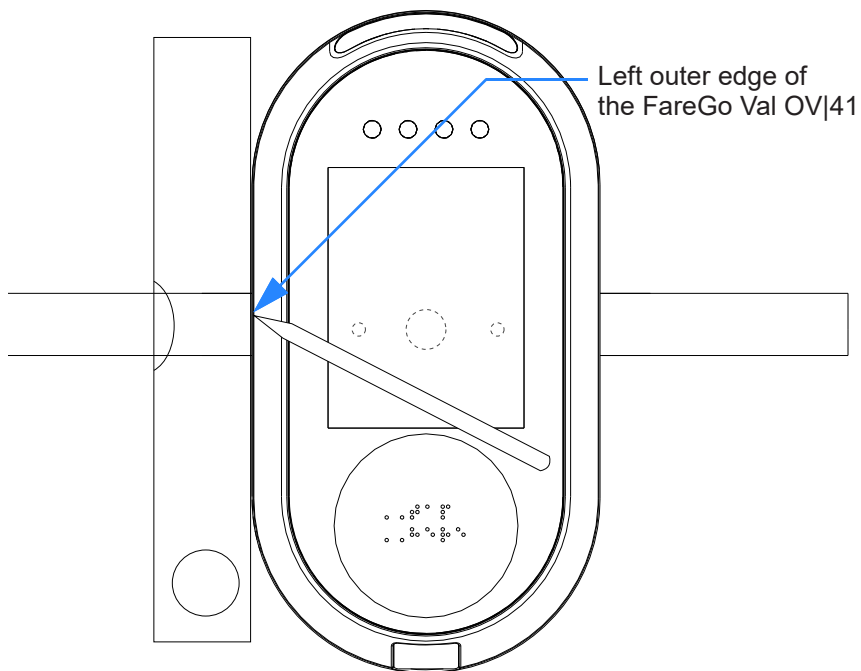


Figure 3-61 Marking Left Outer Edge FareGo Val OV|41 Position

Step 2 Clamp the drilling aid on the pole. The left hole of the drilling aid is located 65 mm (2.56") from the Left edge of the validator.

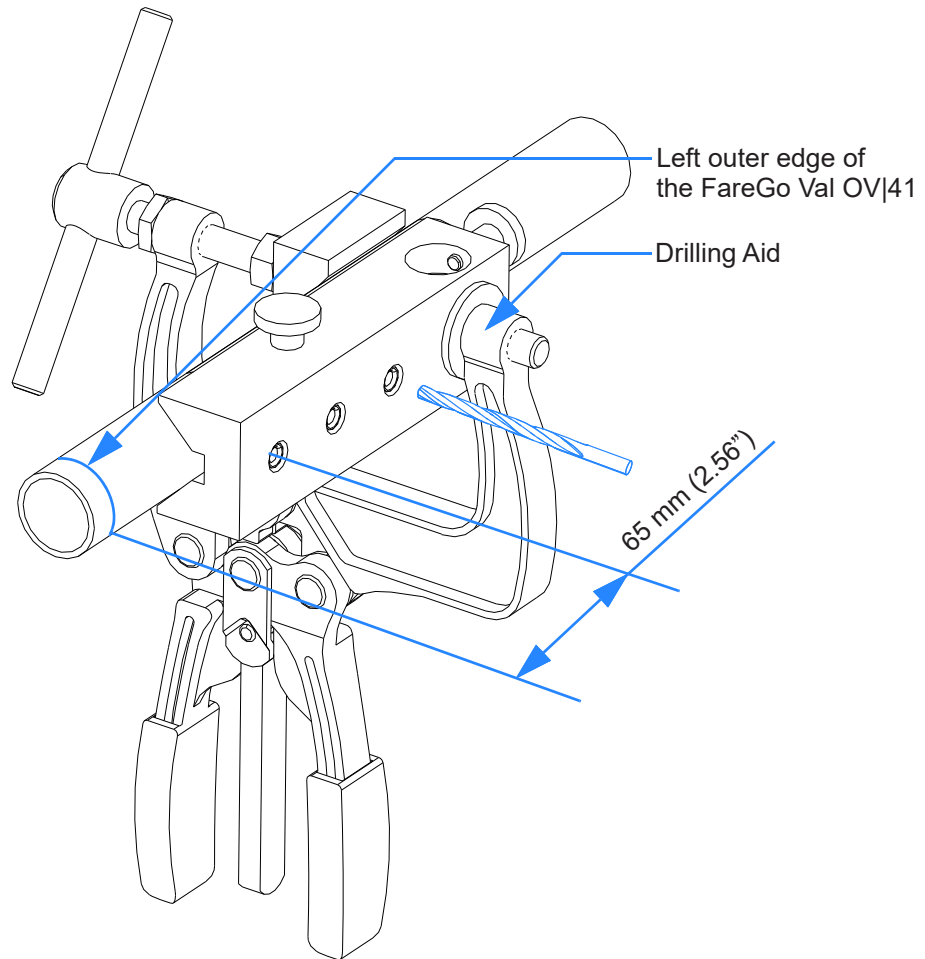


Figure 3-62 Positioning the Drilling Aid

- Step 3** Drill the 5 mm (0.20") holes for the studs and the cut out for the cable into the pole, see **Figure 3-41** and **Figure 3-42**.
- Step 4** Expand the 5 mm (0.20") hole for the cable opening (middle hole) as needed for the existing cable with a appropriated drill.
- Step 5** De-burr all boreholes.

Wear safety glasses when drilling for eye protection!

Grip the drill firmly. If it sticks, it can twist in your hands and cause serious injury!

Use a trim along the sharp edges of the cable cut out to protect the wiring. This edge trim must comply with TÜV-SÜD-NRTL R/C QMFZ2 Plastics with a minimum Flame class HB.

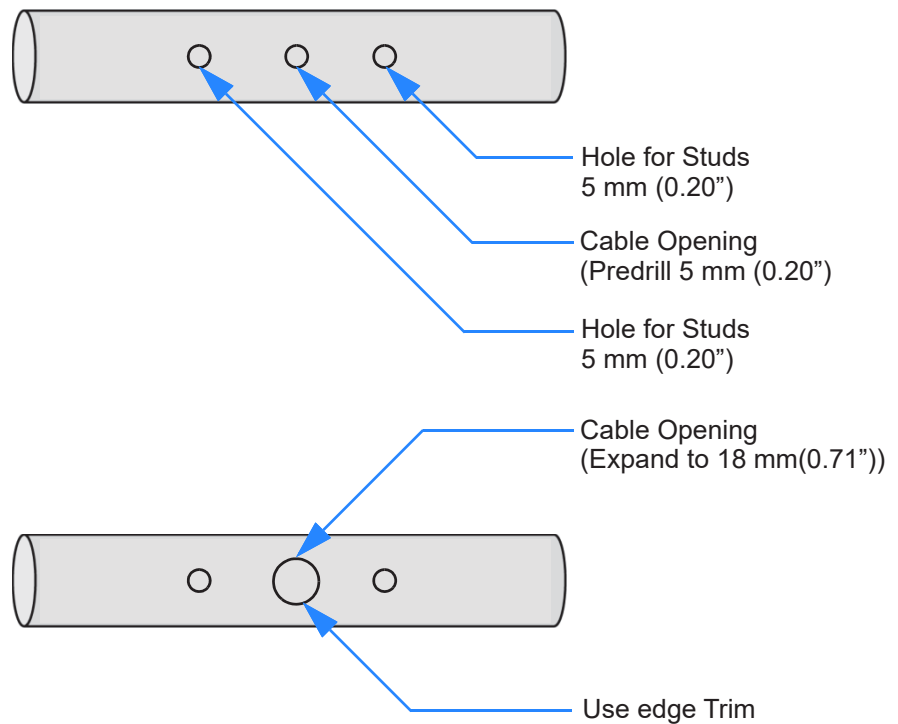


Figure 3-63 FareGo Val OV|41 Mounting Openings

Step 6 Run the Power/Network cable through the pole and pull it out through the cable opening.

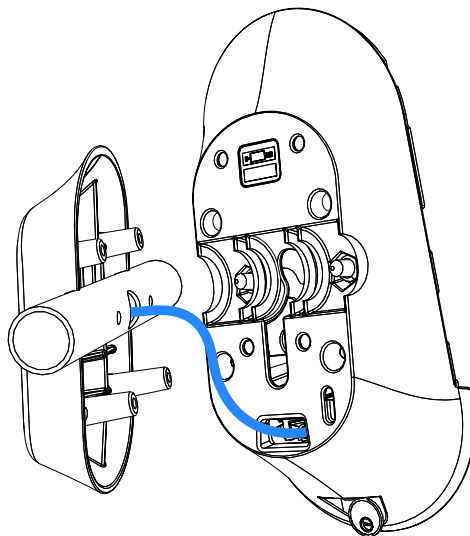


Figure 3-64 Wiring Opening

- Step 7** Place the FareGo Val OV|41 onto the pole by inserting the studs in the designated holes. The studs prevent the FareGo Val OV|41 from twisting on the pole, see **Figure 3-65**.

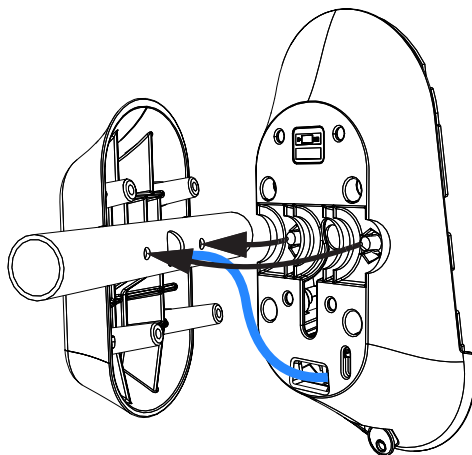
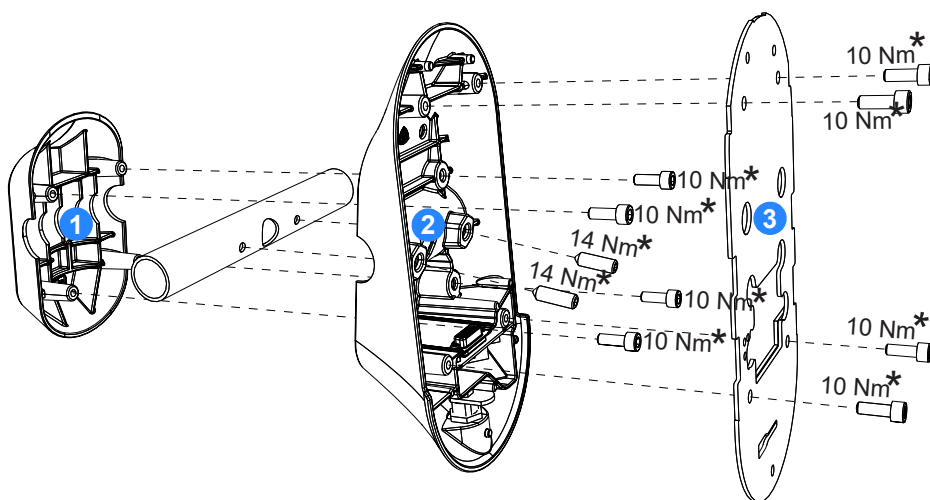


Figure 3-65 Pole Installation

All screws, except the two grub screws, must be secured with Loctite 243 (S&B Art. # 99002740).

- Step 8** Put the rear part of the mounting unit on the front part of the mounting unit around the pole and fix it with four screws, see **Figure 3-66**.



- 1** Mounting Unit Rear Part
- 2** Mounting Unit Front Part
- 3** Mounting Plate
- * Secure with Loctite 243

Figure 3-66 Mount the Mounting Unit

- Step 9** Loosen the two screws that fix the connection board (one turn is enough) and slide out the connection board, see **Figure 3-67**.

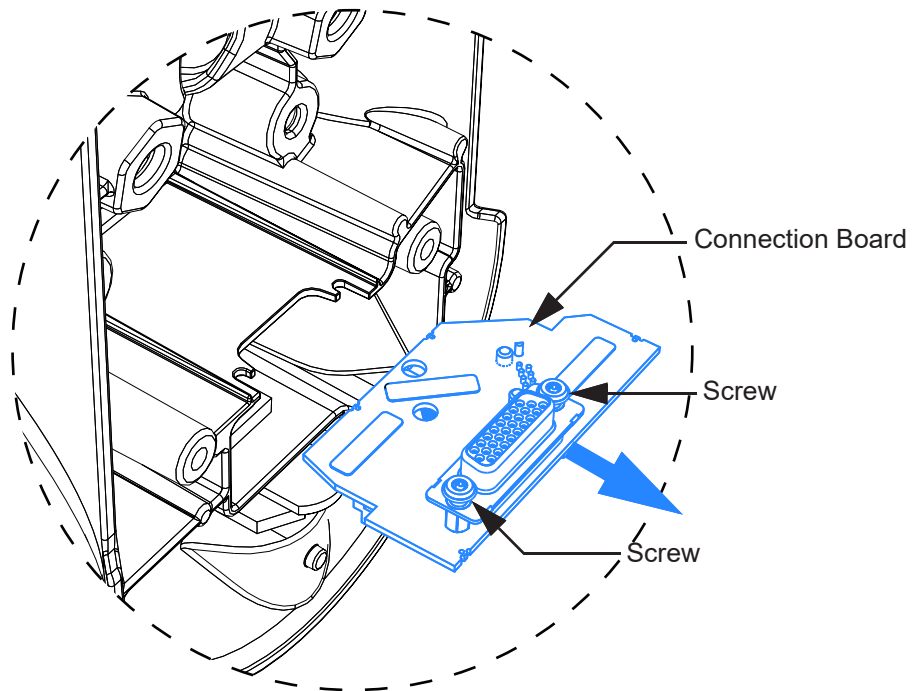


Figure 3-67 Slide out Connection Board

- Step 10** Plug in the cables to the connection board see **Figure 3-68**.

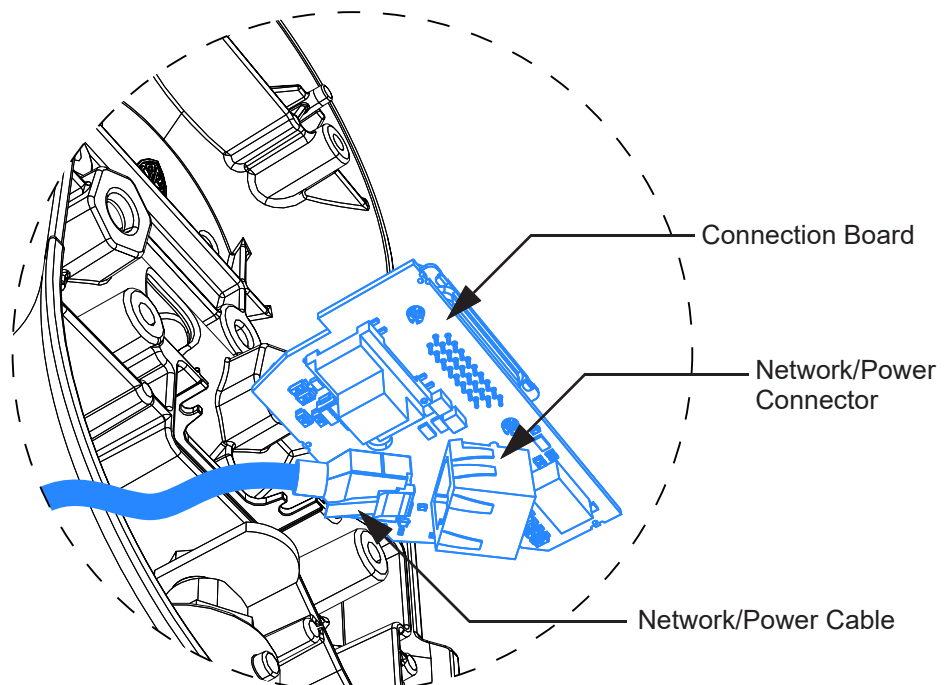


Figure 3-68 Cable Connection

Step 11 Secure the plug to the connection board with a cable tie, see **Figure 3-69**.

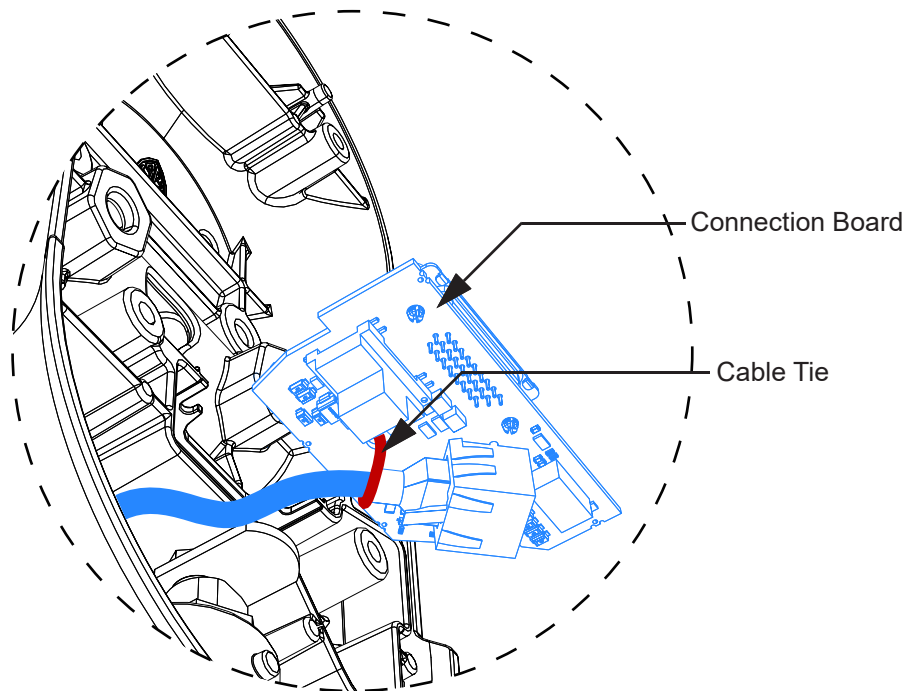


Figure 3-69 Cable Connection

Step 12 Slide the connection board back into the mounting unit and tighten the fixing screws, see **Figure 3-70**.

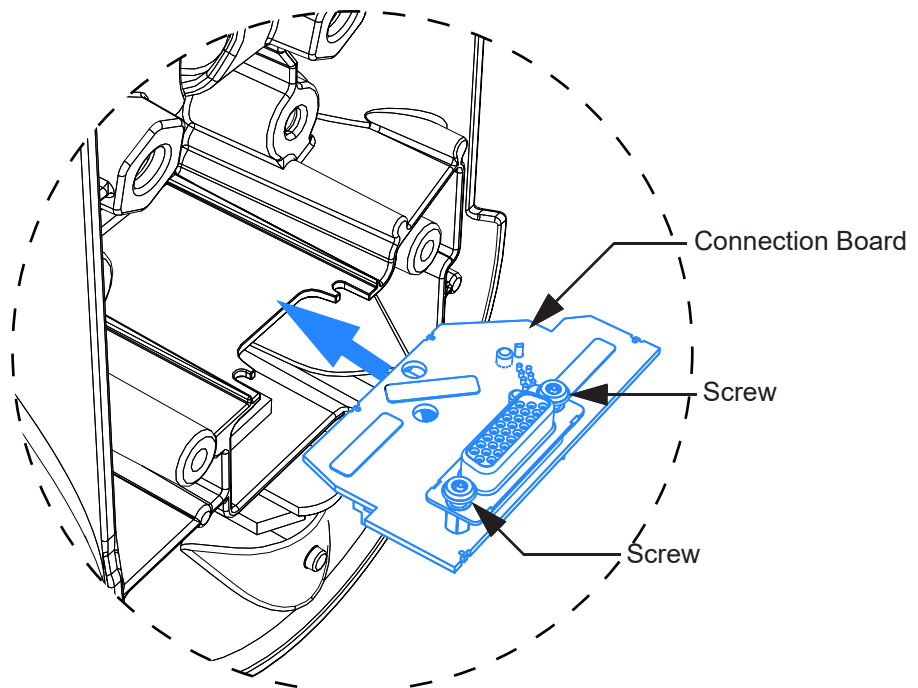
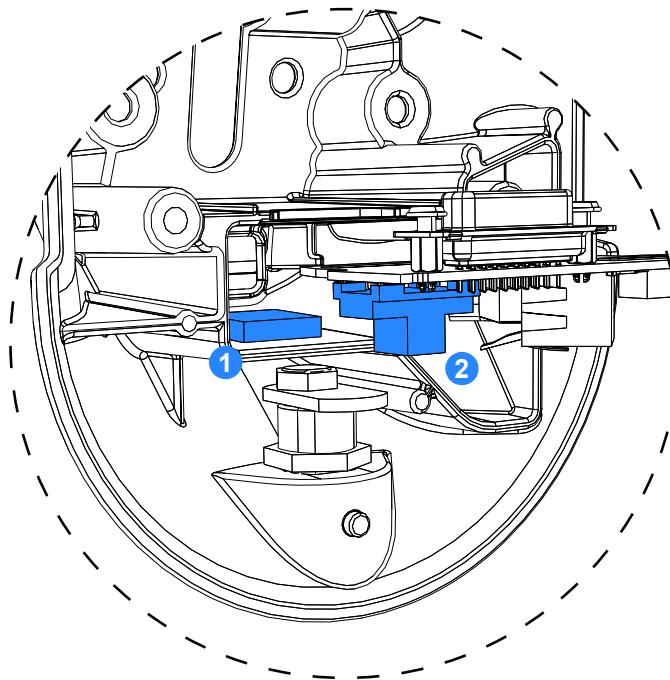


Figure 3-70 Slide out Connection Board

There are two different versions of the connection board. In the version with a DC/DC converter, care must be taken that the DC/DC converter has good contact with the thermal pad.

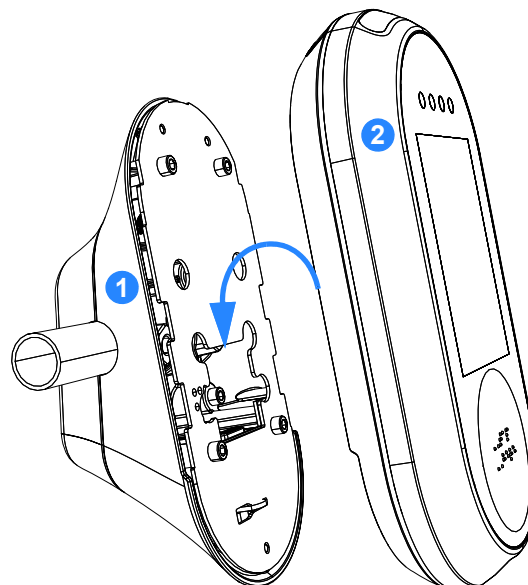


1 Thermal Pad 2 DC/DC Converter

Figure 3-71 DC/DC Converter

Step 13 Put the mounting plate on the mounting unit front part and fix it with four screws, see **Figure 3-66**.

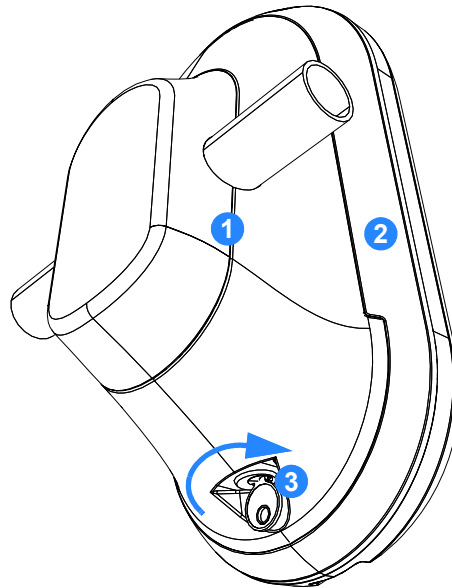
Step 14 Put the base unit on the mounting unit, see **Figure 3-72**.



1 Mounting Unit
2 Base Unit

Figure 3-72 Slide Base Unit on Mounting Unit

Step 15 Lock the device as shown in **Figure 3-73**.



- ① Mounting Unit
- ② Base Unit
- ③ Lock

Figure 3-73 Lock

3.10 Post-Installation Checklist

The installer must use the following checklist to verify proper installation of the FareGo Val OV|41 and associated equipment.

- ✓ Ensure the stability of the FareGo Val OV|41 at the assembly site.
- ✓ Verify any attached cables are secure.
- ✓ Ensure there is adequate power and network.

3.11 Disassembly and Removal

Should it become necessary to remove the complete FareGo Val OV|41 (mounting unit and base unit) from its permanent location, the following procedure must be followed.

When disassembling, observe all applicable occupational safety regulations. The regulations and instructions apply as in the installation.

Hazardous Voltage

Touching live parts can cause life-threatening injuries

- ▶ Make sure the power supply cables are not powered during connection activities.
- ▶ Switch OFF the station circuit breaker for the appropriate cables.

Step 1

Turn off main circuit breaker.

Step 2

Disassemble the FareGo Val OV|41 in reverse order.

Step 3

After removing the FareGo Val OV|41, the remaining cables and conduits must be removed by an authorized worker.

For questions about the disposal site, please contact.

Scheidt & Bachmann USA
1001 Pawtucket Boulevard
MA 01854, Lowell
USA

Chapter 4 Commissioning

4.1 Initialization This chapter explains how to initialize the FareGo Val OV|41.

4.2 Initial Power-up

- Step 1** Remove all packing material, clean the exterior of the housing and remove any foreign objects from the device (dust, scrapped wiring, paper, tape).
- Step 2** Check if all screws and nuts are tightened firmly.
- Step 3** Check the state of electrical connection.
- Step 4** Close the Lock.

4.3 Initialization

4.3.1 Workshop Pole Initialization

To initialize the validator in a workshop, a workshop pole containing an EEPROM (Electrically Erasable Programmable Read-Only Memory) is needed. In general, the EEPROMS are used to identify the Validator's position in the vehicle and to assign the correct software settings that are stored in the back office system for the corresponding device.

The following steps need to be performed to program the EEPROM of the workshop pole before using the workshop pole for the first time:

- Step 1** Mount Validator that is not initialized yet to the workshop pole.
- Step 2** Wait until the Basic Administration Tool (BAT) has started automatically.
- Step 3** Choose the menu in the upper left corner of the home screen (see **Figure 4-1**).

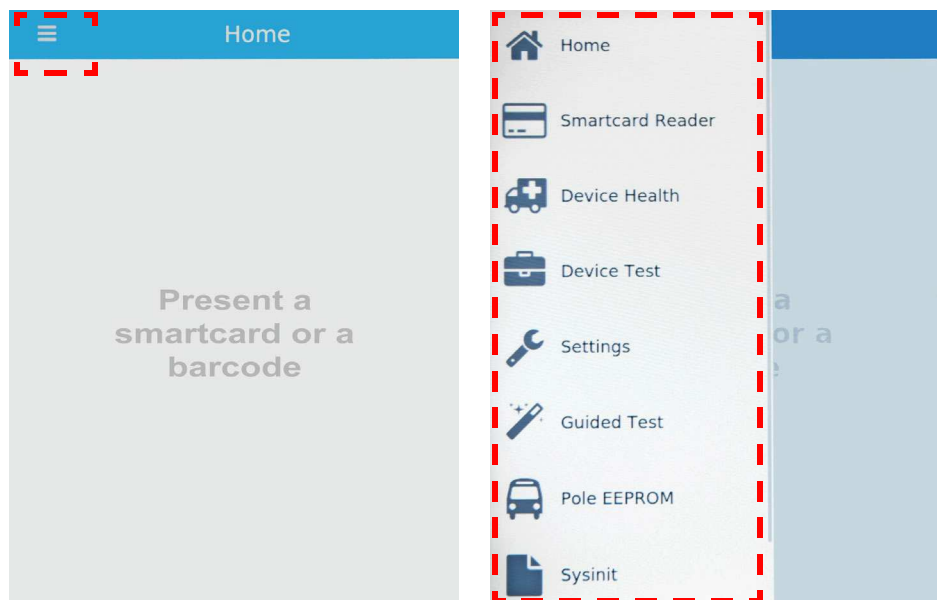


Figure 4-1 BAT 1

Choose <Pole EEPROM> in the menu (see in **Figure 4-2**).

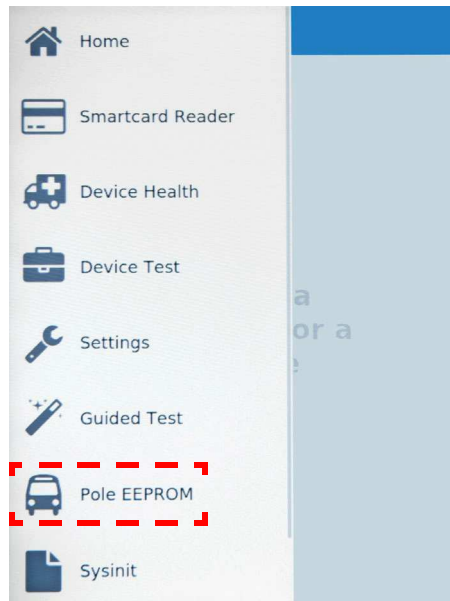


Figure 4-2 BAT 2

Step 4 Choose <workshop pole> in the EEPROM programmer (see in **Figure 4-3**).

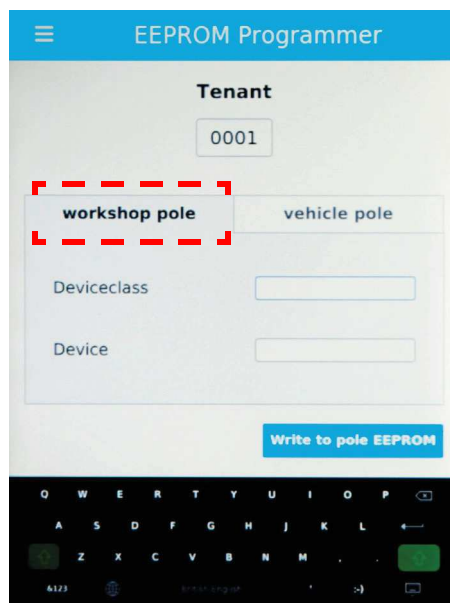


Figure 4-3 BAT 3

Step 5 Enter Tenant ID, Device class and Device ID (see **Figure 4-4**).
The Tenant ID, the Device class and the Device are defined in FareGo Data. To get valid values for these input fields, contact the software administrator.

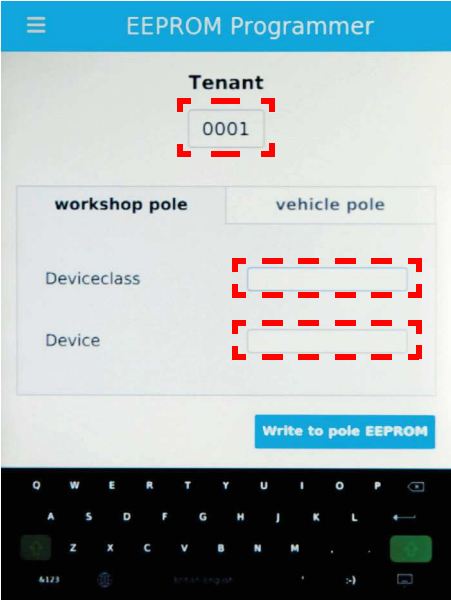


Figure 4-4 BAT 4

Step 6 Press the <Write to pole EEPROM> button (see **Figure 4-5**).

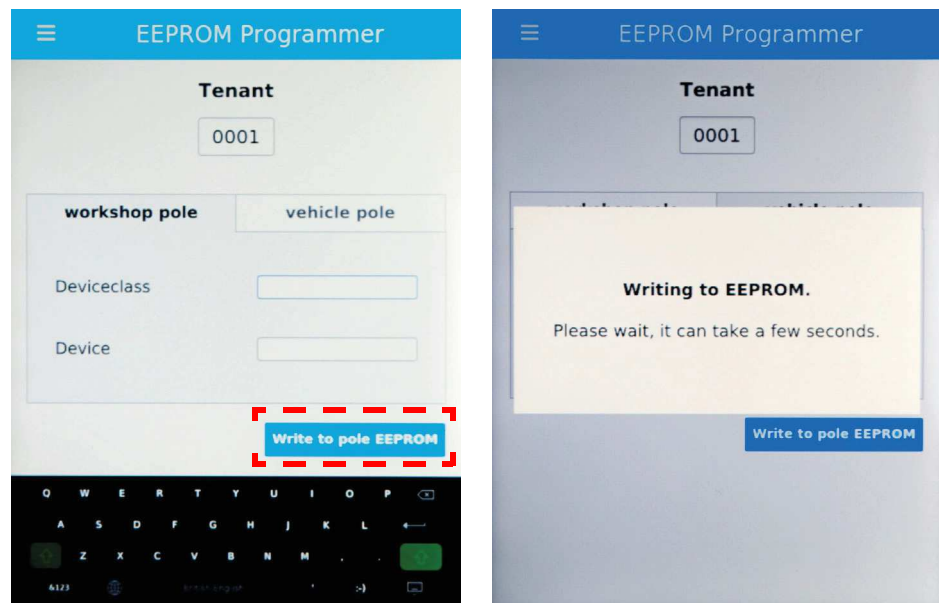


Figure 4-5 BAT 5

4.3.2 Vehicle Pole Initialization

When a vehicle pole was installed or the EEPROM circuit board of a vehicle pole was replaced, the EEPROM inside the pole has to be initialized.

To Initialize the EEPROM of a vehicle pole, follow the steps in **Section 4.3.1**.

But instead of choosing workshop pole in **Step 4**, choose vehicle pole.

4.3.3 Validator Initialization (Workshop)

Before the validator can be installed in a vehicle, the validator must pre-initialized at a workshop pole.

Step 7 Mount Validator that is not initialized yet to the workshop pole.

Step 8 Wait until the Basic Administration Tool (BAT) has started automatically.
Choose the menu in the upper left corner of the home screen (see **Figure 4-6**).

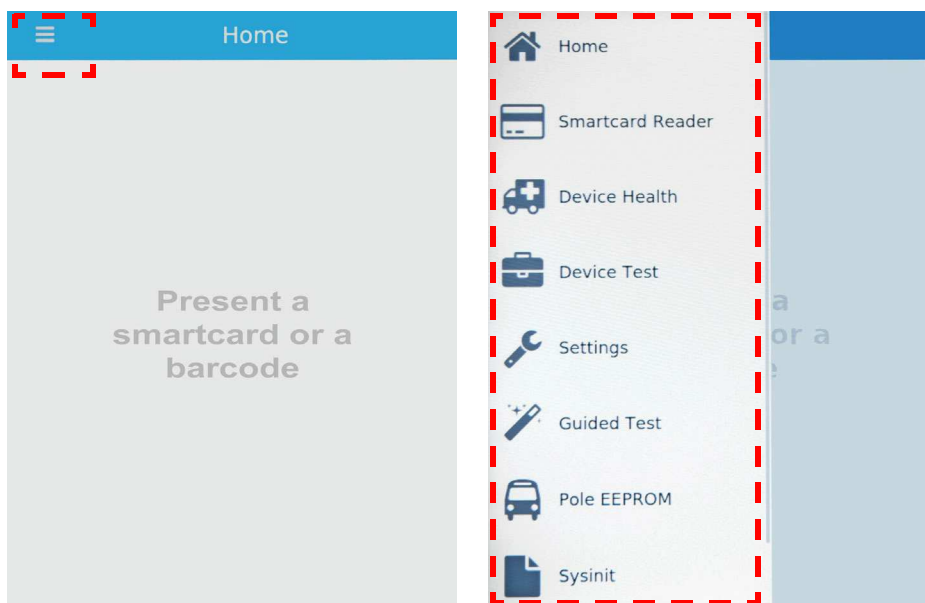


Figure 4-6 Validator Initialization (Workshop) 1

Step 9 Choose <Sysinit> in the menu (see **Figure 4-7**).

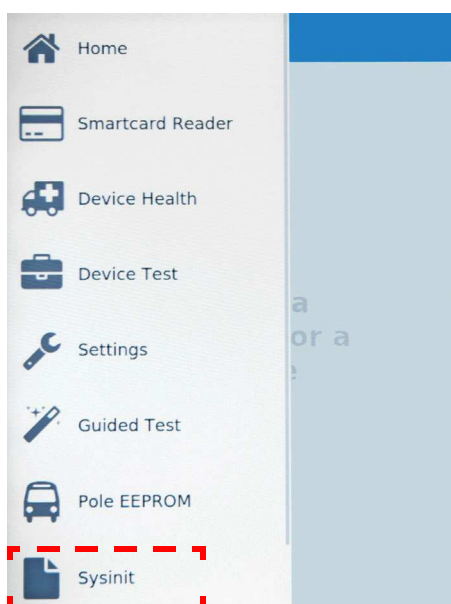


Figure 4-7 Validator Initialization (Workshop) 2

Step 10 Choose <Yukoninit> (see **Figure 4-8**).

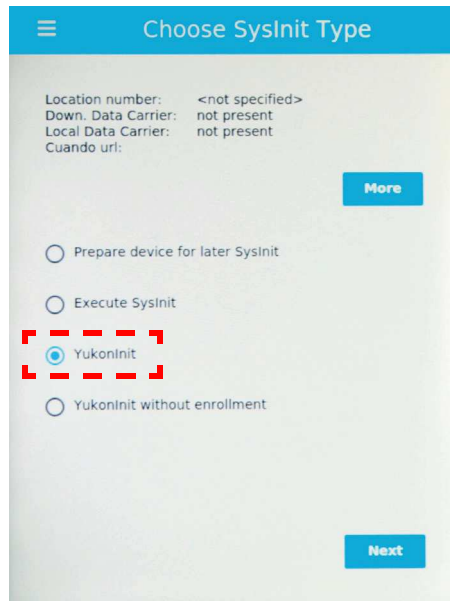


Figure 4-8 Validator Initialization (Workshop) 3

Step 11 Press the <Next> button to download certificate (see **Figure 4-9**).

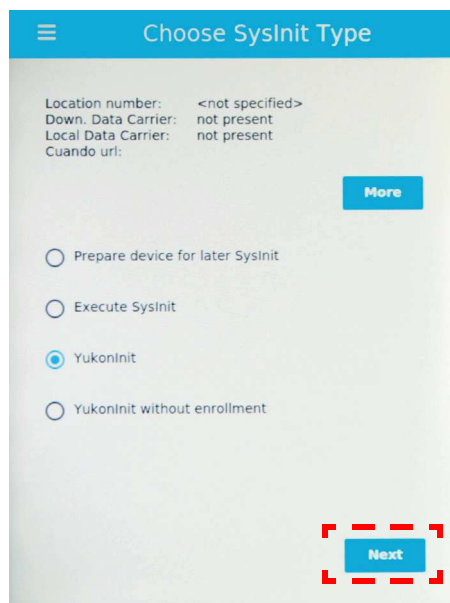


Figure 4-9 Validator Initialization (Workshop) 4

Step 12 Press the <Next> button to install certificate (see **Figure 4-10**).

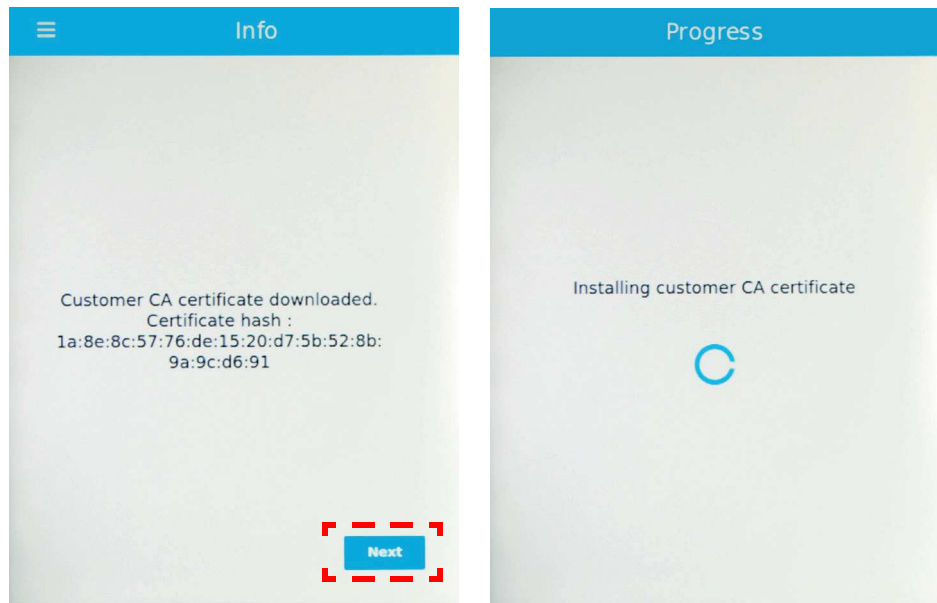


Figure 4-10 Validator Initialization (Workshop) 5

Step 13 Set login and password and press the <Next> button (see **Figure 4-11**).

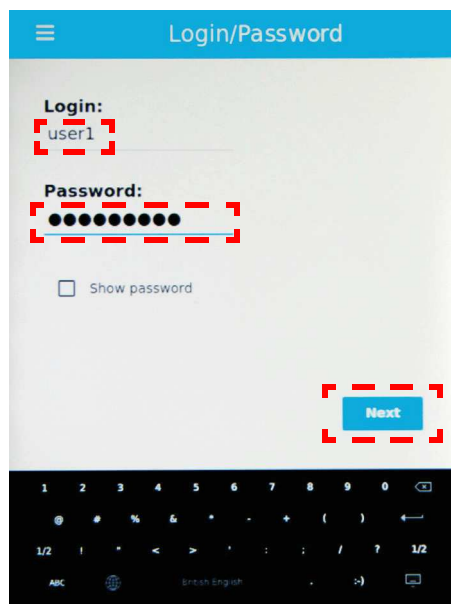


Figure 4-11 Validator Initialization (Workshop) 6

- Step 14** Yukon updates will be downloaded. After successful download, press the <Next> button on the screen (see **Figure 4-12**).

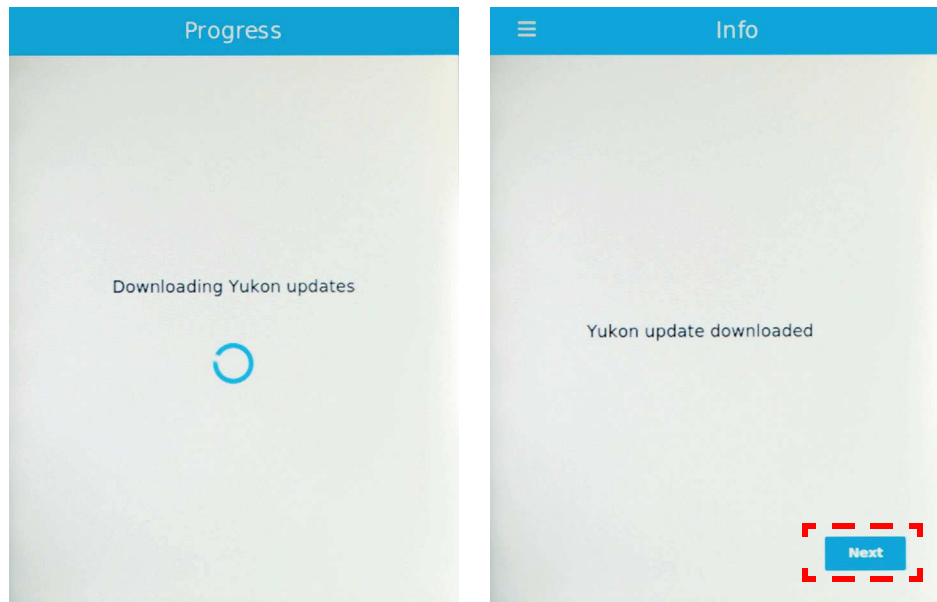


Figure 4-12 Validator Initialization (Workshop) 7

- Step 15** Confirm time zone by pressing <Next> (see **Figure 4-13**).



Figure 4-13 Validator Initialization (Workshop) 8

Step 16 The Yukon updates will be installed (see **Figure 4-14**).



Figure 4-14 Validator Initialization (Workshop) 9

Step 17 Validator boots automatically (see **Figure 4-15**).

Step 18 Validator shows "Out of Service" screen (see **Figure 4-15**).

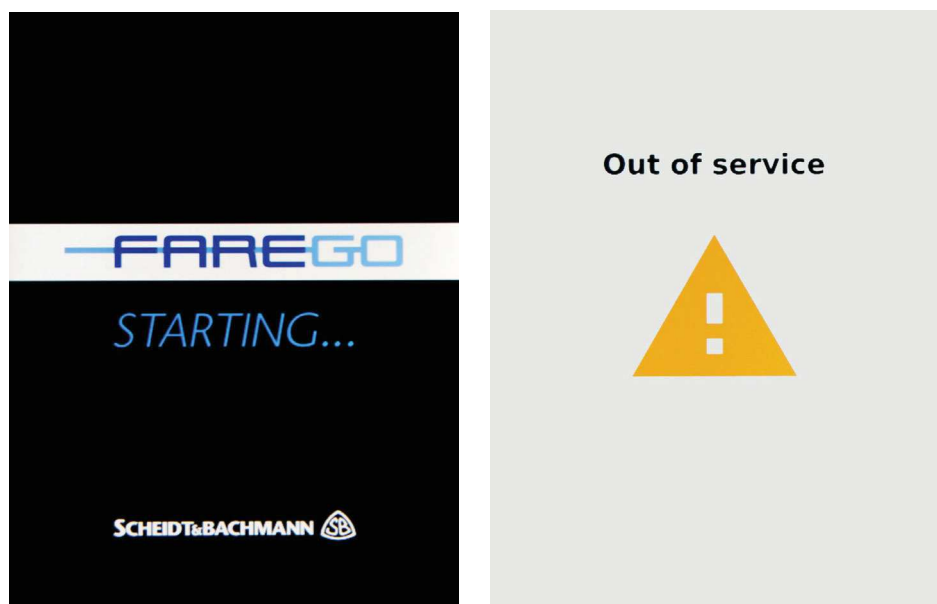


Figure 4-15 Validator Initialization (Workshop) 10

Step 19 Remove the validator from the workshop pole.
Now the validator is ready to be installed in a vehicle.

4.3.4 Validator Initialization (Vehicle)

When installing the Validator in the vehicle, the EEPROM of the vehicle pole (e.g. bus pole) needs to be programmed as described in **Section 4.3.2**. This is only necessary when the bus pole is put into operation for the first time.

After programming the EEPROM of the vehicle pole, the Validator can be initialized finally for the operation in the vehicle:

- Step 1** Mount Validator that was initialized with the help of the workshop pole on the vehicle pole.
- Step 2** Validator boots and initializes automatically with the correct software.

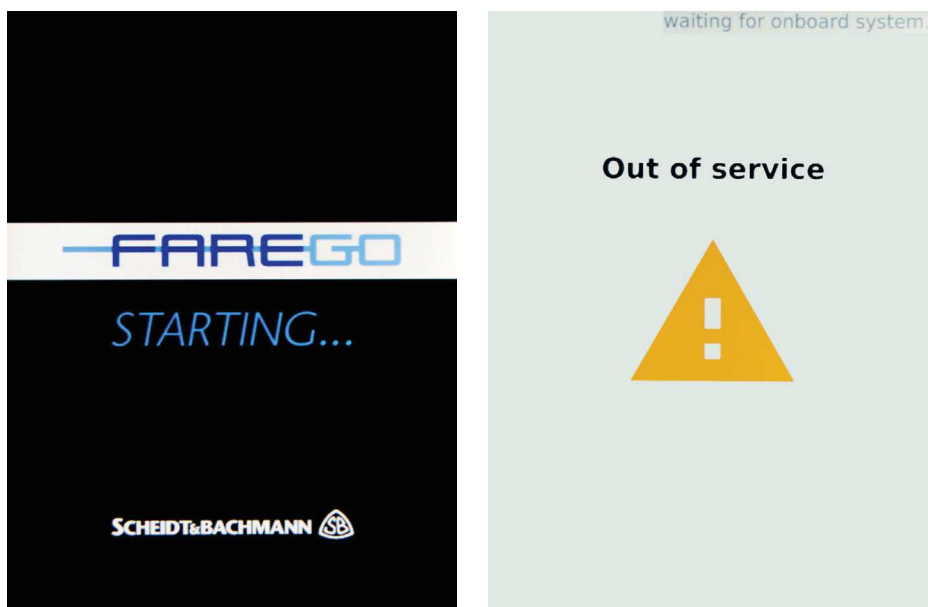


Figure 4-16 Validator Initialization (Vehicle) 1

- Step 3** Validator reboots and goes into service.

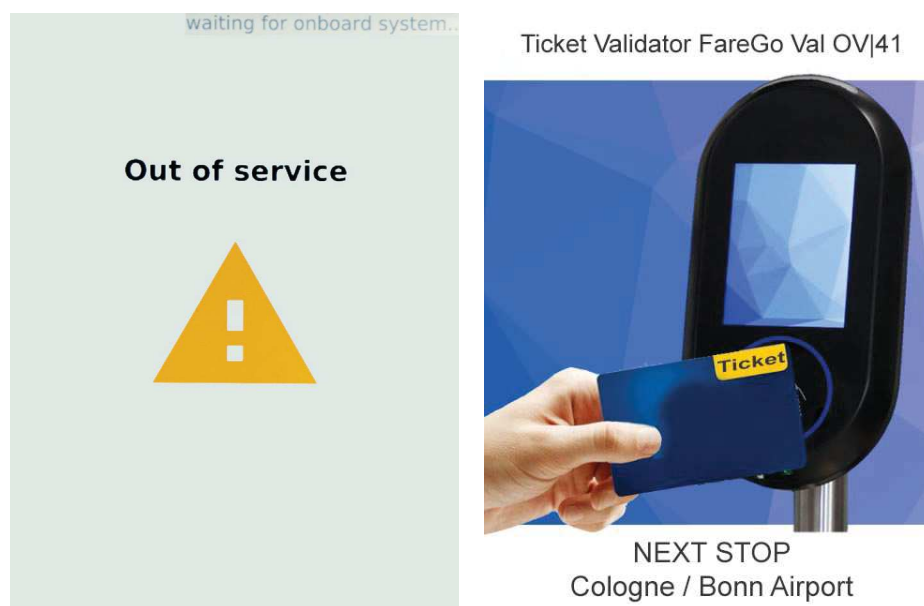


Figure 4-17 Validator Initialization (Vehicle) 1

Chapter 5

Product Description

5.1 Overview

Currently smart cards, credit cards and smartphones are often used as a type of ticket medium. The validation of those media is a core functionality of modern ticketing systems. The E-Ticketing validator FareGo Val OV|41 is perfectly tailored to the requirements of such systems as it's capable of processing contactless media and barcodes very quickly.

Its multifunctional reader platform supports various smart card schemes such as Calypso or ITSO and contactless bank cards. The variable barcode reader allows simultaneous processing of barcode tickets e.g. within mobile ticketing portfolio on smartphones. FareGo Val OV|41 is designed for on-board usage in public transportation vehicles and provides passengers stress-free and comfortable boarding.

The minimum configuration of a FareGo Val OV|41 is a Power Box, a Mounting Unit and a Base Unit including the cables to connect the devices.

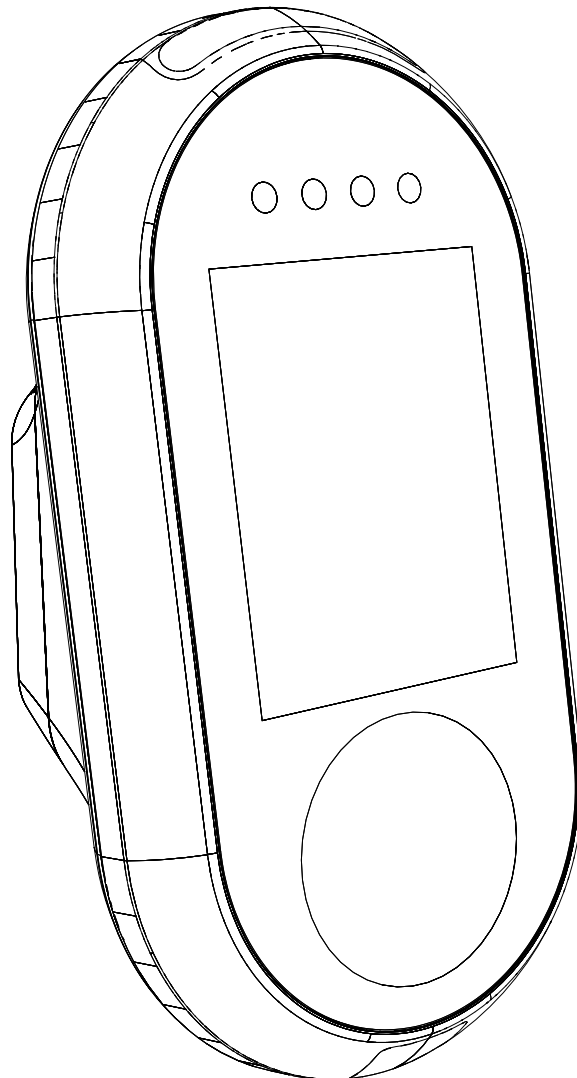


Figure 5-1 Minimum FareGo Val OV|41 Configuration

The Validator accepts Smart Cards to allow easy boarding.

5.2 Technical Data

5.3 Construction Material

The **Table 5-1** lists the materials that are used for the FareGo Val OV|41 external components.

Part	Material
Housing	Pry resistant, impact proof and flame retardant plastic
Front plate	Hardened glass
Gaskets	Closed Cell Neoprene
Reader antenna bezels	Plastic

Table 5-1 FareGo Val OV|41 Housing Material

5.4 Dimensions

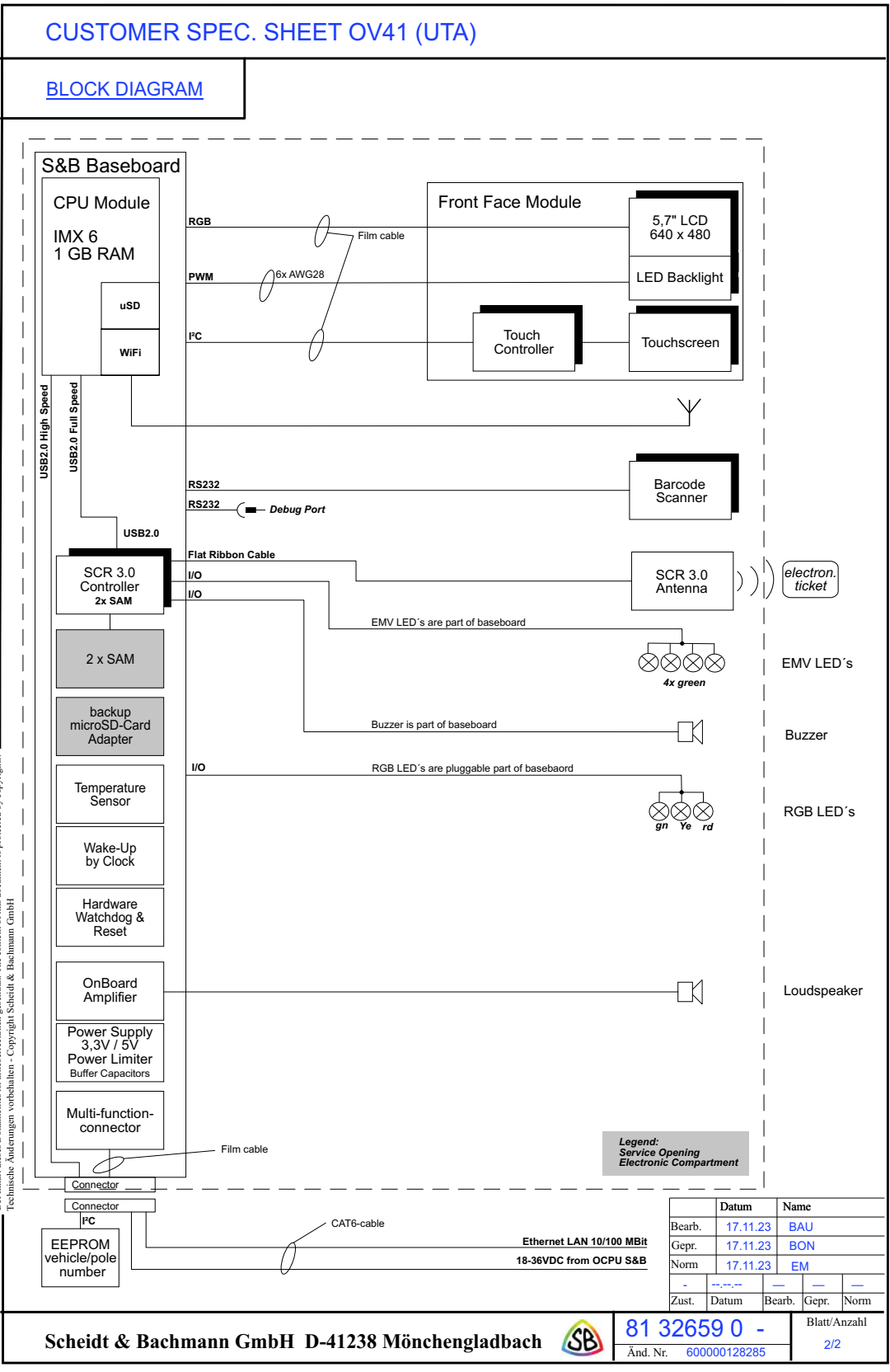
The **Table 5-2** lists the dimensions of the FareGo Val OV|41.

Device	Width	Height	Depth	Depth including Mounting Unit
FareGo Val OV 41	155 mm 6.1"	295 mm 11.6"	56 mm 2.2"	158 mm 2.2"
Power Box	130 mm 5.12"	115 mm 4.33"	35 mm 1.38"	-
Power Switch Box	350 mm 13.78"	200 mm 7.87"	81 mm 3.19"	-
Power Switch Box All In One	235 mm 9.25"	197 mm 7.75"	56 mm 2.20"	-

Table 5-2 Dimensions

5.5 Component Diagram and Logical Links

Please see below for the logical connection (links and interfaces) between the FareGo Val OV|41 components.



5.6 Components of the FareGo Val OV|41

The **Figure 5-3** shows the main components of the FareGo Val OV|41.

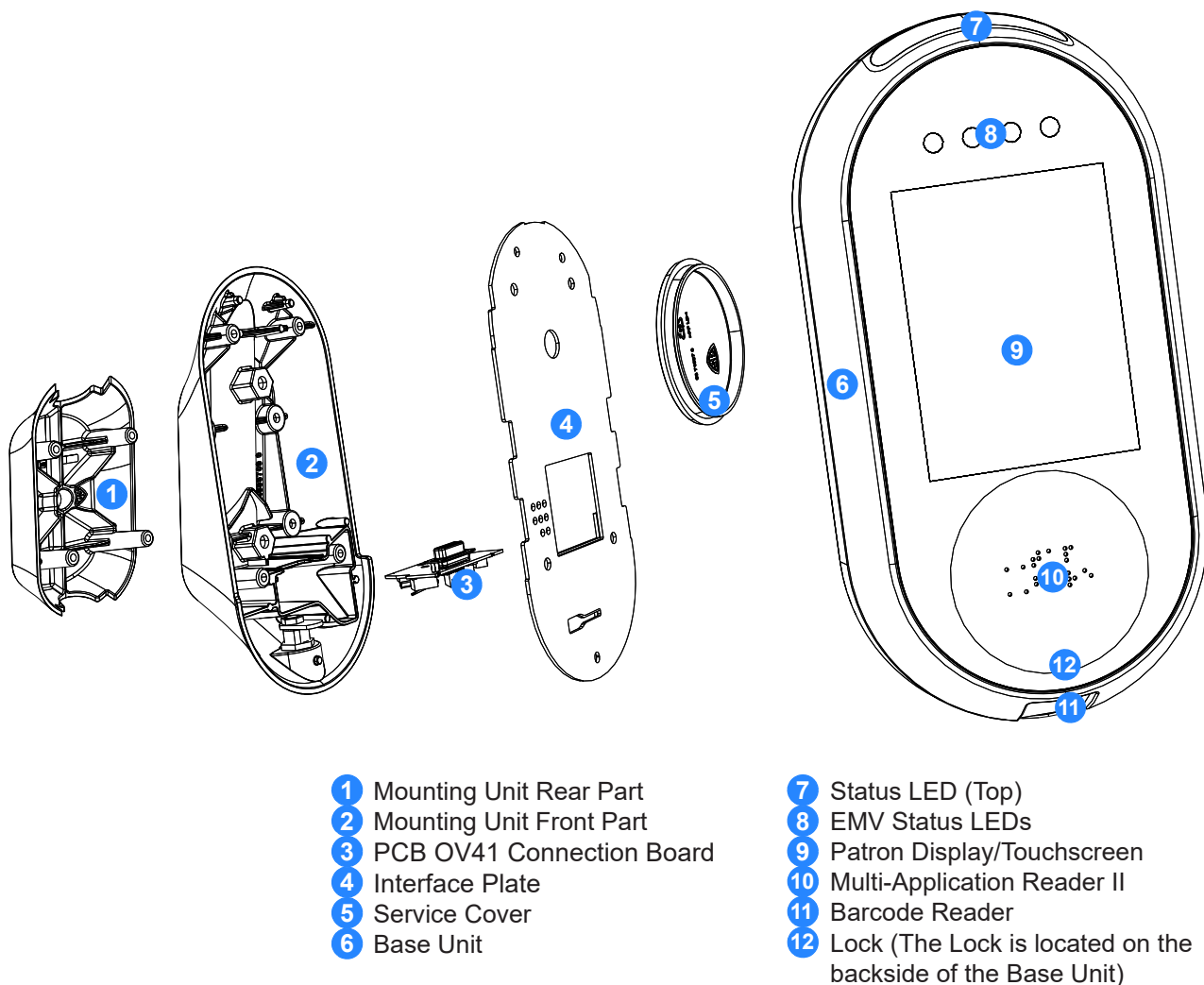
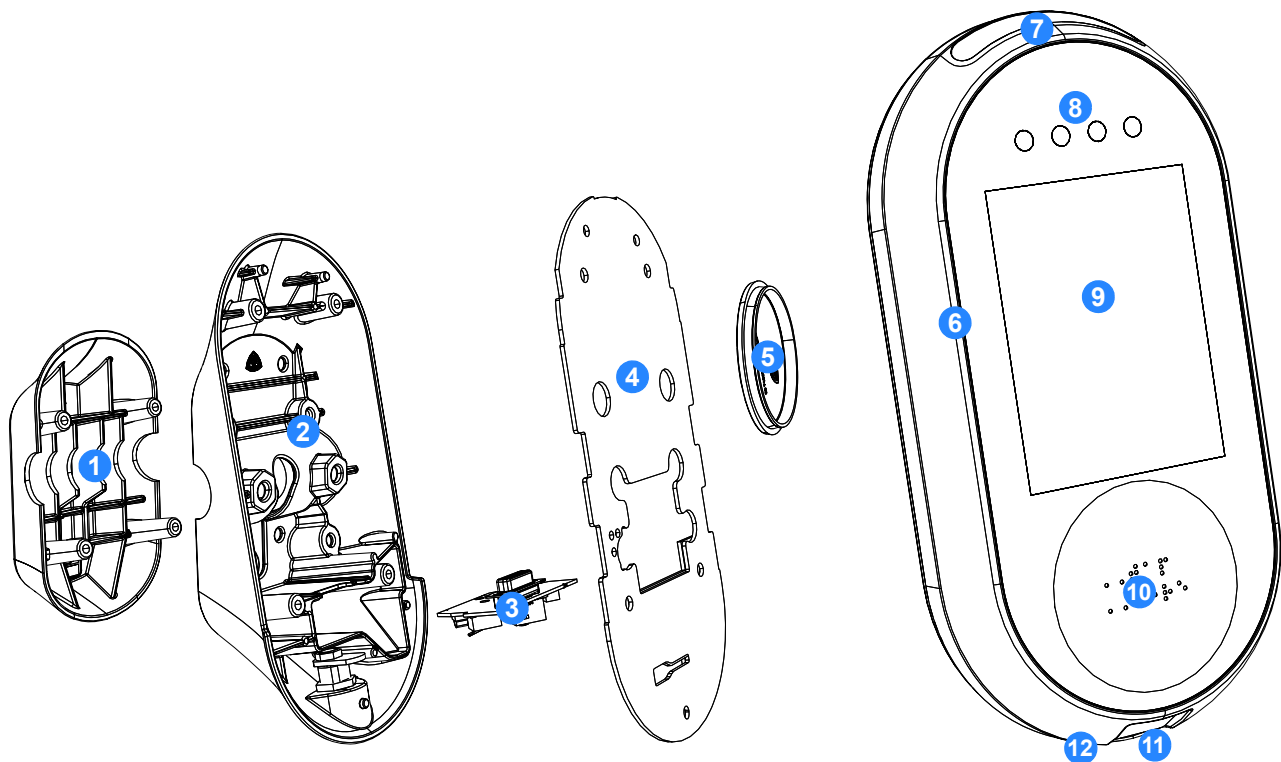


Figure 5-3 Component Identification (Vertical Installation)



- | | |
|-----------------------------|--|
| 1 Mounting Unit Rear Part | 7 Status LED (Top) |
| 2 Mounting Unit Front Part | 8 EMV Status LEDs |
| 3 PCB OV41 Connection Board | 9 Patron Display/Touchscreen |
| 4 Interface Plate | 10 Multi-Application Reader II |
| 5 Service Cover | 11 Barcode Reader |
| 6 Base Unit | 12 Lock (The Lock is located on the backside of the Base Unit) |

Figure 5-4 Component Identification (Horizontal Installation)

5.6.1 Status LED
(Top)

The validator is equipped with colored LEDs for the indication of the operational status of the device, as well as the result of the transaction. The colored LEDs are accommodated in the validator housing and illuminate the transparent area in the upper side of the housing for simple visualization of the device and transaction status, see **Figure 5-5** .

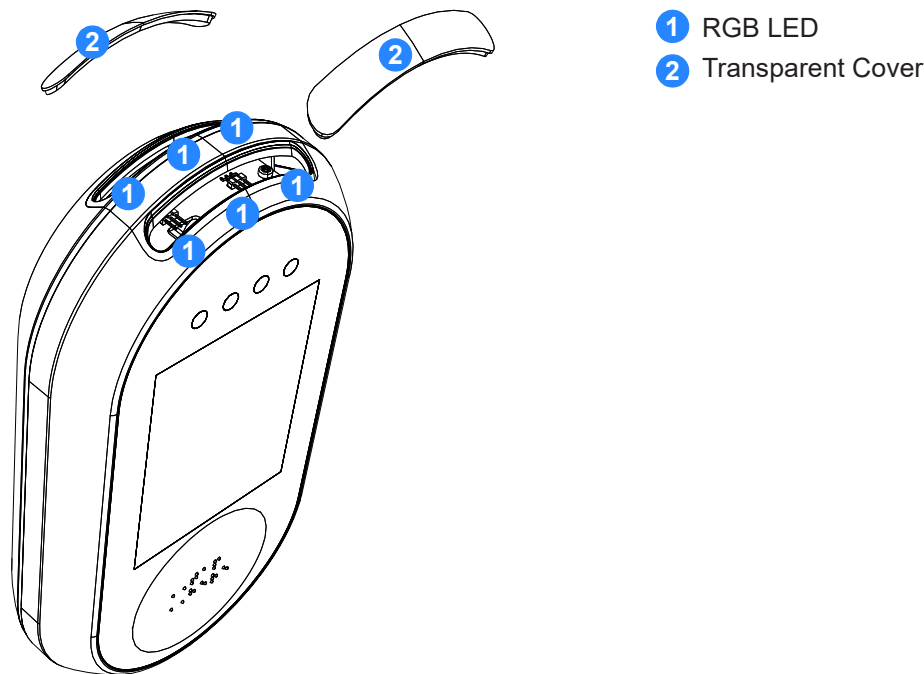


Figure 5-5 Status LED (Top)

The devices indications are controlled by the customer specific application, in general the following indication are possible

- Red
- Green
- Yellow

In the following table a sample setup of status and transaction indication is listed:

Functionality	LED Color	Description
Status indication	Green	Device "In Service"
	Red	Device "Out of Service"
Transaction indication	Yellow	• Card blocked • value not sufficient • ticket not valid
	Green	Transaction successful
	Red	• Failure • card not valid • error occurred

Table 5-3 Status LED Indication

5.6.2 EMV Status LED

For EMV processing the validator has four green LEDs to display the status and transaction information for EMV solutions according to EMVCo standard, see **Figure 5-6** .

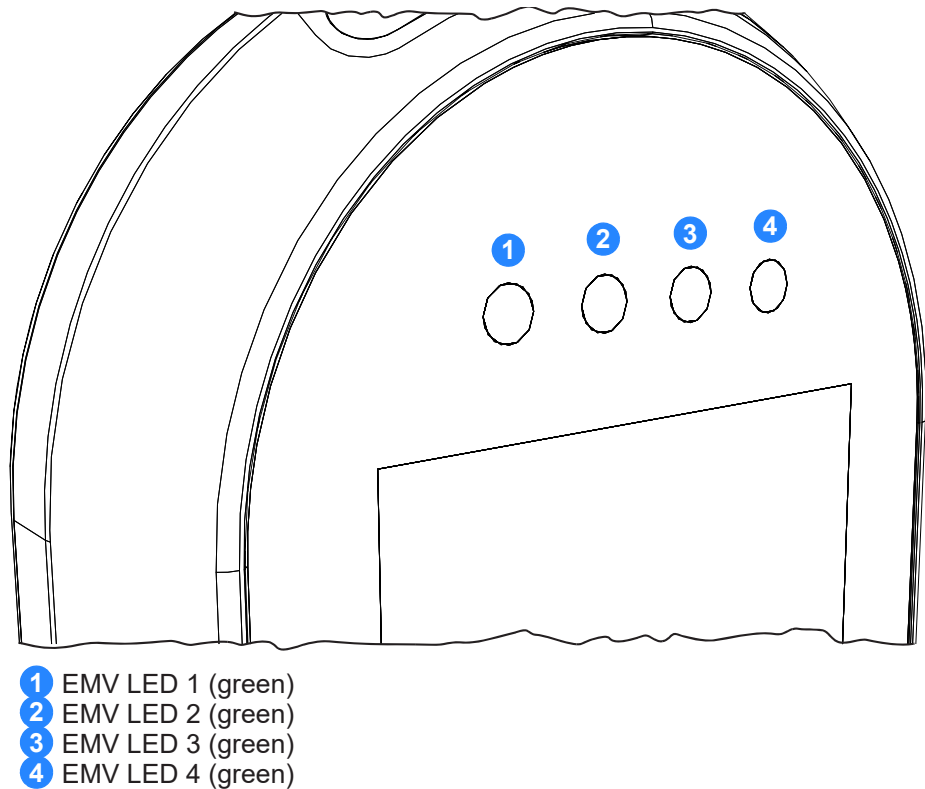


Figure 5-6 EMV Status LED

These LEDs are:

- EMVCo LED1 is flashing for idle or switched on for card acceptance ready.
- EMVCo LED2 if card is processed
- EMVCo LED3 if card is processed
- EMVCo LED4 if card is processed successfully

Additional Indication of EMV LED 1 (since software Version 80063.V (v1.7.1.2))

- An uninitialized reader all flashes at 1 Hz with EMV LED 1 and the yellow LED.
- If a SAMv2 for EMV is available, the EMV-LED1 flashes briefly every 5 seconds (ready for operation but no read enable).
- If an EMV order is present, the EMV LED 1 lights up continuously, all results (Approved/Declined) are displayed as usual.
- If there is a job for another application and the EMV application would also be ready for operation (SAMv2 available), the EMV LED 1 lights up.

If the EMV application is not ready for operation, the EMV LED1 remains off, but Presto cards, for example, can still be processed.

5.6.3 Patron

The validator is equipped with a 5.7" VGA TFT color display for patron information. The display has a resolution of 640 x 480 pixels and the following characteristics, see **Figure 5-7** :

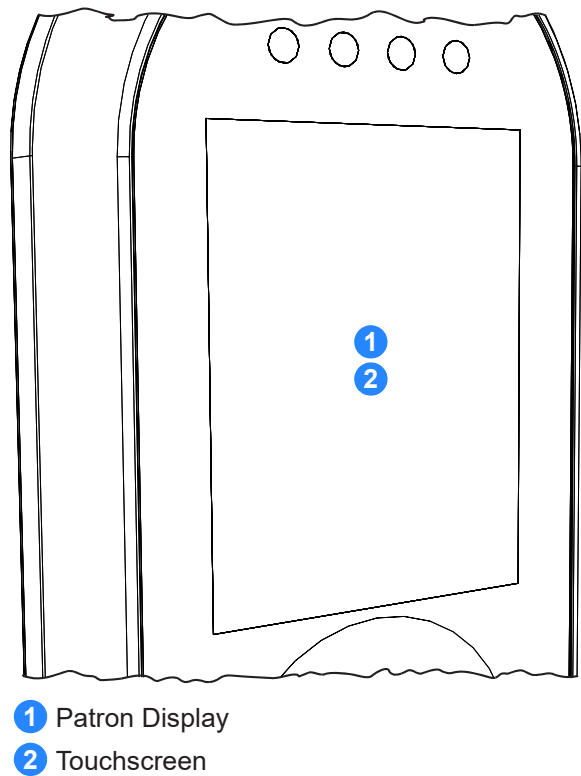


Figure 5-7 Patron Display

Display diagonal	5.7"
Ratio	4:3
Resolution	640 x 480 VGA
Colors	262144
Backlight system	LED based
Contrast ratio	200:1 (typ)
Brightness	350 cd/m²
Viewing angle	Readable minimum 45° in all directions

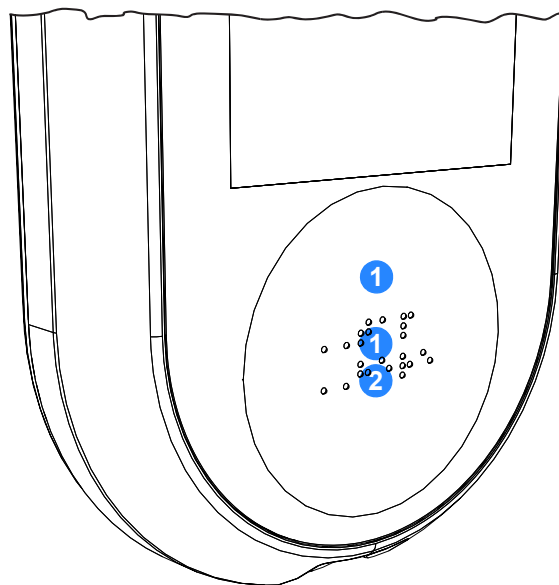
Table 5-4 Patron Display Technical Data

5.6.4 Multi-Application Reader 3.0

Scheidt & Bachmann's contactless Multi-Application Reader 3.0 (Smart Card Reader 3.0, SCR 3.0) (see **Figure 5-8**) is designed for reading of contactless media with different standards and applications as well as NFC passive initiator mode communications with mobile phones. The Multi-Application Reader 3.0 is a standalone unit, certified for EMV credit cards and used in multiple Scheidt & Bachmann devices. The Multi-Application Reader 3.0 consists of two parts - a circuit board and an antenna. The circuit board of the reader and the system software is fully developed and manufactured in house.

The Multi-Application Reader 3.0 offers maximum contactless media flexibility - it has four ISO 7816 SAM slots. The reader is capable of simultaneously processing multiple Smart Card specifications, with auto-sensing of the appropriate scheme as the card is presented.

The reader's high processing speed delivers fast transaction times by use of a high speed processor and good antenna design. Long component life and innovative design helps ensure a long lifespan.



1 Multi-Application Reader Antenna (Reading Area)

Figure 5-8 Multi-Application Reader 3.0

The specific media that are supported are agreed on a project-specific basis.

5.6.5 Barcode Reader

A 1D/2D barcode reader is installed, providing the ability to capture data from tickets and other documents such as loyalty cards or paper tickets with barcodes for the purposes of fast and simple transactions.

The reader incorporates a CMOS imager which has a wide scan area and is capable of capturing printed barcodes or barcodes on a display of a mobile phone. Successful reads are indicated by an audible tone.

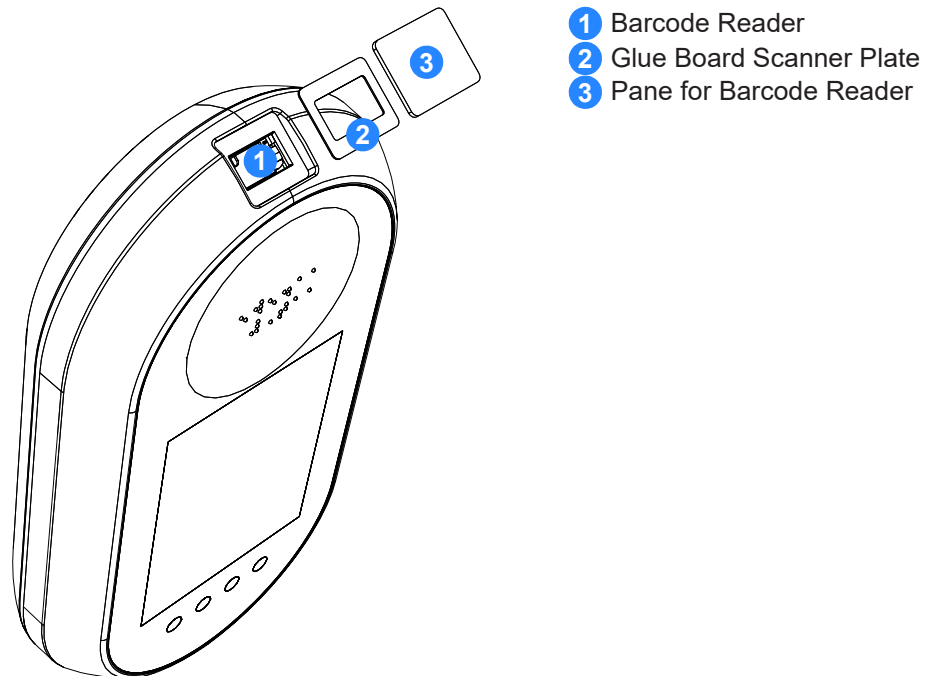


Figure 5-9 Barcode Reader

The barcode reader supports the common 1D and 2D codes. Detailed information on the individual codes the barcode reader can read can be found in the corresponding manual, see **Chapter 11**.

The barcode reader is installed in the lower part of the housing so that any potential eye damage is prevented as best as possible. The aimer is a red LED which lights up the readable area of the scanner.

The barcode focusing range is depending on the barcode used and typically within a distance of 100 mm to 200 mm (3.94" to 7.87") from the reader.

5.6.6 Computer System

The Scheidt & Bachmann validator PC is designed around an industrial grade high performance motherboard with a Trizeps VII module, and a Linux operating system. Special attention was put on a compact design, without compromising maintainability and reliability.

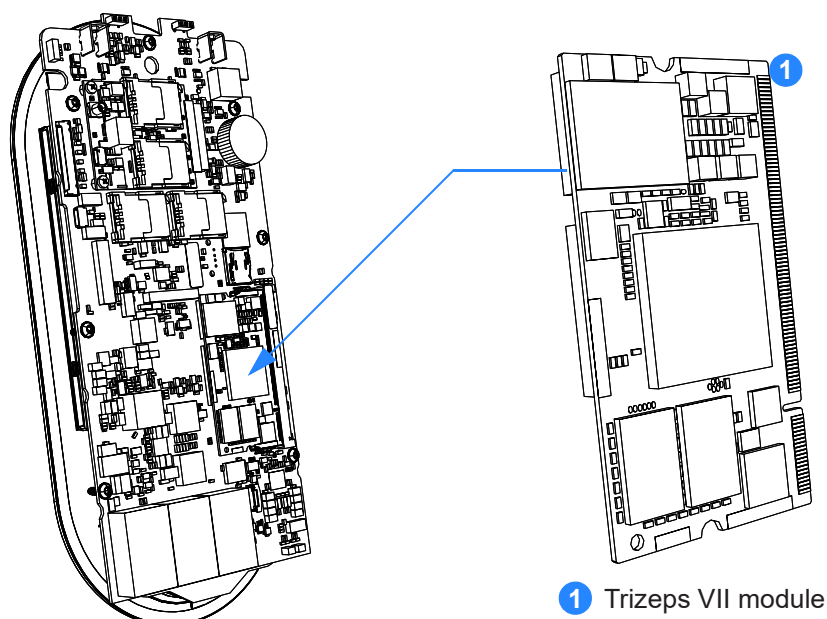


Figure 5-10 Computer System

The computer system has the following specification:

Processor	i.MX 6 ARM Cortex A9 Trizeps VII CPU Module Industrial Version with 800MHz
RAM	1 GB
Memory	• 1 microSD card (System memory) • Optional: 1 microSD Card (Backup Data)]
Operating System	Linux
Watchdog	Hardware Watchdog to reboot the device in case of system failure
Temperature Sensors	Temperature sensor for system shutdown outside of specified temperature ranges
On-board Clock	Real-Time Clock (Capacitor Buffered)
Audio	Audio on Board
Power Supply	Power Supply via Power Switch Box or Power Box or Power Switch Box - All In One
Interfaces	100 Mbit Ethernet Interface
Smart Card Processing Subsystem	• S&B Multi-Application Reader 2.0 • Smart Card Antenna Interface

Table 5-5 Computer System

5.6.6.1 Clock

The computer features a capacitor power buffering electronic clock, which is able to save the time and date settings when the validator is without power. The clock unit maintains the current time and the calendar data for the current year, leap year, month and day without any manual intervention.

5.6.6.2 Software Configuration

The operating system for the processor is Linux. The following software packages will be part of the software system:

- Linux operating system
- Software for the process management
- Software for recording transactional data
- Software for online and offline data transfers
- Software for system self-test procedures

5.6.6.3 Transaction Data Storage

Transactions are stored in two different folders within the device's file system:

- One containing the files that are currently open
 - One containing the files that have been closed but not transmitted yet to the transaction server
- Already successfully uploaded files will be marked as uploaded and stored in the same folder

Files in the second folder are stored for a period of up to 365 (configurable parameter) days.

The device's file system is managed by the operating system, enabling data access and recovery even in case of application software failure (assuming the main hardware components are still functioning).

5.6.6.4 Backup Memory (Option)

The Validator is equipped with a microSD card data module for backup-storage of transaction and event data. In case of a validator replacement, the backup microSD card has to be removed from the old device and re-inserted into the new device. The stored transaction data can be recovered from the backup microSD card by the new device for seamless transaction recording.

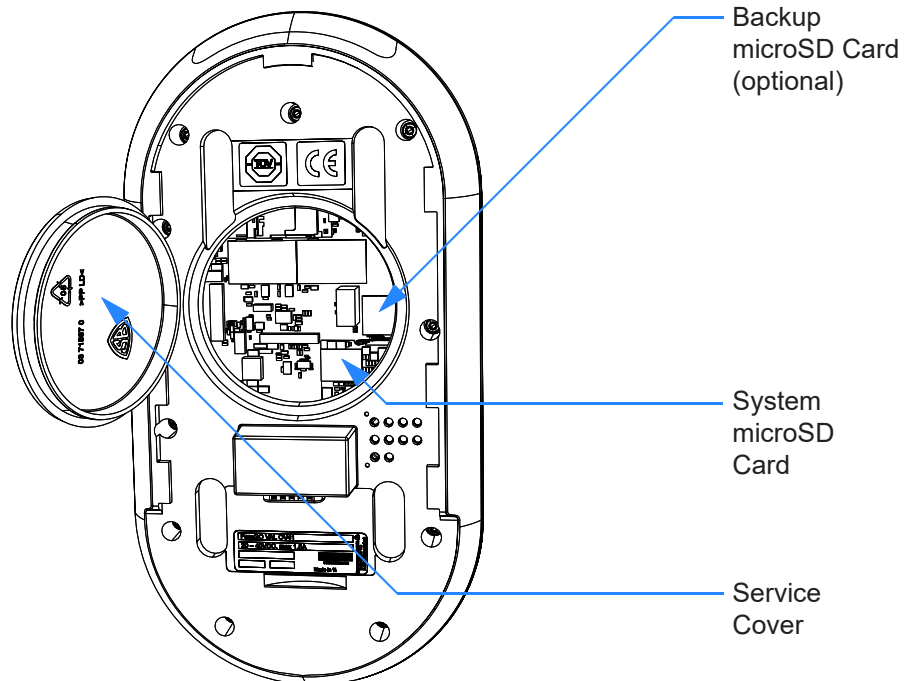


Figure 5-11 MicroSD Card Location

5.6.6.5 LAN Interface

The computer baseboard includes an Ethernet communication interface to perform communication to other components of the fare collection system and the backend. Additionally the LAN interface cable is used for the power connection to the validator.

By this, the validator has to be connected to a Scheidt & Bachmann EPF system like Power Switch Box (PSB), Power Switch Box - All in one (PSB AIO) or Power Box (PB) which provides the necessary operating power and connectivity.

5.6.6.6 IBIS IP

The validator physical supports IBIS IP (VDV 301) communication with other onboard equipment by using the existing Ethernet-connection. The implementation and usage of IBIS IP (VDV 301) is subject to the software implementation and defined in the related specification document if applicable.

5.6.6.7 WiFi Connectivity (Option)

WiFi is not activated based on system design.

Chapter 6

Basic Administration Tool (BAT)

The BAT can be operated with the help of the touch screen. The customer is guided through menus, which enables simple and intuitive operation.

The following tasks can be carried out with the help of the BAT:

- Test Smarcard reader (optional)
- Display device status
- Test device components
- Make settings
- Version displays
- Perform guided test
- Write external EEPROM
- Initialise
- Update operating system

The BAT is only available for validators that have not yet been initialised. The validator is therefore in the basic configuration.

6.1 Start service mode

The BAT is started automatically as soon as the validator is plugged into a workshop or vehicle pole. After initialisation with a customised application, the BAT is no longer available.

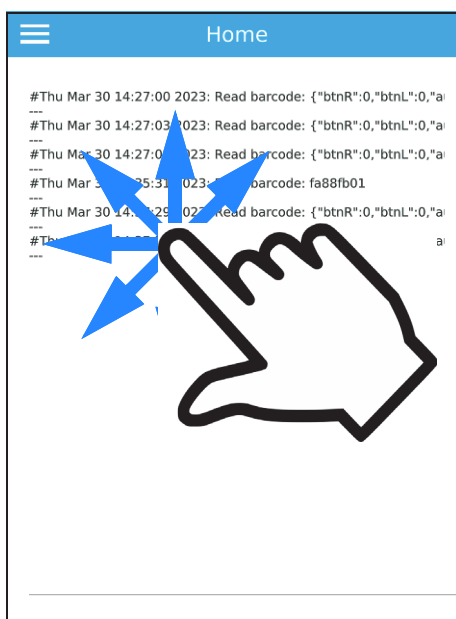
When the validator is started, the following screen is displayed.

In the basic position, smart cards and barcodes can be read.



After reading a barcode or smart card, the result is displayed as an event.

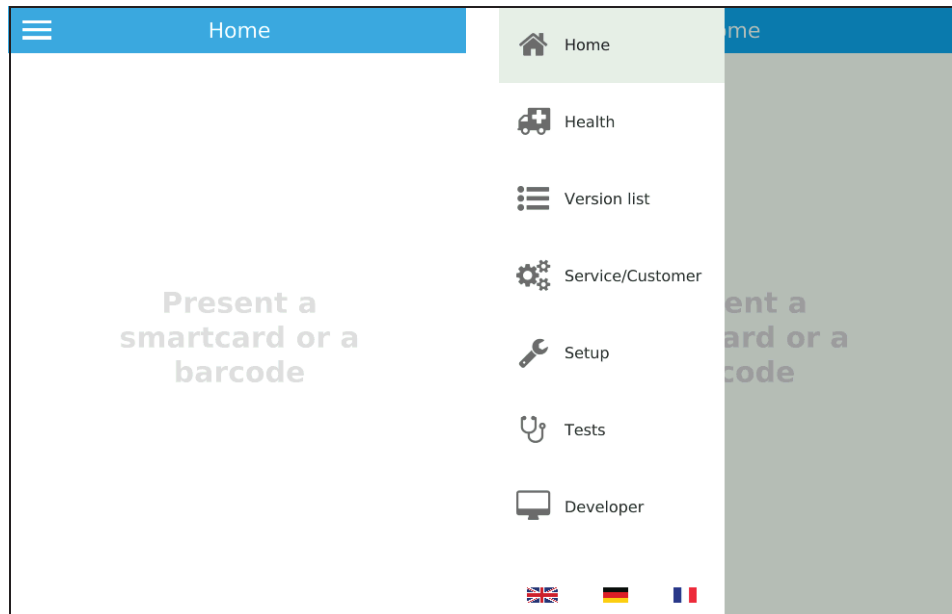
With many screens where the text is longer than the display can show, it is possible to move the text on the screen. To do this, touch the touch screen and move the text in the desired direction.



6.2 User interface

The user interface is divided into different areas. An explanation of the different areas can be found on the following pages.

Tapping the menu symbol  takes you to the overview of functions.



The areas are:

- Home
- Health
- Version list
- Service/Customer
- Setup
- Tests
- Developer

6.2.1 Home

The Home symbol  takes you back to the home position of the BAT.

6.2.2 Health

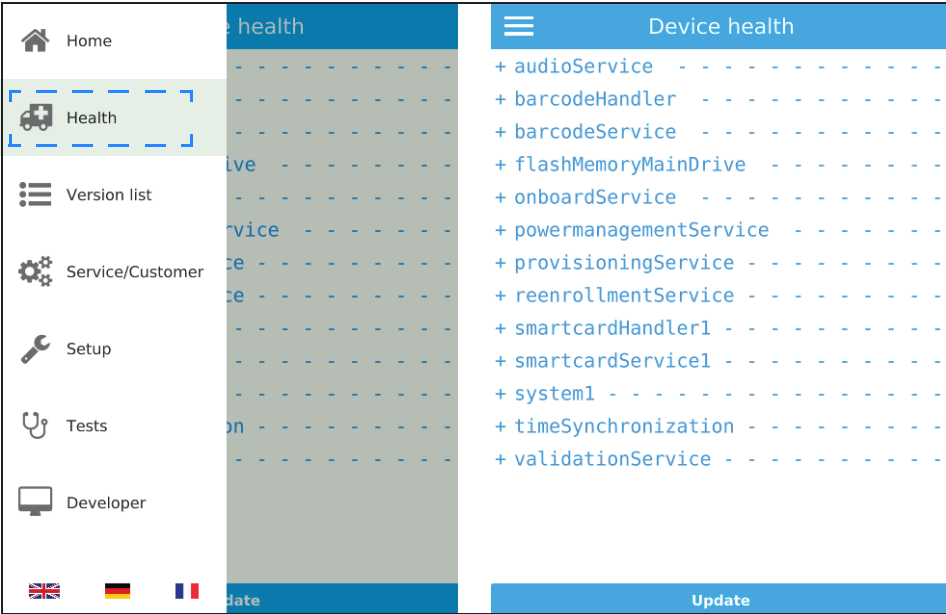
At the menu "Health", the condition of various hardware and software components are shown.

Clicking on the sign  opens the sub-menu with detailed information.

The "Refresh" button reads the unit states again.

All information in this area is important for hardware and software development and is not required by the customer.

Therefore, this point will not be discussed further. For an extended error analysis, it may happen that data from this area is requested by the helpdesk or a developer.



6.2.3 Version list

At the menu “Version list” the current software version of the various components are displayed:

- System
- Smart Card Reader
- Barcode Reader
- Dependencies

Here you can check whether the required software versions are available on the unit.

Home

Health

Version list

Service/Customer

Setup

Tests

Developer

on list

4.0.8-35-80db051

Ubuntu 18.04.6 LTS

.999-184-gc587bb828

n/a

n/a

07337130_d

BI000492EAA

lop/4.1.10-SNAPSHOT

Version list

- System -

Baseimage: 4.0.8-35-80db051

Operating system: Ubuntu 18.04.6 LTS

Yukon SDK: 5.0.999-184-gc587bb828

- Smartcard -

Bootloader: n/a

Configuration: n/a

Firmware: 07337130_d

- Barcode -

Firmware: BI000492EAA

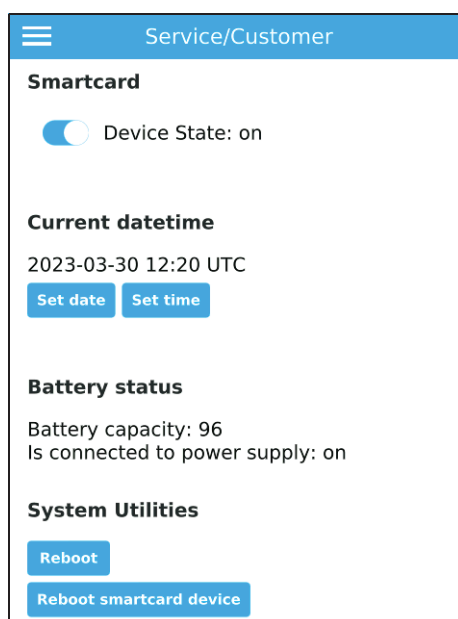
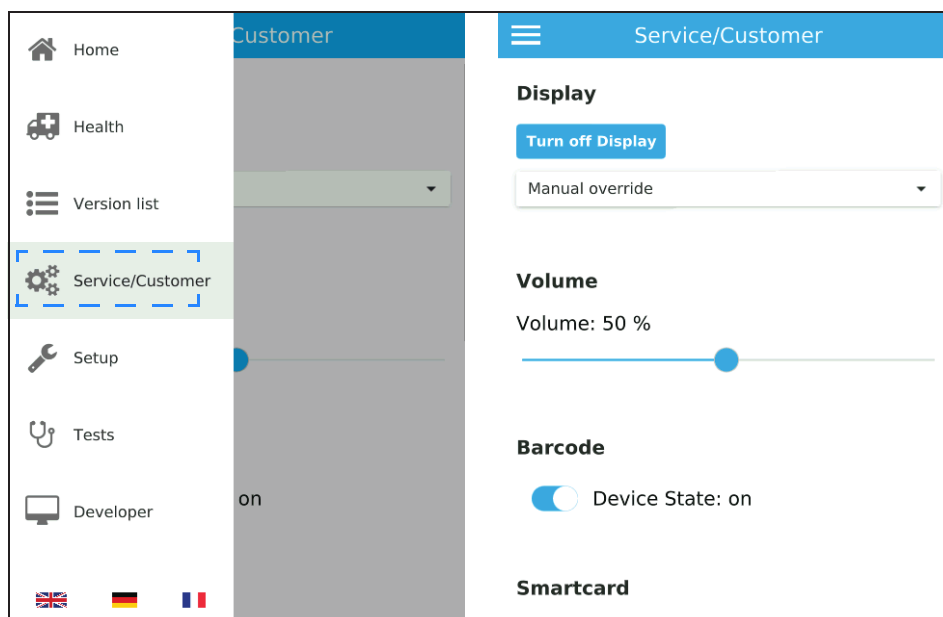
- Dependencies -

fcs_oid_version: develop/4.1.10-SNAPSHOT

6.2.4 Service/ Customer

Under "Service/Customer" you can make settings for the following components:

- Display (see **Chapter 6.2.4.1**)
- Volume (see **Chapter 6.2.4.2**)
- Barcode Reader (see **Chapter 6.2.4.3**)
- Smart Card Reader (see **Chapter 6.2.4.4**)
- Current Date and Time (see **Chapter 6.2.4.5**)
- Battery Status (see **Chapter 6.2.4.6**)
- System Utilities (see **Chapter 6.2.4.1**)

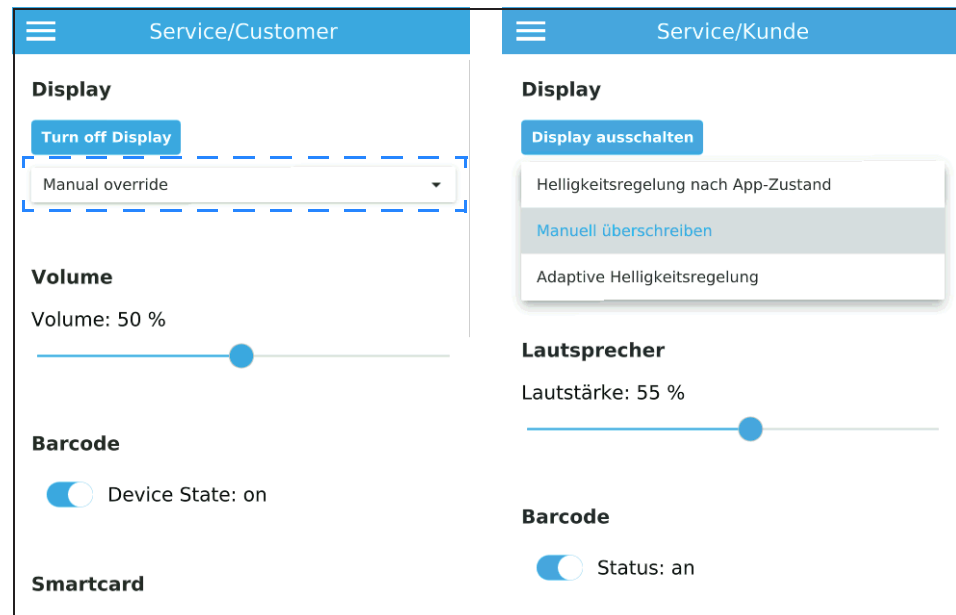


6.2.4.1 Display

Here you can set how the brightness of the display is regulated.

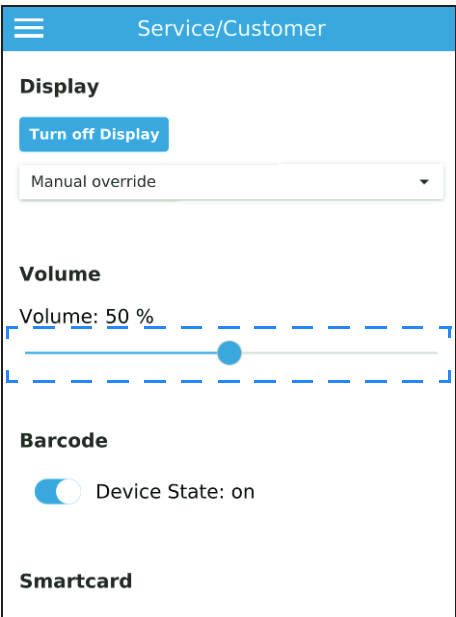
- Brightness control according to app state - (the operating software controls the brightness as required)
- Override manually - (the brightness is adjusted manually via a slider on the screen)
- Adaptive brightness control - (currently not supported)

The "Switch off display" button switches the display off for 5 seconds. The display switches itself on again after 5 seconds.



6.2.4.2 Loudspeaker

Here you can adjust the volume of the internal loudspeaker via a slider on the screen.
Each time the volume is changed, a test tone is played to check the set volume.



6.2.4.3 Barcode Reader

Each time the volume is changed, a test tone is played to check the set volume.

