Manual
Datafox PZE-MasterIV V4

Flexible data collection with method

![datafox devices logo]

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Alternations

Alternation in this Dokument

Date	Chapter	Discription
01.03.2013	all	Revision the manual to new version 04.02.03.xx Please note that not all chapters are in English. We are working on it.
22.07.2013	SMS	new version 04.02.04.xx
29.08.2013	Access control	Compleate the Wiring plan
29.12.2017	all	Revision the manual to new version 04.03.09.xx

Alternations of the version

With the device generation IV a new versioning scheme has been introduced. According to this scheme the file name of the device firmware and the setup program (DatafoxStudioIV) is composed as follows:

Product name	XX. Device genera-tion	YY. Compatibility (which versions can be used to-gether)	ZZ. Version number (functional exten-sion)	Build Troubleshooting (with a new version the Build number is reset)
z. B. AE-MasterIV	04.	02.	01.	04

The use of the manual depends on the version of the firmware and the DatafoxStudioIV or the DFComDLL. Gather from the following table which manual matches which version. For different combinations no support can be offered.

Firmware StudioIV and DLL validity

Firmware: 4.03.09.xx.

Studio: 4.03.09.xx

Dll: 4.03.09.xx

The DatafoxStudioIV is backward compatible. This means that you can configure a device with a newer DatafoxStudioIV also older firmware, the device only supports the natural functions that are implemented in the older firmware version. Ie, relevant to the functions that are possible, is always the manual state that the firmware associated with the Setup equivalent. It is not possible to provide a centering firmware configured with a stand of DatafoxStudioIV to who is older than the firmware.
recommendation:
If possible, use always the current version of DatafoxStudioIV.
What features are supported in which software versions, is from the file:
Datafox MasterIV, SW version xxx.pdf list as shown.
The file is located on the Datafox DVD and for download on the homepage. Please also note the instructions in each chapter in the manual. The updates are available on our website under www.datafox.de download.

Content

1. For you Safty

Safety Information for Datafox Products

The PZE-MasterIV V4 must only be operated according to the instructions given in the manual.
Do no insert any foreign objects into the openings and ports.
The device must not be opened. All maintenance work must only be performed by authorized specialists.

Some devices contain a lithium ion battery or a lithium battery.
Do not throw into fire!

Achtung! Supply voltage: 12 Volt DC
Siehe jeweiliges Typenschild / technische Daten.
See respective type label / technical data.
The device must only be operated with a power-limited power supply according to EN 60950-1. If you do not observe these instructions, the device may be damaged.
The following temperature ranges must be observed
Working area / storage temperature: -20° C bis +70° C
Mobile communications module: -20° C bis +55° C

In areas with cellphone ban, GSM, WLAN and other cellular modems must be turned off.
Persons with heart pacemakers:
When using the device, maintain a distance of at least 20 cm between the heart pacemaker and the device in order to avoid possible interferences.
Turn the device off immediately if interferences are assumed.

Protection class: Observe the technical data of the respective device.
In case of laser devices of class 2, the eye is protected by the blink reflex and/or turning reactions if you briefly and accidentally look into the laser beam. The devices may be used without further protective measures. Nevertheless, avoid looking directly into the laser beam of the laser scanner.

Observe the additional notes in the chapter,
"Proper use and environmental protection"

We declare under our sole responsibility that the product described fullfills the protection requirements of European Directive 89/336 / EEC as amended by 91/236 / EEC, 92/31 / EEC, 93/97 / EEC and 93/68 /. See the manual of the devices for the standards. Evidence is provided by compliance with the following standards:
- EN 55022 : 2006 + A1:2007
- EN 55024 : 2003
- EN 61000 – 6 – 2: 2005
- IEC 61000-3-2 : 2005 + A1:2008 + A2:2009
- IEC 61000-3-3 : 2008

2. introduction

Datafox data terminals have been developed to fulfill the requirements of modern personnel time recording where users have high demands concerning flexible and elegant design. Furthermore, the Datafox Embedded-Concept also covers access control. All relevant data can be recorded with modern technology and be transferred to the analysis software immediately. Billings, calculations or other analyses can be performed in a timely manner; processes can be monitored and controlled actively. This saves time and ensures the data quality and immediacy required.

Datafox data terminals are based on the Datafox Embedded-System which is equipped with modern technology for data collection and of course also data transfer. You make your entries comfortably via keyboard, touch display, RFID or barcode. The device is available with fingerprint, GPS, GSM, GPRS, USB etc. It fulfills all conditions for a flexible usage not only for personnel or order time recording but also for further scopes. This constitutes a real added value. The powerful tools Datafox-StudioIV and DLL facilitate quick and easy integration in any IT solutions. Due to scalability, numerous options are available. You can select according to your company's requirements and only pay what you really need.

2.1. Structure of the Documentation

The manual contains a change history as well as a general part with safety information, the introduction and information concerning system requirements and system structure.

The general part is followed by the main part of the manual. It contains the chapter Product Description Device. In this chapter, device-specific components are described as well as the device's functions.

The final part of the manual provides technical data about the device and a glossary whose purpose it is to ensure a consistent understanding between user and manufacturer.

2.2. Guarantee Restriction

All installers are responsible for the use of the device and its accessories in accordance with its intended purpose and in compliance with the applicable laws, standards and directives.

All data in this manual has been checked carefully. Nevertheless, errors cannot be excluded. Therefore, we offer no guarantee nor accept any liability for consequences that derive from errors of this manual. Of course we are grateful if you point out errors to us. We reserve the right to make modifications in respect of technical progress. Our general terms and conditions of business apply.

> **Note:**
> Due to DatafoxStudioIV, Datafox devices offer many functions and combinations of functions not all of which can be tested in the case of updates. This applies especially to setups defined by you as customer. Before updating your device, please ensure by tests that your individual setup works without any errors. If you encounter a problem, please inform us immediately. We will take care of the clarification of the problem on short notice.

2.3. Typography of the Documentation

FW .... Abbreviation for firmware (software in the device)
SW .... Abbreviation for software
HW .... Abbreviation for hardware
GV .... Abbreviation for global variable
<Name;Software Version.pdf> .... File names

👉 **Note:**
Useful information which helps you avoiding possible mistakes during the installation, configuration and commissioning is given here.

❗❗ **Caution:**
Here, notes are provided which must be strictly observed. Otherwise, malfunctio the system will occur.

2.4. Important General Notes

❗ **Caution:**
Use the devices only according to regulations and follow the installation, commissioning and operating instructions. Installation and commissioning may only be performed by authorized specialists.

Subject to technical alterations.

❗ **Caution:**
Due to technical development, illustrations, function steps, procedures and technical data may vary slightly.

The Datafox device has been developed for the purpose of creating a flexible and easily integrated terminal for data recording serving for a great variety of applications. The device is robust and easy to use. Due to the PC setup program, the device is quickly and easily configured for its application field so that you save time.

Numerous optional features, such as bar code reader, transponder reader, digital inputs etc., enable you to use the device for:

PZE - Personnel time recording
AZE - Order time recording
BDE - Operating data recording (I/O-processing)
ZK - Access control
FZDE - Vehicle data recording / telematics

This manual describes the creation of setups with the setup program DatafoxStudioIV without covering specific applications. Potential problems and difficulties are pointed out.
This manual describes the functionality of the PZE-MasterIV V4 and explains its characteristic features. For example, installation, operation and equipment of the device are described.

In order to define the behavior of the device, a setup must be created. For this purpose, the DatafoxStudioIV has been developed.

With some practice it will be possible to create a complete compilation for the PZE-MasterIV V4 within half an hour. If you need functions that are not available, please contact us.

> ☞ **Note:**
> If you need support for the compilation of setups, we offer you our services. Due to our extensive experience with the setup, we work very quickly and can make your setup even more efficient through useful advices, so that the input at the device can be performed quickly and securely.

> ☞ **Note:**
> Due to DatafoxStudioIV, Datafox devices offer many functions and combinations of functions not all of which can be tested in the case of updates. This applies especially to setups defined by you as customer. Before updating your device, please ensure by tests that your individual setup works without any errors. If you still encounter problems after thoroughly testing your setup, please inform us immediately. We will fix the error on short notice.

3. Intended Use and Environmental Protection

3.1. Regulations and Notices

According to the current state of the art, measures were taken to ensure that the device meets the technical and legal regulations as well as safety standards. Nevertheless, malfunctions due to interferences through other devices can still occur.
Please observe local regulations when using the device.

3.2. Power supply

Only operate the device externally with a limited power source in accordance with EN 60950-1.

Connection voltage of the MasterIV devices: :   12 to 24 volts DC

If the devices run with rechargeable batteries, note the instructions in chapter "Rechargeable Battery".

> **!** **Caution:**
> In the event of non-compliance with these instructions, the device or the battery (if any) can be damaged or destroyed!

In order to ensure maximum battery life, it is recommended to recharge the battery only after complete discharge.

See respective type label of the device PZE-MasterIV V4.

3.3. Environmental Influences

Extreme environmental influences may damage or destroy the device and should be avoided. This includes fire, extreme sunlight, water, extreme cold and extreme heat.
See respective type label of the device.

3.4. Mounting outdoors

3.4.1. Degree of protection

The device has IP65 on the front side.
On the backside, only the cable feed / connection area is a restriction with respect to the IP class. If the device is mounted on a flat base, the connection area is protected so that the entire system has IP65.

This edge lies flat on the wall.
Here, the device can be sealed with a thin silicone joint to the wall.
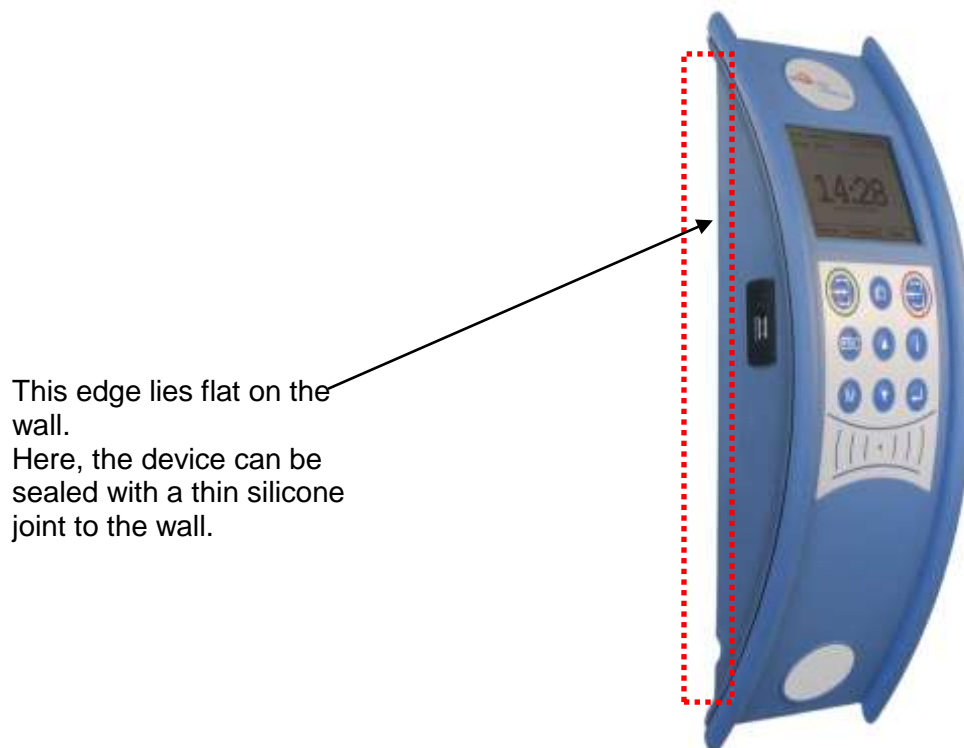
3.5. Temperature

The device has an approved temperature range of - 20 ° C to + 70 ° C.
A heater is not necessary for outdoor use.
Due to the inherent heat of the electronics and power supply, the temperatures in the unit are higher even at ambient temperatures below -20 ° C.
Condensation water only occurs when a cold object comes into the heat and would therefore only be an issue for mobile devices.
We recommand, if you use the devices outsite, then let it running permanently. Both in terms of temperature as well as condensation, it is recommended to not switch off devices which are used outdoors.

3.6. Repair

Except for the battery replacement in mobile devices , Datafox devices are maintenance-free and must only be opened by authorized professionals. In case of defects, please contact your dealer or the Datafox service hotline.
If a definite defect is present, you can also send the device directly to Datafox.

3.7. Cleaning

For the removal of smudges, especially on the display, the keypad and the finger scanner, please only use a dry or very damp cloth.

Never use a scrubbing solution or acidic cleaner.

CAUTION
Risk of explosion if batteries are replaced improperly.
Dispose used batteries according to the instructions.

3.8. Further Notices

Do not expose the device to strong magnetic fields, especially during operation.
Operate the slots and connections of the device only with the appropriate intended equipment.
Ensure that the device is secured during transport. For reasons of safety, do not use the device while driving a vehicle. Also ensure that technical equipment of your vehicle is not compromised by the device.
In order to prevent SIM card misuse, have your SIM card blocked immediately in cases of loss or theft of the device.

3.9. Disposal

Observe local regulations concerning the disposal of packaging material, used batteries and scrapped electrical equipment.

This product complies with the EU Directive No. 2002/95/EC, its appendices and the Council Decision laying down the restrictions of the use of hazardous substances in electrical and electronic equipment.

The device is covered by the European Directive on Waste Electrical and Electronic Equipment which came into force on February 13, 2003 and was translated into the legislation of the Federal Republic of Germany on August 18, 2005.
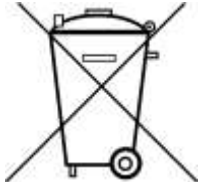
  Do not dispose the device in domestic waste!

As the user, it lies within your responsibility to dispose electrical and electronic equipment via the designated collection facilities. The correct disposal of electrical and electronic equipment protects human life and the environment.

For more information regarding the disposal of electrical and electronic equipment, please contact your local authorities or waste disposal companies.

4. System Requirements / Hardware

4.1. System Structure

The system consists of the Datafox device, the DatafoxStudioIV, the communication DLL and a software for processing the generated data.

Create setup   **Save setup**   **Transfer setup to device**
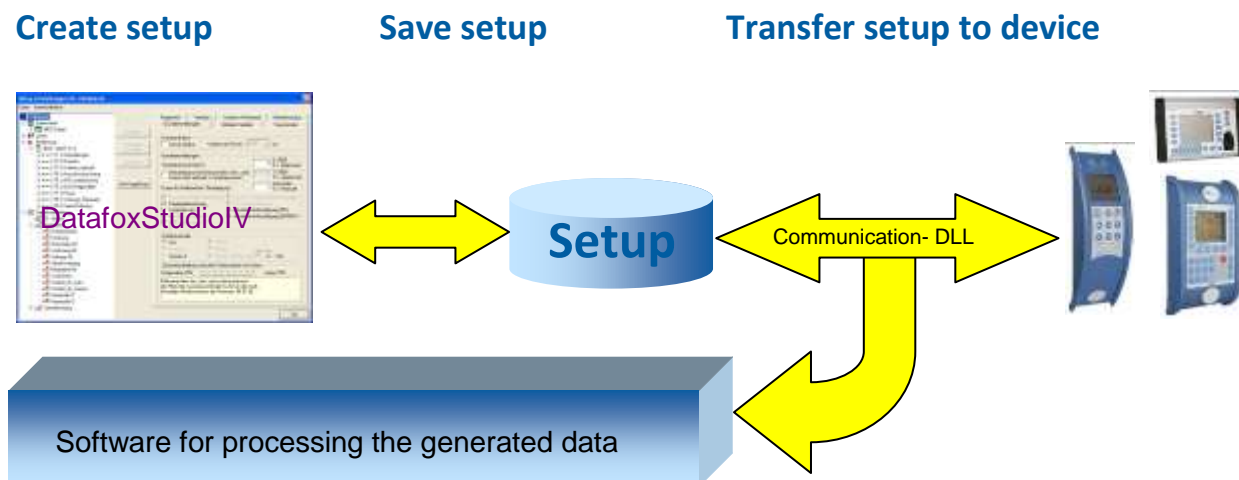
4.2. Requirements for Operating Datafox Devices

In order to operate the Datafox device, you need a 230 V power connection for the Datafox power supply. Depending on the main communication set, you need a corresponding transfer medium or connection cable.

Main communication:

- USB > one standard USB-A toUSB-mirco Cable (see the chapter connection USB).
- RS485 > a transmission path in accordance with the EIA-485 standard (see Connection RS485).
- GSM/GPRS > a distortion-free mobile connection (see Connection GSM).
- WLAN WiFi> a distortion-free channel to an access point (802.11 b/g) within reach (see Connection WLAN).
- at least one standard Ethernet cable, no „cross over" (see Connection TCP)
- HTTP(internet) via LAN > TCP/IP connection with free internet access. The data are sent to a server.

> **Note:**
> With increasing demands on transfer rate and interference immunity, the demands on the transmission path increase as well with regard to quality (interference immunity).

4.3. Kompatibilität Compatibility

The compatibility must be observed urgently between:
- Datafox devices and the device firmware
- Device firmware and device setup
- Device firmware and communication DLL
- Communication DLL and DatafoxStudioIV
- DatafoxStudioIV and device setup

4.3.1. Firmware File Archive (*.dfz)

Description
Device files (*.hex) of the MasterIV devices are delivered in a common firmware file archive. It has the file extension DFZ (stands for Datafox Zip). Now simply the firmware file archives (*.dfz) are indicated instead of the device files (*.hex). This applies to the DatafoxStudioIV and the DLL. The indication of device files (*.hex) is still possible.

Function of the Archive
The transfer routine of the device file selects the right file from the firmware file archive on the basis of the hardware options available in the device. Thus, it is guaranteed that all hardware components available in the device are supported by the corresponding firmware.

Manual Selection of a File
If you do not want to integrate the archive in your installation, you have the possibility to add single device files from the archive to the installation.
The file format of the firmware file archive is ZIP. Hence, you can open the archive with every standard ZIP-program. Via the entry "Open With" in the context menu you can select an appropriate program for opening the file. If necessary, you can call up a program combined with this file format to open the file by renaming the file from DFZ to ZIP.
In the archive you find a file named "Inhalt.pdf"; it contains information which file (*.hex) of the archive matches your device. Extract the desired device file (*.hex) and rename it if necessary. A renaming of a file is possible at any time, because all information are in the file itself.
You can state the device file extracted before as device file in DatafoxStudioIV and at calling the DLL function. It is still tested if the file can be loaded into the chosen device before the transfer takes place.

4.3.2. Datafox Devices and Device Firmware

Each Datafox device has an electronic flat module. The module has specific hardware equipment concerning the options (e.g. mobile radio, WLAN, fingerprint,...). Due to technical conditions, different options are mutually exclusive. Currently, not all hardware options can be supported in one firmware file due to limited program memory. This means that each device with specific hardware options needs a proper firmware to support the hardware options by the software.

> **!** **Caution:**
> Hardware generation V 3 is supported from version 04.02.00.x onwards. The DatafoxStudioIV is compatible up to and including firmware version 04.01.x.y. Older versions 04.00.x.y are not supported any more.

4.3.3. Device Firmware and Device Setup

The firmware (operating system) of the device and the device setup (*.aes data file = application program) form a unit. By the device setup, the runtime behavior of the device (the firmware) is determined. This means the response of the device to input events by the user or the environment (e.g. digital inputs). In principle, only those functions of the device are executed that are supported by the firmware and defined via the setup. Prior to the productive commencement, you should there-

fore test each setup with the corresponding device or on a device with the same hardware options and firmware.

4.3.4. Device Firmware and Communications DLL

A firmware supports certain functions, dependent on the hardware options. The communication DLL is the interface between the firmware and the DatafoxStudioIV or your processing software. Therefore, the firmware must always have the same or a lower version number as the communication DLL.

> **Note:**
> If your application uses a newer version of the DLL than the firmware does, you can only use functions that are supported by the firmware.
> Otherwise, you will receive an error message (e.g. function not supported) which has to be analyzed.

4.3.5. Communications DLL and DatafoxStudioIV

> **Note:**
> The DatafoxStudioIV and the communication DLL are developed and released as a bundle. Therefore, they have to be used as a bundle.
> A newer version of DatafoxStudioIV does not work with an older DLL.

4.3.6. DatafoxStudioIV and Device Setup

With the DatafoxStudioIV, you create a device setup (application program) for the Datafox device. That means that in the setup only those functions were defined which were available in the DatafoxStudioIV version at the time of the setup creation. The DatafoxStudioIV you use for opening a device setup may thus only be newer but never older than the DatafoxStudioIV version you used to create the device setup.

> **Note:**
> The updates are always available for download on our homepage www.datafox.de.

> **Caution:**
> When new devices are delivered, the latest firmware is loaded on the devices. If you wish to work with an older firmware version, please perform a downgrade. Please observe the compatibility notes in the release notes of the respective firmware version.

The data file <Device name>, Software Versionen Stand <version number>.pdf shows which functions are supported by which software release.
You will find the file on the product CD. Please also follow the instructions given in the chapters of the manual.

4.3.7. Update / Downgrade

A firmware update or downgrade is a very sensitive process. Possibly, a reset of the main communication to RS232 may occur. In any case, consider the information regarding the compatibility in the software version list.

Firmware Update

> **!** **Caution:**
> Before starting a firmware update, please check on the basis of the software version list whether there are any version dependencies that must be observed.

For example: when changing from Version 04.00.xx to version 04.01.xx, at least version 04.00.23.769 or higher must be present in order to run the update to version 04.01.xx successfully.

Firmware Downgrade

A firmware downgrade is not recommended.
We are constantly working towards improving the software/firmware; all functionalities are still included in new versions. New software always offers better functionalities and possible bugs are fixed.

> **!** **Caution:**
> When performing a firmware downgrade the firmware has to be transmitted to the device twice. This has technical reasons. Errors shown on the display of the device after the first transfer can be ignored.

5. Device

> **Note:**
> ☞ It has to be taken care of a suitable protection from direct sunlight because the synthetic materials are not 100% UV resistant. Fading simply is an optical defect which does not restrict the function of the device.

> **Caution:**
> ❗ Pleas keep in mind that MasterIV terminals use a flash memory. According to the manufacturer each memory sector (512 byte) can be written to a maximum of 100,000 times. The firmware of the terminals distributes the access to the memory sectors, this technique is called wear levelling. Bad blocks in case of write or read failures are not used anymore. However, despite this technique it is not advisable to write the memory too frequently. The application should initialize a new list transfer only after a change of the list data but not cyclically.
>
> Keep in mind the message - FlashService - in the display of the device. It means that the live time of the flash memory according to the manufacturer instruction will be reached soon. Then the device has to be sent to Datafox for service.

5.1. Commissioning

On delivery, the device is fully functional and configured with a demo setup so that you can test the input immediately. After establishing the power supply the device will switch on automatically. The PZE-MasterIV V4 automatically starts booting, recognition of the hardware options and loading the setup. After having finished booting, the device switches to operation. Now the PZE-MasterIV V4 is ready for use.

> **Note:**
> ☞ On delivery, the main communication is set to USB.

> **Caution:**
> ❗ If external modules (e.g. access control, signal processing via the digital inputs) with an external power supply are used, ensure to comply with all limits (max. voltage and current) before commissioning the system.

5.2. Display and Operation

5.2.1. Keyboard

> **Caution:**
> The buttons of the devices may only be pushed using fingers. **Under no circumstances** should the buttons be pressed by **hard** or **pointy objects** such as keys, transponders or coins.

The keyboard of the PZE-MasterIV is structured as follows:

finger scanner

Keys for input sequence 1 – 5 the function is defined in the setup.

The keys 6 and 7 use for navigation in lists and chose symbols by inputs over Keys.
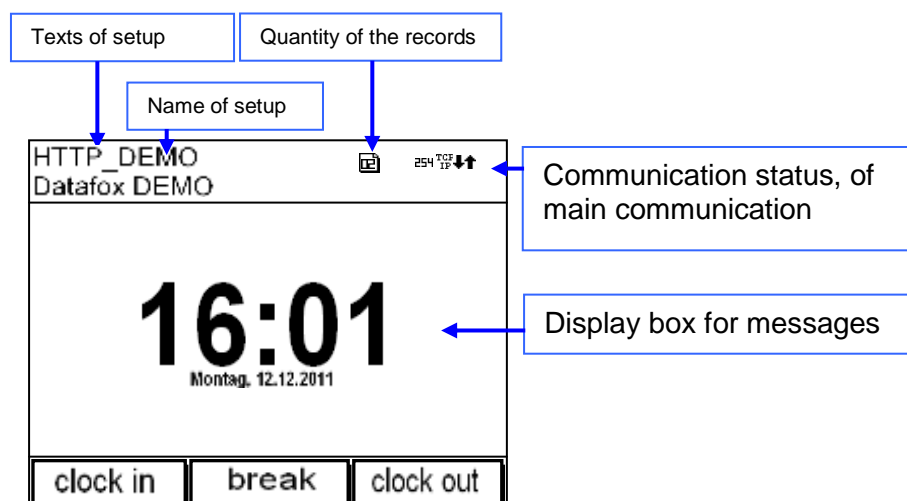
The Key 8 to confirm an input or an action.

The Key 9 to stop an input. Or use in combination with other Keys.
Then must be press first the "ESC" and hold.
After that press the Combine Key.

read range for RFID

5.2.2. Display and Menu Bios V4

5.2.2.1. Display

Texts of setup   Quantity of the records

Name of setup

HTTP_DEMO
Datafox DEMO

16:01
Montag, 12.12.2011

clock in   break   clock out

Communication status, of main communication

Display box for messages

- **Date and Time** corresponds to the system time of the device, these are also used in the records.
- ⊡ **counter of records** (to indicate up to 99, more are shown as 99+).
- **GPS-State (Position system):**
  o ⊡ GPS-Module activated, GPS-A-Data available.
  o No Symbol: GPS-Module de activated or not included.
  o ⊡ GPS-Module activated, but not GPS-A-Data available.
- ч = Number of satellite to use for the position system
- **communications field** with symbols for state:
  o ⊡ TCP /IP is activate, with this symbol you see the communication work⬇⬆.
  o Wan Kommunikation
    ▪ ⊡ Wlan (WiFi) is activate
    ▪ ⊡ Wlan (WiFi) is connected
    ▪ ⊡Wlan (WiFi) is connected and the communication active
  o ⊡ USB
  o ⊡ RS 485
  o ⊡ USB Host (transfer records to USB-Stick)
  o ⊡ GSM with state E.g.[10].
  o GPRS with state on Display E.g.[33] see „State message on Display".
    ▪ ⊡ Mobile phone modem off
    ▪ ⊡ Mobile phone modem is on, but has not connected to the Provider.
    ▪ ⊡ Mobile phone modem is on, and have connect to the Provider
- **Read out on Display**
  o Text in the main menu, line 1(HTTP_Demo) and 2(Datafox Demo) from setup.
  o In menus and input sequences shown in the header line 3 and 4.
  o During transmission of a setup or updates the symbol „⊡ Systemstop" is shown.
  o On the left site in the Display:
    ▪ ⊡= read RFID
    ▪ ⊡= read barcode
    ▪ ⊡= to clock in
    ▪ ⊡= to clock out

5.2.2.2. Key and the Combinations

☞ **Note:**
Keep to the given order of the key combinations. Otherwise, you will switch to an in-put sequence and the desired function will not be available.

- **Activating start options**
  - Press ENTER key during booting.

- **Opening device BIOS**
  - Press upward arrow + downward arrow simultaneously
  - from FW V 04.01.01 onwards also: Press ESC + ENTER in sequence and hold

- **Opening transponder menu**
  - from FW V 04.01.01 onwards: Press ESC + F1 in sequence and hold

- **Navigating in lists**
  - Downward arrow or upward arrow

- **Entering printable characters via keyboard (PZE only?)**
  - Downward arrow or upward arrow

- **Taking over a selected list entry**
  - ENTER key

- **Cancelling any action**
  - ESC key

- **Switching to main menu in operation mode PZE**
  - ESC key

- **Changing pages e.g. at GV info screen**
  - Left arrow or right arrow
- **Rebooting the device**
  - F1(1) + F2(2) + M(5) + Enter↵ (8)

5.2.2.3. System menu BIOS

You can make directly different basic settings at the terminal via the system menu.
To open the bios menu with key combinations ▼and▲ or ESC and↵ .

This is first site at the Display bios menu:
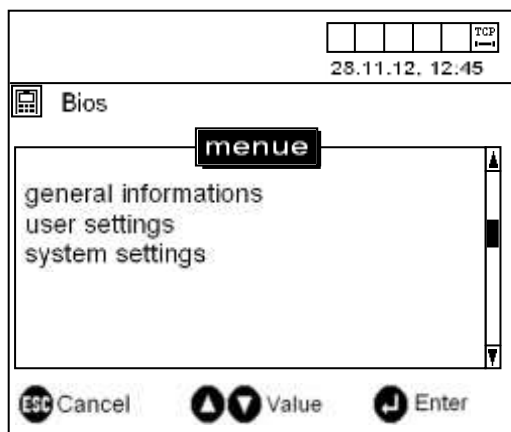
Select the menu with the key ▼and▲ and confirm this with the button↵ "Enter".

general informations:
- firmware information
- check transponder
- Record memory
- list memory
- memory usage

The respective sub-menus should be self explanatory.

user settings:
- transponder menue
- display / signals
- date and time

More about transponder menu in the next caption!
The respective sub-menus should be self explanatory.

system settings:
- firmware information
- system information
- communication
- display / signals
- date and time

- interface   rs 232   (select the communication with the device – pc to coose the communication via RS 232, TCP/IP, GPRS...)

- active   no   (always "no" please read the caption active connection befor they put to yes.)

- http   no   (select „yes" when you send date to webserver via http, select „no" when you use the DFCom.dll or the program DatafoxStudioIV)

- tcp / ip   (this is for setting TCP/IP address, port, gateway…)

5.3. Connection of PZE-MasterIV V4

5.3.1. Pin assignment PZE-MasterIV V4

The PZE-MasterIV V4 have seven places for extended modules. This modules can you chose free and can be fitted.
Below is an example of the placement:
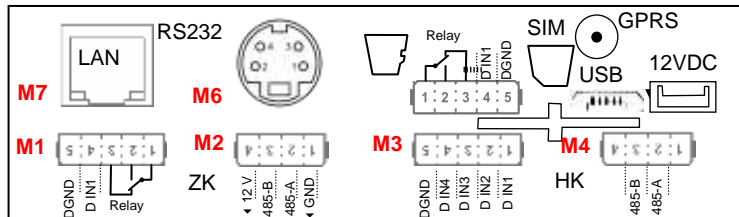
Connector strip PZE-Master V4

Bezeichnung	Modul	PIN	Beschreibung
Digital IO 1x digi. IN 1x digi. OUT	M1	4-5 1-3	Standard: 1 digital input 1 digital ouput with a contact NO and NC
RS485 for access control	M2	1	ground
		2	A RS 485 for access control readers
		3	B RS 485 for access control readers
		4	+ 12 V
Digital IO 4x digi. IN	M3	1	1 digital input
		2	2 digital input
		3	3 digital input
		4	4 digital input
		5	ground
RS485 for main- communication	M2	1	ground
		2	A RS 485 for main communication
		3	B RS 485 for main communication
		4	Not connected
Digital IO 1x digi. IN 1x digi. OUT	M5	4-5 1-3	Standard: 1 digital input 1 digital ouput with a contact NO and NC
Modulplace 6 RS 232 Mini-DIN M004	M6	1	TXD
		2	RXD
		3	+ 5 V
		4	Ground / GND
Modulplace 7	M7		TCP/IP - LAN RJ 45

5.3.2. Powersuply for the PZE-Master V4

5.3.2.1. Powersuply via power grid

The supply voltage is supplied by means of a power supply 12V DC / 18 W.
Possible is a power supply up to 24 V DC.

The power supply:

Reverse polarity protection plug
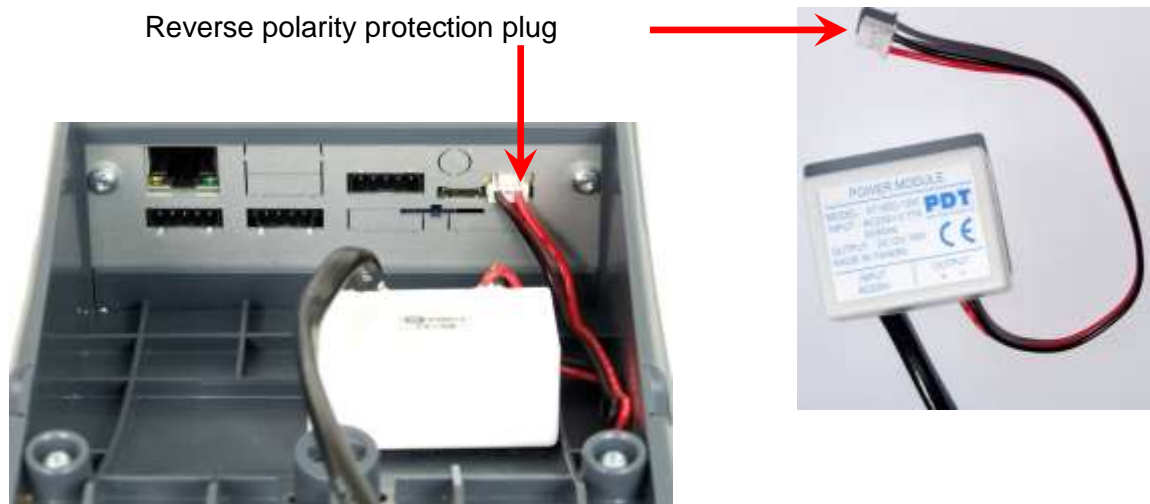
5.3.2.2. POE power supply

Optional can be intergadet a POE-Module (Art. number.: 105117-V4).
2 Standards are supportet by Datafox devices.

PoE-Standard		Power per port	Usable power
PoE	IEEE 802.3af	15,4 Watt	12,95 Watt
PoE+	IEEE 802.3at	25,4 Watt	21,90 Watt

If the power supply is over POE, can also one access reader module supply.

5.3.3. Modules for devices of hardware V4

5.3.3.1. Description of the various extension modules

The Datafox devices of the generation V4 are particularly distinguished by the variable configuration of individual modules.
Depending on the device, a certain number of module locations are available.
These can be individually equipped with the individual available modules.
Depending on the size of the module, the individual modules occupy one or two module locations.
Thus, e.g. the GPRS module (mobile radio) requires 2 module slots and one relay module only needs one module slot.

<u>**Overview of the different optional modules:**</u>

modul description	Required module slots	Description in the BIOS-Menu and Module mumber.:	Max. possible number of module	items No. for the plug	overprint & Colour
RS 232 - mini DIN Barcode	1	032 Serial port mini DIN	1		
RS 485 access	1	014 RS485 + 12V Supply	3	A310000 4-01	**485** ⊥ A B ⊥
RS 485 for main communication	1	035 RS 485 Com Port	1		
GPRS Mobile (Cell phone) network	2	Mobile MC 55i	1		
TCP/ IP	1	011 Ethernet Port	1		
WLAN (WiFi)	1	001 WLAN Red Pine	1		
2x digital Out	1	005 Relais Output	8	A310000 5-01	Relay-2
1x digital In + 1x digital Out	1	012 Digital In-/Output	8		ZK-Opt 1 ⊥
4x digital In	1	006 Digital Input	8	A310000 5-02	Dig-in-4 1 2 3 4 ⊥
4x anlog In	1	008 Analog Input	8	A310000 5-03	Ana-In-4 1 2 3 4 ⊥

How manny modulplaces are usable you see device in the device manual in the chapter "Connection of device".

5.3.3.2. Read the optional placement of the device
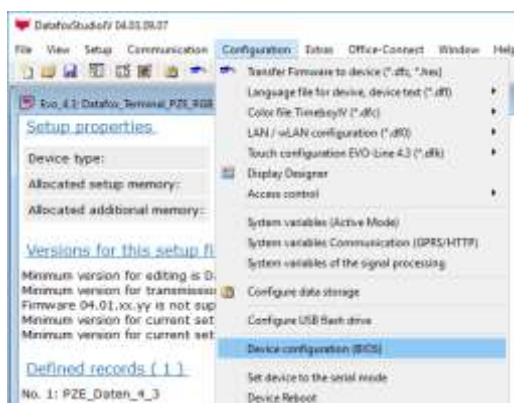
Click on:
„Configuration -> Device configuration (Bios)"
Then click on „Read".

Display in the Bios-Menu:

Here show all moduls they are fited in the device:
You see which module on which place is. You get extendet information how MAC adress, the number and order of the inputs and outputs.

Example 1:
- Modulplace = M1
- Digital Input 1 to 4
- Module Number: = 006

Example 2:
- module slot = M4
- Analog Input 5 to 8
- Module Number: = 008 analog Input

E.g. Type lable of a IO-Box V4:
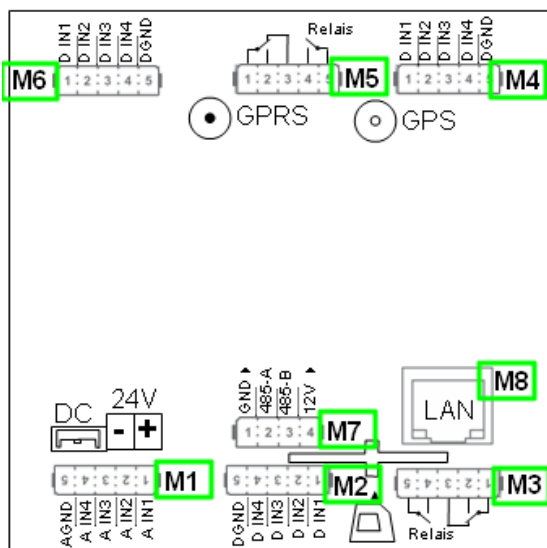
You see here, in the IO-Box are

8 Modulplaces usable. This can be individually fitted.
Exceptions:
- Modulplace 8, only here TCP is possible.
- RS 485 for access control - maximum 4 Modules can be fitted.

5.3.3.3. Read out important module information from the device

Click on:
"Configuration -> Device Configuration BI-OS"
Then click on "Status" thereafter
Click "Read".

Device configuration (BIOS)

" Com_3_fest [COM3]

Device
  Status
  BIOS
  LAN MasterIV
  WLAN MasterIV

```
[SETUP]
Status=Running
1  Name=IO_BOX_AIN_DigIN_2xRel.aes
2  Time=2017-01-30 09:17:44

   [IN]
3  Status=00000000-

   [CNT]
4  Values=-

   [OUT]
5  Status=000

   [ANALOG]
6  Values=0.01 V, 0.01 V, 0.01 V, 0.01 V, 0.01 V

7  [TIMER]
   Time to next trigger 1 (2)

   [MEMORY]
   Size=4194304

   [RECORDS]
   Size=786432
   Free=785980 (99%)
8  Used=452 (1%)
   Count=4

   [LAN]
   Mac=E4-F7-A1-00-0B-5E
   Ip=192.168.1.122
   Mask=255.255.255.0
   Gateway=0.0.0.0
```

Here you will find a whole series of important information about the terminal.
Here are some explanations of the individual lines:

1) Name of the setup, this is also available when reading out.
2) The date when the setup was loaded into the device.
3) State of the digital inputs. All inputs which are physically present and defined in the setup are displayed here with their status.
   a. 00000000 = Digital inputs defined in the setup
   b. 0 = Input on low (logical 0)
   c. 1 = Input on hi   (logical 1)

4) If digital inputs are defined in the setup as counter, the current count value is displayed here.
5) Status of the digital outputs: Output 1 is continuous here from left to right.
6) Analog inputs from left to right with respective currently applied voltage.
7) Number of stored records in the device and memory used.

5.3.3.4. Connection of the individual modules

The connector / socket for the module always has the following assignment:

Socket on the device:

The plug can be inserted only in one direction and is therefore protected against reverse polarity.
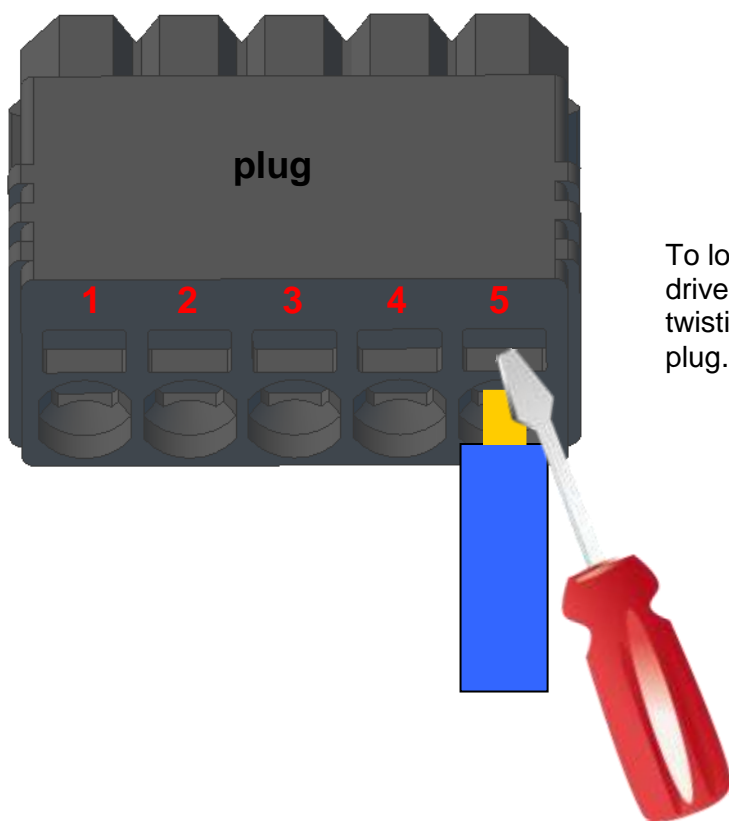
plug

To loosen the cable, use a small screwdriver. Solid wires can be loosened by twisting back and forth on the wire and plug.

5.3.3.5. Analog inputs, 4 times analog IN

common ground; GND / Ground

Ana-in-4
1 2 3 4 ⊥

+ 0-10 V Signal 4
+ 0-10 V Signal 3
+ 0-10 V Signal 2
+ 0-10 V Signal 1
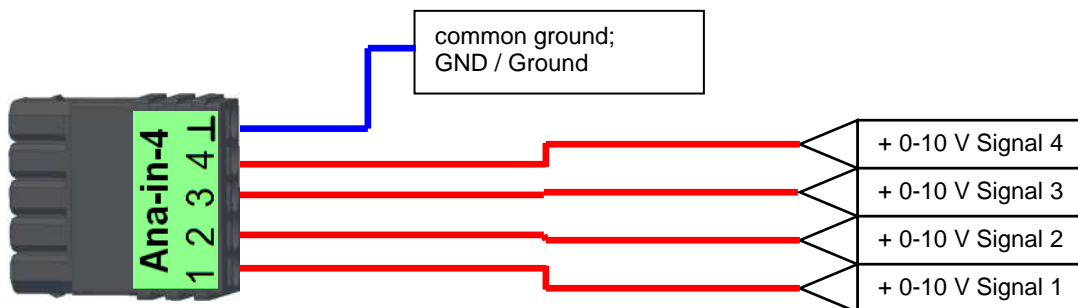
5.3.3.6. 2 times digital out

Connection example:
(Connection of a signal light and a signal horn via a potential-free contact):

max. 30V AC/DC / 2A / 60W
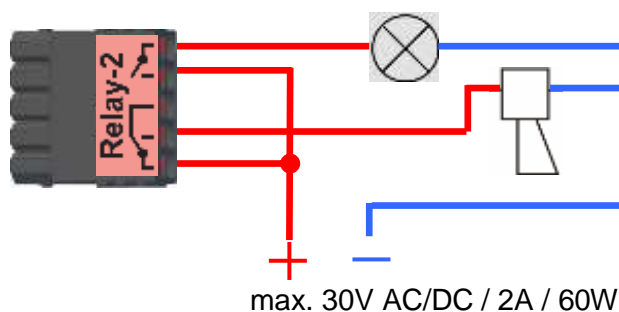
5.3.3.7. 1 time digital Out 1x digital IN

Connectiom example (Connection of a signal light and a door contact):

max. 30V
0 - 1,5 V   Input logical 0
3,5 V - 30 V   Input logical 1

e.g .: Door contact

max. 30V AC /DC
2A / 60W
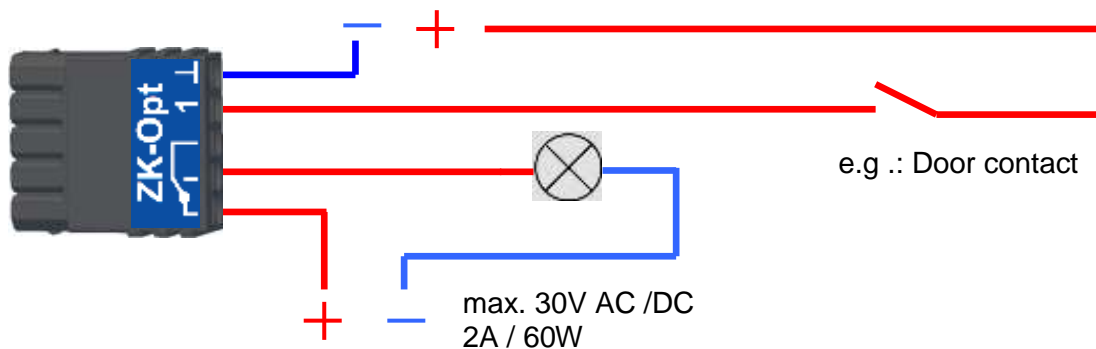
5.3.3.8. 4 times digital IN

Connectiom example (Connection of 4 contacts):

e.g.: 4x digital in

max. 30V
0 - 1,5 V   Input logical 0
3,5 V - 30 V   Input logical 1
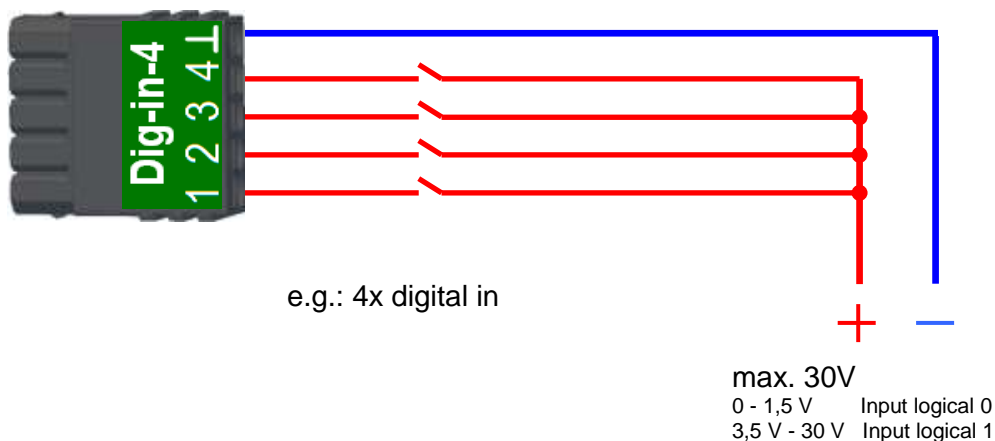
5.3.3.9. RS-485 bus for access control

The access control option provides the connection for external readers on the device.
The pin assignment looks as follows:

12V +

GND -

The power supply is sufficient for max. 1 external reader.

This voltage must not be combined with other voltage sources.
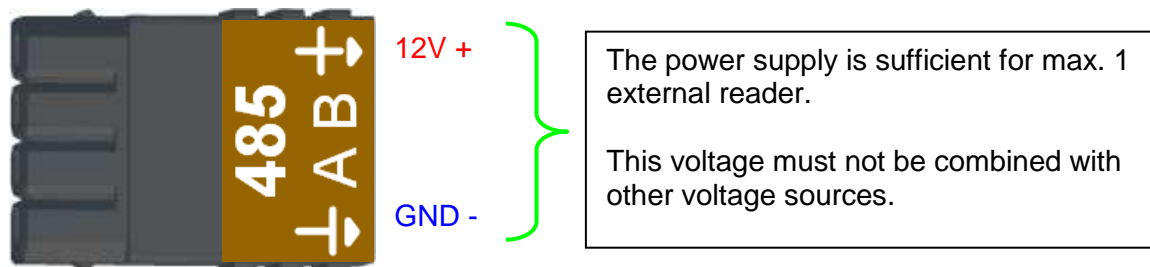
Note:
The 12 V are only present when the access control on the device is activated and all access lists have been played on the device.

Furthermore, the connection for a digital input and output is available.
The pin assignment looks as follows:

How the individual access components are connected or wired, can be found in the chapter "Access control"

5.4. Montage des PZE-Master

Das 2-schalige Gehäuse hat im unteren Drittel den Steckerbereich, der nur von hinten zugänglich ist. Hierdurch sind die Stecker im montierten Zustand komplett verdeckt. Die Manipulationsmöglichkeiten werden damit sehr stark eingeschränkt. Im gleichen Bauraum ist auch das Netzteil untergebracht. Eine Bohrschablone zur Montageunterstützung finden Sie auf der Produkt DVD.

5.4.1. Wandmontage

LCD Modul
320x240 Pixel

Lesebereich des
Transponderlesers
sofern vorhanden

Wandmontage über
3 Punkte
(Schrauben liegen
bei)

Netzteil 24V AC,
300 mA, Datafox
Artikel-Nr.: 105108

Wenn das Gerät auf eine Unterputzdose montiert wird und dort nur eine Schraubklemme zur Verfügung steht, schneiden Sie einfach den 230 Volt Stecker ab und schließen Sie die Adern an die Schraubklemme an.

> **Achtung:**
> Bei der Verwendung von Simons & Voss Leser, muss das Netzteil außerhalb des Anschlussbereiches montiert werden.

5.4.2. Montage mit Standsäule

Die Montage erfolgt über 3 Punkte (Schrauben liegen bei).

Netzteil 24V AC, 300 mA, Datafox Artikel-Nr.: 105108

Die Leitungszuführung erfolgt hierbei über den Standfuß.

5.5. Communication of Hardware V4 Devices

!	**Caution:** The type of communication depends on the device. All possible communications are listet in the device.

☞	**Note:** Datafox-devices are able to communicate encrypted. Read more in the manual for the „DatafoxStudioIV".

The switching of the communication can be done
via :
1. the system menu bios on the device
2. with firmware version 04.02.04 and up with the function „Switch communication".
3. from the Firmware version 04.02.04 upwards with the fieldfunktion „switch communication". Read more in the manual for the „DatafoxStudioIV"

Mögliche Kommunikationsarten sind:
1. USB (on PC)
2. USB Host, Save data on a USB-stick
3. TCP/IP over LAN
4. TCP/IP over the internet (with HTTP)
5. TCP/IP over WLAN
6. GPRS connection with mobil cell network.

5.5.1. Communication via USB
Every EVO-Line Device is equipped with an usb interface.
The Micro-USB-B Port can be connected directly to a PC.
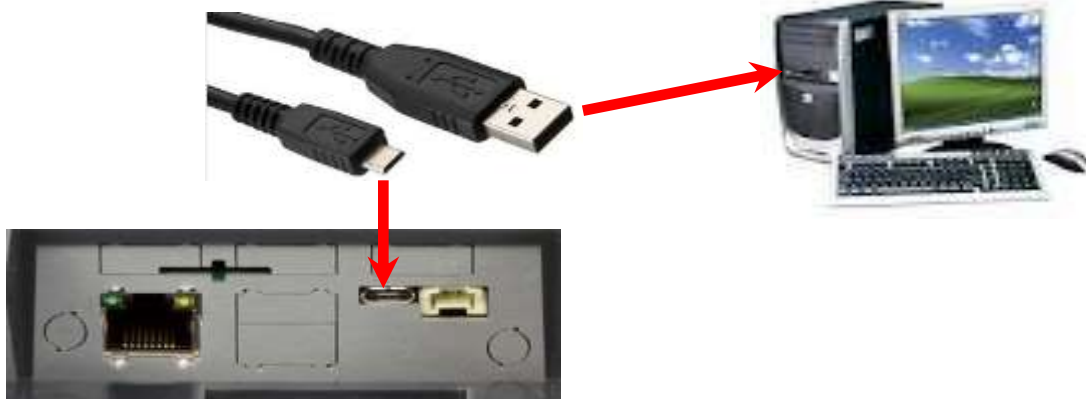
!	**Caution:** The Terminal works with a USB-B Interface. Das heißt, dass das Terminal im Slave-Modus arbeitet und kann daher keine anderen USB-Geräte verwalten. This means that the device works in slave mode only. So it is not possible for the device to control any other devices via USB.

5.5.2. Automatic dedected conectet USB to PC

If the terminal is connected to a pc it will recognize the connection and will switch the communication to USB.

DatafoxStudioIV will recognize the device and a notification will pop up.
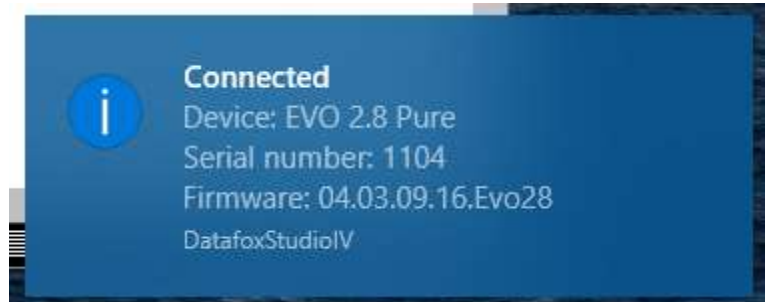
The studio will generate an entry for the device.
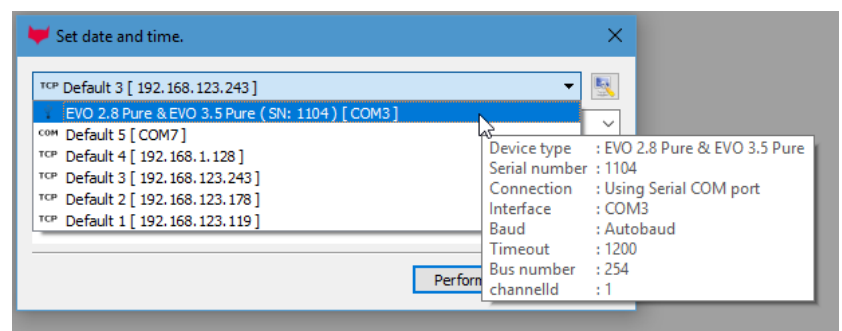
On the device the following icon is displayed:

It is not necessary to switch the main communication to usb manually.
It's especially useful for boxed devices.
This will save much time in the parameterizing process.

> **Note:**
> ☞ If the device is connected to a pc no other connections (for example Wi-Fi) will happen
> If the USB-cable is disconnected it will automatically switch to the configured main communication

5.5.3. Installing USB driver for Hardware V4 Devices

Installation for Windows 7, 8, 8.1 and 10.
The USB-Driver is a small installer which will do the necessary configuration.
Just launch the .exe file.
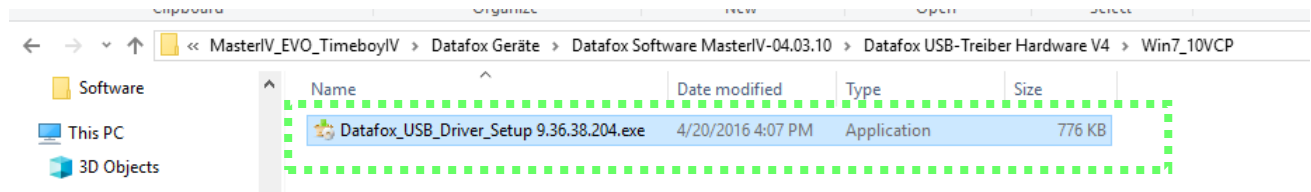
Follow the instructions on the screen:
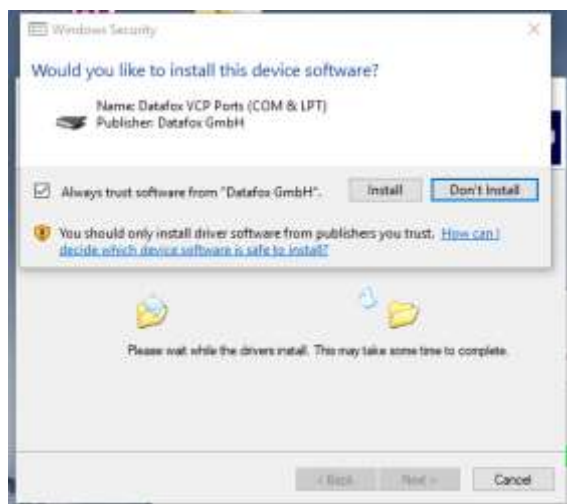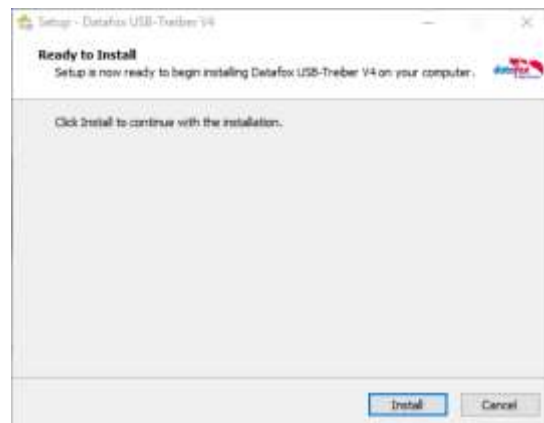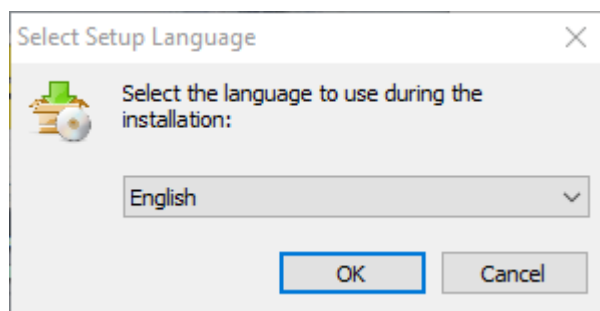
!	**Caution:** Only use the driver wich are delivered with the device!

☞	**Note:** If you have DatafoxStudioIV installed the USB-driver will already be installed on your pc.

5.5.4. Comunication / record transfer via USB-Stick (Host)

To be able to transfer data from the device to a USB stick, the device must have the option "USB host".
You can see this at the neckline.

The USB-Stick must be in **FAT(32).**

The device dedected the stick automaticaly when the stick is plugged in.
The main communication must be set on "USB-Host". You see the activated main communiction on this symbol Symbol (Icon) 📇.
The main communication can you set in the bios-menu.

USB - Stick adjust:
The USB stick is configured with the help of DatafoxStudioIV.
You find the configuration menu under the point „Configuration"->Configure USB flash drive.
More description you find in the manual "DatafoxStudioIV".

☞ **Note:**
We recoment to use a passoword for the communication with the USB-stick.

! **Caution:**
The usb cable to the PC must not be connected if you want to use the stick on the device

! **Caution:**
Lists of access control can be transferred individually, operation lists must always be transmitted in complete form. All lists defined in the setup must also exist on the stick in the "List" directory.

5.5.4.1. Error message by using USB-Stick (Host)

Error code	Description
1	**Read error**
2	**Write error**
3	**Error during the communication with the USB host**
4	**Error during the changing the directory**
5	**Error by the check of the stick**
6	**Error by the list directory**
7	**Error to create a data directory**
8	**Error handle**
9	**Error to open a file**
10	**Error not find the path**
11	**Error, the file is already open**
12	**Fehler to open a file**
13	**Error by closeing the file**
14	**Error by closeing the file, false handle**
15	**Error by checking the handle**
16	**Error by checking the handle, the file is not open**
17	**Error write protect**
18	**Error by the record stucture**
19	**Error duren the firmware update**
20	**No USB stick**
21	**Incorrect password**
22	**No list**

5.5.5. Communication via TCP / IP

The setting of the LAN / WLAN parameters is done via DatafoxStudioIV under the menu item "Configuration" -> "LAN / WLAN – Configuration (*.df0)".
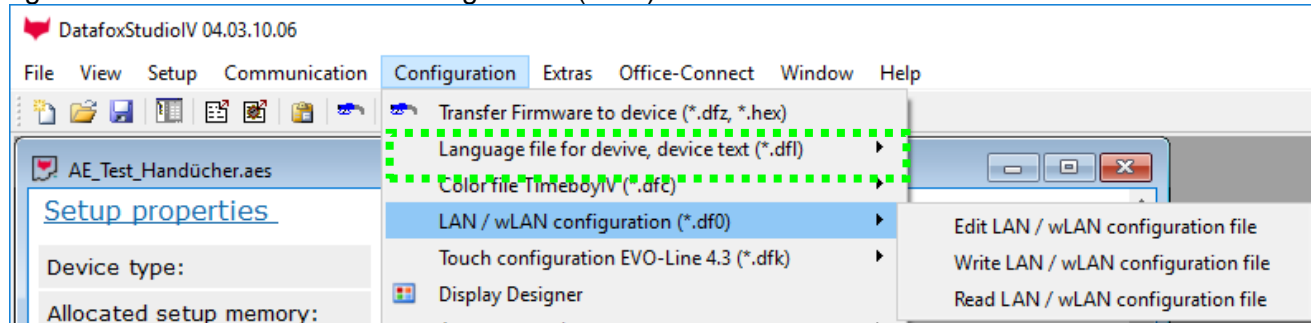
The LAN / WLAN configurations are saved in a file with the filename extension "*. df0".
Here you now have the possibility to edit the file, load it into the Datafox device (upload) or read it from the device (download).
When reading the WLAN setting from the device, the currently specified file is overwritten.

In the General tab, first of all, you can set the main communication with which the device is equipped.
- Device with LAN (The first configuration is for LAN connection)
- Device with WLAN
- Device with LAN and WLAN (The first configuration is for the LAN connection)
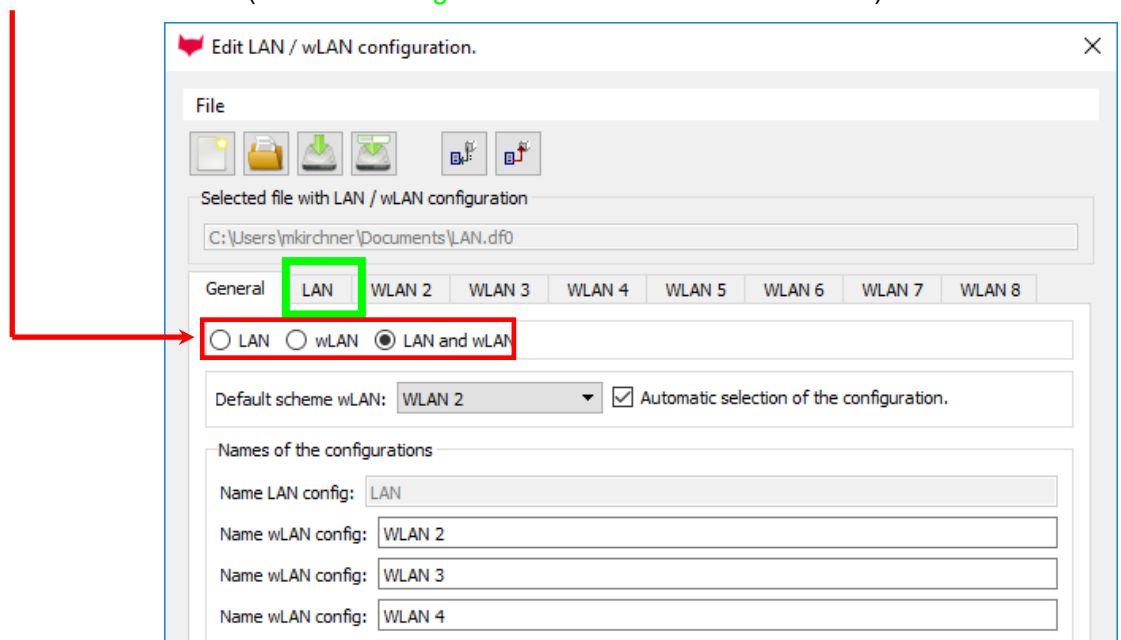
Coution:
For TimboyIV only this setting (only wLAN) can be used.
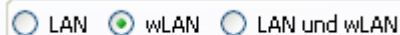
5.5.5.1. Communication TCP / IP via network-cable

You can make the IP settings on the "LAN" tab.

Please enter the desired IP address, subnet and if necessary a gateway.
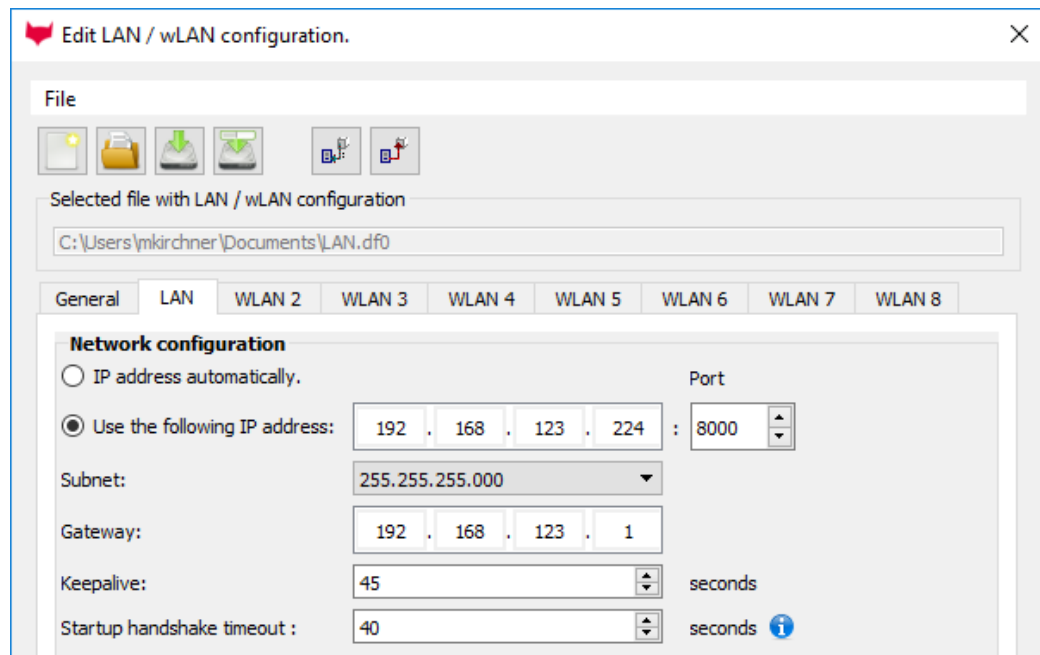
For devices with display, the IP address can also be entered directly on the device.
Press ESC and ENTER simultaneously to enter the Bios menu of the device.

More information can be found in the chapter „bios menu".

5.5.5.2. Communication TCP / IP via wLAN / Wifi

This overview shows you which WLAN methods are supported.
Not supported is WPA (Predecessor of WPA2).
5 GHz connections are not supported and no mixed operation 2.4 GHz / 5 GHz.
Authentication via WPA2 Enterprise according to IEEE 802.1x is not supported.

```
                    ┌─────────────────────────┐
                    │ WLAN / Wifi – overview   │
                    │ about the encriptions    │
                    │ and „Infrastructure"     │
                    └─────────────────────────┘
```

Security: WEP(1)	Security: WPA2/802.11i	Security: None (0) ohne
Encryption	Encryption	NO Key
WEP64	AES / CCMP „AES 128"	
WEP128	AES / CCMP + WEP	
Authentication Open/None (0) Shared/PSK (1)	Authentication Shared/PSK	
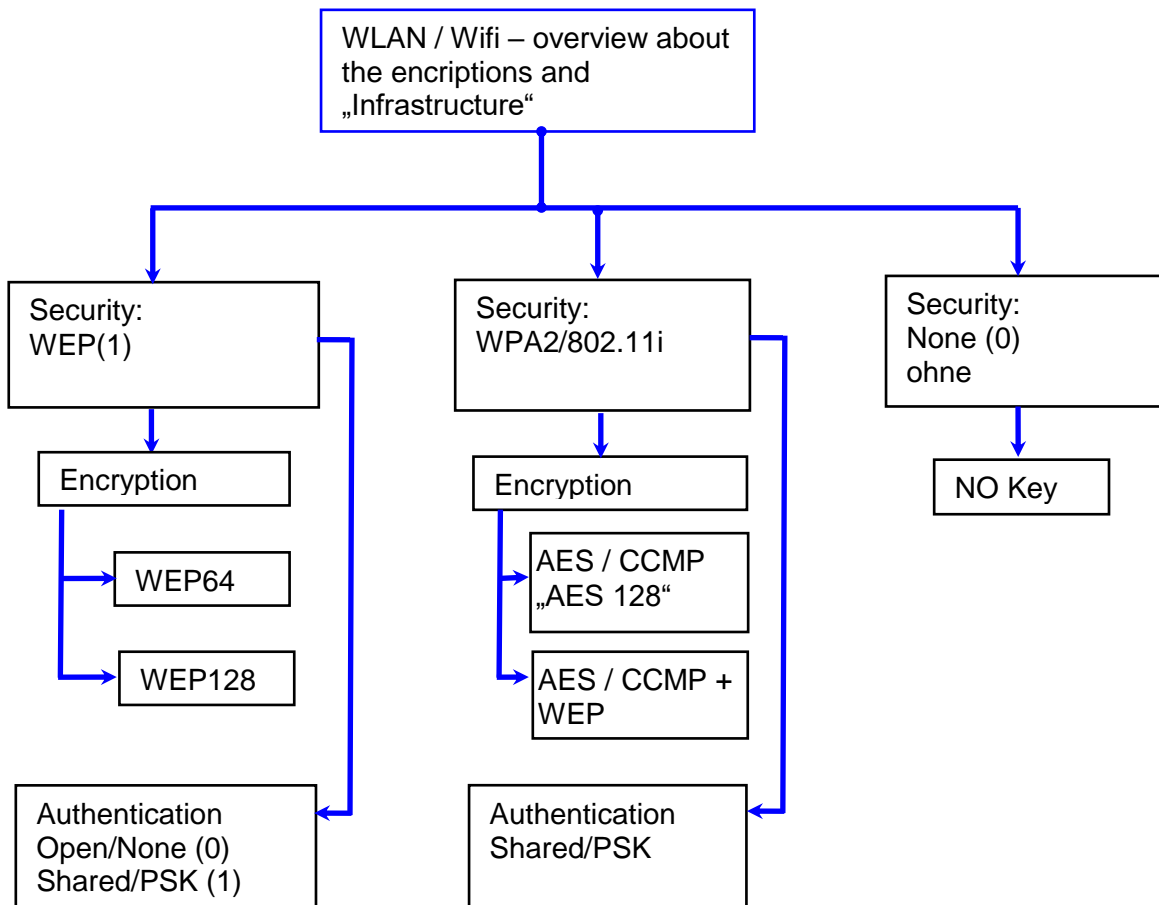
> **!** **Attention:**
> We cannot test every available Acsess-Point on the market.
> Therefore, it is not possible for us to guarantee a connection to any AP.

When setting the encryption AES or WEP, only one type is used at a time.
The setting AES+WEP means for some access points that AES encryption is performed first and then additionally encrypted with WEP.
In this case, only set AES.

Select the configuration or location for which you want to set the WLAN parameters.

Enter the IP address for the device here.
This must be the same for every location.

All the settings required for an access point can be made here.

If a key is stored, this will be displayed.

If you check this box, the battery life will be significantly increased if the device is operated with a rechargeable battery. Important for TimeboyIV!

A scan (search) for access points is only carried out after a disconnection after this set time. Please note the following Attention Box!

> **!**
> **Attention:**
> A search for a new access point requires a lot of energy and drains the battery. Avoid a continuous search for an access point when the device is operating at the limit by generously selecting the pause between scans for new access points (80-120s).
> At most access points there is the possibility to set the "Beacon Interval". The higher this is set, the less power the TimeboyIV needs. Recommendation: Beacon interval >300ms.

The entire file with all settings is transferred to the device. If the device has a display, the location can be selected in the Bios menu -> Communication -> WLAN. Each location has its own configuration for the WLAN connection. The user therefore has no insight into the dial-in parameters at the various locations.

> ☞ **Hint:**
> With automatic selection of the configuration / location, the first attempt is always made to establish a connection with the default schema.

5.5.5.3. Location selection in the Bios menu WLAN

All available WLAN networks are dis-
played in the Bios.

A configuration is stored for these networks
and can be selected.

These two networks were found by the
WLAN module, but there is no dial-in da-
ta available.

```
15.08.11 11:28:08
        Bios
        Akt. Konfig.
F1   Datafox Support     74db
F2   Datafox Gast        74db
?    Standort Geisa      86db
?    FA Muster           90db
ESC Abbruch      Seite      Taste
```
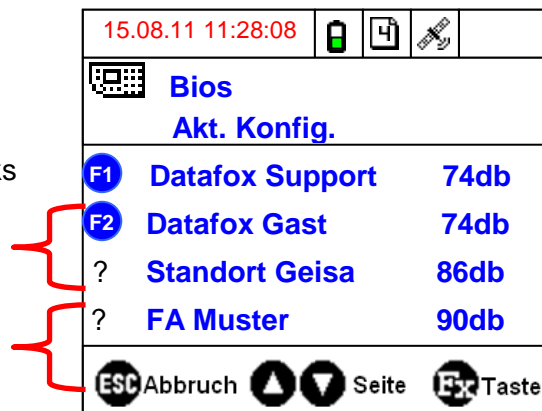
5.5.5.4. Recommended setting

We recommend the following setting:
- WPA2
- AES
- Shared/PSK

Datafox uses the following access points internally for testing:
- Longshine LCS-WA5-45 IEEE802.11g
- WatchGuard XTM WEB UI
- Longshine IEEE802.11n
- TP-Link WR841N v6/v7 00000000

Setting Access-Point

Setting StudioIV_WLAN-Device

5.5.6. Communication via RS485

5.5.6.1. Connecting the termina via RS485 to PC

RS 485 to PC
up to 1000m

RS 485 Anschluss am Terminal

USB - RS485 Adapter am PC

5.5.6.2. Connecting the Terminal via RS485 with a Comserver Lantronix

TCP/IP   RS485

120 Ohm

plug
Pin 15 - BUS B
Pin 14 - BUS A
Pin 7 - GND

plugr 4 Pol.
BUS A
BUS B
Pin 1 - GND

plug 4 Pol.
BUS A
BUS B
Pin 1 - GND
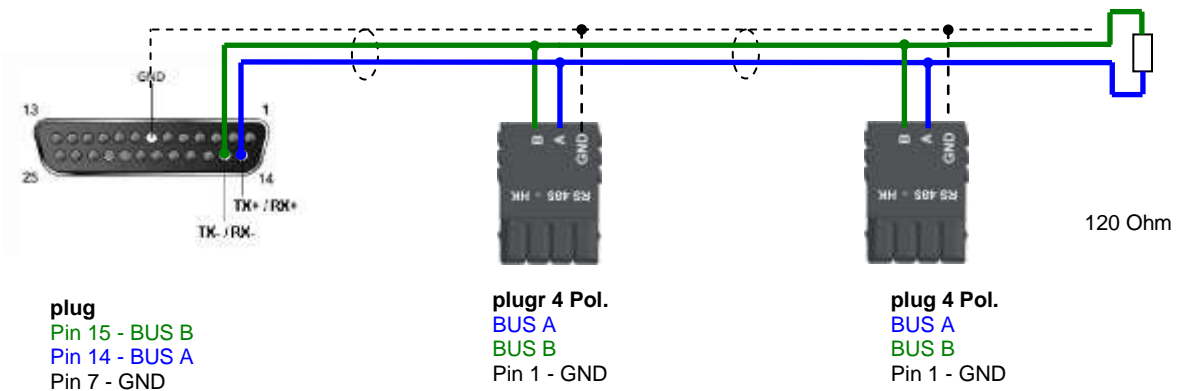
5.5.7. Communication via Cellular Network (GPRS)

The PZE-MasterIV V4can be equipped with a cellular network modem. It enables the communication via cellular network. The antenna is located in the connection compartment of the device and can optionally be replaced by an external antenna if reception is bad.
The SIM card is inserted via the connection compartment of the PZE-MasterIV V4.

Einsetzen der Sim-Karte beim Gerät
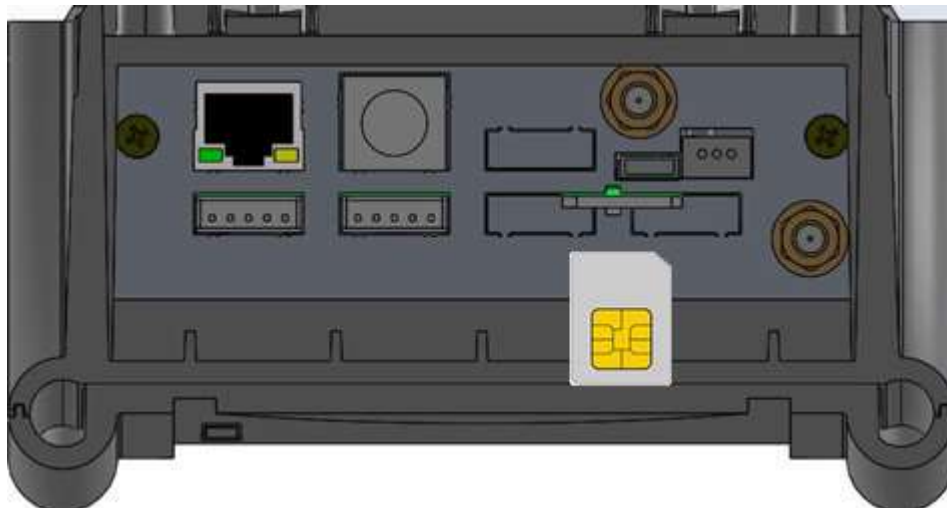
> **!** **Caution:**
> For inserting the SIM card a tool in pen or screwdriver form is required. Take care that the SIM card is not damaged.

For removing, the SIM card has to be pushed in a bit. After releasing it, the SIM card protrudes a bit and can be removed.

> ☞ **Hinweis:**
> Wir empfehlen T-Mobile oder Vodafone als Provider für Mobilfunk einzusetzen! Unsere Erfahrung zeigt, dass bei anderen Anbietern mit häufigeren Einwahlen und damit auch verzögerter Datenübertragung und ggf. mit höheren Kosten gerechnet werden muss.

Informationen zu M2M:
http://www.t-mobile.de/business/machinetomachine/m2m-im-einsatz/0,23219,26762-_,00.html

5.5.7.1. Communication state

The state of GPRS-/GSM-connection you can always see in the state bar on the display.
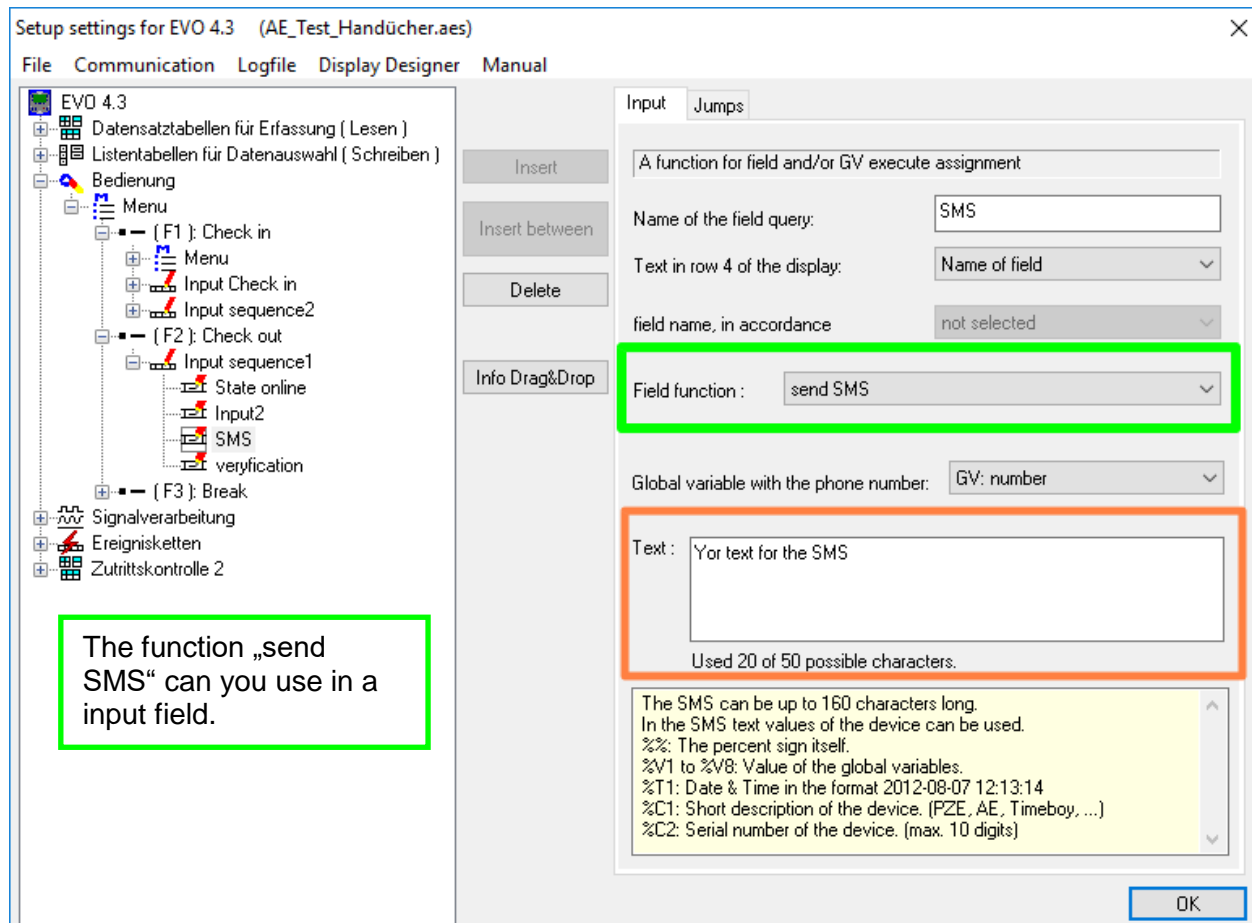
Pin	Bez.
0	Modem is off
1	Initialization of the software
2, 3	Start of the modem
4, 5	Initialization of the modem and SIM-card check
6	if PIN necessary, sending of the PIN
7	if PUK necessary, sending of the PUK
8	dilated initialization of the modem
10	Modem in standby mode
11	Call recognized
12	take calls
14	GSM connection activ
15, 16	GSM connection closed
20	GPRS Standby, Initialization of the GPRS connection after the first records
25	connection to Provider (Attach)
30	GPRS standby (waiting for next data/records)
31	Server (Open)
32	connect to server
33	send data to Server (HTTP)
34	Wait for quitting from server (HTTP)
35	recive data from server (TCP/IP)
36	send data to server (TCP/IP)
37	close connection
38	Braek between tries to connect the server, active mode
40	timeout after failed connection , to 15 minutes
41[1]	timeout after failed connection Provider, to 15 minutes.
42[1]	count of the connection attempt is end
43	on the Device is the encryption active, but not on the server
44	battery is down, to disable Modem.
45	impossible connect to the provider or bzw. Roaming impossible
50	close connection
55	Turn modem off

5.5.8. Communication via SMS

5.5.8.1. Send a SMS

With the PZE-MasterIV V4, it's possible to send an SMS. Condition for this is, an integrated GPRS-Modem (communication via Cellular Network). The main communication must be set on GSM or GPRS/GSM.
To send an SMS you must use the Field Function "send SMS" in the device Setup.

The function „send SMS" can you use in a input field.

The maximum length of the SMS is 160 characters.
The text can integrated device value:
%%: The percent signs self.
%V1 to %V8: value of global variable.
%T1: date and time 2012-08-07 12:13:14
%C1: Short device description. (PZE, AE, TIMEBOY, ...)
%C2: Serial number of the device. (max. 10 Stellen) %1 für GV 1, %2 für GV2 usw..

The call number if you want send an SMS must be saved in a GV.

! **Caution:**
Enter the phone number always with a country code.
Example.: +49161458✳✳✳✳✳

The device can be saved 128 SMS. Then there is additional as follows to clear the oldest SMS.

5.5.8.2. Receive SMS

The follows functions are possible:

► View the SMS on the display. The sam action you find in the „DFCComSendMessage" or the answer via HTTP.

► to order an service connection (the same how in the HTTP- answer)

► start in the signal processing an input sequence

► Output an acoustic signal

Condition to receive a SMS is a KEY include in the device an in the text from the SMS.
The Key fort he device can set in the GPRS/HTTP .ini file.
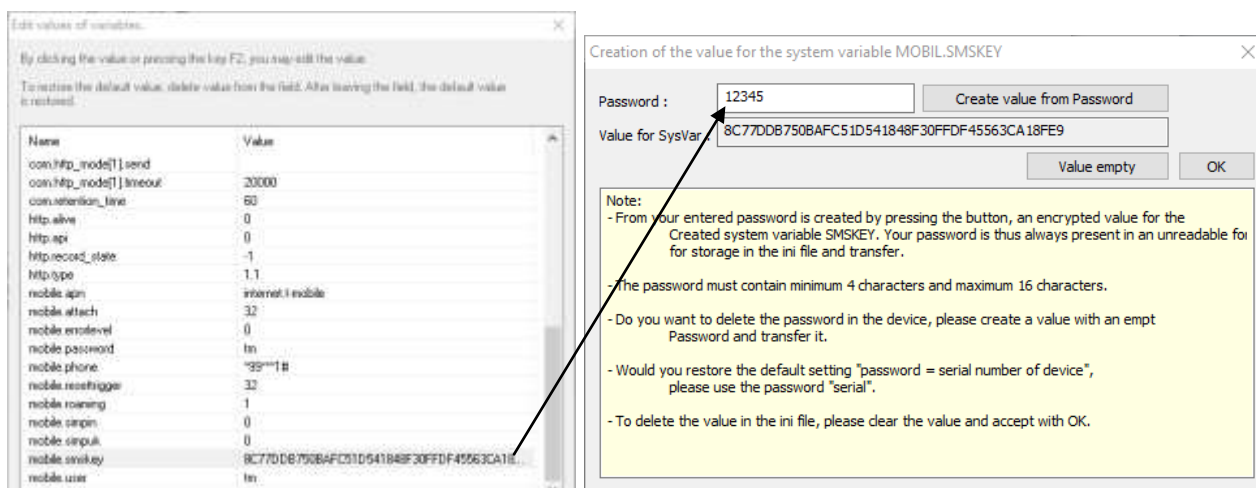
Textmassage
The keyword must be included in the SMS-text is:
message=text1↵ text line2 ↵ line3 etc.
&delay=10&key=12345

The 10, is the time how long to display the message.
After the character ↵ gives a line break (carriage return).
If not a key in the device, you can use the serial number as a key (default setting). Save you an empty Key, then receive the device every SMS. The last received SMS can you see in the Bios-Menu under „general information Bios (Menu)".

Service-connection (active-mode)
The content of the SMS is similar to that of HTTP-Answer from the WEB-Server.
Actually supported are 3 keywords: **service**, **host** and **port**. The keyword must follow
an "=" character with corresponding value. The individual fields are separate with the character "&".
With the KEY „**service=1**", open the device a Service-connection. The connection Parameters
(Host, Port) are saved in the "active.ini" file from the device.
An option is, to give the device the Parameters for the connection via SMS (->**host=**, **port=**). Then
use the device this parameters from the SMS and not the saved from the "active.ini" (active mode).

"**&service=2**"
Coution ! this funktion first supportet with the hardware version V4 GPRS(Mobilfunk) and FW 04.03.06.XX.
When using parameter 2, the service connection is established immediately.

Beispiele:
  a) **service=X**&key=12345
  b) **service=X&host=www.datafox.de**&key=12345
  c) **service=X&host=123.123.123.123**&key=12345
  d) **service=X&host=www.datafox.de&port=4711**&key=12345

a) Connection to the server with the saved parameters in the „active mode".
b) and c) Connection on Port 8000 to the server (www.datafox.de/123.123.123.123).
d) Connection to the server "www.datafox.de" and port "4711".

Start an input sequence in the device signal processing

The keyword, if you need in the SMS is:
ek=name&key=ja   (the name of the input sequence).

The name of the input sequence must match completely, otherwise it will not run.
Receive the device an SMS with this text, then start the input sequence.

If save a SMS Key, the must included the SMS this Key (&key=ja).

With this are many different variants are possible.
Here some example:

Open a door via SMS.

check

open the door

SMS
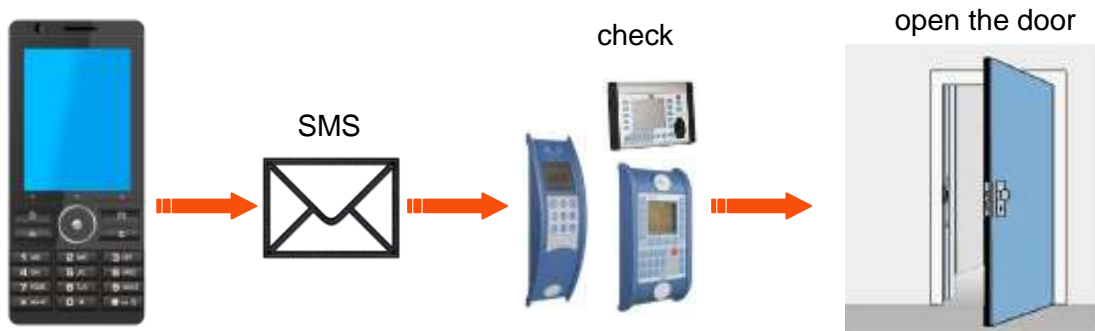
Control a technical system and send a SMS in trouble:

Is the level of regulation from the system not correct then gives a report via SMS.
The Datafox MasterIV is here not the regulator. He gives only a report in trouble.
If necessary, a procedure also can be done.

Füllstand

oversize the level

Standhöhe

SMS from device to you

SMS to the device

The Datafox-device switch on a pump.

you can activate a action
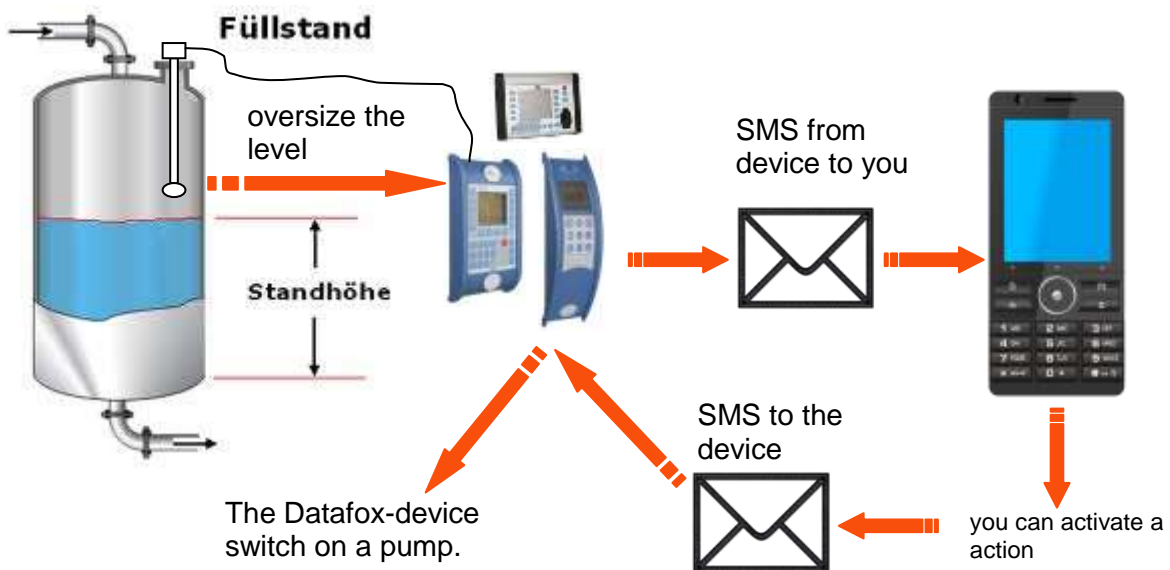
> **!** **Caution:**
> There is no 100% guarantee that a sent text message reaches the receiver. This is only an example which is intended to represent the possibilities.

5.6.   connection and wirering of the accesscontrol

5.6.1. Configuration of Access control adn stuckture

The basis of the access control II are tables. They store all information about the hardware configuration of the access control system, access right of the employees, periods of time (activation, blocking times, holidays,...). The tables are connected as follows:
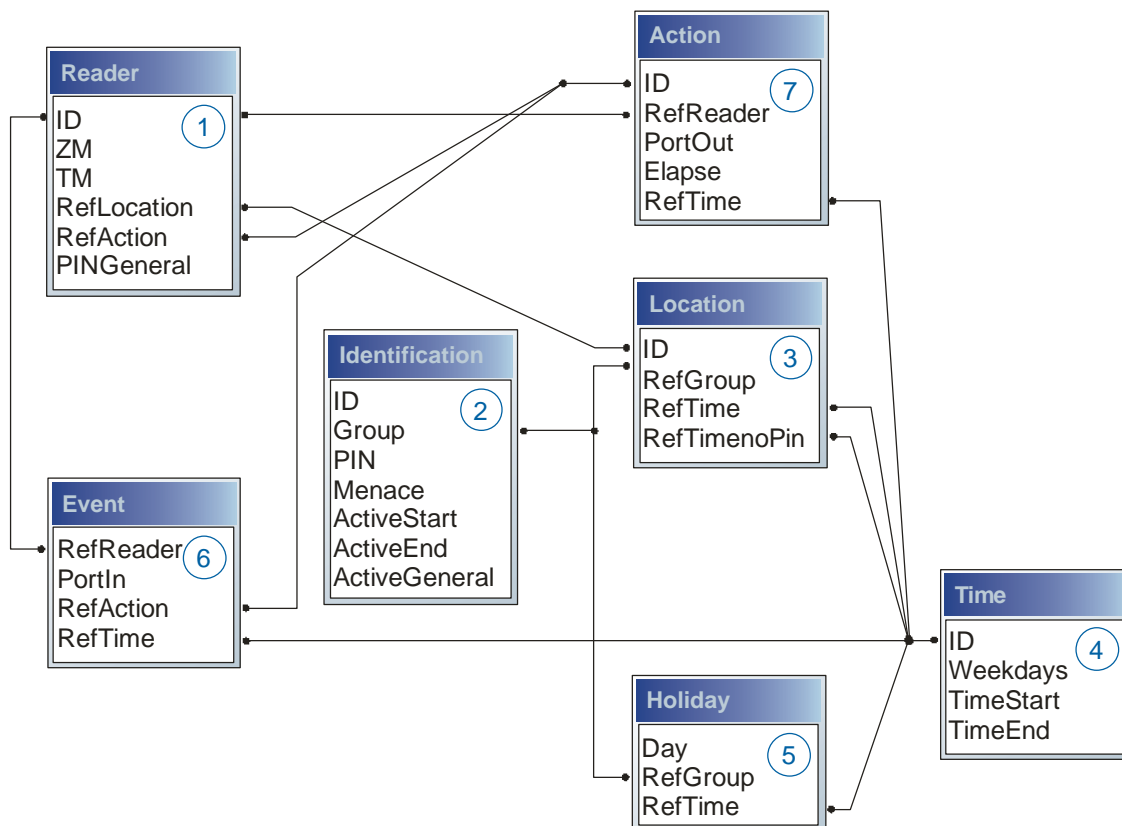
The tables are created as text files. For an easier administration you can add comments within the files.

When adding comments, you have to notice that in a comment line no field values can be given and that the comment line has to start with a semicolon.

The table Reader.txt might look like this:

ID	ZM	TM	RefLocation	RefAction	PinGeneral
1	1	320	0	1	0
2	1	000	1	2	0
3	1	010	2	3	0

Holiday Control It is now possible for ZK-II to consider holidays at switching the relay. In order to achieve compatibility with older versions, the function Consider Holidays for the Time Control of Relays has to be activated at the setup page Access Control 2. In the column Group, you specify the Action ID of the switched relay output instead of a Group ID. Thus, it is not necessary to alter the table structure of the holiday list. The column RefTime provides the time model applicable that day. A minus sign must be inserted in front of the Action ID in order that the MasterIV terminal can differentiate between Action ID and Group ID. As a result, these Action IDs must be three-digit numbers.

Example:
Action

ID	RefReader	PortOut	Elapse	RefTime
1	10	1	25	0
2	11	1	25	0
3	12	1	0	0

Holiday

Day	RefGroup „Action-ID"	RefTime
2012-05-01	1	3
2012-05-01	2	4
2012-05-01	-3	5

In the action list above, the door module with the ID 12 was assigned the time model 2 which switches port 1 of the module. If separate holiday control has been activated in the setup, time model 2 is not applied to the relay output at May 1, 2012, but time model 5.

Extended Parameterization ZK-II

The value range of the parameter 'ActiveGeneral' has been extended by the value 8. Additionally to the general permission (value 9), a PIN request is executed - if defined so for the user and activated for the reader. Furthermore, at both configurations of the ID cards with the ActiveGeneral value 8 and 9, the validity period of the ID card is checked.

For ZK-II the operation modes online, offline or online/offline after time-out are available. In online mode, configuration lists stored in the device are not considered. A data record is read from the server, analyzed and an action triggered. In offline mode, the configuration lists of the terminal are used to grant or deny access to a person. Online / offline after time-out is a combination. If the server is unavailable, the terminal can decide on basis of its lists whether to grant access to a person or not.

Timing of the Digital Outputs for the MasterIV Device Series:
It is possible to time the digital outputs of the MasterIV device series via tables. Thus, for example turning down the heating system at night, a buzzer control and much more can be realized.

The following tables must be configured:
- ►Action
- ►Reader
- ►Time

Description:

Each action that is to be activated must be entered in the table Action. The table Action refers to the tables Reader and Time. In the table Reader the module is provided on which the relay or the Open Collector is to be switched. The reference to the table Time indicates when the switch is to be done. If start and stop time are entered, the relay is switched on when exceeding the start time and switched off when exceeding the stop time. The entry of the duration Elapse in the table Action is ignored. If the relay is only to be activated for a few seconds, e.g. for a buzzer control, the stop time has to be set on "'00 : 00'". If the start time is exceeded, the respective output will be switched for X seconds (RefTime in Action table). The entry Elapse in the table Action now indicates the on-time.

Example:
- ► A buzzer is to be activated for **3** seconds from Monday to Friday at **10.00** am and 4 pm (**16.00**). The buzzer is controlled by the internal relay of the PZE-MasterIV.
- ► The heating system is to be set to the "'day mode'" at **07.00** am and to the "night mode" at 7 pm (**19.00**) on all weekdays. The corresponding relay is at the door module with the bus number **2**.

Reader.txt

ID	ZM	TM	RefLocation	RefAction	PinGeneral
1	1	320	0	0	0
2	1	020	0	0	0

Time.txt

ID	Weekdays	TimeEnd	TimeEnd
3	12345	**10:00**	00:00
4	12345	**16:00**	00:00
5	1234567	**07:00**	**19:00**

Action.txt

ID	RefReader	PortOut	Elapse	RefTime
6	1	1	15	**3**
7	1	1	15	**4**
8	2	1	0	**5**

5.6.1.1. Description of Tables for Access Control 2

Name	Data type	Length	Description
ID	Number (int)	4	Unique Key (value>0) of the Reader table.
ZM	Number (int)	4	In our example, it has number 1. If there are several PZE-MasterIVs in an access system, they can be depicted in one table connection and it is not necessary to have a separate string for each PZE-MasterIV.

TM	Number (int)	3	Contains two information in one number. Both figures on the left (010) indicate the bus number of the door module, the figure on the right (010) contains information about the type of connection. A 0 means a connection via RS485, a 1 stands for a connection via RS232 as stub.
RefLocation	Number (int)	4	Indicates which room is supervised by the reader.
RefAction	Number (int)	4	Indicates which action is worked through after a successful check.
PinGeneral	Number (int)	8	Can contain a numerical sequence by which a person without a card gets access.

Table Reader (List of all devices installed in the system)

Name	Data type	Length	Description
ID	Text (ASCII)	20	Contains the ID card no. which is read at the TMR33 device or terminal. An ID card can occur several times (is assigned to several authority groups).
Group	Number (int)	4	Assigns the ID card to an authority group.
Pin	Number (int)	8	Activates a PIN request if not equal 0. Please note that a PIN must not start with zero. 0815 would be invalid.
Menace	Number (int)	4	Activates (if not equal 0) a "'menace-PIN'" that can be added to the PIN. If entered, the system sends a data record that can be analyzed by software developed for this purpose and sets off the alarm.
ActiveStart	Text (Date)	10	The tag entered here indicates the start date of the validity of the ID card. (for example 2007-07-12 = yyyy-mm-dd)
ActiveEnd	Text (Date)	10	The tag entered here indicates the end date of the validity of the ID card. (for example 2007-07-12 = yyyy-mm-dd)
ActiveGeneral	Number (int)	1	Activates or deactivates this card record. 0 = card blocked 1 = card active 2= virtual card (use only via DLL) 3 = access only by entering the PIN 8 = general authority (with PIN request) 9 = general authority (no PIN request)

Table Identification (list of all devices installed in the system - master and door modules)

Name	Data type	Length	Description
Day	Text (Date)	10	Date of the blocking day. (form: YYYY-MM-DD)
RefGroup	Number (int)	4	Indicates the authorization group to which the blocking day is applied. Zero defines a global validity for all groups.
RefTime	Text (Time)	4	Indicates the assigned time model. (0 = not used) During this time access is granted. Thus, also "'half holidays'" like New Year's Eve can be realized.

Table Holiday (setting blocking days like holidays or company holidays)

Identifier	Data type	Length	Description
ID	Number (int)	4	ID of the room. All other tables refer to this data line via this number, if necessary.
RefGroup	Number (int)	4	Reference to the identification table. Labels the access authorized group. All cards of this group have access to this room.
RefTime	Number (int)	4	The time model in which authorized persons get access. (0 = not used)
RefTimeNoPin	Number (int)	4	The time model for which entering an additional PIN is not necessary (at peak times etc.).

Table Location (defines which card groups get access to which room at which time)

Name	Data type	Length	Description
ID	Number (int)	4	ID of the time model. All other tables refer to this data line via this number, if necessary.
Weekdays	Number (int)	7	Indicates the weekdays on which the following period of time should be applied (form: 7 digits at most 1-7 e.g. 134567 = Monday, Wednesday till Sunday)
TimeStart	Text (Time)	5	The start point for the period of time. (form: 24h HH:MM)
TimeEnd	Text (Time)	5	The end point for the period of time.

Table Time (grouping of single time zones (weekday from to) as a time model number)

Name	Data type	Length	Description
RefReader	Number (int)	4	Module (door module or master) where the digital input is.
PortIn	Number (int)	1	Number of the digital input on the module.
RefAction	Number (int)	4	Reference to the action that should be carried out (e.g. switch relay).
RefTime	Number (int)	4	The time model which indicates when the digital input is checked. (0 = not used).

Table Event (assigning an action to a signal at the digital input)

Name	Data type	Length	Description
ID	Number (int)	4	Action number, it can occur several times due to several actions that have to be worked through.
RefReader	Number (int)	4	Module (door module or master) on which an output(relay) is switched.
PortOut	Number (int)	1	Indicates the number of the output on the module.
Elapse	Number (int)	3	The duration of the switching of the relay (0 = permanently). Unit 200 ms
RefTime	Number (int)	4	The time model indicates when the output may be switched. (0 = not used)

Table Action (list of all workable actions in the access control system; an action group, i.e. all actions with the same action number, can switch several relays)

5.6.2. Access control II with PHG-Modules

The following hardware is available to set up an access control with PHG modules. The devices can be combined in different ways according to their hardware requirements.

PZE-MasterIV V4

If the device MasterIV is used for access control, door supervision or remote monitoring, one device can supervise up to 8 doors and control 12 doors at most.

VOXIO

Flush-mounted: 81 x 81 x 11 mm (WxHxD)
Surface-mounted: 81 x 81 x 40 mm (WxHxD)

The VOXIO can be used with Legic or Mifare. It is available for in-wall or on-wall mounting with or without keyboard. Each reader has a sabotage recognition, three lamps for visualizing the state and a buzzer for the acoustic signaling.

Relino
Relino B

50 x 50 x 43 mm (WxHxD)

The RELINO(B) reader can be used with Legic or Mifare. It is available for in-wall mounting. Each reader has three lamps for visualizing the state and a buzzer for acoustic signaling.

IO-Box
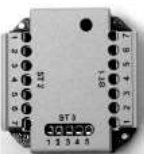
51 x 48 x 22 mm (WxHxD)
The I/O box as equipment for the RFID wall reader or RELINO reader has two digital inputs and two digital outputs. The I2C bus is used as interface.

From firmware version of the access reader 69806D of the PHG readers the autologin function for Mifare is supported. Here for 5 of the max. 6 keys can be used in the setup.

> **!** **Attention:**
> Technical data for the PHG access modules can be found on the Datafox DVD or in our download area. Please note the power consumption of the modules and the voltage drop at long cable lengths.
> The responsibility for calculating the maximum cable lengths lies with the installer.

5.6.2.1. Connecting of PHG-reader

In order to connect the PHG modules, please note the PHG documentation on the Datafox CD:
    <Datafox-Geräte- Datafox-Zutritt-Module PHG *.pdf>

In the PHG documents for the single modules, the pin assignment and configuration via the DIP switches are described. In order to carry out an access control with thePZE-MasterIV V4 the option "'access"' has to be integrated (Datafox art. no. 105201). The following figure shows the possibilities for connecting the PHG devices to a. The following figure shows the possibilities for connecting the PHG devices to a PZE-MasterIV V4 for access control.
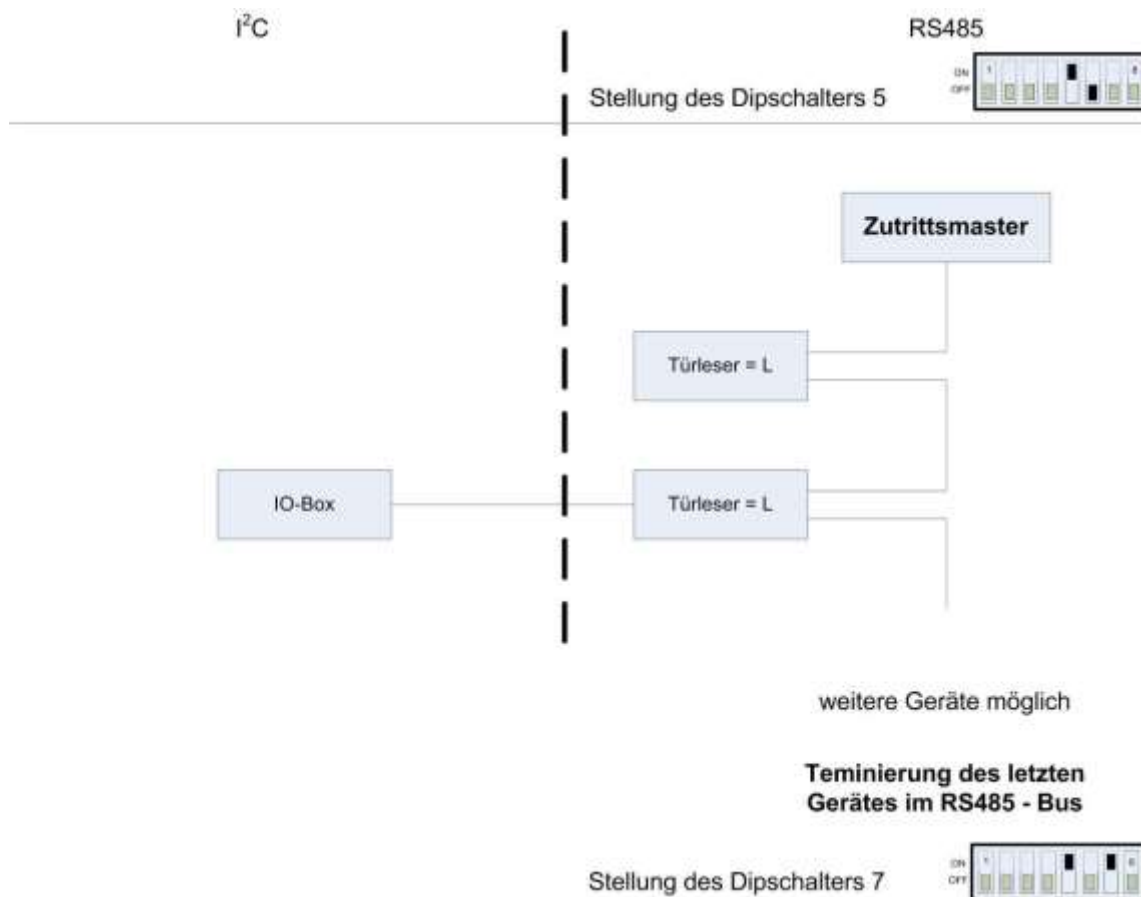
The bus number of the module is set via the DIP switches 1 - 4. The DIP switch 5 always must be set to "ON". The DIP switches 6 and 8 always must be set to "OFF". With the DIP switch 7 = "ON" the RS485 bus is terminated at the last module, otherwise always "'OFF"'.
If a door-opener is to be controlled additionally via a relay, the IO-box must be used.
With the IO-box two digital outputs as relays are available.

Connection example one door and I/O Box:
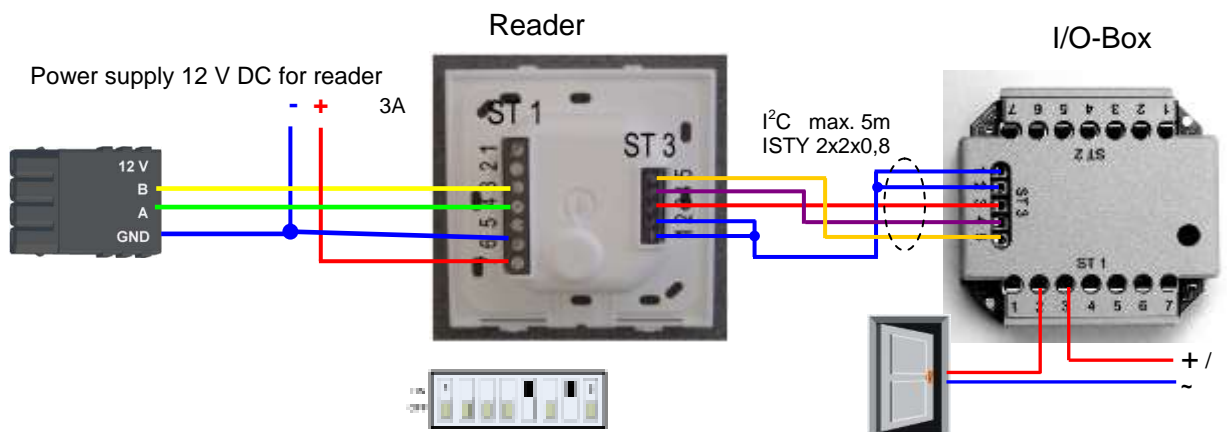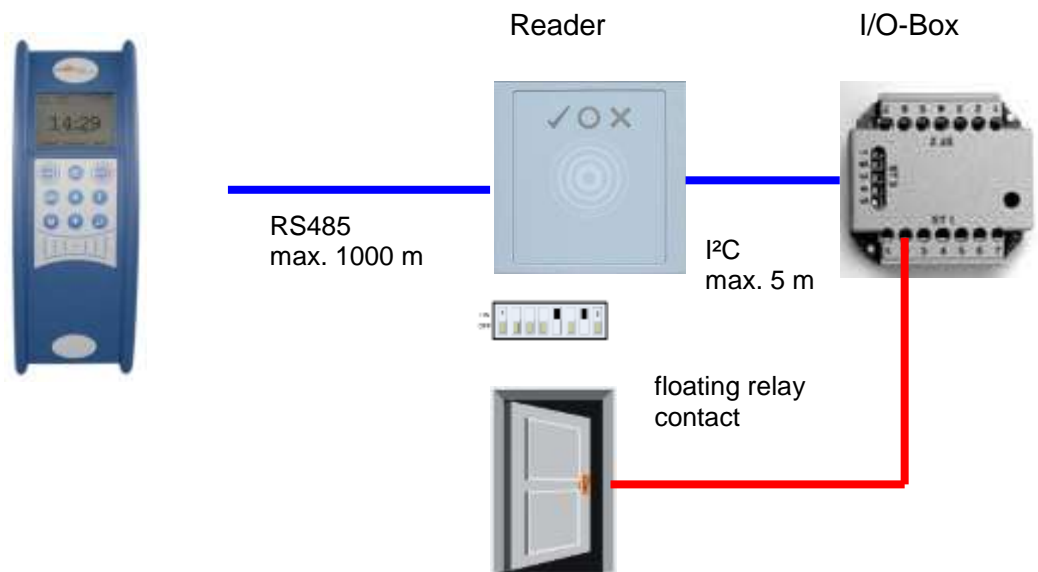
Connecting example with one door and without I/O-Box:

RS485

TCP/IP

Busadresse

Türöffner

Wire plan:

max. 42 V; 2A
Power supply for door opener
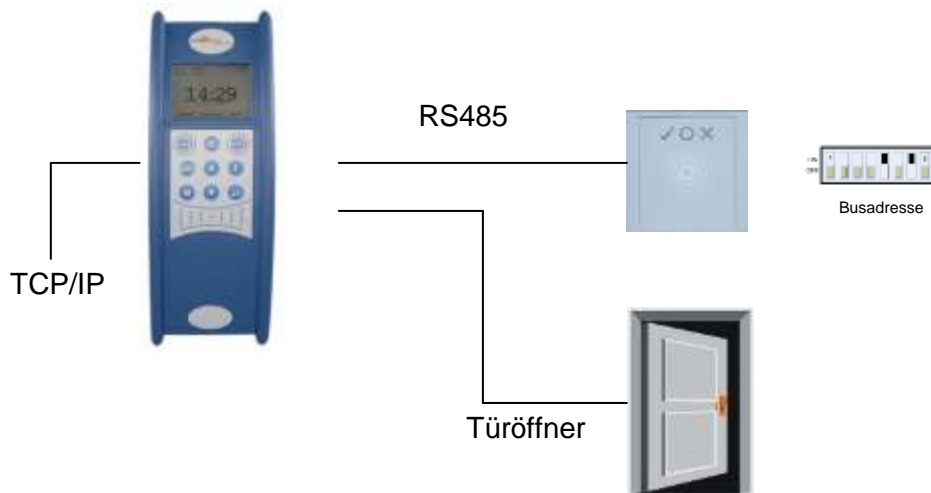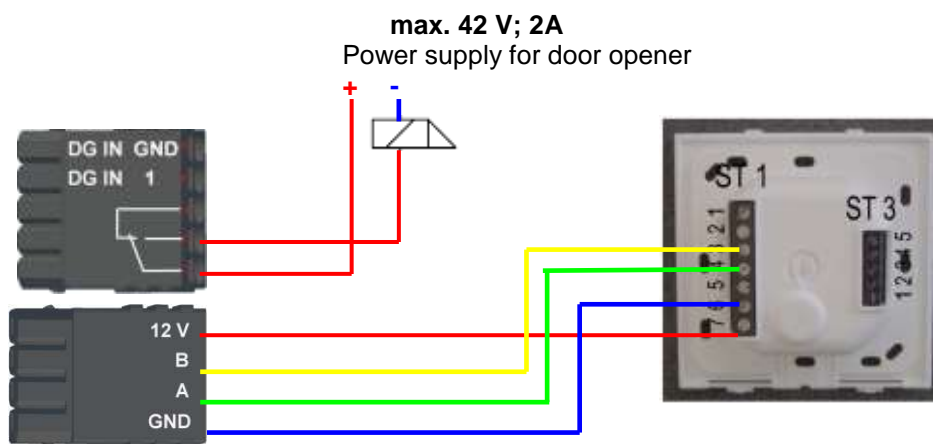
Wire plan for Siedle access reader:

Bus Nr. 1
Siedle-access reader

Power supply 12 V DC for reader
3A

max. 42V; 2A
Power supply for door opener
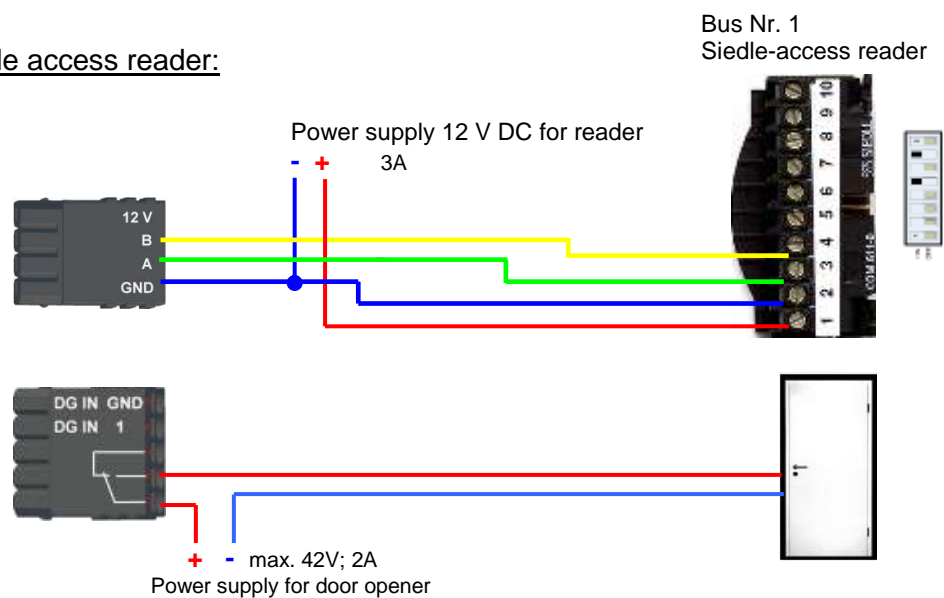
RS485 bus diagram for access control with 3 PHG- modules:

TCP/IP und
AC 100-230 V

DIP-switch setting

RS485

Reader

I²C
max. 5 m

potential-free
contact for door

RS485

Reader

I²C
max. 5 m

potential-free
contact for door

RS485

Reader

I²C
max. 5 m

potential-free
contact for door

more reader

Last reader
end resistor
switch 7 -> on

last reader
max. 1000 m

Wire plan PHG-reader:

supply
12V 3A/DC

I²C   max. 5m
ISTY 2x2x0,8

Door opener

I²C   max. 5m
ISTY 2x2x0,8

Door opener

I²C   max. 5m
ISTY 2x2x0,8

+   GND A B
further reader

Door opener

+ / ~
− / ~

+ / ~
− / ~

+ / ~
− / ~

In any case, a protection circuit should be integrated when connecting the door-opener.
A fly back diode for DC and an RC element for AC.

Connecting the IO-Box:

Anschluss (ST1,2,3)	Klemme Nr.	Beschreibung
ST1	1	Relais 1→ normaly close
	2	Relais 1→ common
	3	Relais 1→ normaly open
	4	free
	5	free
	6	digital in 1 Signal
	7	digital in 1 ground
ST2	1	Relais 2→ normaly close
	2	Relais 2→ common
	3	Relais 2→ normaly open
	4	free
	5	free
	6	digital in 2 Signal
	7	digital in 2 ground
ST3	1 und 2	ground
	3	U+ 8…..30V
	4	SCL
	5	SDA
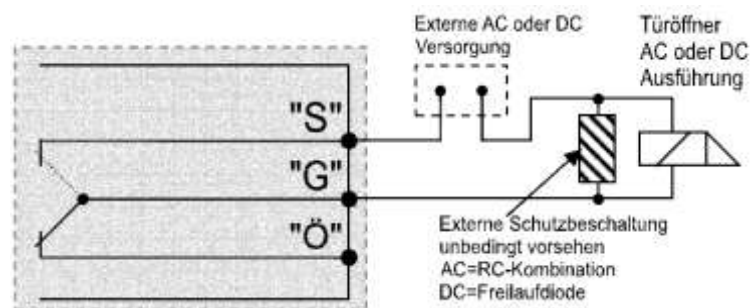
ST 1   Circuit diagram
3   =   "S" normaly open
2   =   "G" common
1   =   "Ö" normaly close

5.6.2.2. Configuration

The access modules work with internal encryption. The key is stored in the DatafoxStudioIV but not visible.
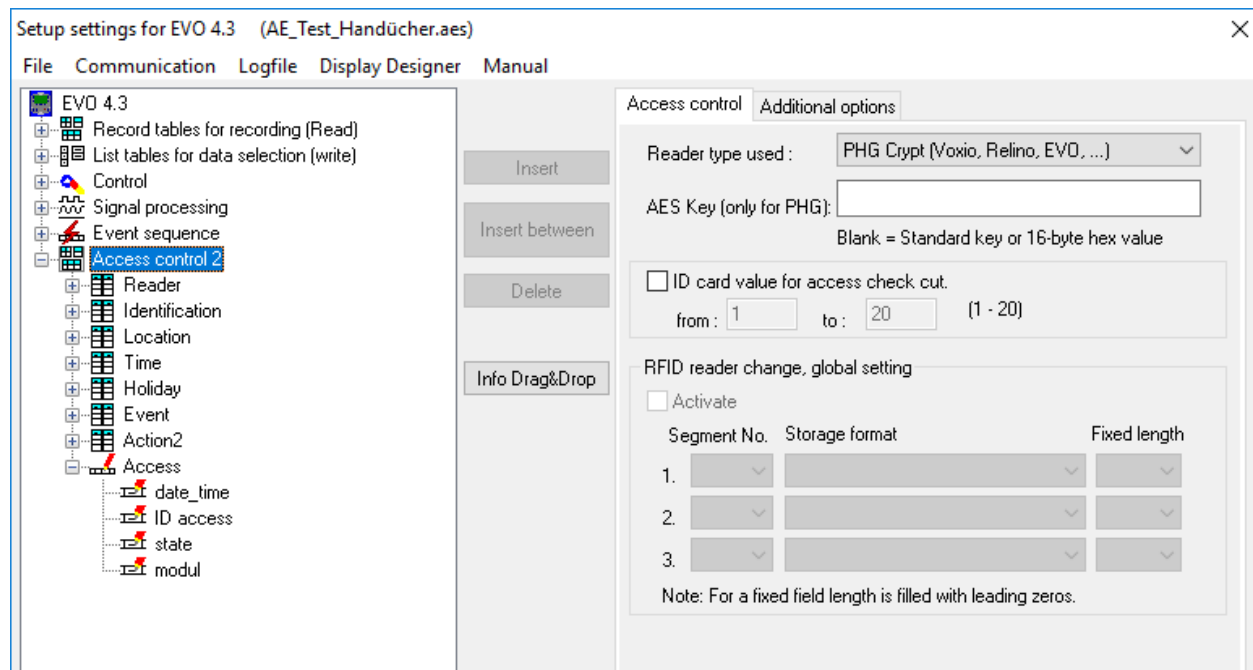
If no key is provided under "AES Key" (PHG only), the default key is used.

> **!** **Caution:**
> The key must only be changed at a fully installed access control. If you changed the key and forgot it, the modules must be sent in. Restoring the default key is <u>subject to a charge</u>.

All door modules that are compiled in the reader table have to be available in the RS485 network in order to guarantee that the code can be changed in all modules if a new setup with a different code is loaded. If a door module from the list in the bus is missing, the key is not changed. The old setup with the old key has to be reloaded; otherwise, after rebooting the device, it is not possible to communicate with the door modules until the right key is used again.

If a defective reader is replaced by a new reader that has not been used yet, it is recognized by the firmware automatically at the start and the encryption is set up. The reader can also be replaced during operation, the firmware automatically integrates it.

Contrary to GIS readers, PHG readers always have 2 digital inputs and a sabotage contact. The firmware regards input 1 and input 2 as normal inputs with the number 1 and 2 and the sabotage contact as number 3. The sabotage contact is integrated in the reader. The PHG reader has no analog-switch-input for door monitoring.

Additionally, the PHG reader can be extended by an IO box. The IO box has two digital inputs and two relay outputs. The IO box is accessed via the same address like the reader. The two digital inputs have port number 4 and 5, the digital outputs port number 1 and 2. In case of discontinuity or sabotage, port no. 6 is used.

PHG modules and firmware:

If you want to use the PHG modules, you have to set it in the Additional Options.

After changing over to the access readers of the PHG series, the firmware must be transferred again.
The device then selects the respective firmware from the DFZ-file.

All configurations like tables etc. are to be configured in the same way as for the access readers of the TS series.
Only exception:
The IO box is not specified in the reader table. Thus, information regarding the modules which are connected via the I^{2}C bus, is omitted.

Corresponding reader table:

ID	ZM	TM	RefLocation	RefAction	PinGeneral	Description
1	320	1	0	1	0	Master device
2	010	1	1	1	0	Reader at RS485 (PHG)
~~3~~	~~011~~	~~1~~	~~1~~	~~1~~	~~0~~	~~IO-Box at I^{2}C-Bus~~
4	020	1	2	2	0	Reader at RS485 (LTM)
~~5~~	~~021~~	~~1~~	~~2~~	~~2~~	~~0~~	~~IO-Box at I^{2}C-Bus~~

5.6.3. Access control wiht EVO-access modules

The following hardware is available to set up an access control with EVO-modules. The devices can be combined in different ways according to their hardware requirements.

PZE-MasterIV V4

If the device MasterIV is used for access control, door supervision or remote monitoring, one device can supervise up to 8 doors and control 12 doors at most.

EVO-access-reader

diensions: 81 x 81 x 19 mm (BxHxT)

The EVO acceess reader can be used with 125 kHz, Legic or Mifare. It is available for in-wall or on-wall mounting with or without keyboard. Each reader has a sabotage recognition, three lamps for visualizing the state and a buzzer for the acoustic signaling.

IO-modul for EVO-Access reader
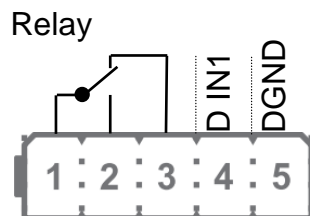
Signals from the backlight:
white permanent = Reader found an ready
white flashing   = reader not found and not connection to the master

Signals from the backlight:
green = access accept

Signals from the backlight:
red = access denied or the master configured the reader currently.

Display	Backlit transponder symbol		3-coloured white, green, red	
Individualization	Integrated backlight		Individual printable front glass with backlight 56 x 37mm	
			Colour always like transponder symbol	
power supply	10 - 30V DC, max. 120mA			
Environment values	Ambient temperature, Protection	-20 ° C to +70 ° C, IP65		
Transponder systems	**125kHz**	**Mifare**		**Legic**
	Hitag 1+2+S	Mifare Classic		Legic prime
	Unique EM4102	Mifare Desfire		Legic advant
	Titan EM4450	Mifare Ultralight		

Connectors of EVO-reader:

DIP-switch:

switch number	Off	On
1 – address Bit 0	+ 0	+ 1
2 – address Bit 1	+ 0	+ 2
3 – address Bit 2	+ 0	+ 4
4 – address Bit 3	+ 0	+ 8
5 – terminate resistor 120 ohm	not activ	activ

example	5-4-3-2-1
address 2, with terminate resistor	1-0-0-1-0
address 3, without terminate resistor	0-0-0-1-1

Connector for IO-modul
Relay + digital in

pin Number.	description
1	+10V bis +30V DC **! neu**
2	RS 485-Data „B"
3	RS 485-Data „A"
4	GND ground

DIP-switch
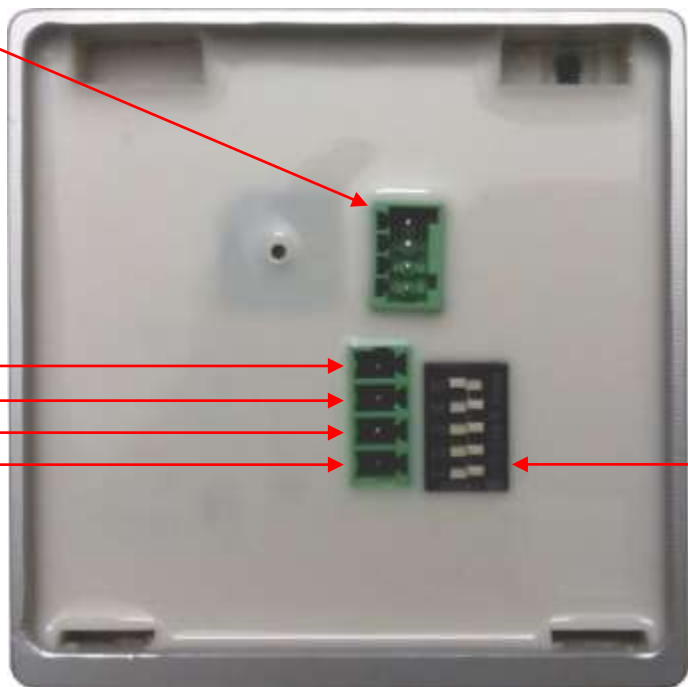
5.6.3.1. Connecting of the EVO-access reader examples

Cable plan for one door, 1 Relay in the PZE-MasterIV V4:

TCP / IP (LAN)

Bus Nr. 1

RS 485 ZK Bus-ID 1

12V vom Master

Türöffner Relais 1 der ZK-Box

Bus Nr. 1
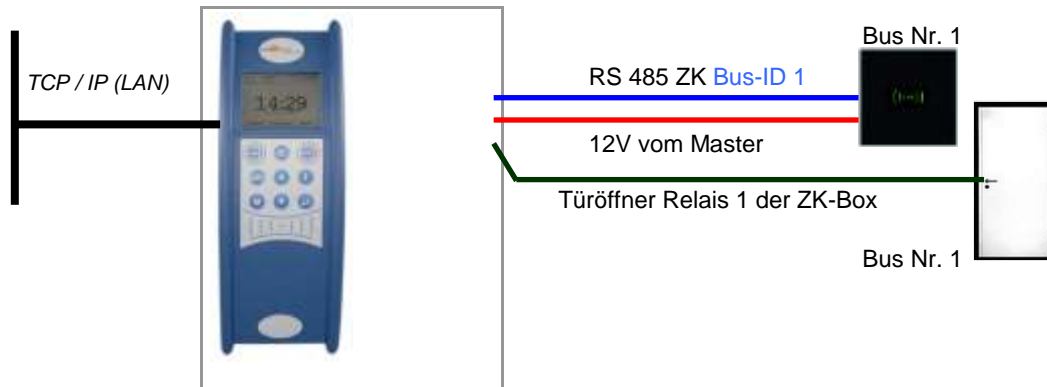
Reader Tabelle, for this example:

ID	ZM / Bus-ID	TM (Busadresse)	RefLocation	RefAction	PinGeneral	Beschreibungstext
1	1	010	1	1	0	Reader on RS485 Modulplace 1 = Bus ID 1
4	1	320	0	1	0	access-Box V4 (Masterdevice)

Wire plan for one access reader EVO:

Bus Nr. 1
EVO-access reader

Connector 4 pole for Access Bus

12 V
B
A
GND

connector 5 pole for digital in and out

DG IN GND
DG IN   1

+ **-** max. 30V; 2A
Power supply for door opener
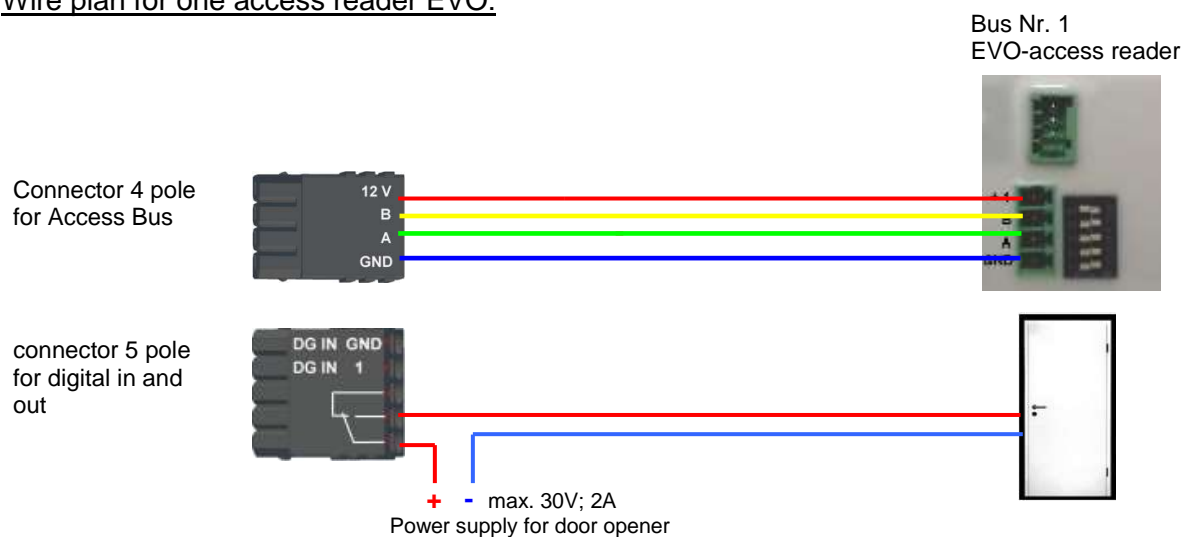
5.6.4. Access control II with EVO-ZK-Plus-reader

5.6.4.1. Display and operation

The reader has a capacitive touch.
All images displayed by the reader and marked as standard below can be exchanged.
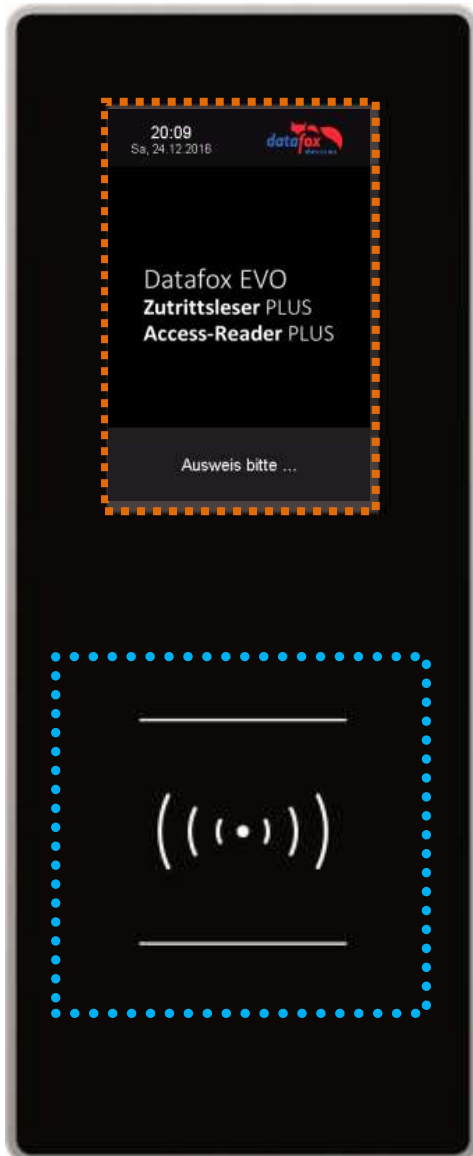
Display:
The entire display area is backed by a touch screen.

With the DatafoxStudioIV, images can be stored here for a gallery display and for the necessary inputs/outputs.
See -> Configuration-> Display Designer.

Reading range of the transponder with backlight in RGB colours. The control of the LED is controlled exclusively by the readers firmware.

access denied = red -

access permitted = green -

Bios activated = blue -

5.6.4.2. Display for state of acces control

Currently there are 2 displayed states for:
granted access: access denied:

Datafox standard image

Datafox standard image

5.6.4.3. Display the number keypad

If an additional PIN is requested for access, the keypad will be displayed automatically. For access only by entering a PIN, it is sufficient to briefly touch the display to activate the PIN display.

Datafox standard image
Picture 1 of the gallery

Antippen
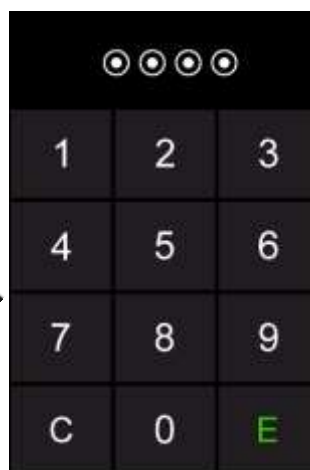
Datafox standard image
PIN normal
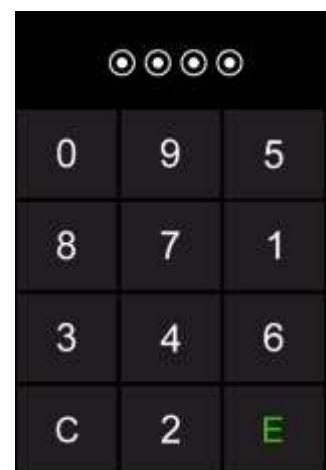
Datafox standard image
PIN randomization

5.6.4.4. Errormessage

The reader is in constant communi-
cation with the master.
If communication is interrupted, this
is indicated by the text "Communi-
cation error" on the reader.

error
communication
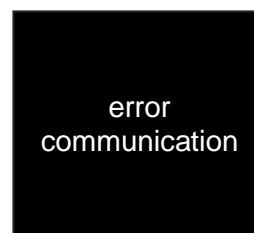
5.6.4.5.   Bios-menu

Connect the reader to the 12V power supply with the connecting cable.
As soon as it is started, connect the reader via USB to a PC or a small battery (power bank).
The Bios menu can only be accessed when the USB port is powered.

Power bank USB

USB port on the back of the reader

USB
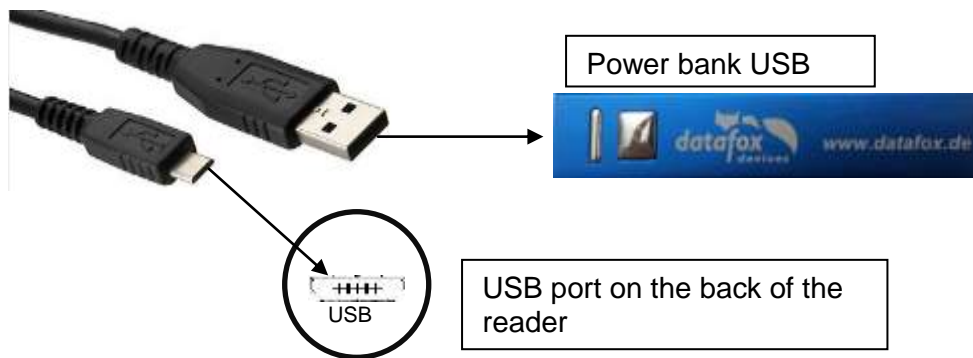
Tap both top left and bottom right at the same time.

5.6.4.6.   General configuration

The following information can be called up in the general con-
figuration:
- Installed firmware, serial number
- Memory allocation for the image memory
- Transponder test for the transponder configured in the mas-
ter setup.
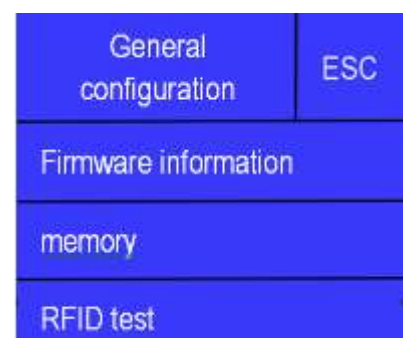
5.6.4.7. Display configuration

The following parameters can be set in the display configuration:

- the brightness of the device
- random number keys - arrangement of the pin and keyboard
- the basic activation of the pin - keyboard

5.6.4.8. Bus configuration

In the bus configuration, the initial parameters that are used for the setup of the reader must be set, configured.

5.6.4.9. Setting the bus adress of the reader for RS485 bus

The bus address is defined in the bus configuration under "Bus number" .
Note that only bus addresses between 1 and 16 are possible.

The input of the bus number is confirmed with the "Enter" key (bottom right).

With the Escape button (bottom left) the process can be aborted.

5.6.4.10. Activate the resistor for the end

The bus terminating resistor of 120 Ω is switched on or off in the bus configuration under "Terminating resistor".

Note: If it is the last or only reader in the RS485 bus, the terminating resistor must be switched on.

5.6.4.11. Connection of the EVO-Access reader plus

On the backsite is a multicore cable.
The connection as fallows:

Nr.	color	function
1	red	+12V Power Input (10 - 30V DC)
2	blue	ground Power Input
3	yellow	RS485 - B
4	green	RS485 - A

I/O-Erweiterung

Nr.	color	function
5	white	Relay common
6	brown	Relay normaly open
7	gray	Relay normaly close
8	violet	Digital in, plus pole
9	black	Digital in, ground

connector 4 poles
access control
Bus plug:

Supply 12 – 30 V
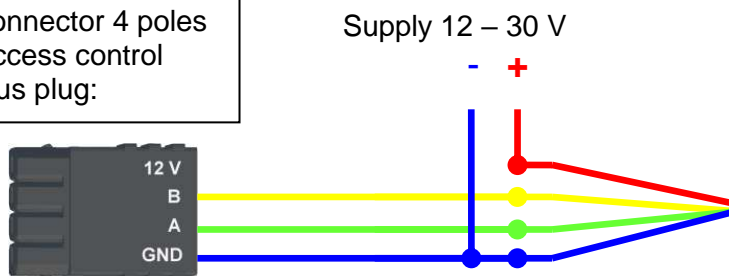
5.6.5.

Housing	Structure	Front panel made of aluminium and glass, capacitive touch, rear housing shell plastic: ABS
	Dimensions (width x height x depth)	85 mm x 208 mm x 27 mm, ca. 20mm additional in flush mounting
	Weight	Basic device 570g plus wall mount plate 170g
Display	LCD	TFT: 320 x 480 Pixel, active area 49,0 x 73,4 mm with LED-Backlight
	Backlit transponder symbol	3-coloured white, green, red
Keys	Type, size	Keyboard on touch screen, touch area 73,4 x 49,0mm
Individualization	Individual graphics	User information configurable by customer specific graphics
	Integrated backlight	Individual printable front glass with backlight 56 x 37mm Colour always like transponder symbol
Power supply	10 - 30V DC, max. 500mA	
Installation	Stainless steel mounting plate, reader is clipped into the plate and secured	
Environment values	Ambient temperature, Protection	-20 ° C to +70 ° C, IP65
Communication	RS485-interface, phg_crypt, 16 bus addresses and termination resistor configurable with menu	
Sabotage sensor	Sabotage detection with distance control to wall mount plate	
Options	Door module	Extension module with relay (SPDT) and one digital input This extension should not be used in unsecured area.
Transponder systems	**125kHz**	**Mifare**	**Legic**
	Hitag 1+2+S	Mifare Classic	Legic prime
	Unique EM4102	Mifare Desfire	Legic advant
	Titan EM4450	Mifare Ultralight	

5.6.6.

Cable plan for 1 Door, 1 Relayin the PZE-MasterIV V4:
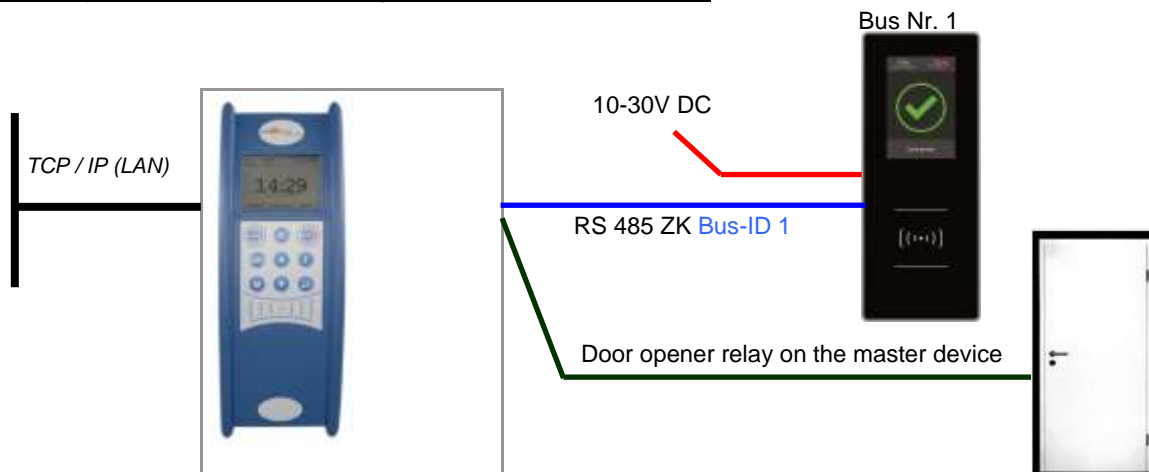
Bus Nr. 1

10-30V DC

TCP / IP (LAN)

RS 485 ZK Bus-ID 1

Door opener relay on the master device

Reader Table,   for this example:

ID	ZM / Bus-ID	TM (Busadresse)	RefLocation	RefAction	PinGeneral	description
1	1	010	1	1	0	Reader RS485 Modulplace 1 = Bus ID 1
4	1	320	0	1	0	(Masterdevice)

Recoment wirering for one Bus RS485 with one EVO-Reader-Plus:

Supply
12 – 30 V

Bus Nr. 1
EVO-ZK-Leser-Plus

connector 4 poles
for access
control

connector 5 poles
for access
control

+ - max. 30V; 2A
Supply for door opener
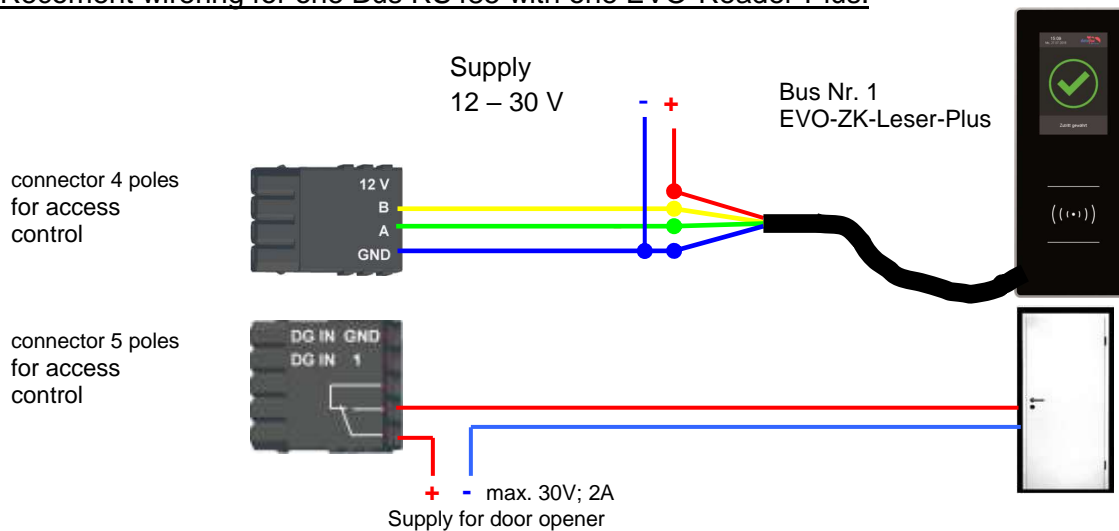
Alternate can you use the power from the master device on the RS485 Moduls. Condition is: maximum one reader in use.

Maximum
recomment length = **L**
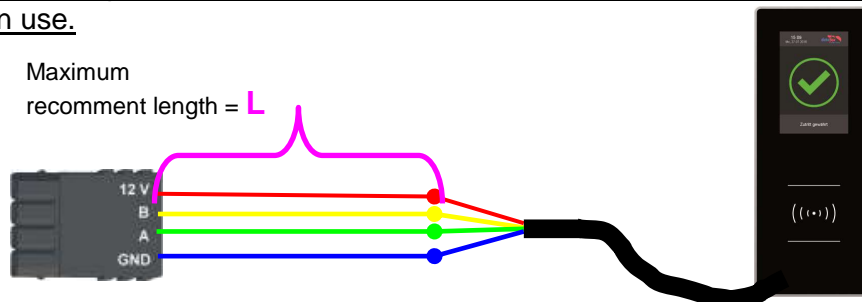
RFID Reader Type	**L in m**	current in mA	Strom bei Start in mA	gf. Ergänzungen
Legic	50	iA	iA	
Mifare	100	iA	iA	
Unique	100	iA	iA	

Cable plan for 3 doors, 3 Relays in the PZE-MasterIV V4:
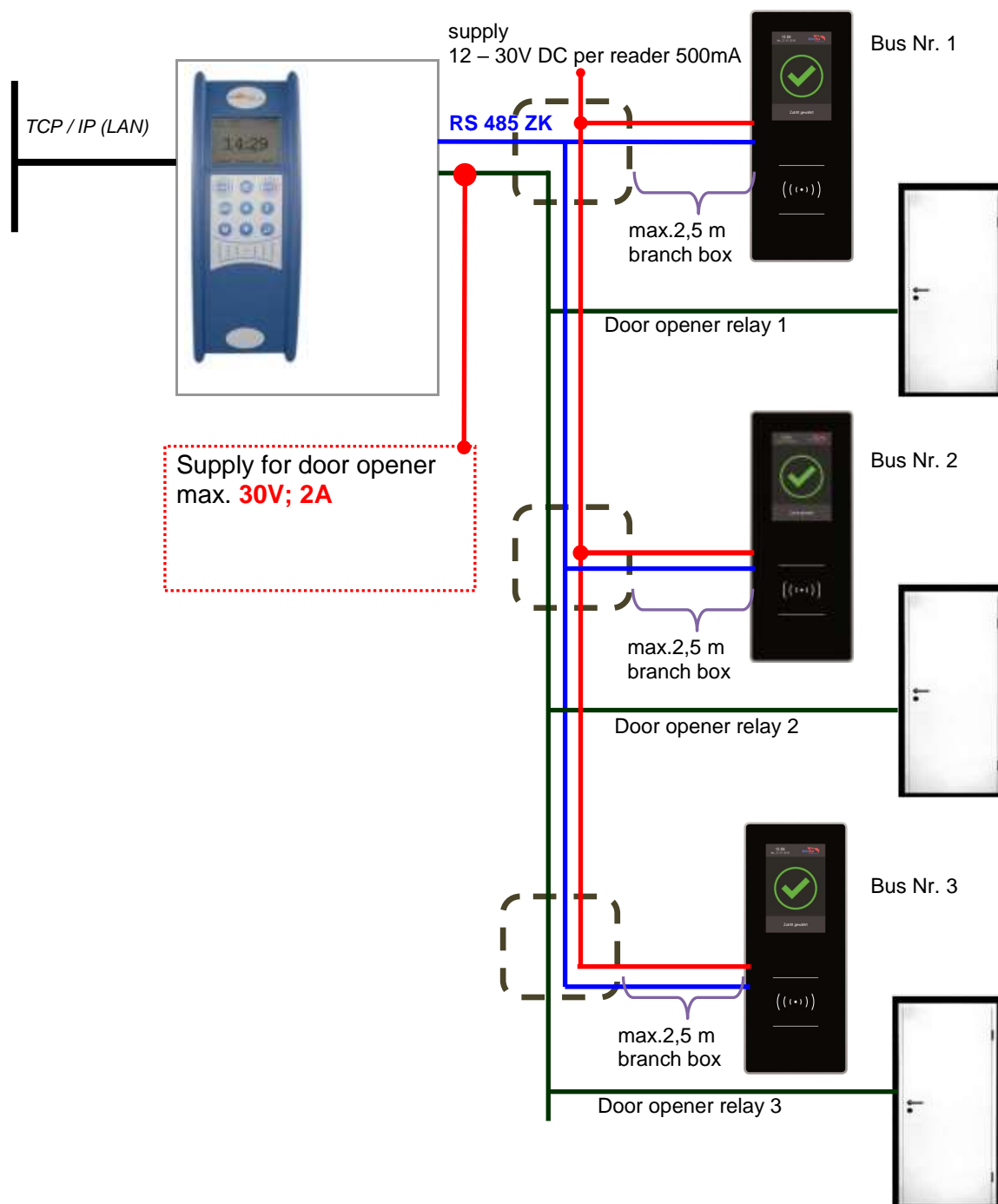
supply
12 – 30V DC per reader 500mA

Bus Nr. 1

TCP / IP (LAN)

RS 485 ZK

max.2,5 m
branch box

Door opener relay 1

Supply for door opener
max. **30V; 2A**

Bus Nr. 2

max.2,5 m
branch box

Door opener relay 2

Bus Nr. 3

max.2,5 m
branch box

Door opener relay 3

Reader Table, for this example:

ID	ZM / Bus-ID	TM (Busadresse)	RefLocation	RefAction	PinGeneral	description
1	1	010	1	1	0	reader Bus Nr. 1
2	1	020	2	2	0	readerit Bus Nr. 2
3	1	030	3	3	0	reader Bus Nr. 3
4	1	320	0	1	0	(Master device)

Wire plan for 3 doors, 3 Relays in the PZE-MasterIV V4:

supply 12 – 30 V   **+** -

Bus Nr. 1

12 V
B
A
GND

+ - supply for door opener

DG IN GND
DG IN   1

max. 2,5m

DG IN GND
DG IN   1

Bus Nr. 2

DG IN GND
DG IN   1

max. 2,5m

Bus Nr. 3

max. 2,5m

more reader possible
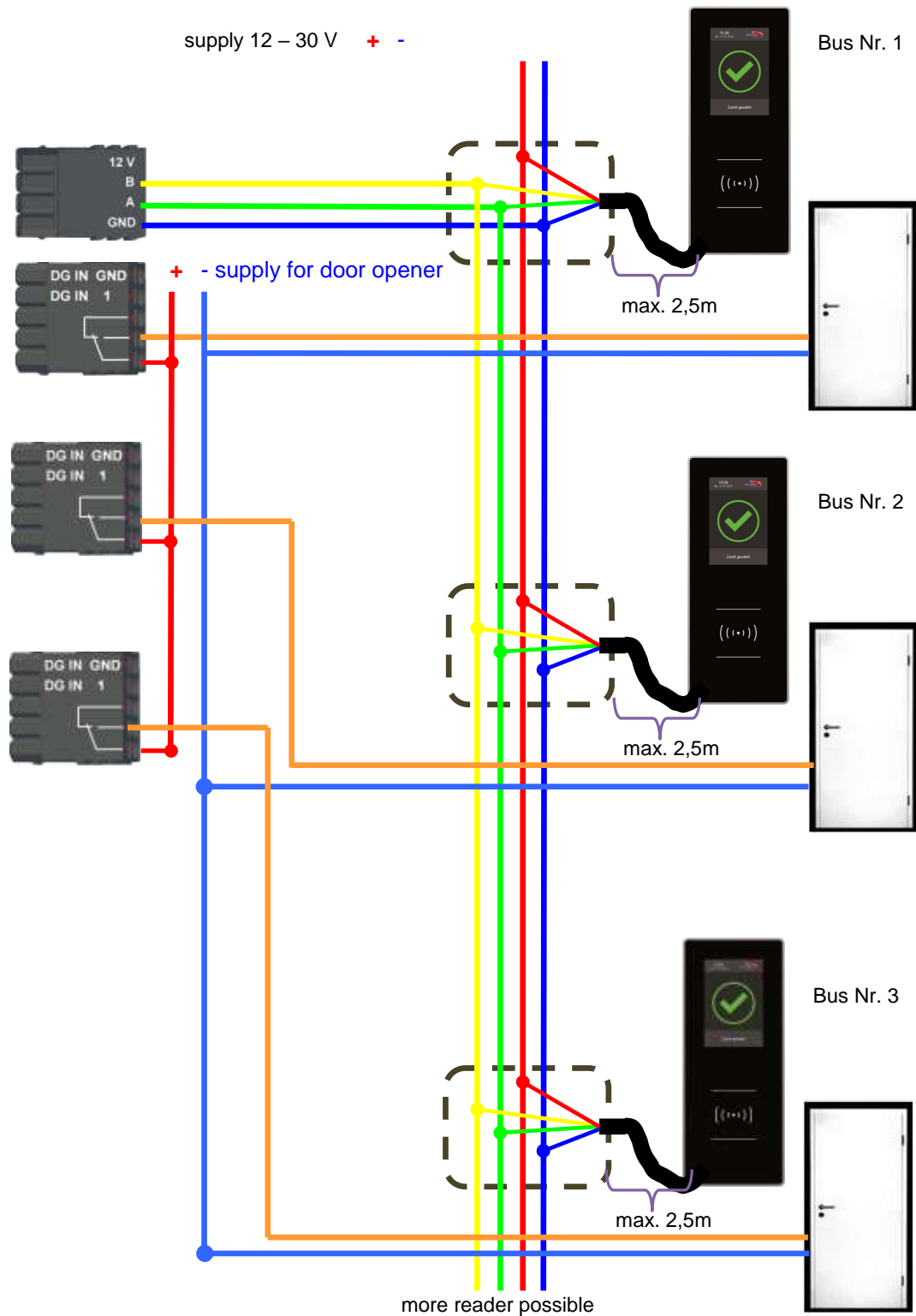
5.6.7. Access control with TS-Readers

The following hardware is available to set-up access control with TS TMR33 modules. The different options can be combined with each other according to the hardware requirements of the single devices.

PZE-MasterIV V4

The MasterIV device supports the opening of up to 8 doors.

Opening module (TS TMR33-TM)
72 x 72 x 40 mm

The door module is offered as pure electronic component e.g. to build it in a padres box, or in a housing for surface mounting with alarm control panel.

Reader (TS TMR33-L)
80 x 80 x 25 mm

The reader can be ordered separately to connect it directly to a PC or another access check. A connecting diagram and a description of the commands for the activation are included.

Reader and Opening Module (TS TMR33-LTM)
80 x 80 x 25 mm

The module set can be ordered separately to connect it directly to a PC or another access check. A connecting diagram and a description of the commands for the activation are included.

> **Note:**
> ☞ The single modules are connected to a bus. DIP switch 5 sets whether the modules are to communicate via RS232 or RS485.

5.6.7.1. Installation Variants

A Door without a Separate Reader

The PZE-MasterIV V4 is access scanner, access master and door-opener at the same time. This solution should only be used in protected areas so that the door opening relay cannot be manipulated.
.

RS232/485
TCP/IP
GSM/GPRS
WLAN

Relay to the door

Digital input for door monitoring

max. 42V; 2A
power supply for door opener
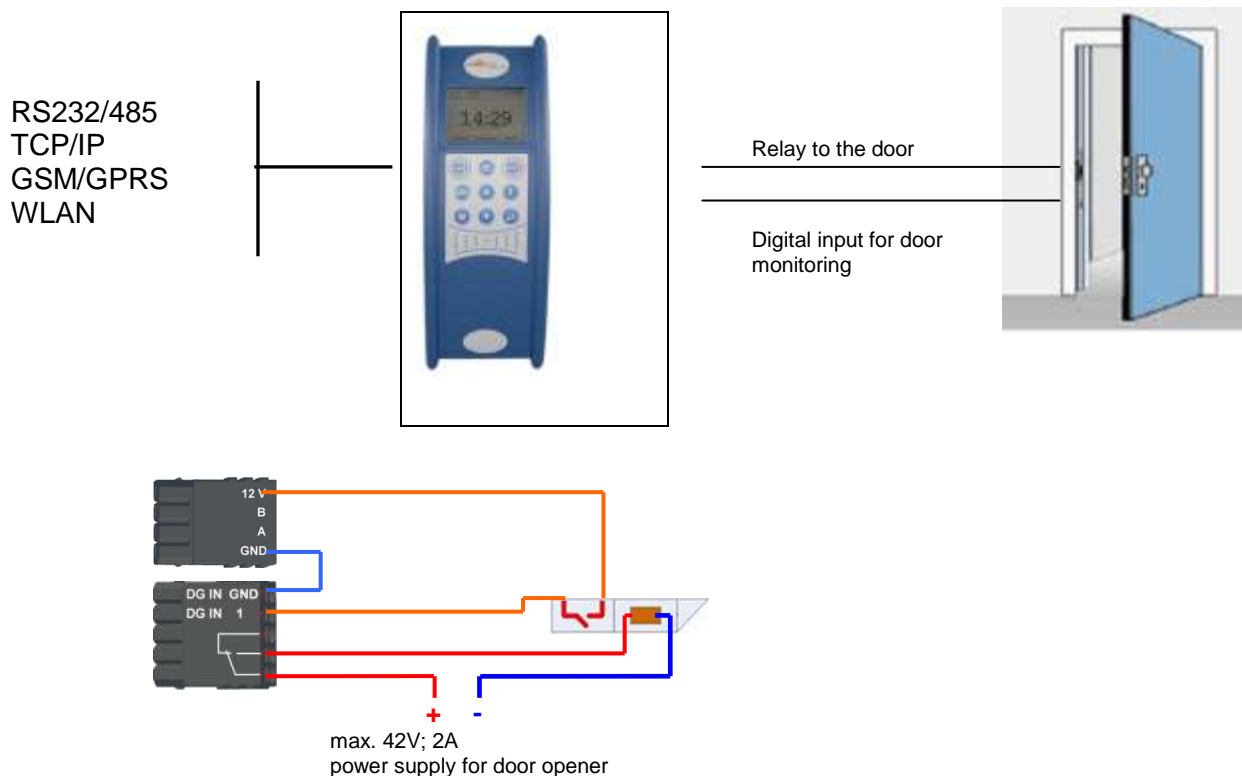
!	**Caution:**
	The installation and connection of the TMR33 module may only be carried out by a qualified specialist. Avoid switching the connecting terminal (reverse polarity).

A Door with a Separate Reader

The PZE-MasterIV V4 is installed in a protected area inside a building and the reader is installed outside. The terminal is access master and door-opener at the same time. The door opening relay is in the PZEMasterIV and thus installed in the protected area. The access identification captured by the reader is transferred to the PZE-MasterIV V4 and analyzed by it. If access is permitted, the door is opened via the relay in the .

Installation plan:

RS485 connection max. 1000 m

RS232/485
TCP/IP usw.

Relay to the door

Dorr monitoring

Reader (**L**)
Art-Nr.:106020
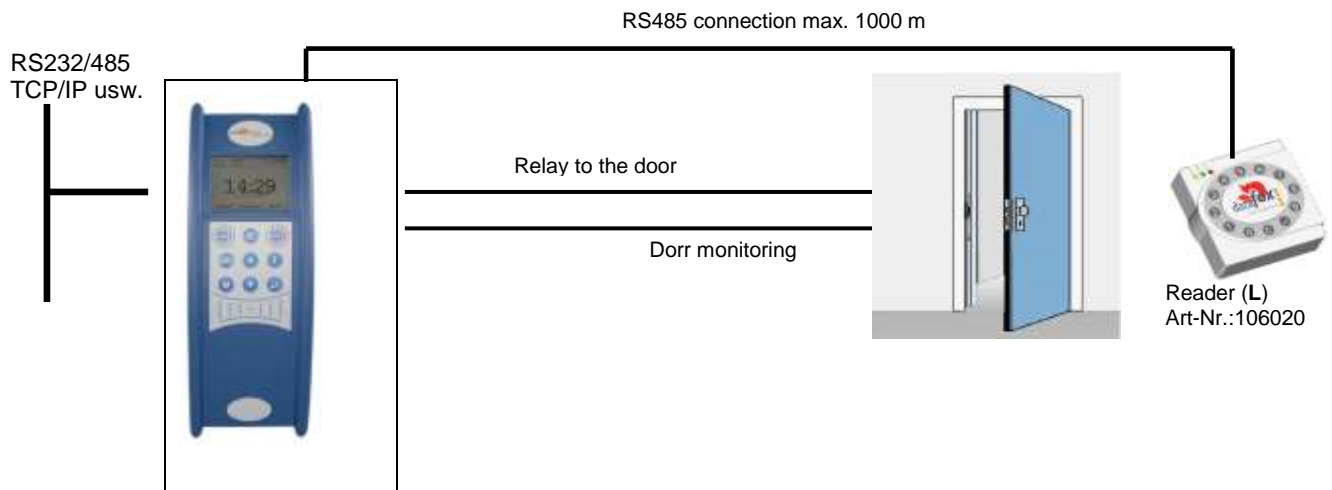
This version is used frequently and can be installed easily and economically as shown in the figure above.

Wiring plan:
:

Reader module (**L**)
Art-Nr.:106020

Power: max 30 V 2A
door opener
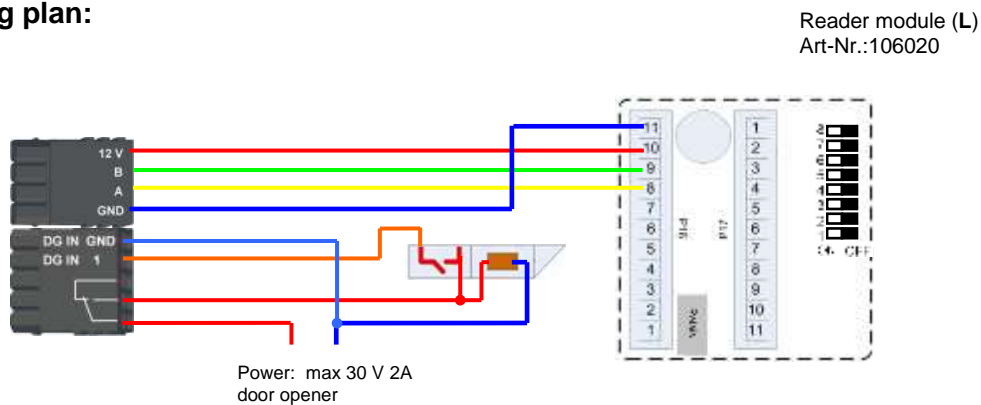
Reader table for this example

ID	ZM	TM	RefLocation	RefAction	PinGeneral	Description
1	1	320	0	1	0	Access master
2	1	010	1	1	0	Reader on RS485 (L)

Several External Doors via RS485 Bus

Here, a door module has to be used so that the door opening relay is within the protected area.

Installation plan:
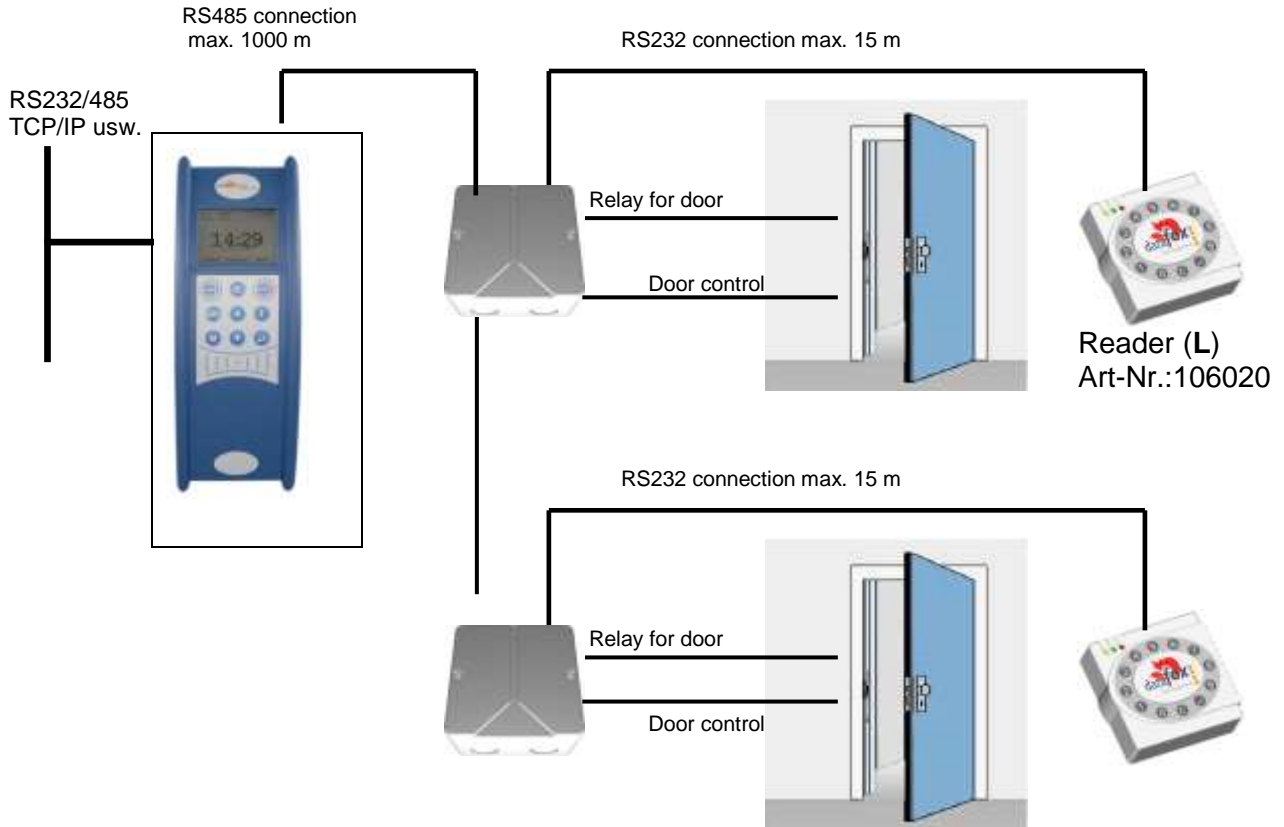
Wire plan:
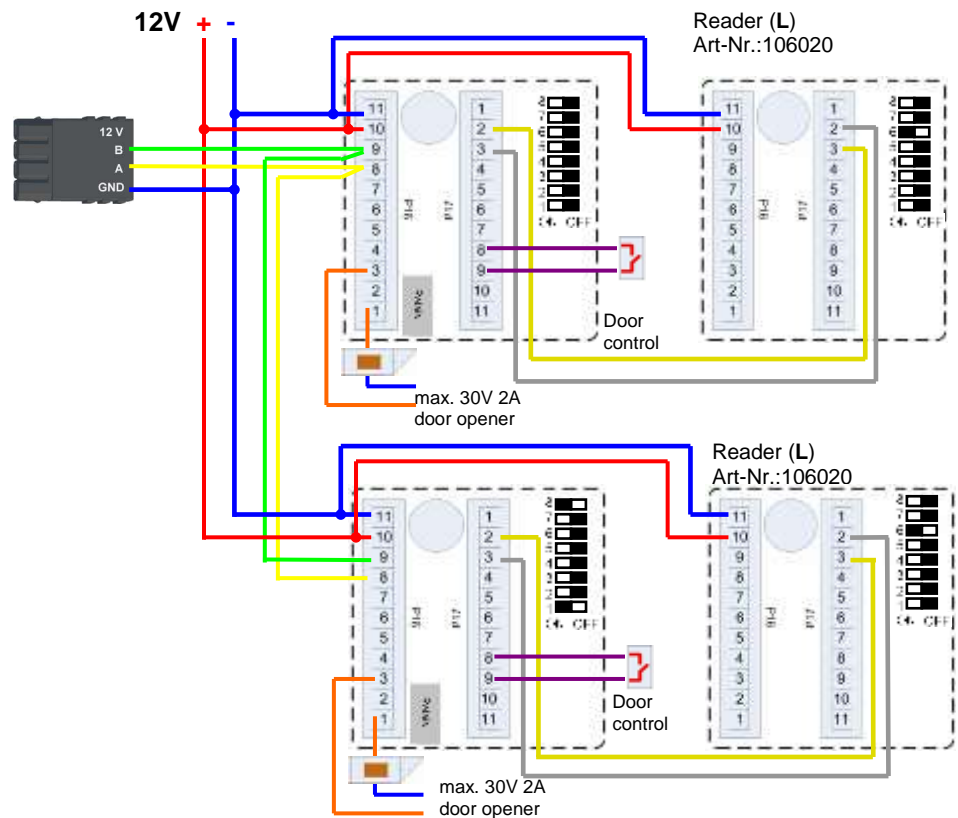
Several Internal Doors via RS485 Bus

The combined reader + door-module is used here. The door opening relay is included in the combined module. Caution: This assembly must not be used at outdoor locations because then the relay is not within a protected area.
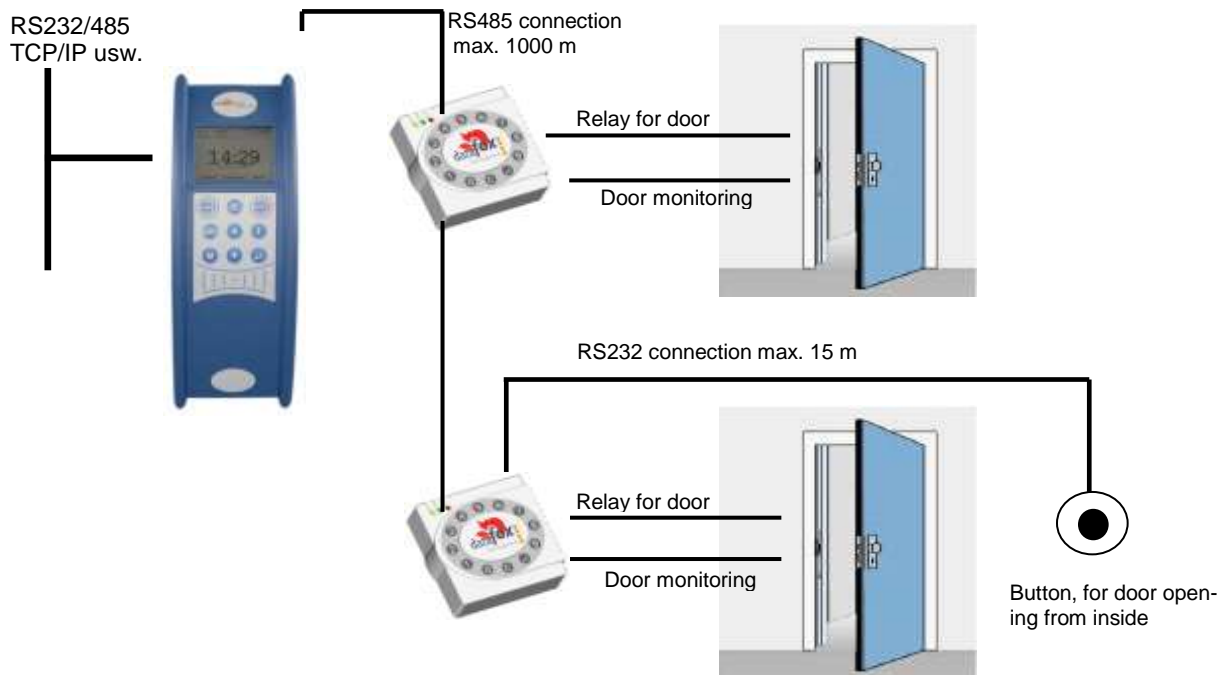
Installation plan:

Wire plan:
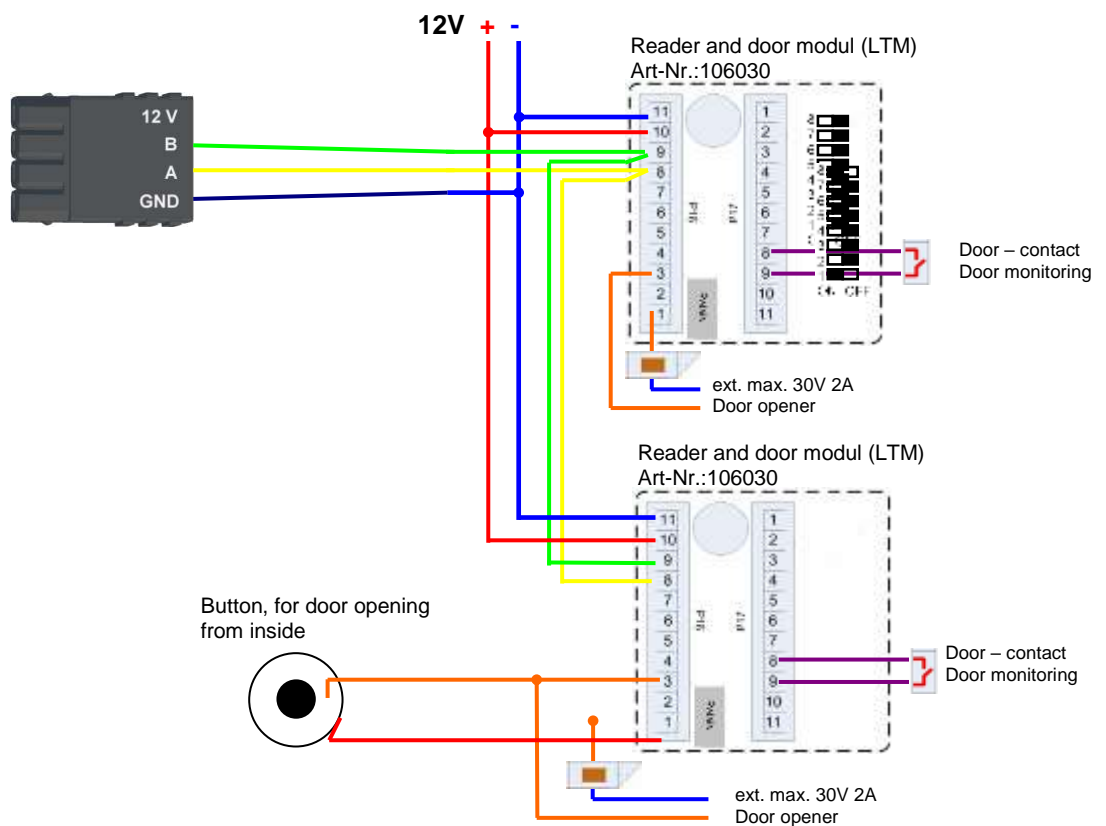
Interlocking Function with RS485 Bus

The combined reader + door-module and the reader-module is used here.

Installation plan:
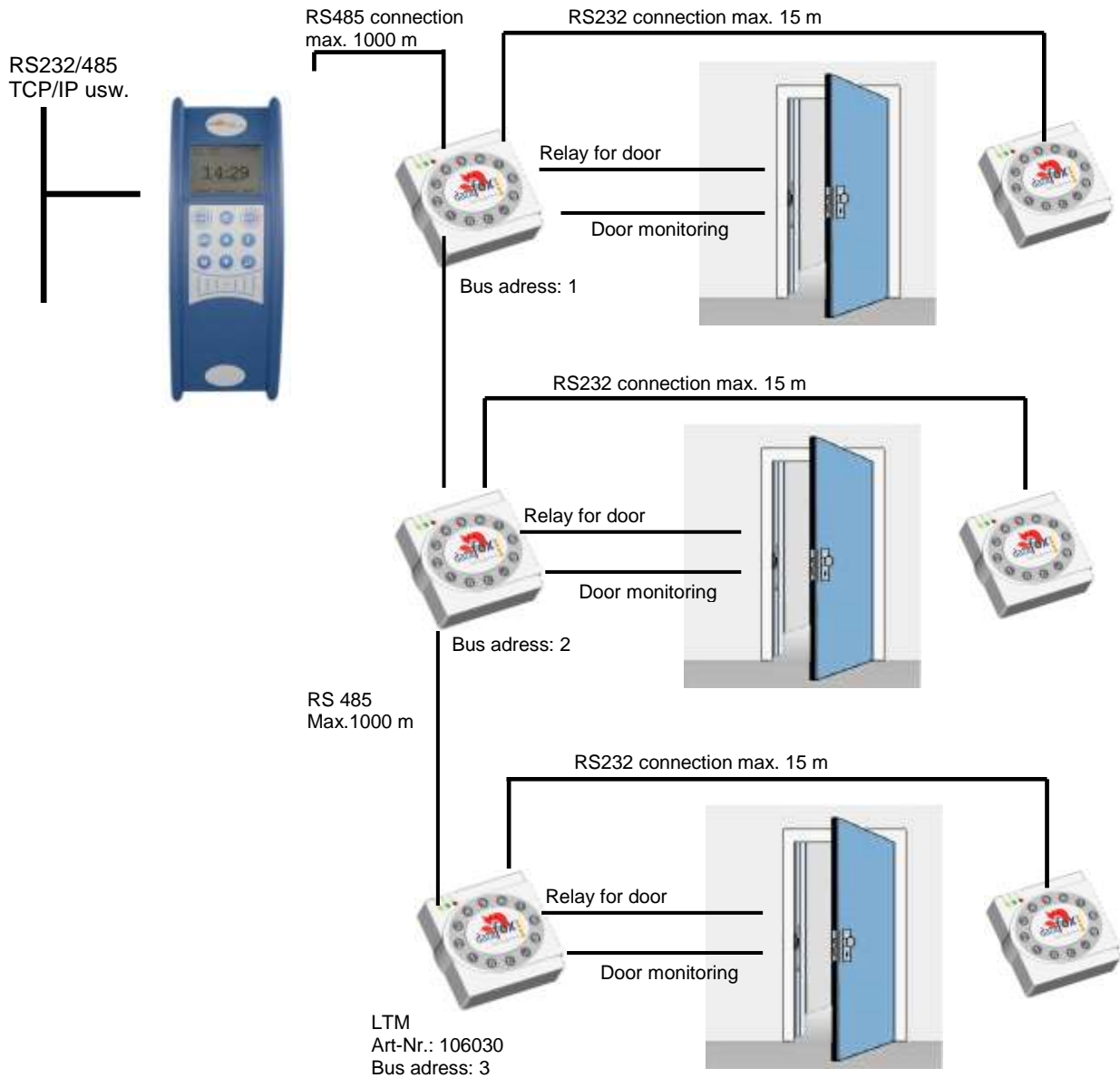
Corresponding reader table:

ID	ZM	TM	RefLocation	RefAction	PinGeneral	Description
1	320	1	0	1	0	Master on bus RS485
2	010	1	1	1	0	Reader and relay on RS485 (LTM)
3	011	1	1	1	0	Reader on RS232 (L)
4	020	1	2	2	0	Reader and relay on RS485 (LTM)
5	021	1	2	2	0	Reader on RS232 (L)
6	030	1	3	3	0	Reader and relay on RS485 (LTM)
7	031	1	3	3	0	Reader on RS232 (L)

Wire plan:

Combination module (**LTM**)
Art-Nr.: 106030

Reader module (**L**)
Art-Nr.:106020

12V **+ -**

Connector on the
MasterIV device

Tür
Kontakt

ext. max 30V 2A
Door opener

Combination module (**LTM**)
Art-Nr.: 106030

Reader module (**L**)
Art-Nr.:106020

Tür
Kontakt

ext. max 30V 2A
Door opener

Combination module (**LTM**)
Art-Nr.: 106030

Reader module (**L**)
Art-Nr.:106020

Tür
Kontakt

ext. max 30V 2A
Door opener
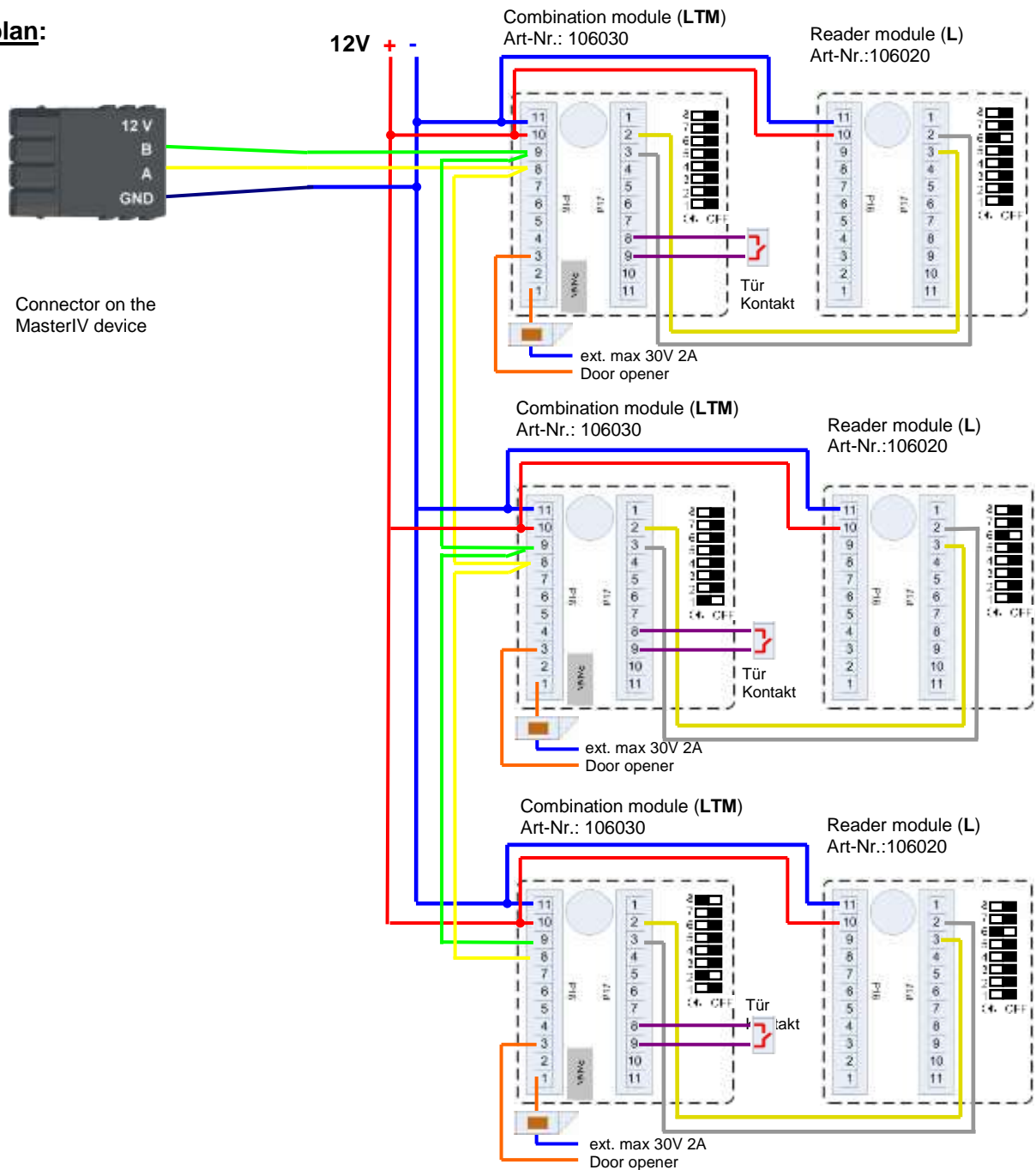
☞ **Note:**
Connection for current supply via power supply unit or bell transformer. Please note the hints for the calculation of the cable cross-section and the cable length. Install the door-opener in the protected area when using it for exterior doors.
At closed door contact ca. 15 mA are used up at 12 V = 0.18 Watt. This means a consumption of ca. 1.6 kWh per year.

5.6.7.2. Connecting the TS-series access reader

The following figure shows the possibilities for connecting the TMR33 devices to a PZE-MasterIV for access control. The TMR33 devices have to be set depending on the interface used (RS232 or RS485).

RS 485   RS 232

Settings of dip switch 6   Settings of dip switch 6

More modules are possible.
PZE-MasterIV to 8 Modules
ZK-MasterIV to 16 Modules

Dip switch 8 is for terminate the RS485 bus line:
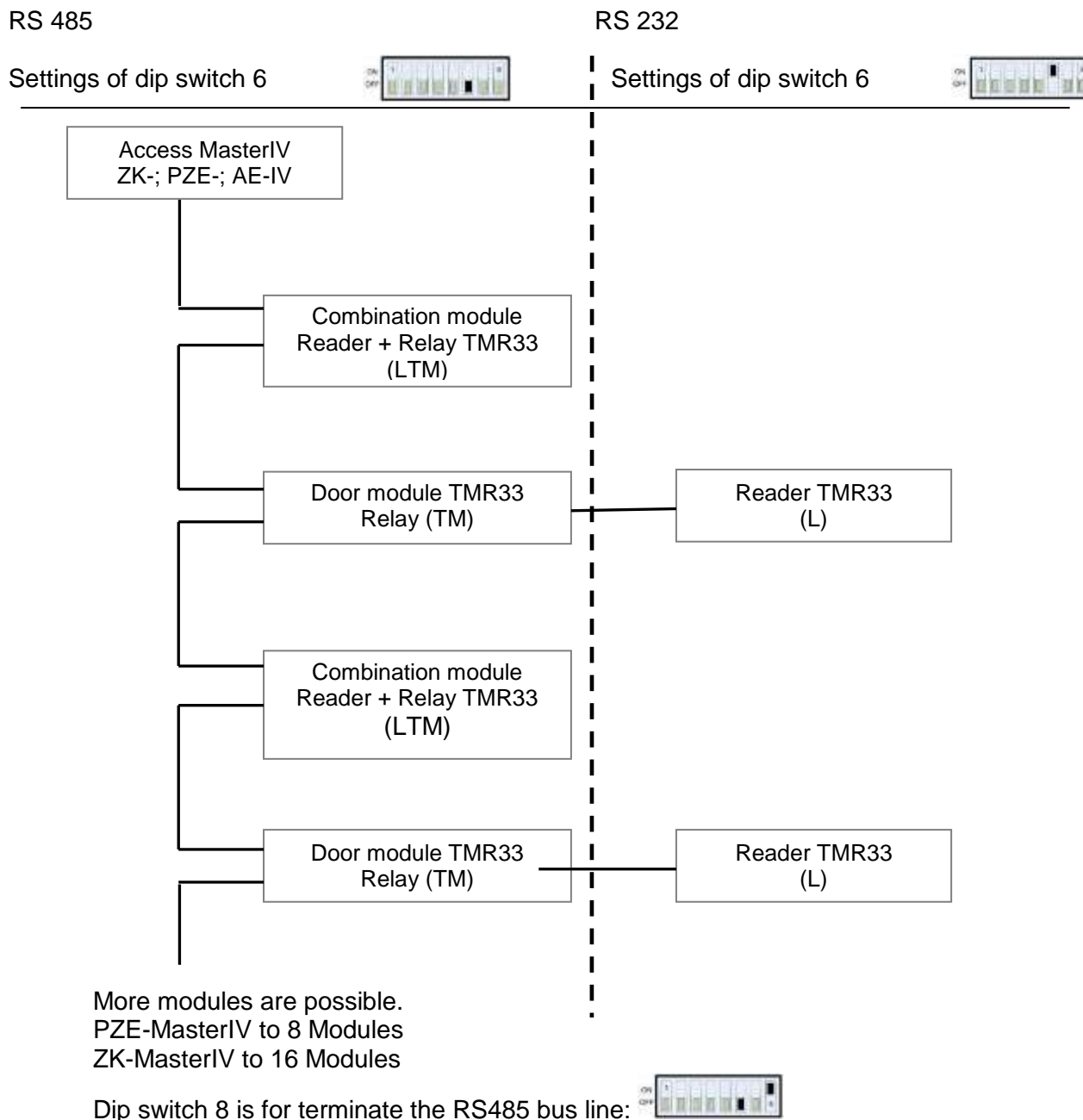
The DIP switches 1 - 5 are for bus configuration. Via the switches, the bus number of the device is set. DIP switch 1 in position "ON" and switches 2 - 5 in position "'OFF'" stand for bus number "1". DIP switches 1 and 2 in position "ON" and switches 3 - 5 in position "OFF" stand for bus no. "3".

Wiring plan:

12V **+** **-**

Connector on the MasterIV device

Combination module (**LTM**)
Art-Nr.: 106030

Tür Kontakt

ext. max 30V 2A
Door opener

Reader module (**L**)
Art-Nr.:106020

Tür Kontakt

ext. max 30V 2A
Door opener

Combination module (**LTM**)
Art-Nr.: 106030

Tür Kontakt

ext. max 30V 2A
Door opener

Reader module (**L**)
Art-Nr.:106020

Tür Kontakt

More modules are possible.

ext. max 30V 2A
Door opener
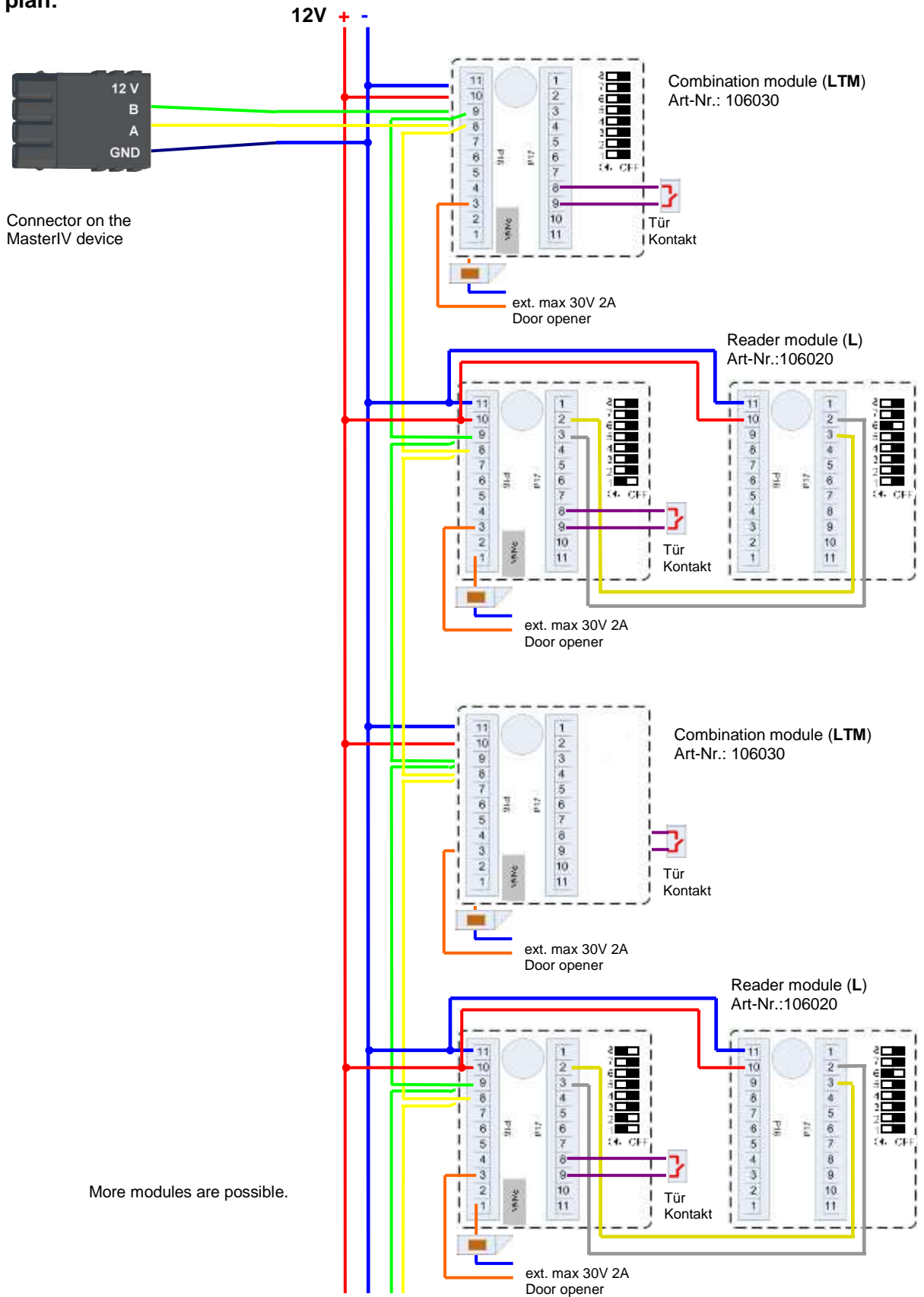
Setting the DIP Switches TS-TMR33

The *addressing* of the bus devices is effected by means of the *DIP switches 1-5* (range 0-31). The *DIP-switch 6* serves for switching from *RS232* to *RS485* communication (for door modules no external reader can be connected at RS232 communication). The *DIP switch 7* is not used and must always be set to *OFF*. *DIP switch 8* turns the *termination* of RS485 on/off; the switch must always be turned on at the last module of the RS485 bus.
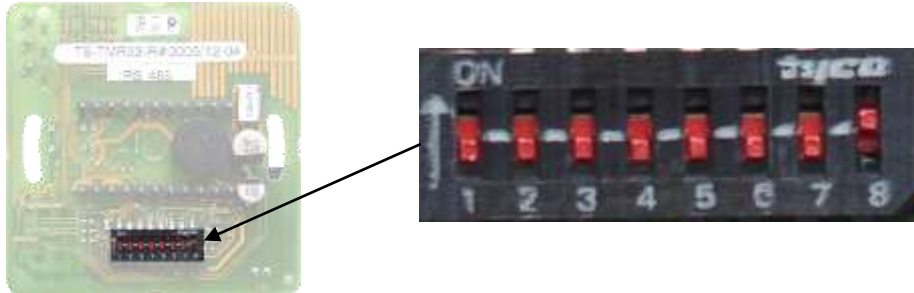
DIP switch	Meaning
1	Bus number (Bit 0)
2	Bus number (Bit 1)
3	Bus number (Bit 2)
4	Bus number (Bit 3)
5	Bus number (Bit 4)
6	DIP switch communication RS232 or RS485 (0=RS485, 1=RS232)
7	always **OFF**
8	Termination for RS485 bus (0= termination off, 1= termination on) 120Ω

Example bus address register:

Address	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	DIP switch
0	0	0	0	0	0	
1	1	0	0	0	0	
2	0	1	0	0	0	
3	1	1	0	0	0	
4	0	0	1	0	0	
5	1	0	1	0	0	
6	0	1	1	0	0	
7	1	1	1	0	0	
8	0	0	0	1	0	
9	1	0	0	1	0	
folder.						

5.6.8. Funkcionfor access control U&Z (locking cylinders)

5.6.8.1.   Design example

The radio locking cylinders are set up and integrated via the standard Datafox access control system. The PHG crypt protocol is used. All data is thus securely encrypted.

Functionality:
The electronic locking systems read an RFID chip / card and transmit the read information to Datafox access control. The Datafox access control then decides on the basis of the access logic whether the door is opened or not.

Design example with integrated radio module in the ZK-Box V4.
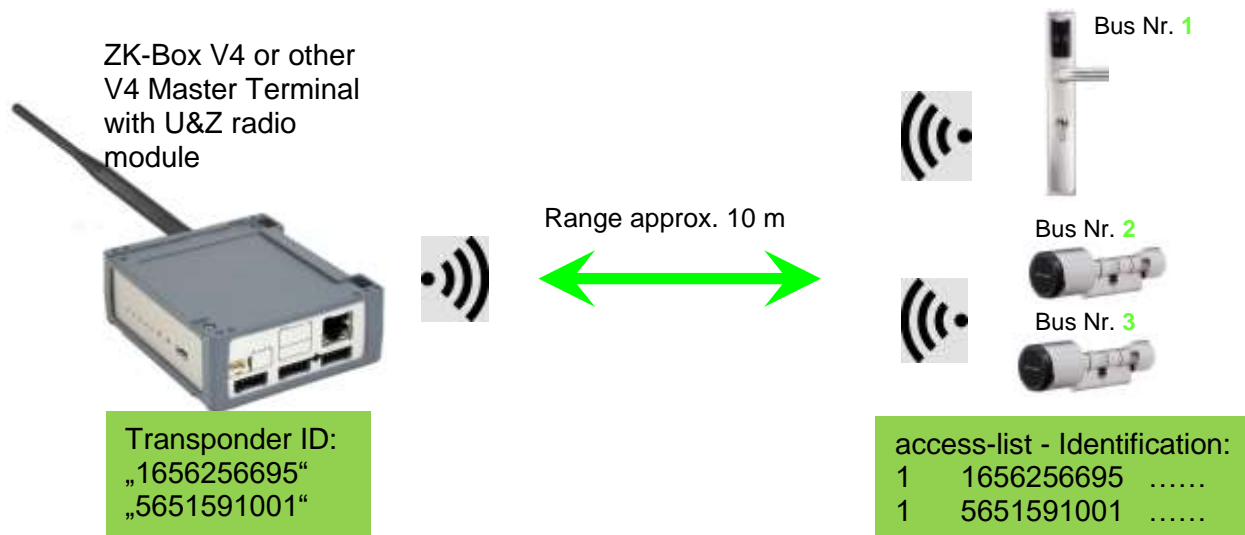
Entsprechende Reader Tabelle, Beispiel:

ID	ZM / Bus-ID	TM (Busadresse)	RefLocation	RefAction	PinGeneral	Description-text
1	1	010	1	1	0	Reader - RS485 module slot 1 = Bus ID 1
2	1	020	2	2	0	Reader - RS485 module slot 3 = Bus ID 1
3	1	030	3	3	0	Reader - RS485 module slot 7 = Bus ID 2

> **Note:**
> The transponders are read by the cylinder and the ID is transferred to the ZK-Box. It then decides whether the ID access is granted and sends a corresponding signal to the cylinder.

> **Note:**
> Only one radio lock cylinder can be used at a time!
> From booking to termination of the radio connection we need approx. 2 seconds for a rejection. With an opening approx. 1 second.
> If ID cards are held on two or more doors at exactly the same time, the first locking cylinder has the connection with the FSM for approx. 2 seconds. If a radio lock cylinder does not receive a radio connection after 1 second, it performs an offline check. If no ID cards have been deposited, they will no longer respond to the ID card. The badge is then stored in the reader and the system no longer reacts to this badge (repeat posting block) until another badge is available.

Construction example ZK-Box V4 with two external radio modules.
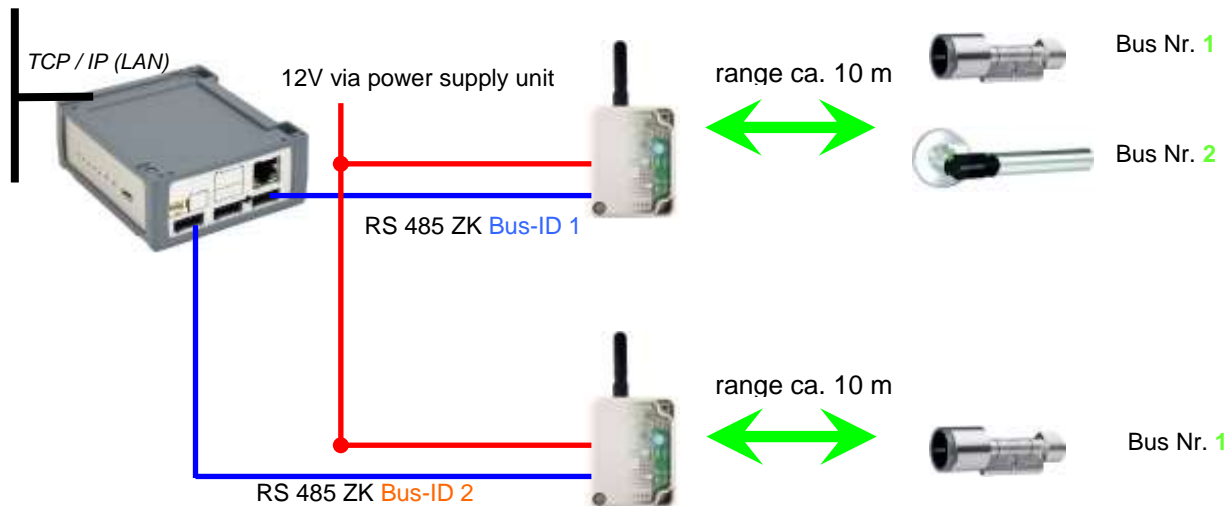
Corresponding reader table, example:

ID	ZM / Bus-ID	TM (Bus-address)	RefLocation	RefAction	PinGeneral	Description-text
1	1	010	1	1	0	reader RS485 module slot 1 = Bus ID 1
2	1	020	2	2	0	Reader RS485 module slot 3 = Bus ID 1
3	2	010	3	3	0	reader RS485 module slot 7 = Bus ID 2
4	1	320	0	1	0	ZK-Box V4 (Master-device)

Wiring diagram for one of the 1 bus connections with EVO reader:
(in this case, the same structure applies per access control string or ZM / Bus-ID)

FSM HW 1.3.1

Nr.	function
15	A – RS 485
16	B – RS 485
operating voltage	
8	12- 20 V + / ~
7	0 V - / ~

Nr.	function
1	B – RS 485
2	A – RS 485
operating voltage	
GND	0 V + / ~
VCC	12- 20 V - / ~
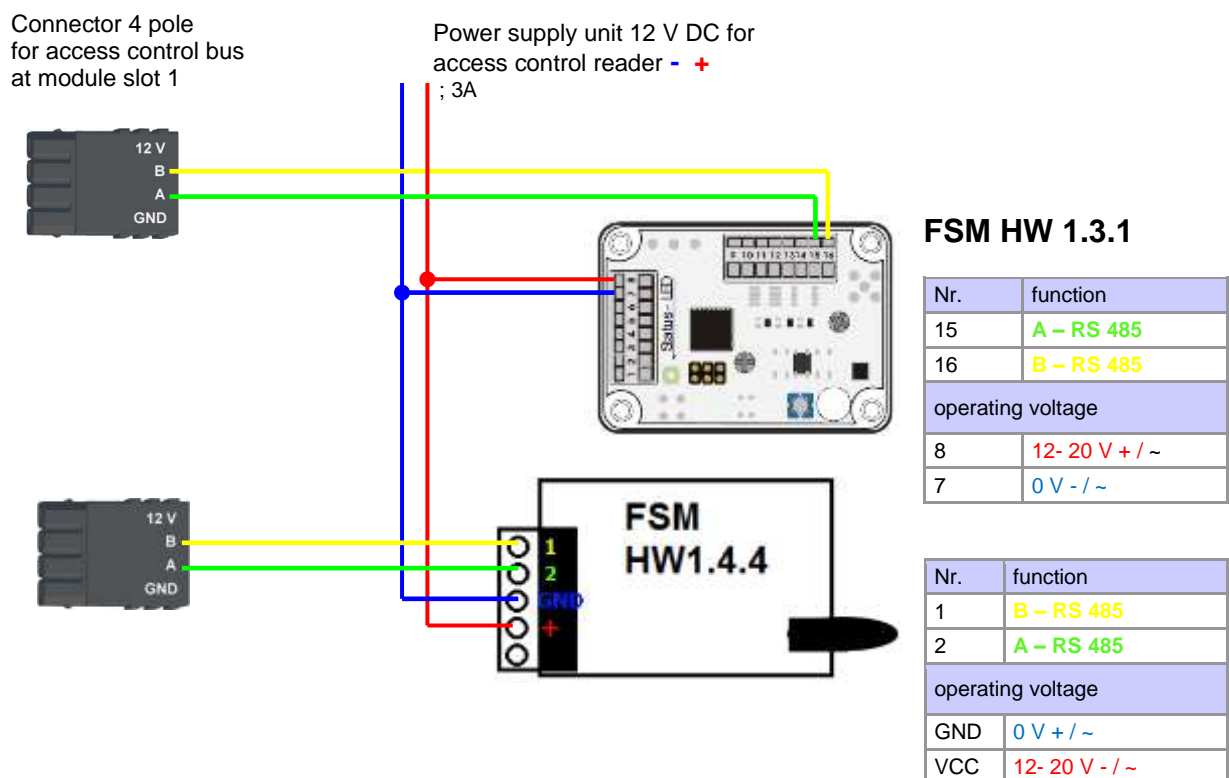
5.6.8.2. First start with locking cylinders

The scope of delivery always includes a service card.
To install the cylinders, you also need a disassembly card.
These have not yet been created in their as-delivered state.

Hold the service key in front of the knob module. (A)
An optical/acoustic signal indicates that the
programming mode is active (possibly before this step, the wake-up function of the knob module
may required by turning it)

Teaching:
1) the first card that is held = battery exchange card
2) the second card becomes the = disassembly card

5.6.8.3. Montage und Demontage der Zylinder

<table>
<tr><td>
1) Hold the disassembly card in front of the knob module (A)
(possibly the knob module may need to be woken up by turning the knob before this step).

2) Knob module enters disassembly mode.

3) Turn the knob module until the emergency power contacts are in the 9 o' clock position.(B)

4) Remove the knob by slightly turning it back and forth and pulling it lightly at the same time.(C+D)
</td><td></td></tr>
</table>
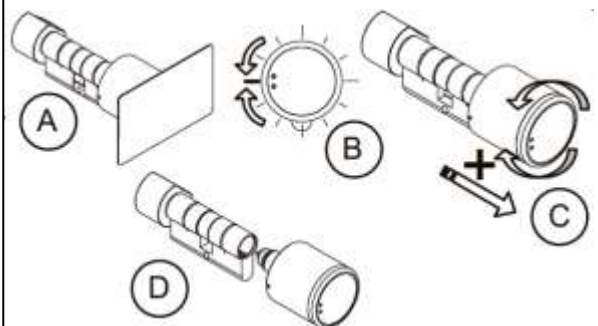
<table>
<tr><td>
1) Carry out steps 1 and 2 as described in the point above (not necessary if the knob module is still in disassembly mode).

2nd) The knob module is mounted in the cylinder housing by inserting and simultaneously rotating it.(A+B)

3) To reset the disassembly mode, hold the disassembly card or an authorised transponder in front of the knob module.(C)
</td><td></td></tr>
</table>
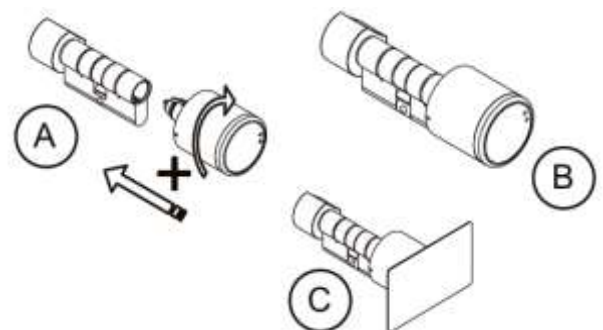
5.6.8.4. Set up the wireless network for cylinder

For setup, DatafoxStudioIV can be used in conjunction with the service key card. To do this, select "Configuration->Access control->Configure U&Z locking cylinder" in DatafoxStudioIV. With "Update data" the current configuration is read from the FSM.
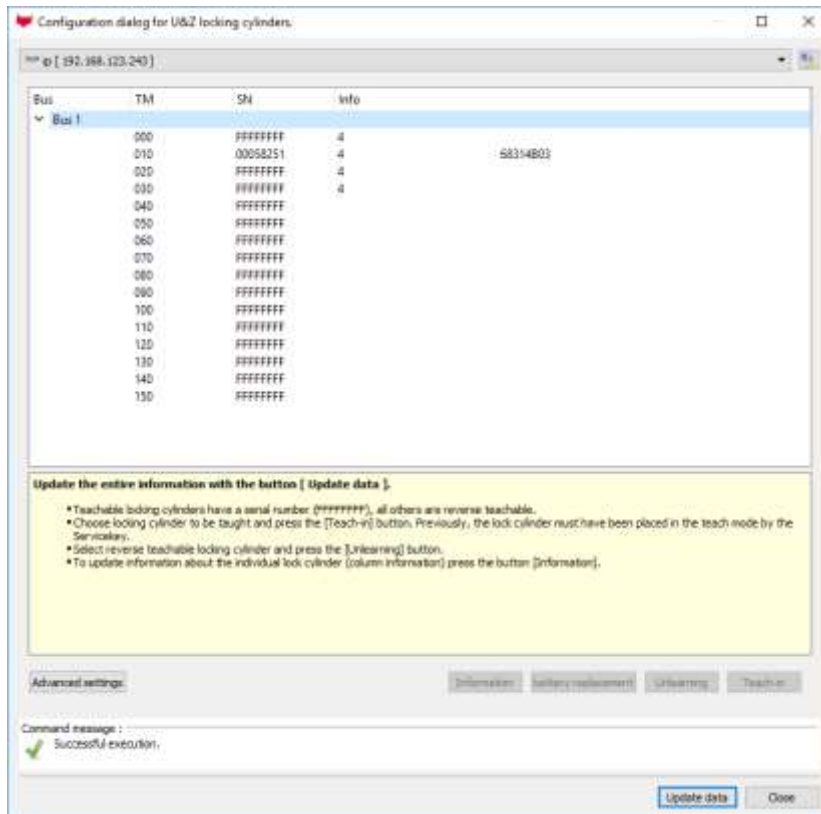
Steps of teaching-in the cylinders:

1. hold service key to cylinder
(Service = 20 seconds active (activate cylinder by turning it briefly!))

2. Refresh data in DatafoxStudioIV!
Free addresses are displayed with FFFFFFFFFF, the serial number of the radio lock cylinder and the status of the modules are displayed for the assigned addresses, as in the dialogue Status of the access modules.
The "Configuration dialog for U&Z locking cylinders" dialog allows different things to be done.
Advanced settings:
- Setting the ZK-Master ID for the device
- KnobActiveTime: Time that the cylinder tries to reach the FSM after activation until it goes back to standby.
- Update information on individual locking cylinders (column "Info")
- Changing the battery puts the radio lock cylinder into a mode that allows the cover to be removed and the battery to be changed. To do this, brief communication with the FSM is required. This is achieved by turning the knob or holding a transponder in front of it.
- Teach out: The cylinder is removed from the FSM and can be taught in to another FSM.
- Teach-in: To connect a radio lock cylinder to the FSM (the radio lock cylinder then only communicates with this FSM)

5.6.8.5. Battery state and live time

With "Open" the command to open is sent to the FSM. This stops the command until a radio con-
nection is established. This can be achieved by turning or holding a transponder in front of it. The
locking pins of the hood are then unlocked.

With "Close" the command for locking the hood bolts is sent back to the FSM. However, the lock is
only established after a good entry / opening.

The three phases of battery management
Phase 1
If an authorized ID card is held in front of the knob module, the locking authorisation is granted in
accordance with the programming. However, the door opening is accompanied by 5x red flashing
(LED) and 5 short acoustic signals at the same time.

Phase 2
If an authorized ID card is held in front of the knob module, the locking authorisation is only granted
after approx. 5 seconds according to the programming. During these 5 seconds the LED flashes
green. The door opening is accompanied by 5x red flashing (LED) and 5 short acoustic signals.

Phase 3
The knob module no longer responds to authorized ID cards. Replace the battery immediately. This
is now only possible using the service key and the service device or the battery replacement card.

Please also note the corresponding status messages from the access control system:

display	Assigned status message
0	Module detected, everything's OK.
12	Battery status of the radio lock cylinders in phase 0 (full)
13	Battery status of the radio lock cylinders in phase 1
14	Battery status of the radio lock cylinders in phase 2
15	Battery status of the radio lock cylinders in phase 3 (empty)
16	Radio lock cylinder set to battery change mode

5.6.8.6. change the access control master ID and nob Active Time

To change the access control master ID, the "Configuration dialog for U&Z locking cylinders" dialog must be used. It contains "Advanced settings" and with a click on it this dialog opens.
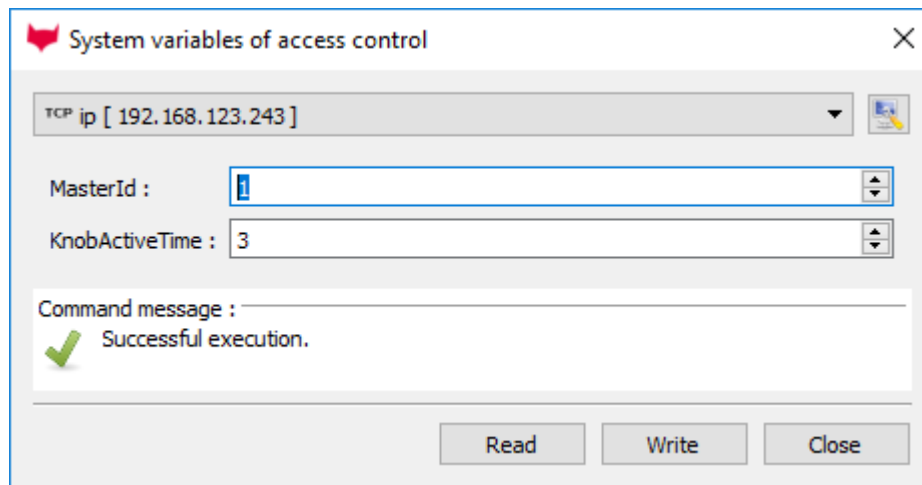
Master ID can be set in the range from 1 to 9999. If a device has more than one access control bus, the access control master ID is the ID of the first bus. The second bus access-control-Master ID + 1 etc.

The Knob Active Time is for presetting how long a radio lock cylinder maintains radio communication with the FSM when activated. When a transponder booking is made, the access control master automatically closes the connection after signaling and opening. If the Knob Active Time is less than required for the transponder booking, the radio lock cylinder switches off and an opening fails. This happens at e. g. Knob Active Time = 1 (1s). If someone turns the knob of the radio lock cylinder, the radio connection to the FSM is established and the connection remains active as long as the Knob Active Time is active. Useful values are between 2 and 10 seconds. By default, this time is set to 3 seconds.

5.6.8.7. Optische und akustische Signale des U&Z Schließzylinders

function	sounds	Optical signals
sleep mode		
Start programming mode	**- - - O**	🟢
badge trained	**O O**	🟢
Badge deleted	**- - - - - -**	🔴
warning signal Delete all badges	**O O O O O** 15 sek.	🟢
End of programming mode	**O - - -**	🔴
After wake-up - Read mode		🔴
Badge not authorized	**- - -**	🔴
badge authorized	**O**	🟢
After battery change	**- - -**	🟢🔴
No radio link (out of range)	No sound	🔴 long 🔴 short 🔴 short

🔴 **=** red lights up   🔴**=** red flashing
🟢 **=** green lights up   🟢**=** green flashing

-   = long low tone
O = short beep

5.6.8.8. Unterstützte Transponderverfahren und Einschränkungen

Transponder for 125kHz
Supported is
- read Unique
- read Hitag1
- read Hitag2 only serial number

Not supported is
- reading of Hitag2 segments
- reading of Titan, Q5 und ATA5577

Mifare Classic
Supported is
- read UID
- read Sector/Block
Not supported is
- Autologin (for reading all passwords)

Mifare Plus
Supported is only Security Level 1
- read UID
- read Sektor/Block
Not supported is
- Autologin (Use the default passwords for reading)
- Random UID (Read true UID at Random UID badges)

Mifare Desfire
Supported is
- read UID
- Read file (max. 220Byte)
Not supported is
- Random UID (Read true UID at Random UID badges)

Legic Prime and Legic Advant
currently no restrictions are known.

5.6.9. Online funktions for the access control

The access control mechanism offers the functionality to control every configuration and action in your software-solution.
So you can

This allows you to react to all requests from the access control in real time.

Activate the online function in the setup under the basic settings tab.

There are 2 opetions:
- Offline Mode (the device always waits for the answer from the server)
- In the option Online/Offline the terminal waits a definedtime before switching to the offline functionality. If this happens the terminal will use the access lists in its memory.
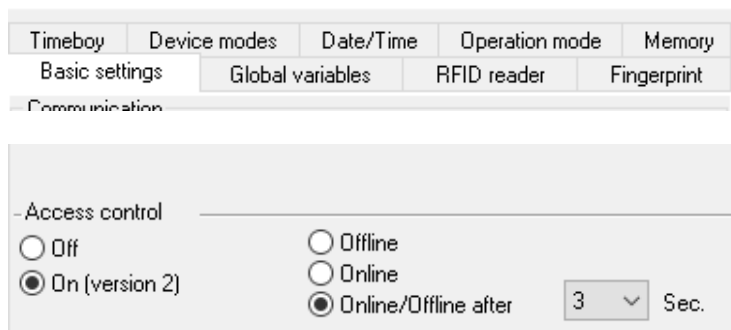
5.6.9.1. Online via http-protocoll

The communication with http is very quick and easy to set up. Therefor the webserver has an easy job to react to the requests in a very short period of time.

Requirements:
Hardware:
- TCP/IP
- GPRS (1-2 seconds delay)
Software:
- Active Script with a logic for the access control and specially designed to suit the connected hardware (ZK-Leser)

With the anser from the server you are able to perform specific actions with the access readers

The following examples will give you an insight in what is possible with the functions and actions.
All parameters correspond the online functions with the dll.

example 1:

The following data is going to be received
table=access&date_time=2013-07-05_07%3A48%3A11&
Master_ID=1&Modul_ID=010&Chip_Nr=2058&Status=34&checksum=2461

Master_ID=1   Master-ID
Modul_ID=010   bus adress of the reader / TM
Ausweis_Nr=2058   ID of the read Chip
Status=34   Online (34)

Fitting answer to grant access:
status=ok&checksum=2461&**access**=010&**mask**=8&**type**=1&**duration**=1

With firmware-version 04.03.04 and up also possible is:

status=ok&checksum=2461&**master**=1&**module**=010&**mask**=8&**type**=1&**duration**=1

access=010   bus adress, on which the action will take place (FW 04.03.03 and lower)
module=010   bus adress on which the action action will take place
master=1   rs485-bus on which the action action will take place
mask=8   relais Nr.1
type=1   turn-on
duration=1   for 1 second

Fitting anser to deny the access => Red-LED:
status=ok&checksum=2482&**access**=010&**mask**=5&**type**=1&**duration**=2
 ab der Firmware 04.03.04 ebenfalls möglich ist:
status=ok&checksum=2461&**master**=1&**module**=010&**mask**=8&**type**=1&**duration**=1

access=010   bus adress, on which the action will take place (FW 04.03.03 and lower)
module=010   bus adress on which the action action will take place
master=1   rs485-bus on which the action action will take place
mask=5   red LED + buzzer
type=1   turn-on
duration=2   for 1 second

Several bus strings can be controlled with the new hardware V4. In order to be able to execute actions on the corresponding bus string, the bus string ID must be transferred with the response as well.

For this, the new keywords "module" and "master" were implemented. These must be used together, replacing the keyword "access".

> **!** **Attention:**
> **•** The order "**access->mask->typ->duration**" or **master->module->mask->typ->duration** must be strictly adhered to.

    status=ok&checksum=2482&**access**=010&**mask**=5&**type**=1&**duration**=2
    status=ok&checksum=2482&**master**=1&**module**=010&**mask**=5&**type**=1&**duration**=2

Overview of the possible parameters for the keywords:

keyword	value / Bit Nr.	description
access= or **module**= function for 1x Bus RS485	000 010 011 … 081 usw.	The value of the string must follow the format of the "TM" field of the "Reader" list. He must therefore always include 3 digits.
master =	1-3 1 2	Id for the RS485 bus ZK, represents the ZK- rs485-bus. RS485 Bus ID 1 RS485 Bus ID 2… „master" has to be set together with „module" and so replaces the function „access"
mask	1 / 0	this bit will trigger the buzzer.
	2 / 1	this bit will trigger the green LED.
	4 / 2	this bit will trigger the red LED.
	8 / 3	this bit will trigger the first relay.
	16 / 4	this bit will trigger the second relay.
	32 / 5	this bit will trigger the third relay.
	64 / 6	this bit will trigger the fourth relay.
	128 / 7	this bit will trigger the fifth relay.
	256 / 8	this bit will trigger the sixth relay.
	….	unused. always set to 0
type	0	Off
	1	On
	2	change (600ms on, 600ms off)
	3	3 times on for 500ms
duration	Sekunden / 0	Is a period of time and only at =1 active. meaning: 0 = always on, 1 - 40 = seconds on.

☞ **Hint:**
You can also perform multiple actions on the access control in one response. However, the total length of the response must not exceed 254 characters.

! Attention:
A automated switch between online and offline mode is not possible in http mode

5.6.9.2. Online via DLL connection

The dll offers the function to directly access the external access reader. With the function "DFCEntrance2OnlineAction"you are able to trigger the buzzer, the LEDs and the relays.

In the case of an access booking, the access master generates a data record. This must be picked up immediately and forwarded to the application on the server. The application then decides whether access is granted and returns a command to control the relay in the door module or lets the buzzer sound and issues a visual message via the LEDs.

More dll functions are documented in the "Datafox SDK" on our website
http://www.datafox.de/software-de.html?file=tl_files/Datafox_Devices/Downloads_Geraete_Zubehoer/MasterIV-Software/Datafox_SDK_Windows.zip

5.6.10. State message off access control

display	Assigned status message
0	module detected everything OK
3	module not in the list defined but found in the bus rs485
4	module in the list reader added but not found in the bus rs485
5	wrong Encryption password
6	login password is wrong
7	RFID-typ (Mifare, Legic, Unique, etc.) wrong
8	Failed to configure the module
9	No modules
10	the Key for communication with PHG-Modules was chonged
11	the Key for communication with PHG-Modules was not chonged
20	ID ok, accses succesful
21	ID is not in the list identification.
22	ActiveGeneral not correct.
23	Validity period does not fit.
24	Could not find the room. (group definitions)
25	Could not find am Time in time-table.
26	wait for PIN-input.
27	Pin wrong
28	threat code was input.
29	the PIN is right, accses successful.
30	the Master-PIN was input, accses successful.
31	PIN-Timeout.
32	Master-ID right, accses successful.
33	accses successful with PIN input.
34	Online-TP.
35	Online-PIN.
36	Make Action closing
40	digital output 1 is low (off)
41	digital output 1 is HIGH.(on)
42	digital output 1 is for the time ELAPSE, HIGH.
43	digital output 2 is low (off)
44	digital output 2 is HIGH.(on)
45	digital output 2 is for the time ELAPSE, HIGH.
46	digital output 3 is low (Off).
47	digital output 3 is HIGH.(On).
48	digital output 3 is for the time ELAPSE, HIGH.
49	digital output 4 is low (Off).
50	digital output 4 is HIGH.(On).
51	digital output 4 is for the time ELAPSE, HIGH.
52 #	digital output 5 is low (Off).
53 #	digital output 5 is HIGH.(On).
54 #	digital output 5 is for the time ELAPSE, HIGH.
55 #	digital output 6 is low (Off).
56 #	digital output 6 is HIGH.(On).
57 #	digital output 6 is for the time ELAPSE, HIGH.

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Statusmeldungen der Zutrittskotrolle

display	Assigned status message
120#	digital output 7 is low (Off).
121#	digital output 7 is HIGH.(On).
122#	digital output 7 is for the time ELAPSE, HIGH.
123#	digital output 8 is low (Off).
124#	digital output 8 is HIGH.(On).
125#	digital output 8 is for the time ELAPSE, HIGH.
126#	digital output 9 is low (Off).
127#	digital output 9 is HIGH.(On).
128#	digital output 9 is for the time ELAPSE, HIGH.
129#	digital output 10 is low (Off).
130#	digital output 10 is HIGH.(On).
131#	digital output 10 is for the time ELAPSE, HIGH.
132#	digital output 11 is low (Off).
133#	digital output 11 is HIGH.(On).
134#	digital output 11 is for the time ELAPSE, HIGH.
135#	digital output 12 is low (Off).
136#	digital output 12 is HIGH.(On).
137#	digital output 12 is for the time ELAPSE, HIGH.
138#	digital output 13 is low (Off).
139#	digital output 13 is HIGH.(On).
140#	digital output 13 is for the time ELAPSE, HIGH.
141#	digital output 14 is low (Off).
142#	digital output 14 is HIGH.(On).
143#	digital output 14 is for the time ELAPSE, HIGH.
141#	digital output 15 is low (Off).
142#	digital output 15 is HIGH.(On).
143#	digital output 15 is for the time ELAPSE, HIGH.
144#	digital output 16 is low (Off).
145#	digital output 16 is HIGH.(On).
146#	digital output 16 is for the time ELAPSE, HIGH.
160#	digital input 7 is Low
161#	digital input 7 is HIGH
162#	digital input 8 is Low
163#	digital input 8 is HIGH
164#	digital input 9 is Low
165#	digital input 9 is HIGH
166#	digital input 10 is Low
167#	digital input 10 is HIGH
168#	digital input 11 is Low
169#	digital input 11 is HIGH
170#	digital input 12 isLow
171#	digital input 12 is HIGH
_____	____continuously until:
210#	digital input 32 is Low
211#	digital input 32 is HIGH

for new devices hardware version 4

Statusmeldungen der Zutrittskotrolle

display	Assigned status message		
100	the access-control is off.		
101	server not online (online accses-control)		
102	the device have no lists.		
103	Type not correct in setup settings (GIS, PHG).		
display	**Assigned status message**		
	Master (ZK-Box / ZK Master)	GIS / TS-Series reader	PHG / EVO-ZK-reader
60	Digital input 1 Master Low	Digital input 1 Reader Low	Digital input 1 (IO-Box is closed)
61	Digital input 1 Master High	Digital input 1 Reader High	Digital input 1 (IO-Box is open)
62	Digital input 2 Master Low	Digital input 2 Reader Low	Digital input 2 (IO-Box closed)
63	Digital input 2 Master High	Digital input 2 Reader High	Digital input 2 (IO-Box open)
64	Digital input 3 Master Low	Digital input 3 Reader Low	Digital input 3 low
65	Digital input 3 Master High	Digital input3 Reader High	Digital input 3 high
66	Digital input 4 Master Low	Digital input 3 wurde unterbrochen	PHG not used
67	Digital input 4 Master High	Digital input 3 wurde kurz geschlossen	PHG not used
68	Digital input 5 Master Low	not used	not used
69	Digital input 5 Master High	not used	not used
70	Digital input 6 Master Low	not used	digital input 1 the Reader Low nicht bei der Voxio-E-Serie
71	Digital input 6 Master High	not used	didigital input 1 on the Reader High nicht bei der Voxio-E-Serie
72		not used	digital input 2 on the Reader Low nicht bei der Voxio-E-Serie
73		not used	digital input 2 am Reader High nicht bei der Voxio-E-Serie
74		not used	tamper switch ➜ OK
75		not used	tamper switch ➜ device manipuliert
display	**Assigned status message**		
80	alarm-input 1		
81	alarm-input 2		
82	alarm-input 3		
83	alarm-input 4		
84	alarm-input 1		
85	alarm-input 6		
220#	alarm-input 7		
221#	alarm-input 8		
_____	_____ continuously until:		
245#	alarm-input 32		

for new devices hardware version 4

State message off access control in a record:

> **Note:**
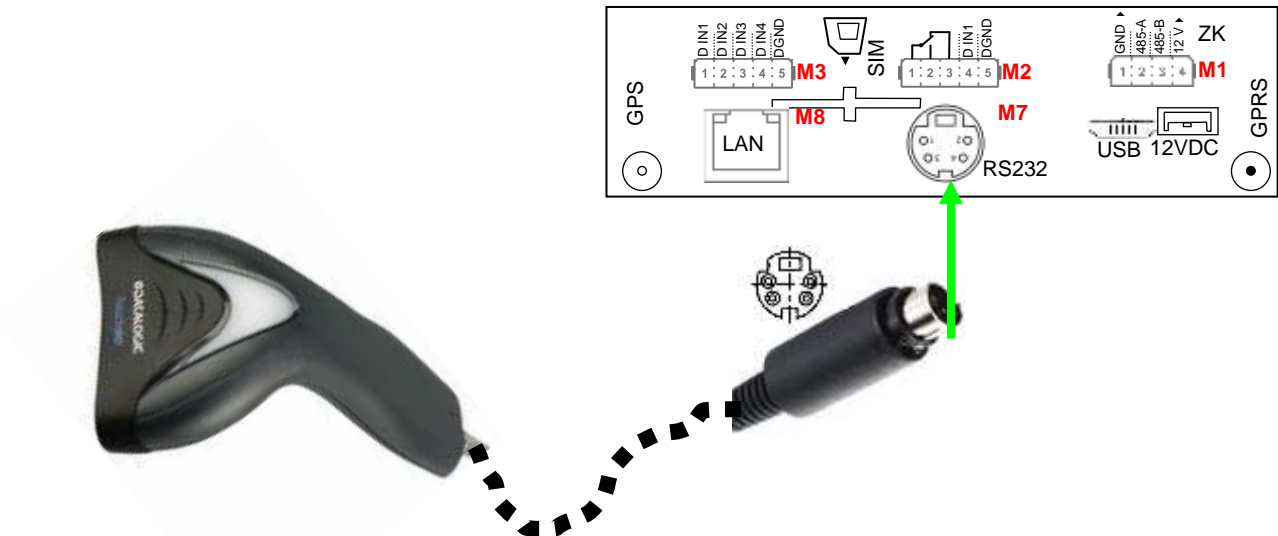> Do you want see the status from accses control, to coose this settigs in the Setup.
>
> field name, in accordance   State
>
> Field function :   Access: State assume

5.7. Barcode Reader

You can connect any barcode reader with a RS232 port to the PZE-MasterIV V4. Observe the following pin assignment of the RS232 interface.

Description	Modulplace	PIN	Function
RS 232 Mini-DIN M004	Here an example on **M7**	1	TXD
		2	RXD
		3	+ 5 V
		4	Ground / GND

Barcodes that are read in can be up to 255 characters long. This is supported by the field function "Normal (value transfer from ID card, etc ...)".

From this 255 characters can you coppy maximum 60 in a global variable.
More information about cut a value find you in the manual DatafoxStudioIV in the chapter "Normal (value transfer from ID card, etc ...)".

Setting in the DatafoxStudioIV:
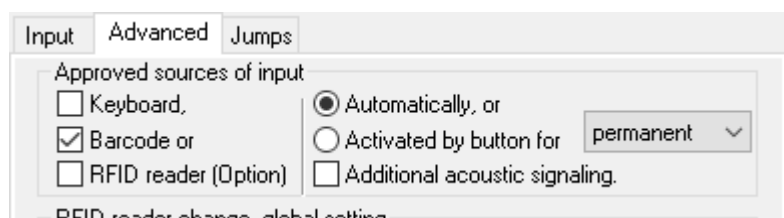
5.8. Fingerscanner

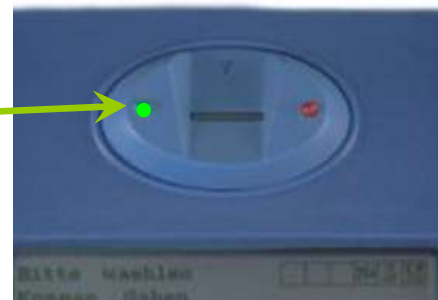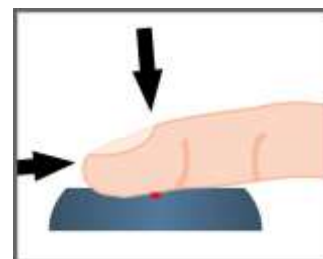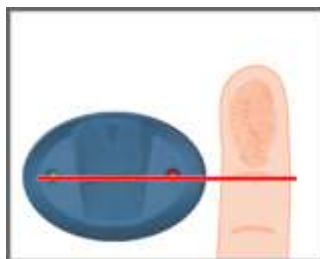The fingerprint reader's readiness to scan is indicated by the flashing green LED.

1.) Place the finger with the area of the first finger segment.

2.) Lay the finger flat. Caution, do not place your fingers on the edge, otherwise only a part can be detected.
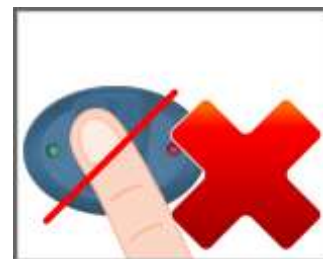
3.) Pull the finger over the scanner with a little pressure on the scanner. In order to allow a good detection of the finger, the fingers must be clean!

Attention!
This small strip, shown here red, is the actual line scanner. Pull the finger over the sensor with light pressure. The contact from the finger to the scanner must not be interrupted.

Cut view
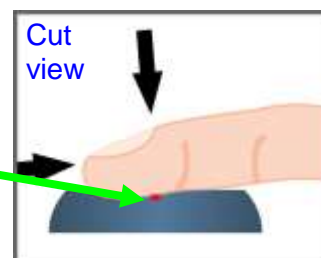
How to scan correctly - video guide:
http://www.datafox.de/videothek.html

> ❗ All terminals should be mounted in such a way that the finger sensor is at the same height so that the handling can be carried out identically.
> In no case may be components on the finger, which have an abrasive effect. These use the protective layer of the line sensor and thus significantly reduce the service life.

5.8.1. General infomation

Biometrics offers the possibility of identification and verification by the body's characteristics. Datafox supports finger detection with the fingerprint module. ID cards and PINs are no longer necessary and thus cannot be forgotten. Reading the fingerprint replaces reading the ID card. Of course, all functions which are available when reading an ID card are also supported for fingerprints. This data sheet is an addition to the respective product sheet.

Basically, you have to differentiate between the following information:

The "PID" is the person identification number, also called employee number. 10 finger templates can be assigned to one PID at most. The PID should be a decimal number; when using transponders the corresponding format (decimal n digits) must be selected.

> **!** **Caution:**
> The PID must not exceed the decimal value of 4294967295 (2 32 -1).
> We recommend working with a 9-place PID.

The "finger template" consists of the PID and the finger characteristics of a person. The finger characteristics are the feature points (minutiae) which are determined from the image after scanning a finger.

The "security level" (false acceptance rate / false rejection rate) defines when a read finger is accepted or rejected. 60 means that 60% of the minutiae of the scanned template must match 60% of the reference template, in order to declare the detection as valid. We recommend setting the value not lower than 55 and not higher than 75. It is best to use 60.

Image quality is the number of usable finger lines in relation to the number of available finger lines. We recommend setting the value not higher than 40.

The "count of minutiae" defines how many minutiae must be determined from the image so that a template for a matching can be created or declared as valid.
We recommend setting the value not lower than 7, better set to 10.

> **!** **Caution:**
> For image quality the recommended value is 40. For older models with Biokey 3000 with a firmware version 04.12, the recommended value is 70. Biokey 3000 with firmware 61.00, the image quality must necessarily be less than 70. The recommended value of 40 offers an optimum for learning the fingers.

	Note:
☞	Recoment settings:
	Security level 60%, quality: 40% minimum of minutien: 15

Difficult fingers can be detected by decreasing the parameters, but this can lead to false detection. The behavior must be checked in each individual case, since it is very dependent on the group of people.
In such cases, one should switch to another finger, because not every human finger is suitable for the Minutien method.

5.8.2. Teach-In

In order to use fingerprint, the persons must be taught-in at the terminal at first.

4 steps to teach-in the Finger

Step 1
Read the PID

Chip number   or   choosing on a list   →   PID

⊟ personnel data
  ▭ (1): ID Number
  ▭ (2): Name

ID-number   Name
00799611485215   M. Mustermann
05597861113494   M. Musterfrau

Step 2
Scan finger

Fingerprint: scanning.

Step 3
PID and finger characteristics to combinate

Field funktion: Fingerprint: fingerprint to train.

PID   +   finger characteristics   =   Template

Step 4
Save Template

on Biokey-Module   on Mifare Transponder   on Server

5.8.3. Procedure

Identification
The finger characteristics are recorded via the fingerprint module. Then, the data pool is checked for matches. If a match is found, the PID of the person is returned, otherwise an error. The matching threshold is determined by the security level.

Verification
An employee identifies himself via a transponder. The PID (employee number) is read from the ID card. Then the employee has to swipe his finger across the scanner of the fingerprint module. In the data pool of the fingerprint module, all primary keys (combination of PID and template) with this PID are determined (up to ten assignments are possible) and checked for matches with the scanned finger characteristics.
Advantage: faster detection, higher security
Disadvantage: further detection medium needed, e.g. transponder

Identification with Data Storage of Finger Templates in the Fingerprint Module
The terminal polls the fingerprint regularly whether someone has read their finger. If so, the fingerprint transfers to the terminal, who has read their finger and whether the finger was valid. PID and validity are transferred. The task in the terminal for the fingerprint triggers an input sequence and access control - if defined in the setup. If no person is detected, the fingerprint returns a PID = 0.

Verification with Data Storage of Finger Templates in the Fingerprint Module
The terminal polls a transponder reader regularly whether a transponder was detected. If so, the serial number or a memory block of the transponder is transferred to the fingerprint module. The fingerprint module waits for the reading of the finger. After reading, it is checked whether the finger stored in the fingerprint module with the serial number or the transponder data matches the read finger. The fingerprint module transfers PID and validity to the terminal. The task in the terminal for the fingerprint triggers an input sequence and access control - if defined in the setup.

Verification with Data Storage of Finger Templates at a Transponder
The terminal polls a transponder reader regularly whether a transponder was detected. If so, the serial number or a memory block of the transponder and the finger data stored in the transponder are transferred to the fingerprint module. The fingerprint module waits for the reading (scanning) of the finger. After reading (scanning), it is checked whether the finger transferred by the ID card matches the read (scanned) finger. The fingerprint module transfers PID and validity to the terminal. The task in the terminal for the fingerprint triggers an input sequence and access control - if defined in the setup.

5.8.4. Process Variants

Teach-in for identification/verification with data storage in the fingerprint module
1.) Determine PID (read from ID card or via list selection)
2.) Scan finger (determine finger characteristics)
3.) Teach-in (amalgamate PID and finger characteristics and save in fingerprint module)

or

1.) Scan finger
2.) Determine PID
3.) Teach-in fingerprint module

Teach-in for verification with data storage on a Mifare card
1.) Determine PID (read from ID card or via list selection)
2.) Scan finger (determine finger characteristics)
3.) Teach-in (amalgamate PID and finger characteristics and save on Mifare card)

or

1.) Scan finger
2.) Determine PID
3.) Teach-in and save on Mifare card

Identification via fingerprint module
1.) Scan finger
2.) Identification via fingerprint module

Verification via BIO key
1.) Determine PID (read from ID card)
2.) Scan finger
3.) Verification via fingerprint module or
1.) Scan finger
2.) Determine PID (read from ID card)
3.) Verification via fingerprint module

Verification via Mifare card
1.) Read template from Mifare card
2.) Determine PID (read from ID card)
3.) Scan finger
4.) Verification by fingerprint module

or

1.) Scan finger
2.) Read template from Mifare card
3.) Determine PID (read from ID card)
4.) Verification by fingerprint module

Deleting a template from a fingerprint module by identification
1.) Scan finger
2.) Delete template from fingerprint module or
1.) Determine PID (read from ID card or via list selection)
2.) Delete template from fingerprint module

Deleting a template from a fingerprint module by verification

1.) Determine PID (read from ID card or via list selection)
2.) Scan finger
3.) Delete template from fingerprint module or
1.) Scan finger
2.) Determine PID (read from ID card or via list selection)
3.) Delete template from fingerprint module

<u>Deleting a template from a Mifare card</u>

1.) Read Mifare card
2.) Delete template from Mifare card

> ☞ **Note:**
> For more information on possible settings see the manual DatafoxStudioIV, chapter "Functions in the Setup > Fingerprint".


5.8.5. Technical Data of the Fingerprint Module

- o ATMEL FingerChip
- o ATMEL ARM9 Controller
- o Storage capacity of 2000 fingers
- o Power consumption ca. 120 mA at 3.3 volts, sleep 1 uA
- o Temperature -20 to + 85 °C (-4 to +185 °F)
- o Template: Idencom compact format 216 Byte
- o Teach-in time 1.2 seconds + processing time terminal
- o Matching time: 0.014 seconds
- o False Rejection Rate (FRR): $1,4 \times 10^{-2}$
- o False Acceptance Rate (FAR) $1,0 \times 10^{-4}$
- o From 100 fingerprints onwards, we recommend verification only. Combination with PIN via keyboard or ID card.
- o Experience shows that not for all employees the fingers can be recorded in sufficient quality.
- o Depends on the state of the fingers. For those persons the ID card or PIN has to be recorded.

5.9. RFID Reader

The RFID reader is built-in the Gerät. If this option is available, see the type label and the label on the backside. By DatafoxStudioIV you can enable the RFID reader. For more information see the manual of DatafoxStudioIV.

For reading a transponder you must hold it in front of the device. The reading area is marked with the corresponding icon.
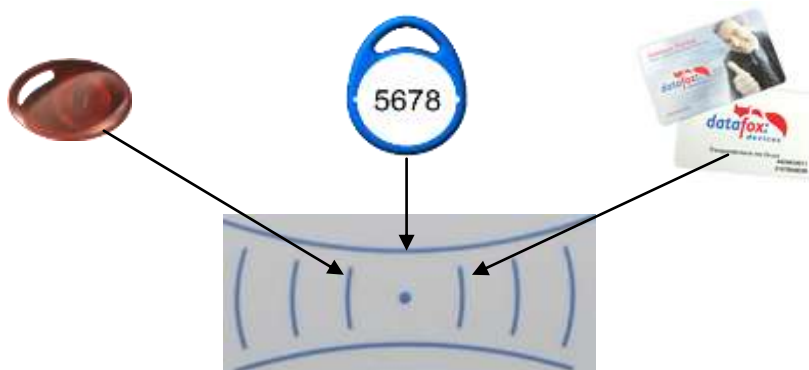
The following transponder readers can be built-in the PZE-MasterIV V4 :

PZE-MasterIV V4 with 125 **kHz:** Unique EM4102, Hitag1, Hitag2, HitagS, Hewi EM4450
LRW 8 cm R/W (LeseReichWeite "Read range" with card)

PZE-MasterIV V4 with Legic-Prime/Advant: LRW 4 cm   R/W

PZE-MasterIV V4 with Mifare-Desfire: LRW 4 cm   R/W für MifarePlus / 7 Byte UID notwendig

PZE-MasterIV V4 with i-Button-Leser: Touchmemory only reading

PZE-MasterIV V4 with HID 125kHz: LRW 4 cm   only reading   ProxPoint Plus 4065

PZE-MasterIV V4 with HID-iCLASS: LRW 4 cm   only reading   13,56MHz

PZE-MasterIV V4 with Nedap: LRW 4 cm   only reading

PZE-MasterIV V4 with SimonsVoss Smart-Relais: LRW optimum at approx. 20 cm! If the transponder is too close, it might be not recognized. (interface Siemens: CLS-Signal=Yes).

☞ **Note:**
More information you found in the manual from DatafoxStudioIV capter
„The RFID Technology"

6.   Technical Data

Housing	Structure	plastic: ABS
	Dimensions (width x height x depth)	130 mm x 360 mm x 70 mm
	Weight (Without power supply)	ca. 750g
System	Clock	Real-time clock
Data storage	Flash	16 MB, 100,000 write cycles
	Memory expansion (optional)	SD card, max 2 GB
Display	LCD	FSTN: 320 x 240 Pixel, active area 82 x 62 mm, LED-Backlight
Keys	Type	Membrane keyboard with tactile feedback (consumable)
	Quantity, Size	9 keys, diameter 14mm
Power	Power Supply	12 V DC
	Power	Base unit 4 watts, depending on the equipment up to max. 12 W
	Clock / RAM buffering	Lithium Battery + goldcap
Environment values	Ambient temperature	-20 ° C to +70 ° C (Power Supply -20 ° C to +60 ° C)
	Protection	IP 65 front, IP 65 completely in mounted position
Software	Configuration program	Setup program (Datafox-Studio) to configure without programming effort
	Communication tools	http, DLL or C source code for inclusion in the application
Module extensions	For the extension to a variety of functions such as communication, inputs / outputs, sensors, ... are 7 expansion slots for modules.	
Data transmission to PC/Server	USB	Micro USB integrated
	TCP / IP (optional)	TCP / IP operating with integrated TCP / IP stack, 10/100 Mbit
	WLAN (optional)	integrated wireless LAN module, WLAN 802.11 bg and 802.11 n (only 2,4GHz)
	GSM / GPRS (optional)	online via GSM and GPRS, mobile module quad band 850 / 900 / 1800 / 1900 MHz
	RS485 (optional)	RS485 2-wire bus
	USB host (optional)	for data transfer via USB stick, protection IP22
	Bluetooth (optional)	Bluetooth module integrated; range up to max. 100 m
Readers Connection	RS232 external (optional)	Connection of bar code readers, magnetic card readers, etc. via mini-DIN connector
Access Options	RS485 external	Connection of up to 3 busses with up to 8 external door modules / access readers each
	Door lock relay with Door Monitoring	1 relay changeover, 42 V AC, 60 V DC, 2 A, max. 60 W, 1 digital input for door monitoring, ...
MDE Options	Module digital inputs	4 x digital input, electrically isolated, up to 100kHz, or 250Hz, Low 0,0...1,5V; High 3,5…30,0V
	Module relay outputs	1 x NO, 1 x changeover contact, 42 V AC, 60 V DC, 2 A, max. 60 W
	Module analog voltage inputs	4 x input, 15-bit resolution, accuracy ± 2% measuring range 0-10 V, other ranges and functional insulation 230 V on request
	Module analog inputs Current	4 x input, 15-bit resolution, accuracy ± 2%, measuring range 0-25 mA; Functional insulation 230 V on request
Additonal Options	Fingerprint	Fingerprint module integrated, sensor on the right below
	Integrated transponder reader	125kHz, for example Unique, titanium, Hitag 13.56 MHz, e.g. Legic, Mifare, ISO14443, ISO15693, Simon Voss, iButton, Nedap
	GPS receiver / receiver	50 Channels, GPS L1 frequency C / A, Galileo Open Service L1
	Column	Column for free putting

6.1. communication modules

LAN (TCP / IP)	Width 20mm	10 / 100Mbit, IPv4, IPv6
WLAN	Width 20mm	Standard 802.11.b/g, encryption WEP, WPA2 802 / 11i
GPRS	Width 40mm	GPRS class 10, quad band, mini-SIM socket
RS485	Width 20mm	RS485 connections, up to 30 participants

6.2. access modules

RS485	Width 20mm	RS485 connection for the access reader, relay modules, ... power supply from 1 external reader when using Datafox power supplies with 12V
Access Control-IO	Width 20mm	1 relay changeover, 42 V AC, DC 60 V, 2 A, max. 60 W; 1 digital input for monitoring door, ...

6.3. Module digital in and out

Digital inputs	20mm	4 x digital input, functional insulation 230V, depending on the device type, up to 250kHz, Low 0.0 ... 1.0 V; High 3,5 ... 30,0V
Digital outputs relay	20mm	1 x NO contact, 1 x change-over contact, 30 V AC, 30 V DC, 2 A, max. 60 W
Digital outputs Open Coll.	20mm	4 x open collector output, 2A, 30V (in preparation)
Analog inputs voltage	20mm	4 x input, 15-bit resolution, accuracy ± 2%, range 0-10 V, other ranges and functional insulation 230 V on request

6.4. Modules miscellaneous

RS232-Modul	Width 20mm	RS232 interface, with MiniDIN connector or spring terminal 5V-output max. 0,5A, with USB supply max. 100mA.
GPS	Width 20mm	50 Channels, GPS L1 frequency C/A, GALILEO Open Service L1
Micro-SD Card	Width 20mm	Micro-SD Card max. 2GB, depending on device accessible from outside the device
Mobil-Box-Modul	Width 40mm	Central connector for power supply, (8-30V DC), 1 relay, 2 digital inputs and connection for Mobile-Dockingstation with Timeboy
Acceleration sensor	Width *20mm*	*3D acceleration sensor in preparation*

7. FAQ

An extensive collection of FAQs can be found on our homepage:
http://www.datafox.de/faq-de.html

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