

Installation and commissioning manual Wireless Data System DATAEAGLE 2XXX Compact®



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DATAEAGLE 2XXX Compact V2
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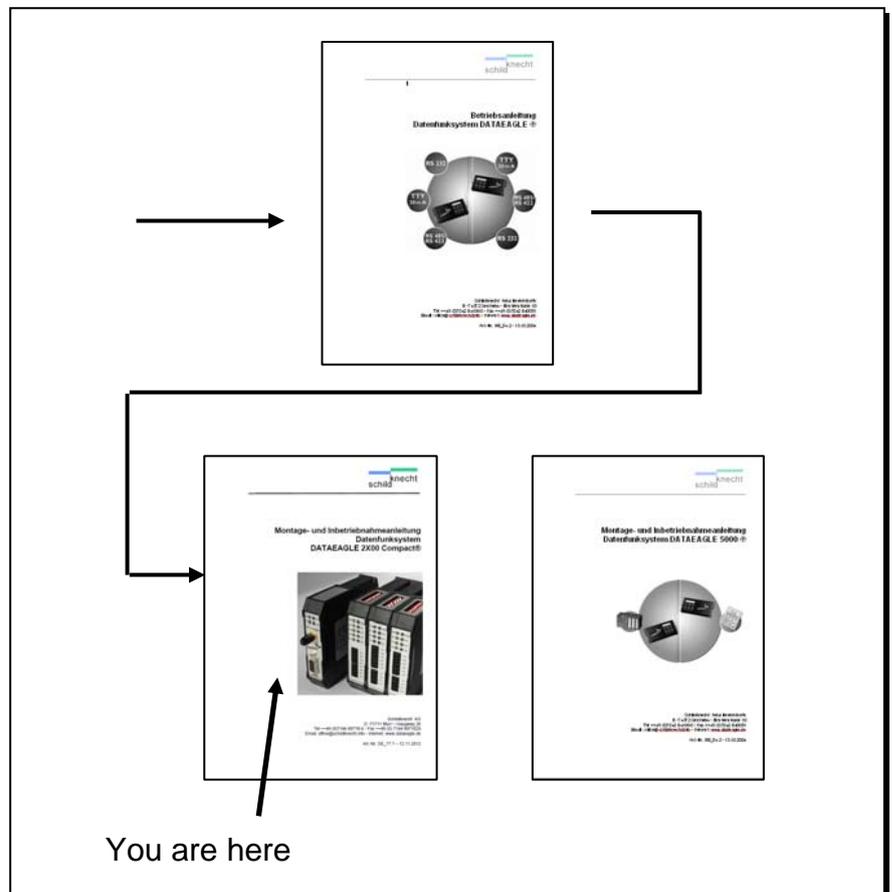
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Introduction

The technical description of the wireless data systems from Schildknecht AG consists of an operating instruction for all product families and an installation and commissioning manual for each product family. Please read both documents carefully before you start working with the wireless data systems. Both documents should be considered as a single entity.



The operating instruction is intended to help you familiarize yourself with the structure and function of wireless data systems.

Here you get **general** information about the complete product family. Please read the operating instructions first if you are not familiar with the structure and function of wireless data systems.

Next, read the installation and commissioning manual of the wireless data system.

To start with, we have a few important things to say about safety. Please observe these instructions without fail, in order to avoid property damage and personal injury.

We show you step by step how to install the system, put it into operation and how to operate it.

Any questions? First, have a look in the table of contents. You will quickly find what you are looking for.

If you do need us in person: just call us or send a fax:

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1. General information

1.1. Guide to symbols

This section contains an explanation of the symbols used in this manual.


DANGER

Indicates an imminently hazardous situation which, if not avoided, may result in death or serious injury.


CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in property damage.



Indicates sections which contain important information.



Indicates work operations which need to be carried out.



This symbol is followed by a description about how the status of the system changes after an operation has been carried out.

1.2. Copyright and brand names

Brand names and product names mentioned in this manual are trademarks or registered trademarks of their respective owners.

Microsoft Windows 7, Windows Vista, Windows 2000, Windows XP and Microsoft Internet Explorer are registered trademarks of Microsoft Corp.

Adobe Reader is a registered trademark of Adobe Systems Corp.

DATAEAGLE® is a registered trademark of Schildknecht AG.

1.3. Declaration of conformity and EC directives

Information about the declaration of conformity and about EC directives can be found under:

<http://www.schildknecht.info/dokumente/doc.pdf>

2. Safety instructions

2.1. *Intended use*

Information about the intended use can be found in the operating instructions wireless data systems DATAEAGLE.

2.2. *General information*

In order to guarantee safe use and fault-free operation, the according safety instructions have to be observed under all circumstances.

Safety instructions which apply to all product families are described in the operating instructions for wireless data systems DATAEAGLE. This manual is part of the system documentation. Read these instructions before installation and commissioning of the wireless data system.

Safety instructions which apply only to an individual wireless data system are described below and in the according section of this installation and commissioning manual.

2.3. Installations instructions



Country licenses can be found in the attached declaration of conformity.

⚠ DANGER



Risk of electrical shock.

Always disconnect the modules from the power source when working on the modules (installation, etc.)!

⚠ DANGER

Risk of injury.

Comply with the local regulations and safety instructions during installation!

⚠ CAUTION



Static charges can damage electronic devices.

Remove electrostatic discharge from your body before touching the device!

⚠ CAUTION

The modules must not be opened or modified (except the steps described in this manual). Do not repair the module yourself, replace it with an equivalent module. Repairs may only be carried out by the Schildknecht AG. The Schildknecht AG is not liable for damage resulting from a failure to comply.

2.4. Safety instructions for operation



Electromagnetic radiation.

Keep at least a distance of 20 cm to the antennas when the devices are in operation.

2.5. Personnel qualification

Only qualified personnel may carry out the following tasks:

- Installation
- Commissioning
- Operation
- Maintenance

Within the context of safety regulations, qualified personnel are individuals authorized to commission, to ground, and to identify equipment and systems in accordance with the safety-engineering standards.

All operating personnel must be trained accordingly.

Personnel involved with operating the unit in conjunction with controllers must possess sound programming skills for the individual controller and programming language in question.

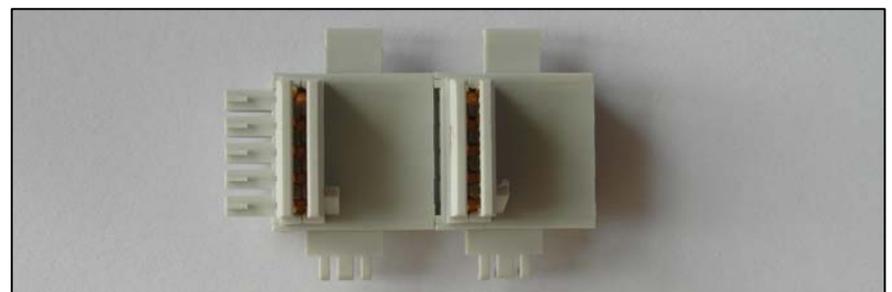
3. Structure

3.1. System description

The system is used for the wireless bidirectional transmission of digital and analog signals. It consists of a radio module and up to five I/O modules on each side.



The modules are connected together by T-bus plugs.



Functional principle

A door control is used as an example to explain the functional principle:

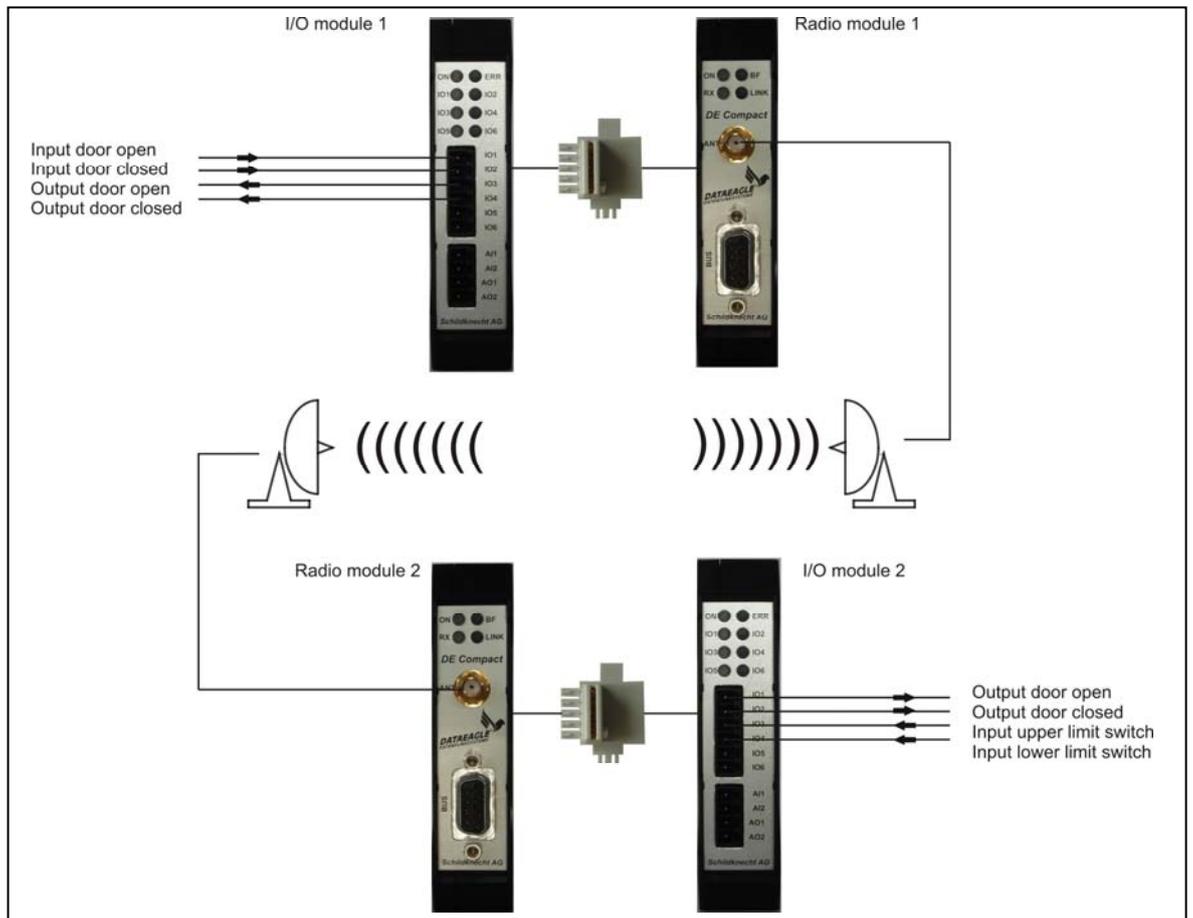
A rolling shutter should be opened and closed via radio signal. Two limit switches (top/bottom) report when the rolling shutter has reached the end position (open/closed).

I/O module 1	
Channel	Configuration
IO1	Input
IO2	Input
IO3	Output
IO4	Output

I/O module 2	
Channel	Configuration
IO1	Output
IO2	Output
IO3	Input
IO4	Input

The signal „Open door“ is connected to the first channel (IO1) of I/O module, sent through the T-bus plug to the radio module 1 and from there transmitted to radio module 2. Radio module 2 sends the signal through the T-bus plug to the first channel of I/O module 2 and can now control the rolling shutter drive. The signal „Close door“ is connected the same way to the second channel (IO2).

The limit switches are connected to IO3 and IO4 of I/O module 2 and transmit the signals from I/O module 2 to I/O module 1.



3.2. Radio module

The radio module transmits the signals via radio and is available in two radio technologies.

Device type	Part no.	Radio technology	Transmission power
DEC 2320	10974	869 MHz	500 mW
DEC 2700	10975	2,4 GHz Bluetooth	100 mW

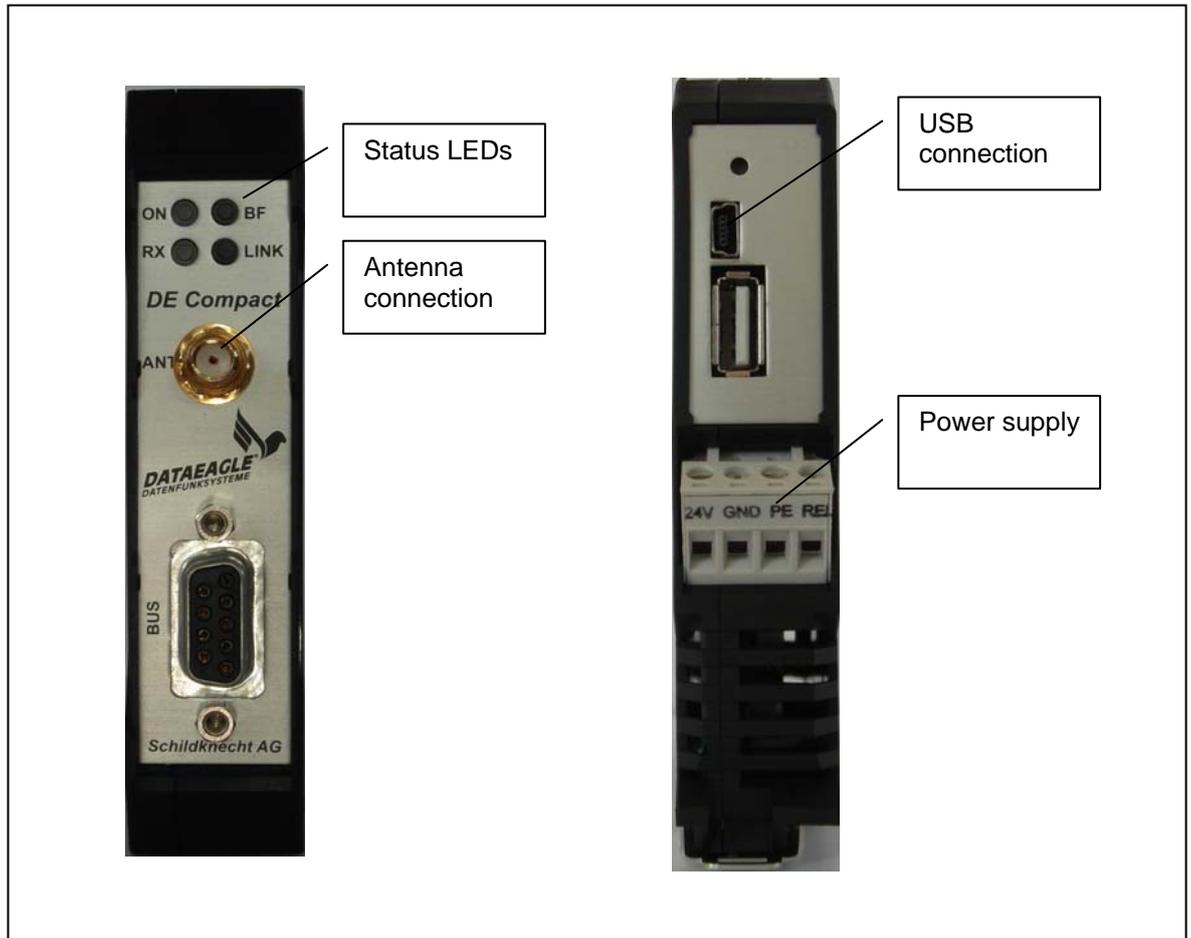


Radio modules are configured with the software Dataeagle Wizard (see chapter 5.3.8)



**New devices are pre-configured in the factory.
Further settings are not necessary.**

The illustration shows all connections of the radio module.



The table shows the meaning of the LEDs at the radio module:

Name	Colour	Function
ON	Green	Power ok
BF	Red	Without function
RX	Yellow	Receiving radio data
LINK	Blue	DE2700: Bluetooth connection established DE2320: Flashes every second when connected

3.3. I/O module

Input and output cables are connected to the I/O module. I/O modules are available in three versions:

Version 1	6 Digital inputs/outputs (configurable) 2 Analog inputs 0-10 V 2 Analog outputs 0-10 V
Version 2	6 Digital inputs/outputs (configurable) 2 Analog inputs 4-20 mA 2 Analog outputs 4-20 mA
Version 3	8 Digital inputs / 8 Relay outputs (configurable)



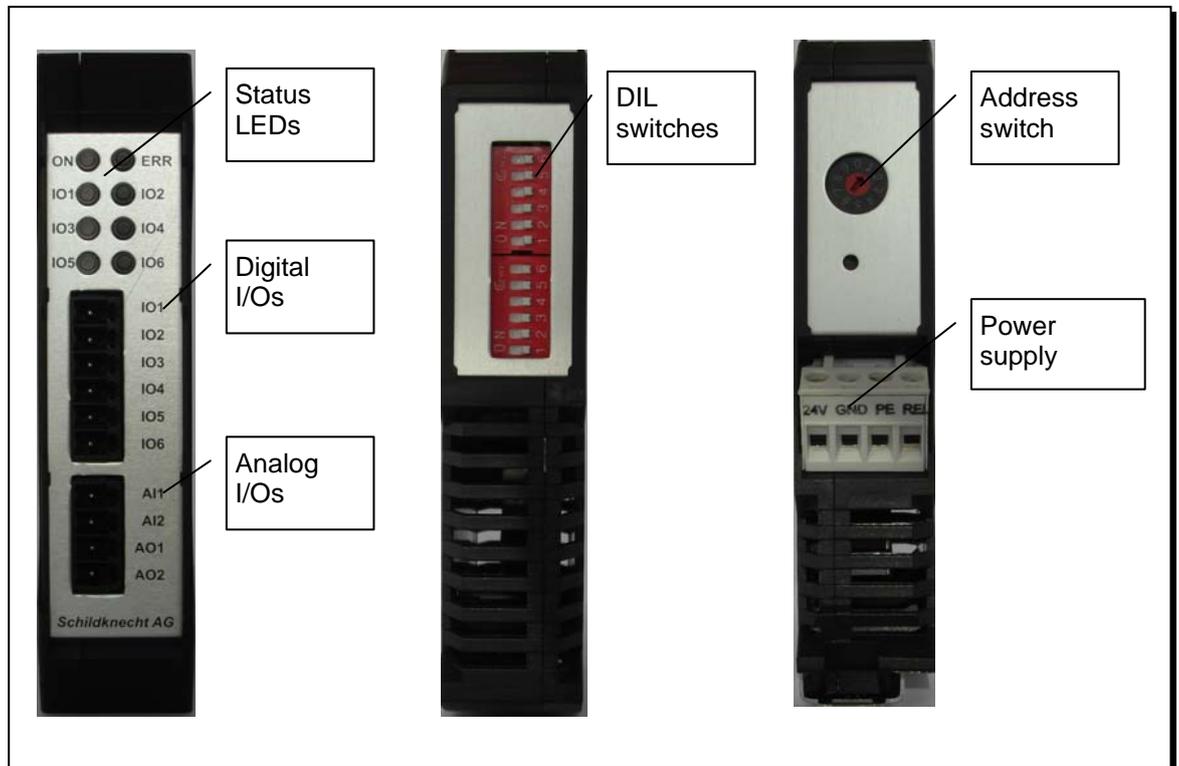
I/O modules are configured with the software Dataeagle Wizard (see chapter 5.3.8)



New devices are pre-configured in the factory.

Further settings are not necessary.

The illustration shows all connections and possible adjustments of the I/O module:



The function of the channel (input or output) is set with the DIL switches. The inputs of version 1 and 2 can be configured with or without pull-up resistors. (see chapter 4.2.1)

The table shows the meaning of the LEDs at the I/O module:



Name	Colour	Function
ON	Green	Power ok
ERR	Red	Error
IO1...	Green	Condition „on“ at the respective input or output

4. Installation of new devices



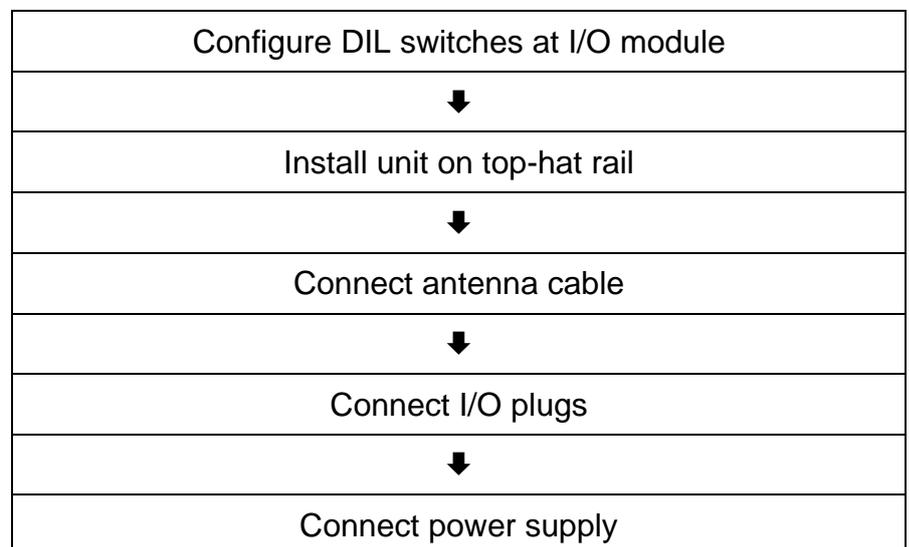
Please be certain to read the guidelines in chapter 7 „Tips and Tricks – improvement of the electromagnetic compatibility (EMC)“. Observe these guidelines during the complete installation procedure. Thereby you avoid electromagnetic interferences and you improve the data transmission quality.



New devices are pre-configured in the factory.
Further settings are not necessary.

4.1. Overview Installation

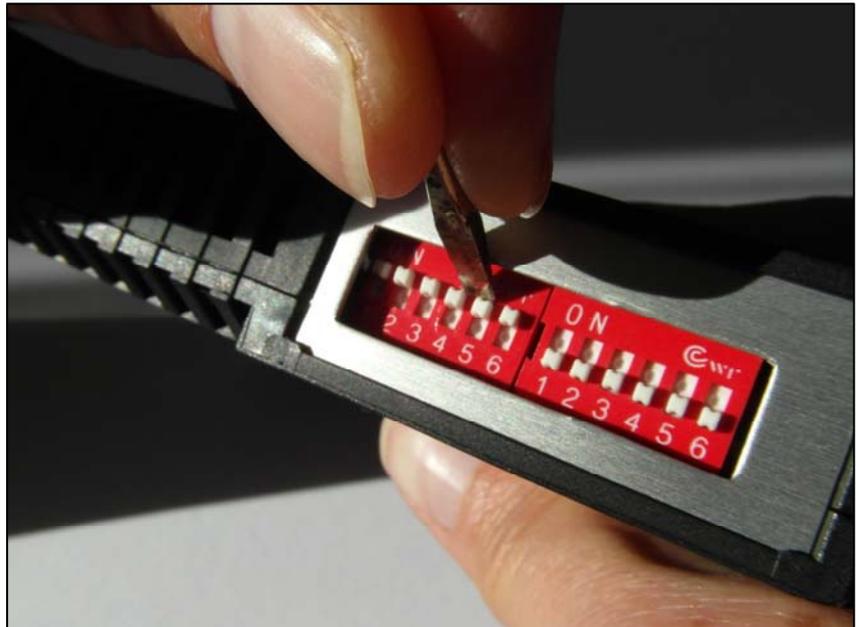
The installation is very easy and is carried out according to the procedure shown below:



**In case of limited space in the control cabinet:
Connect the power supply before you install the unit on the top-hat rail.**

4.2. *Configure DIL switches*

The DIL switches are used to define whether a channel works as an input or output.



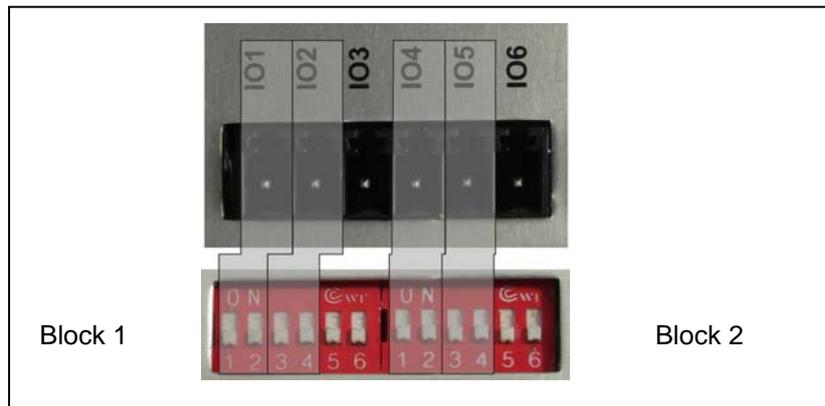
When a signal should be transmitted from **A** to **B** the I/O channel on **side A must be configured as input** and the same channel on **side B must be configured as output**.

Two switch blocks with 6 DIL switches each are available for configuration.

4.2.1. DIL switches for I/O modules with 6 digital I/Os

I/O modules with 6 digital I/Os (version 1 and 2) have **2** DIL switches for each channel. The **first** DIL switch defines whether the input is designed with or without pull-up resistor. The **second** DIL switch defines whether the channel works as an input or as an output.

2 DIL switches for each I/O



The table shows the allocation of the DIL switches to the channels (IOx):

Channel	Block	Switch	Function	
IO1	1	1	ON = with pull-up	OFF = without pull-up
		2	ON = output	OFF = input
IO2		3	ON = with pull-up	OFF = without pull-up
		4	ON = output	OFF = input
IO3		5	ON = with pull-up	OFF = without pull-up
		6	ON = output	OFF = input
IO4	2	1	ON = with pull-up	OFF = without pull-up
IO5		2	ON = output	OFF = input
		3	ON = with pull-up	OFF = without pull-up
IO6		4	ON = output	OFF = input
		5	ON = with pull-up	OFF = without pull-up
		6	ON = output	OFF = input

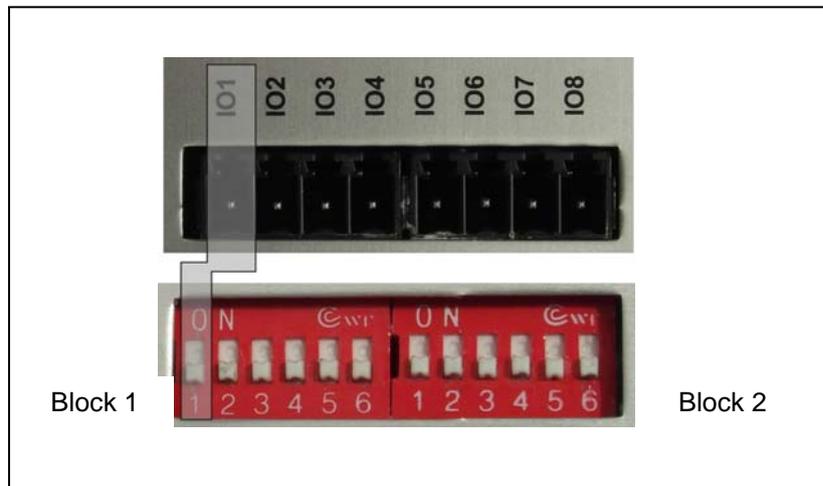
Second switch = output = ON ⇔ First switch without function

No settings are necessary for the analog inputs and outputs.

4.2.2. DIL switches for I/O modules with 8 digital I/Os

I/O modules with 8 digital I/Os (version 3) have 1 DIL switch for the channel configuration (ON = Relay output, OFF = Digital input).

1 DIL switch for each I/O



The table shows the allocation of the DIL switches to the channels (IOx):

Channel	Block	Switch	Function	
IO1	1	1	ON = output	OFF = input
IO2		2	ON = output	OFF = input
IO3		3	ON = output	OFF = input
IO4		4	ON = output	OFF = input
IO5		5	ON = output	OFF = input
IO6		6	ON = output	OFF = input
IO7	2	1	ON = output	OFF = input
		2	OFF	
IO8		3	ON = output	OFF = input
		4	OFF	
		5	OFF	
		6	OFF	

 **CAUTION**

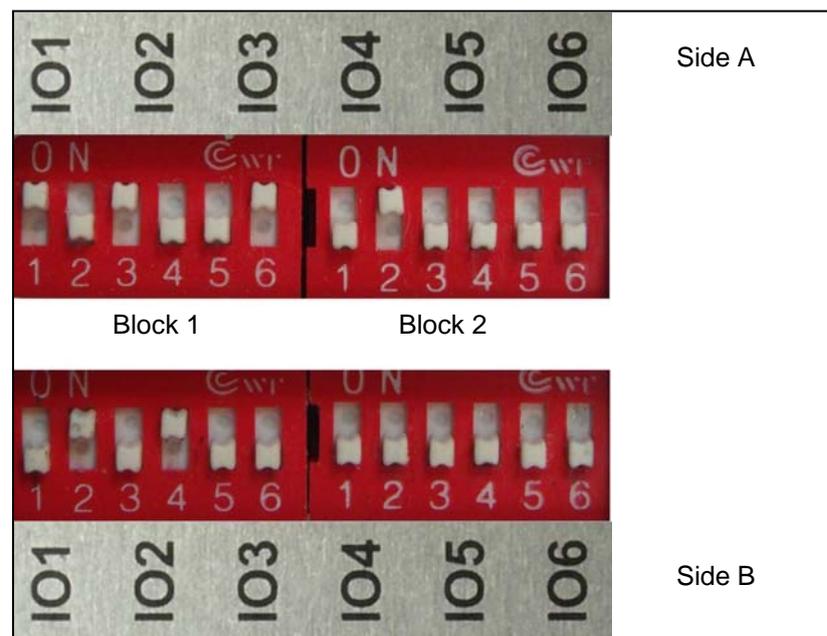
DIL switches 2 and 4 of block 2 must be set to OFF.

4.2.3. Example for DIL switch configuration for I/O modules with 6 digital inputs

The system should be configured as shown below:

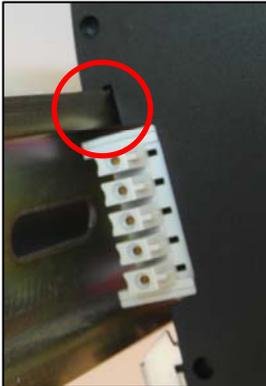
Channel	Side A	Side B
IO1	Input with pull-up	Output
IO2	Input with pull-up	Output
IO3	Output	Input
IO4	Output	Input

Configuration of the DIL switches:

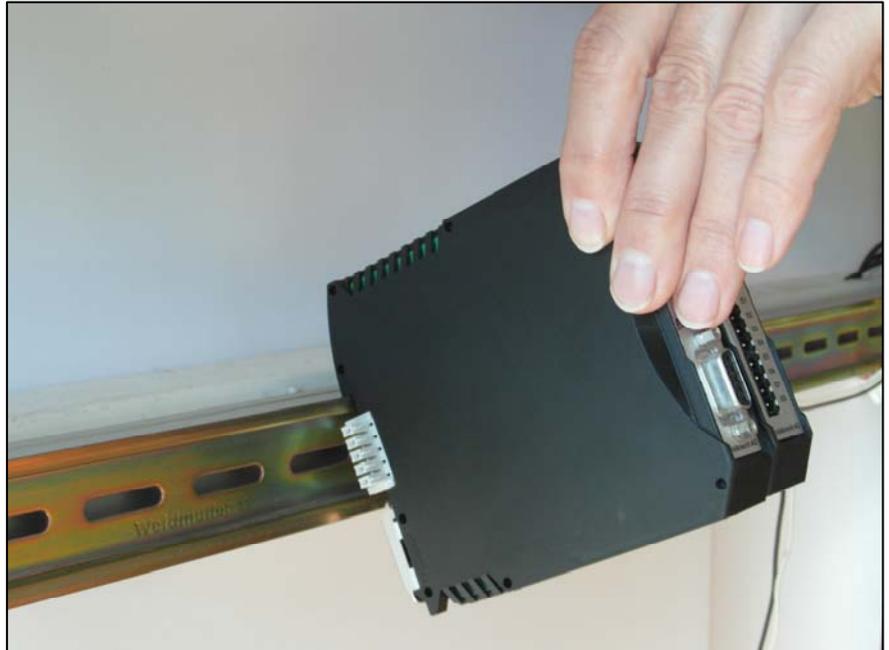


4.3. Install unit on top-hat rail

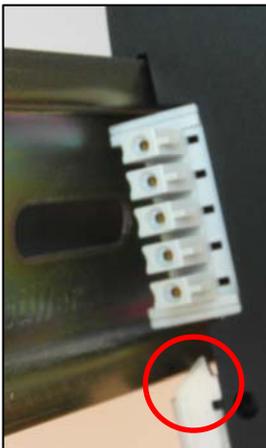
 Place the unit diagonally from above on the top-hat rail.



Nose above the top-hat rail



 Press the unit strongly downwards.



Foot catch snaps in



4.4. Install antenna cable

- ☞ Connect the antenna cable to the antenna connection of the radio module.



 **CAUTION**

The radio module may be damaged if the antenna cable is fastened too tight.

Connect the antenna cable only hand-tight.

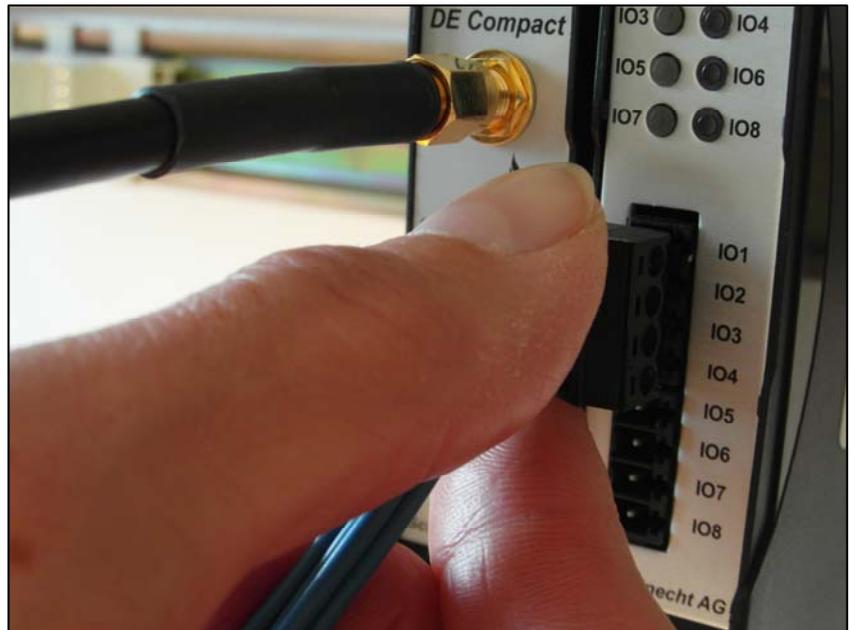
- ☞ Install the antenna at the designated place.



Observe the guidelines for an optimum antenna installation in chapter 7 „Tips and Tricks“.

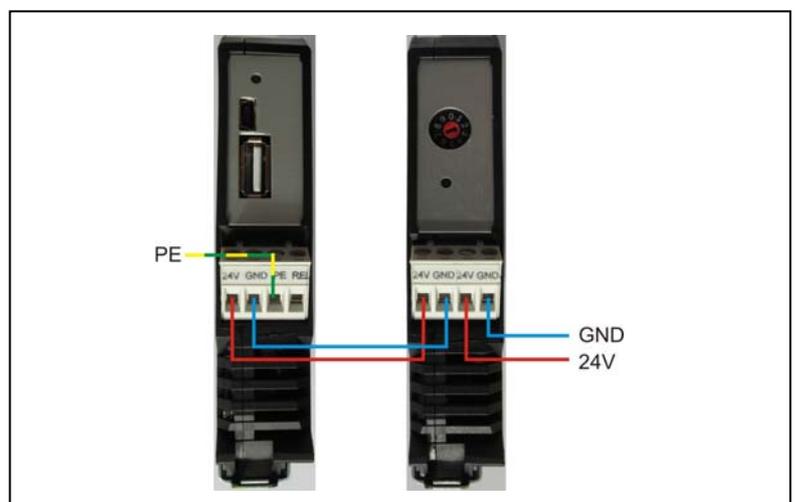
4.5. Install I/O plug

- ☞ Attach the I/O plug onto the according I/O sockets at the I/O module.



4.6. Connect power supply

- ☞ Connect the power supply according to the diagram shown below. The 24 V supply of the control cabinet can be used.



 Connect the PE cable to the radio module.

 **CAUTION**

PE has to be connected with control cabinet round! If the PE is not connected the noise filter cannot filter interferences on 24 V DC power supply line. These may cause malfunctions, errors or the destruction of the device.

The nominal operating voltage of 24 V DC falls into the category SELV (safety extra low voltage) and is thereby no subject to the EC low voltage directive. Usage of other power supplies is not allowed. For connection to the 230 V AC mains supply an external wall power supply with 12 V DC output voltage is used.



A self-healing 0,7A fuse is integrated into the input circuit. This fuse cannot be exchanged. The device has to be disconnected from the power supply for approx. 2 minutes after the fuse has been triggered. Ensure that the power supply provides 9 to 33 V DC before you switch on the supply voltage..

5. Extension and exchange

If the system is extended or if modules are exchanged the modules must be newly configured after installation. Therefore the USB drivers and the software Dataeagle Wizard must be installed on your PC and the radio module has to be connected to the PC.



Do not yet connect the USB cable to the PC!

5.1. Preparation

5.1.1. System requirements

You need a PC with:

- Operating system Windows 7, Vista, XP oder 2000.
- Microsoft Internet Explorer.
- Acrobat Reader.
- Decompression program (WinRAR, WinZIP or similar).
- One free USB interface.

5.1.2. Create a new folder

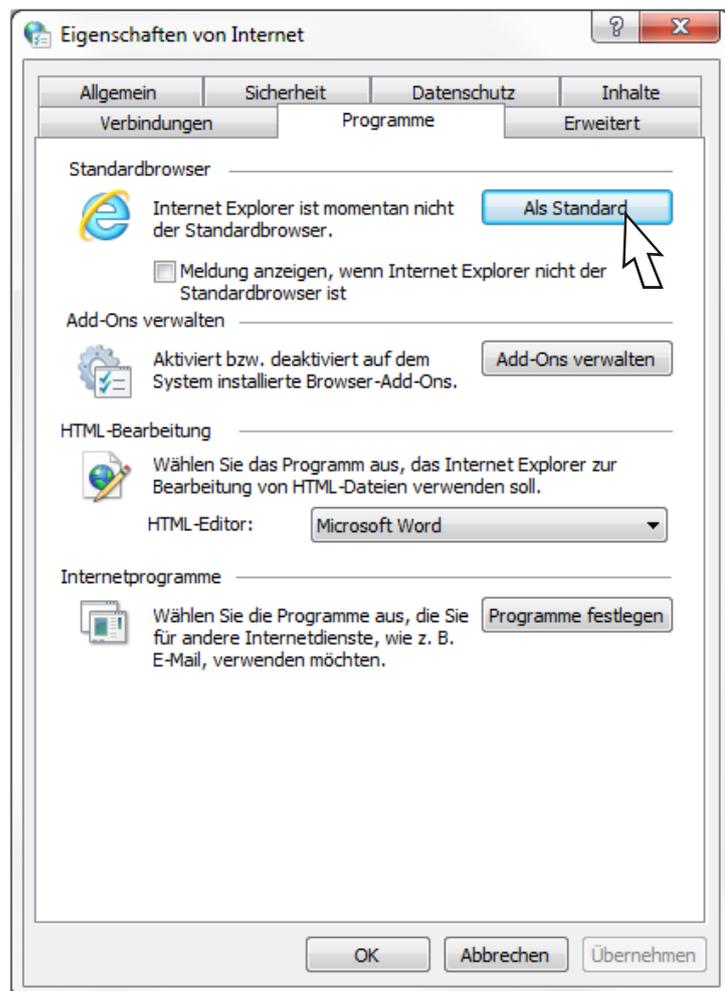
-  Create a new folder (e.g. Dataeagle).
-  Store the data which you will download in the next steps into this folder.

5.1.3. Microsoft Internet Explorer

To ensure a safe function it is important that you define Microsoft Windows Explorer as standard browser before you insert the CD ROM into the drive.

Only when Microsoft Internet Explorer is not the standard browser:

- ☞ Call the internet options via control panel.
- ☞ Define the Internet Explorer as standard browser.

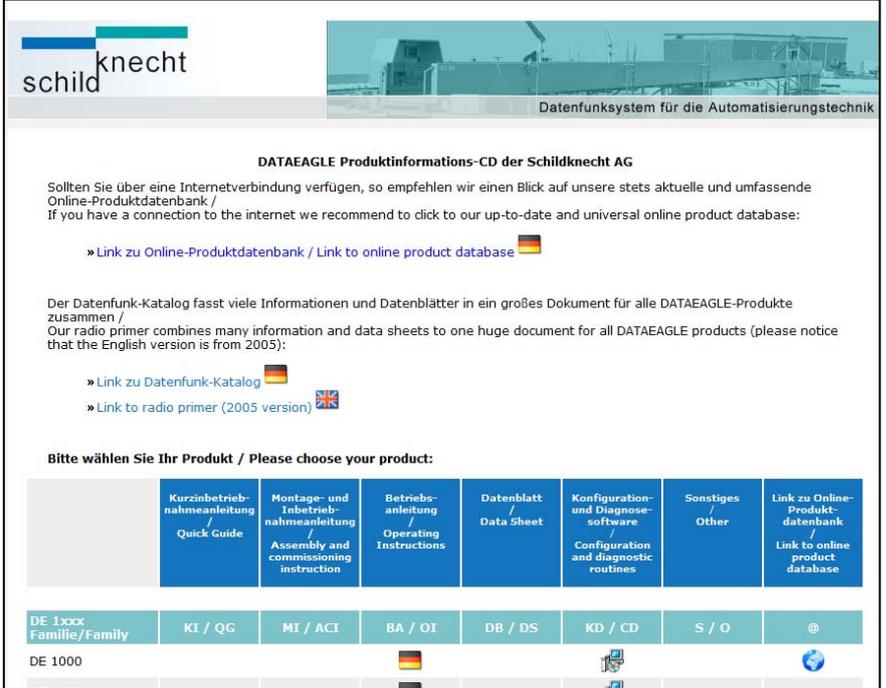


5.1.4. Install USB drivers

For data transmission between PC and radio module it is necessary to install the USB drivers.

☞ Insert the CD in your CD-ROM drive.

⇒ The browser shows the available documents and downloads for all Schildknecht products.



DATAEAGLE Produktinformations-CD der Schildknecht AG

Sollten Sie über eine Internetverbindung verfügen, so empfehlen wir einen Blick auf unsere stets aktuelle und umfassende Online-Produktdatenbank /
If you have a connection to the internet we recommend to click to our up-to-date and universal online product database:

» [Link zu Online-Produktdatenbank / Link to online product database](#) 

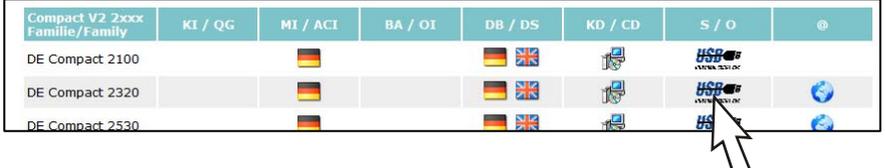
Der Datenfunk-Katalog fasst viele Informationen und Datenblätter in ein großes Dokument für alle DATAEAGLE-Produkte zusammen /
Our radio primer combines many information and data sheets to one huge document for all DATAEAGLE products (please notice that the English version is from 2005):

» [Link zu Datenfunk-Katalog](#) 
» [Link to radio primer \(2005 version\)](#) 

Bitte wählen Sie Ihr Produkt / Please choose your product:

	Kurzinbetriebnahmeanleitung / Quick Guide	Montage- und Inbetriebnahmeanleitung / Assembly and commissioning instruction	Betriebsanleitung / Operating Instructions	Datenblatt / Data Sheet	Konfiguration- und Diagnose-Software / Configuration and diagnostic routines	Sonstiges / Other	Link zu Online-Produktdatenbank / Link to online product database
DE 1xxx Familie/Family	KI / QG	MI / ACI	BA / OI	DB / DS	KD / CD	S / O	@
DE 1000							
DE 1100							

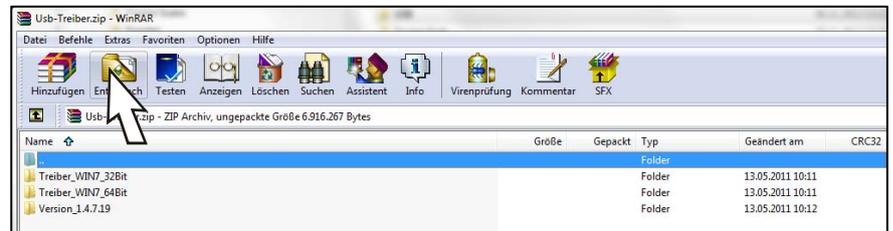
☞ Scroll until you find your product, e.g. DE Compact 2320.



Compact V2 2xxx Familie/Family	KI / QG	MI / ACI	BA / OI	DB / DS	KD / CD	S / O	@
DE Compact 2100				 			
DE Compact 2320				 			
DE Compact 2530				 			

☞ Click on 

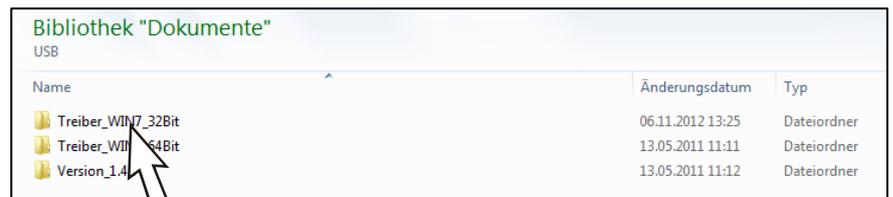
⇒ The installed decompression program is started and the available files are shown.



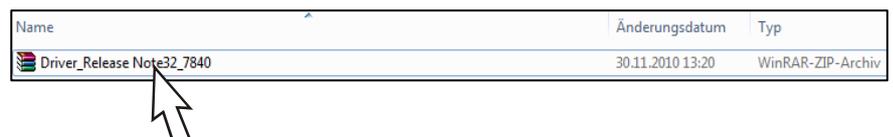
☞ Unpack the files into the previously created folder.

☞ Open the folder.

⇒ All available drivers are shown.

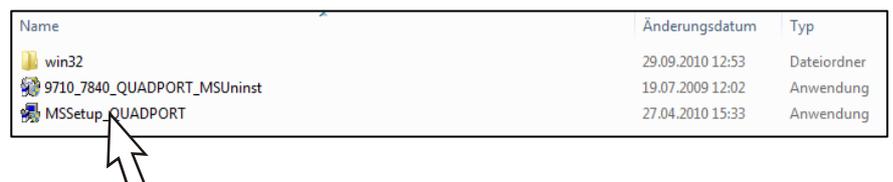


☞ Open the folder which fits to your operating system, e.g. Treiber_WIN7-32Bit if you have installed the 32 bit version of Windows 7.



☞ Unpack the files into the same folder and open the folder.

☞ Click through the folder until you find the file MSSetup_QUADPORT.



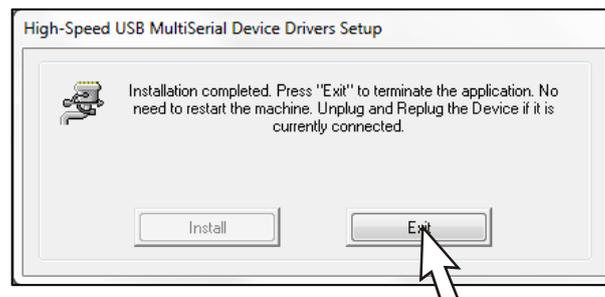
☞ Start the installation.

⇒ The installation program is started.



☞ Click on „Install“.

⇒ The USB drivers are loaded. Finally appears:



☞ Click on „Exit“.

The USB drivers are now installed. After the PC is connected to the radio module you may check in the device manager whether the COM ports have been installed correctly. One of these COM ports is the port for the configuration. Because the operating system assigns the ports freely it is not possible to foresee which one is assigned.

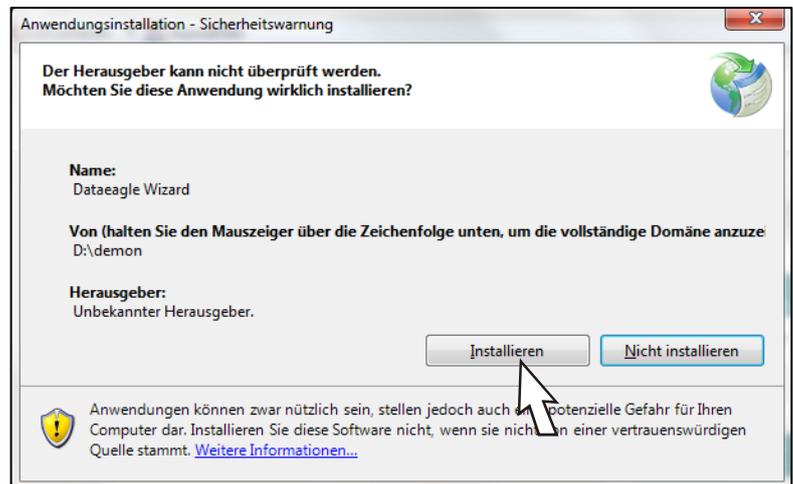
5.1.5. Install Dataeagle Wizard

☞ Select your product in the browser, e.g. DE Compact 2320.

Compact V2 2xxx Familie/Family	KI / QG	MI / ACT	BA / OI	DB / DS	KD / CD	S / O	@
DE Compact 2100							
DE Compact 2320							
DE Compact 2530							

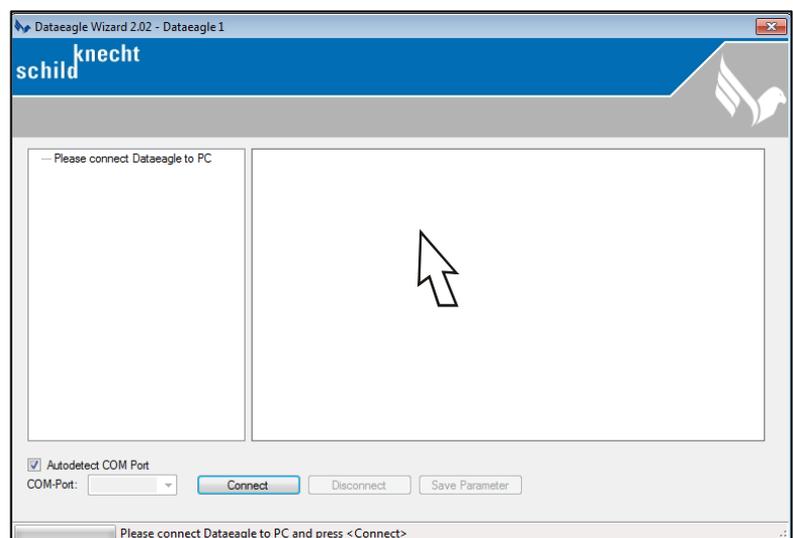
☞ Click on 

⇒ The installation program is started.



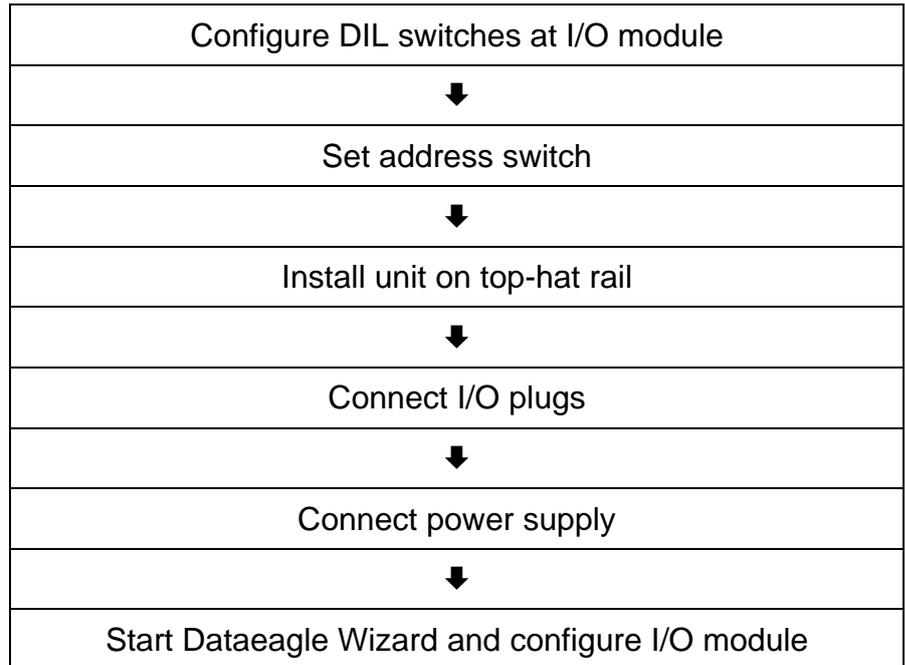
☞ Click on „Install“.

⇒ The program is loaded and started:



5.2. Extension

The extension with additional I/O modules is carried out according to the procedure shown below:



**In case of limited space in the control cabinet:
Connect the power supply before you install the module
on the top-hat rail.**

5.2.1. Configure DIL switches

Configure the DIL switches - see chapter 4.2.

5.2.2. Set address switch

 Set the address switch to the correct address:

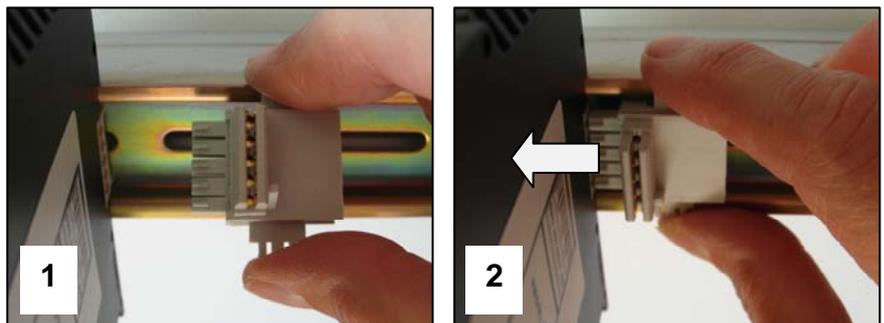
- 2 for the second I/O module
- 3 for the third I/O module



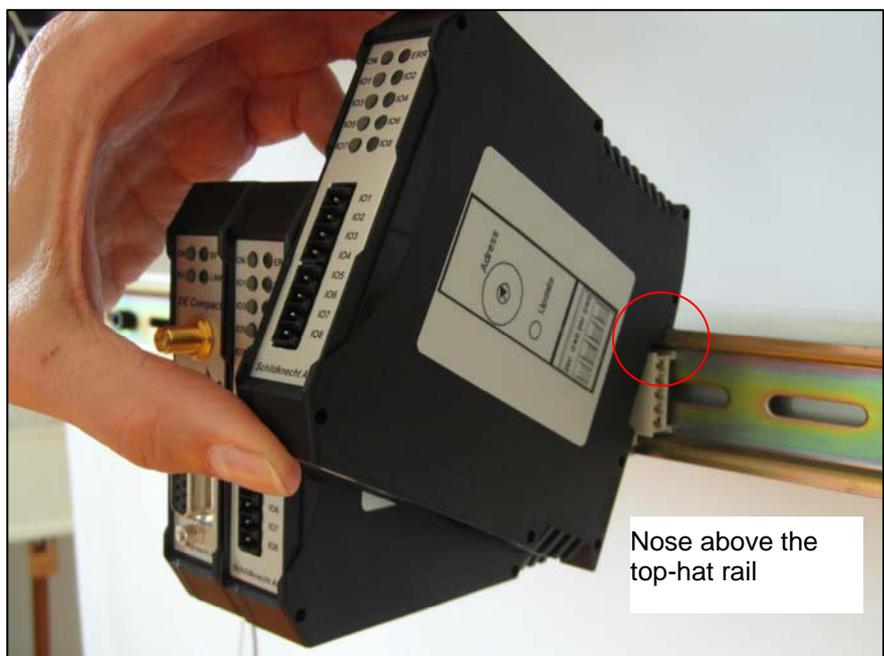
5.2.3. Install module on top-hat rail

 Clip the T-bus plug on the top-hat rail (1).

 Connect the T-bus plugs (2).

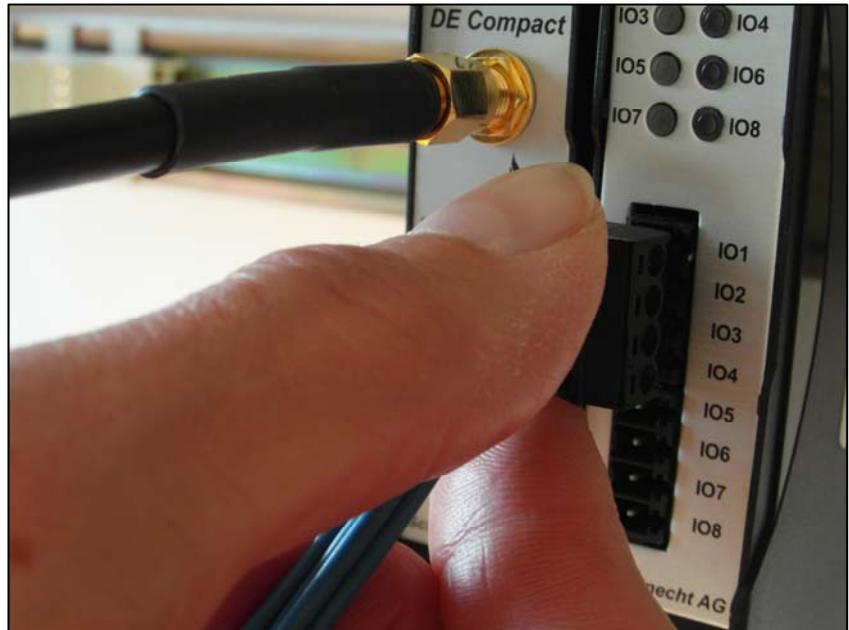


 Place the module diagonally from above on the top-hat rail and press the module strongly downwards.



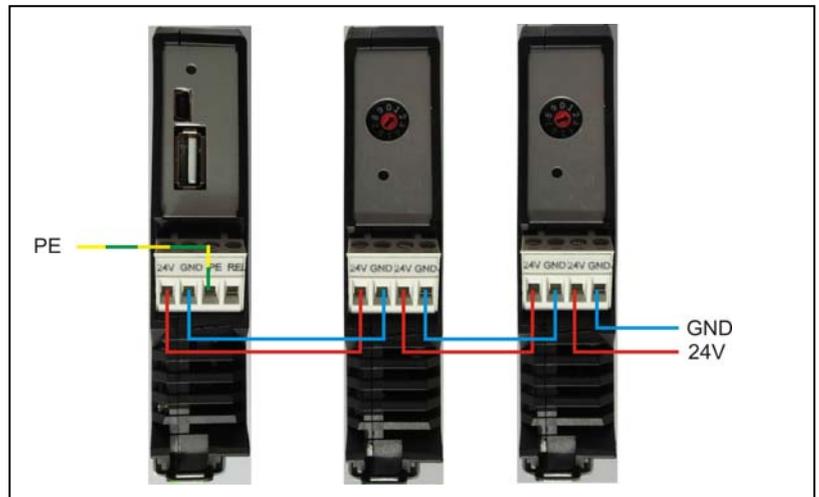
5.2.4. Install I/O plug

- ☞ Attach the I/O plug onto the according I/O sockets at the I/O module.



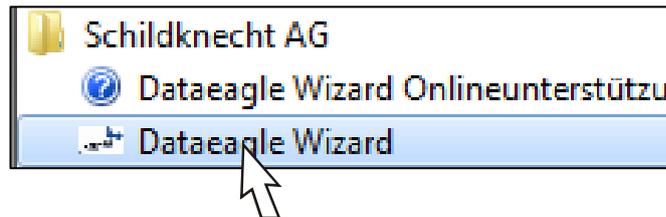
5.2.5. Connect power supply

- ☞ Connect the power supply according to the diagram shown below. The 24 V supply of the control cabinet can be used.



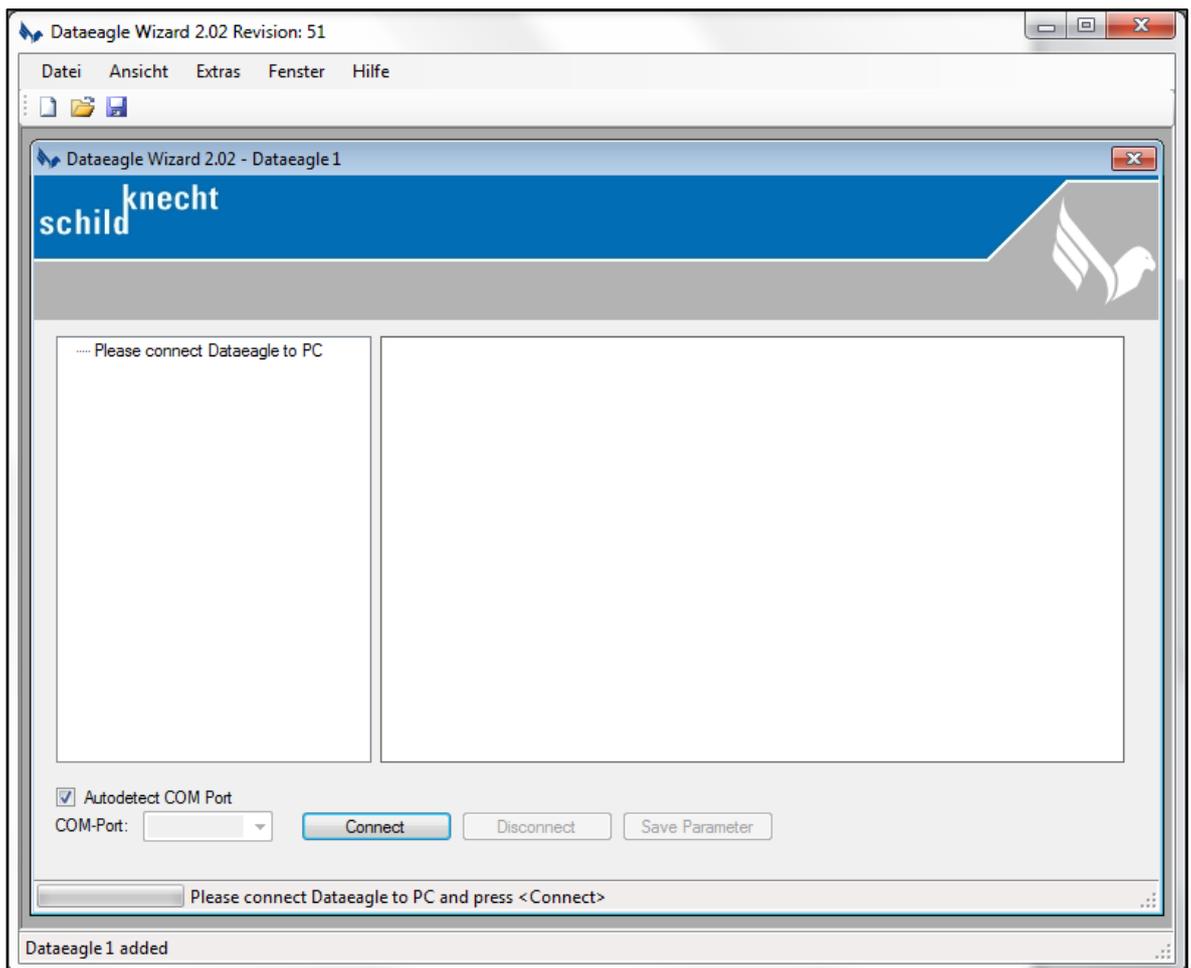
5.2.6. Start Dataeagle Wizard and configure I/O module

 Start the Dataeagle Wizard.



The Dataeagle Wizard is stored in the folder „Schildknecht AG“ during installation.

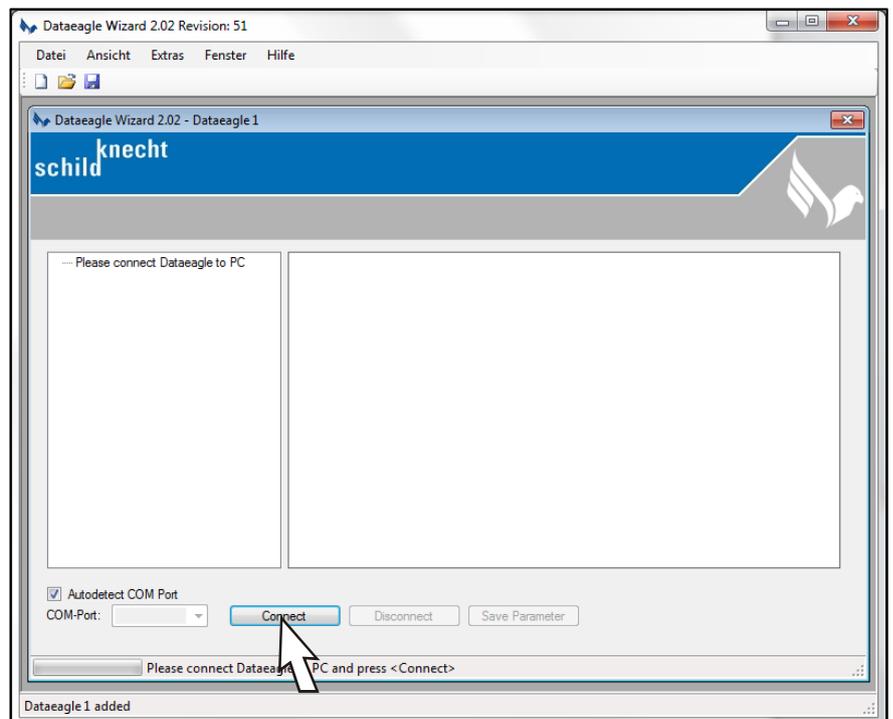
The start screen appears:



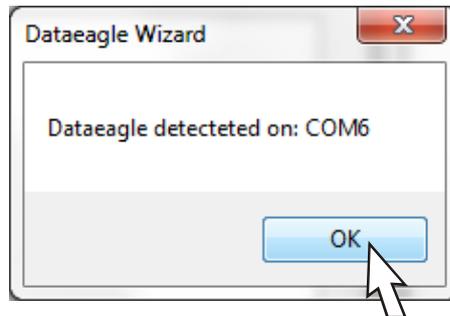
☞ Connect the radio module with an USB cable to the PC.



☞ Click on „Connect“

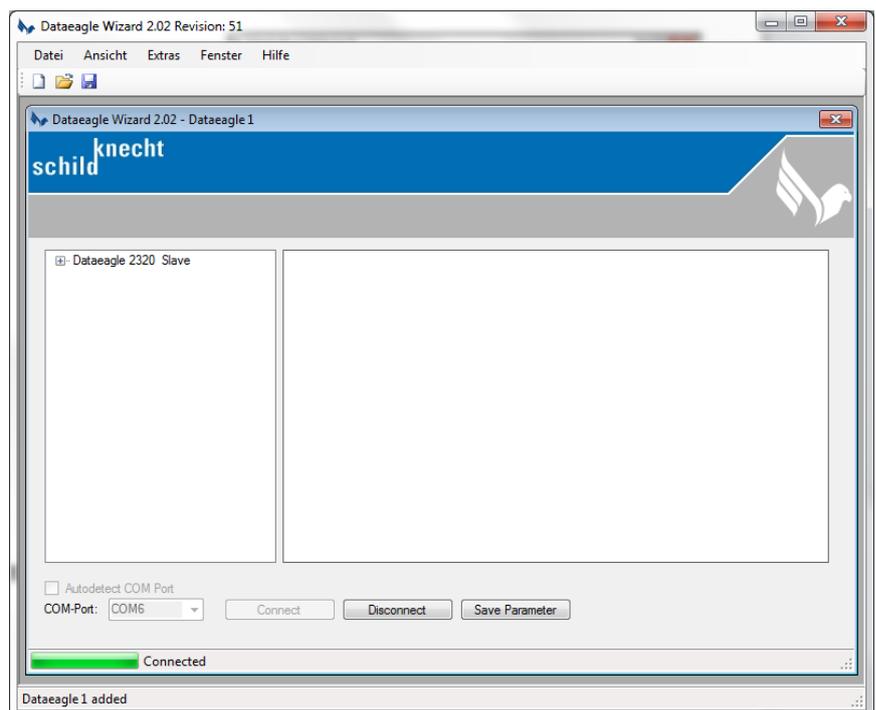


After the radio module is detected the following message appears:



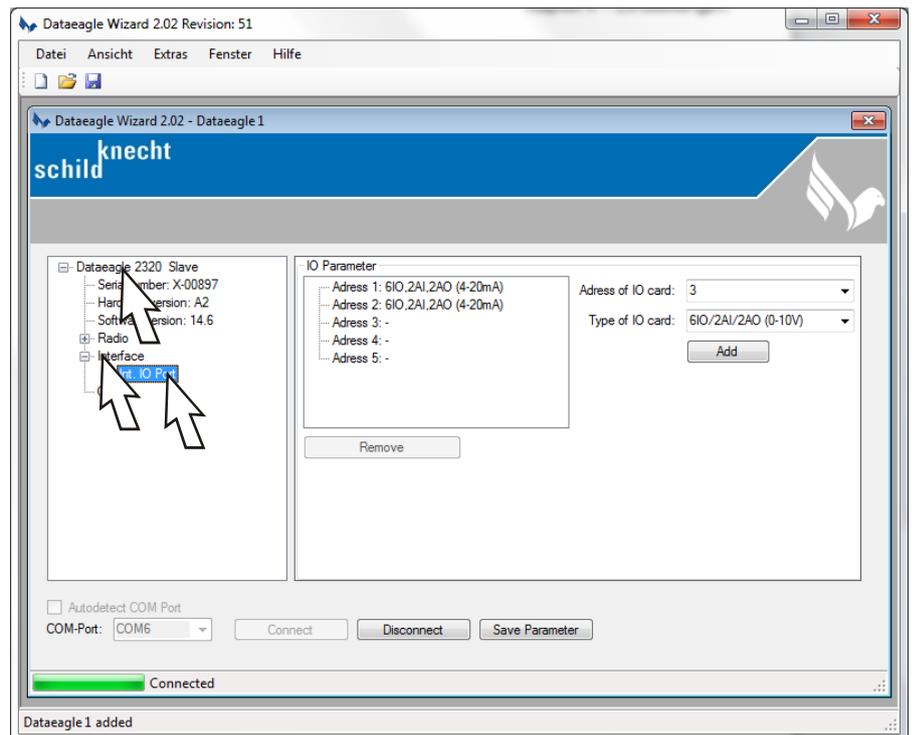
☞ Acknowledge with „OK“.

The radio module is shown, e.g. Dataeagle 2320.



- ☞ Double-click on the device name, then double-click on „Interface“ and double-click on „Int. IO Port“.

The current configuration of the I/O modules is shown:

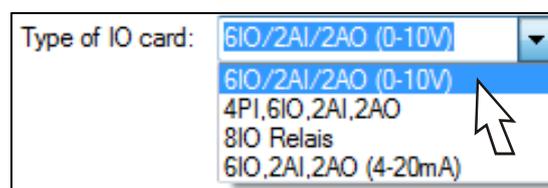


In this example two I/O modules are already installed and a third one is added.

The address of the new I/O module is shown to the right of „Adress of IO card“.

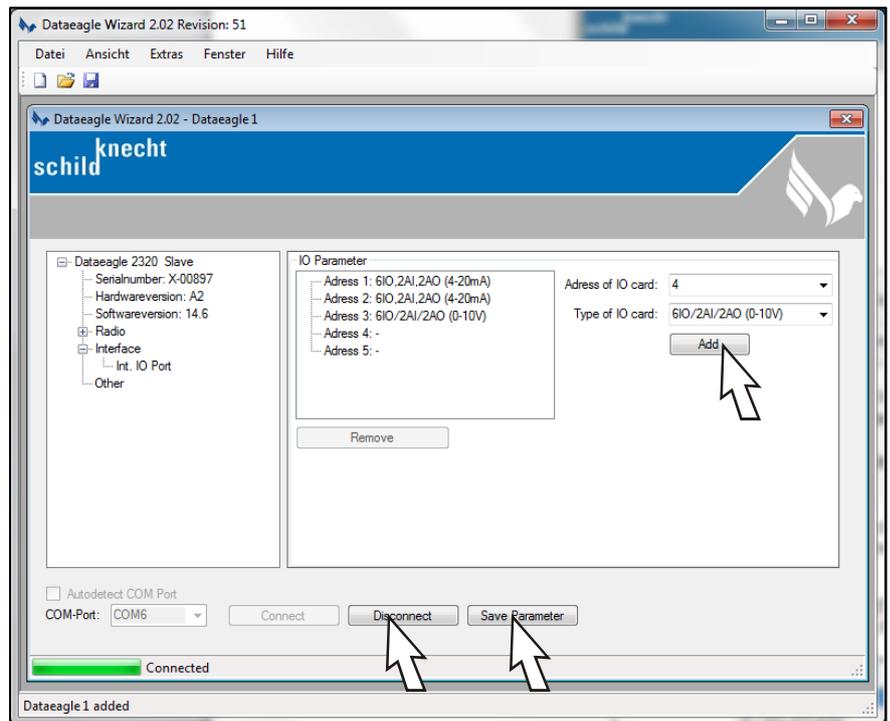
Ensure that the address switch at the I/O module matches the shown address.

- ☞ Click on „Type of IO card“ and select the desired I/O module, e.g. 6IO/2AI/2AO (0-10V)



 Click on „Add“.

The new I/O module is shown.



 Click on „Save Parameter“.

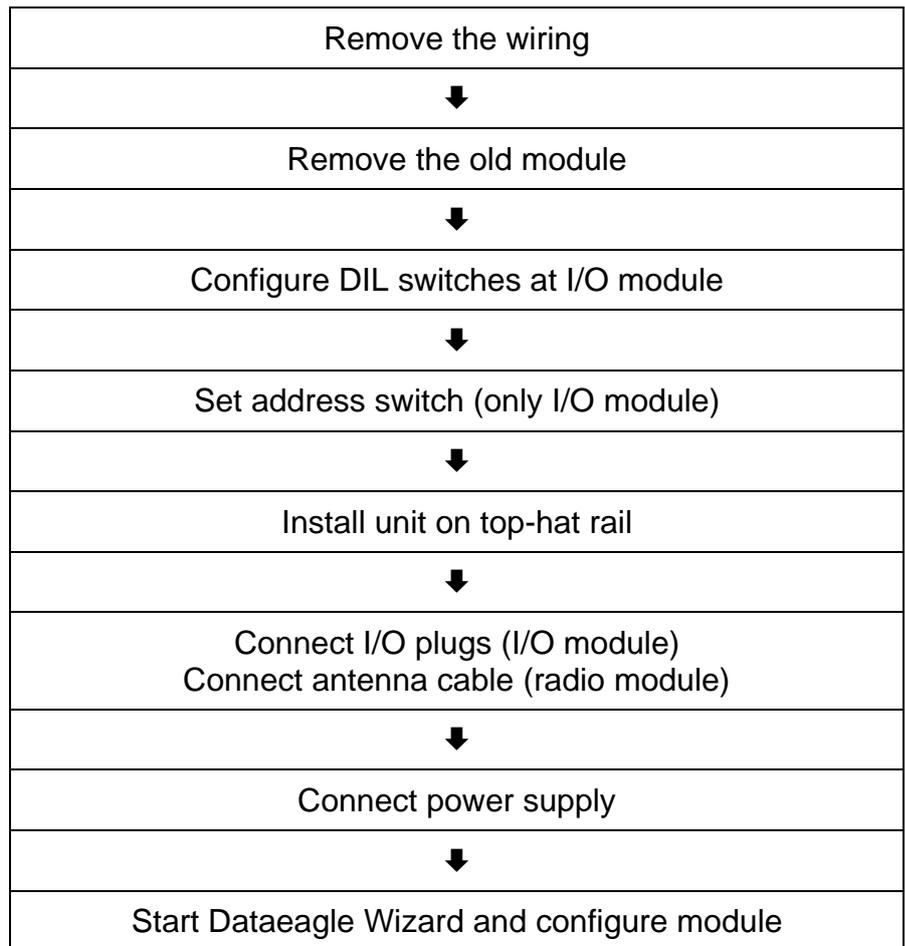
The new configuration is saved.

 Click on „Disconnect“.

The new I/O module is configured.

5.3. Exchange

The exchange of a module is carried out according to the procedure shown below:



**In case of limited space in the control cabinet:
Connect the power supply before you install the module
on the top-hat rail.**

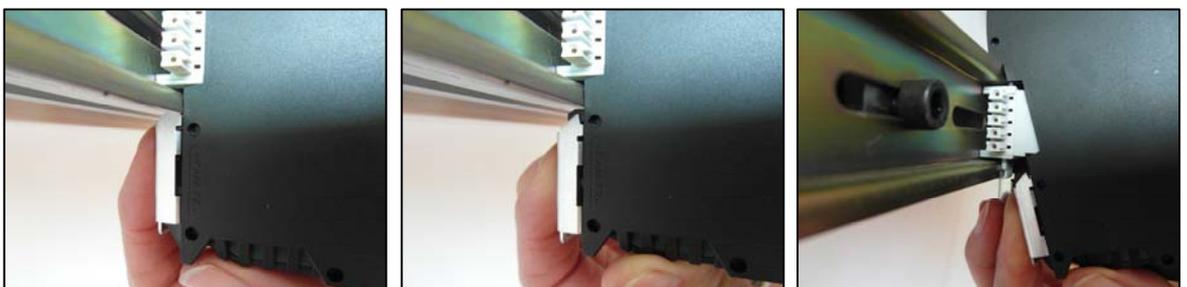
5.3.1. Remove the wiring

- ☞ Remove the I/O plug (when exchanging an I/O module) or remove the antenna cable (when exchanging a radio module).
- ☞ Remove the power supply (best with a small screw driver).



5.3.2. Remove the old module

- ☞ Pull the foot catch downwards and tilt the module upwards.



5.3.3. Configure DIL switches – only I/O modules

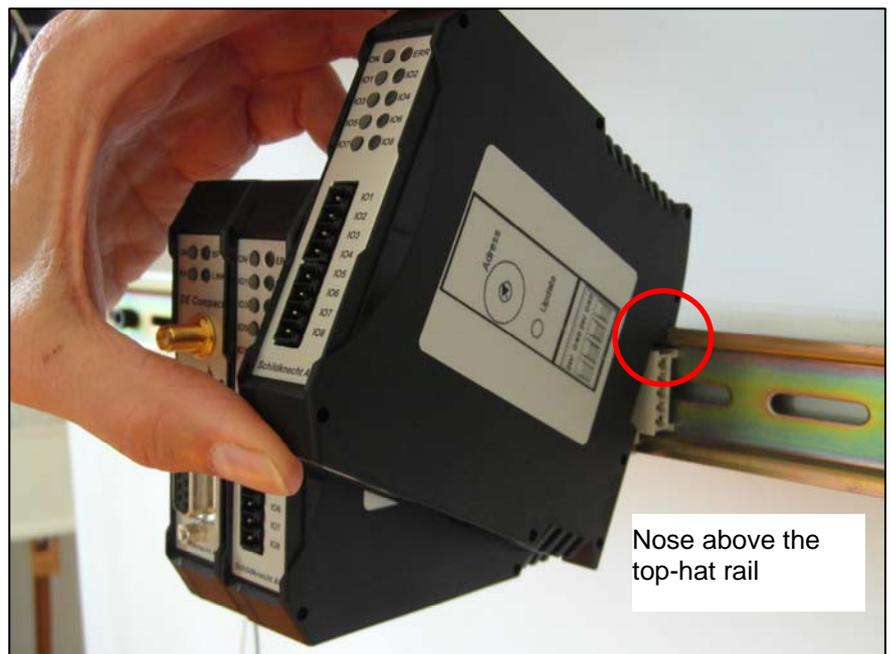
 Configure the DIL switches - see chapter 4.2

5.3.4. Set address switch - only I/O modules

 Set the address switch to the correct address – see chapter 5.2.2. The address must match the address of the exchanged module.

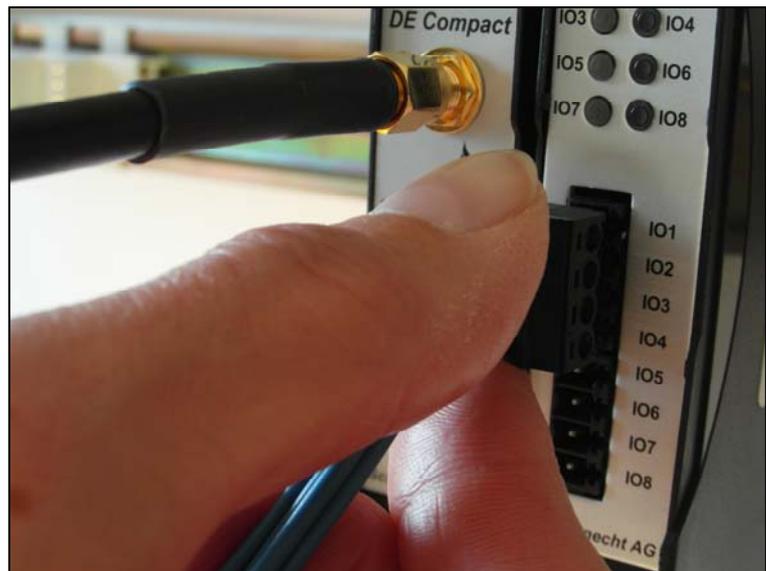
5.3.5. Install module on top-hat rail

 Place the module diagonally from above on the top-hat rail and press the module strongly downwards.



5.3.6. Install I/O plug or antenna cable

- ☞ Attach the I/O plug onto the according I/O sockets at the I/O module or connect the antenna cable to the antenna connection of the radio module.



 **CAUTION**

The radio module may be damaged if the antenna cable is fastened too tight.

Connect the antenna cable only hand-tight.

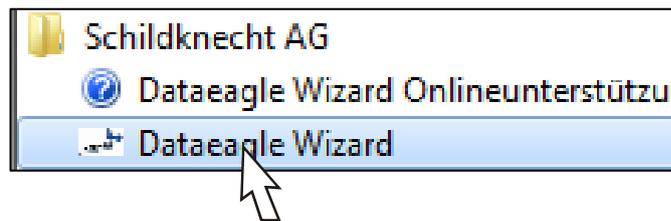
5.3.7. Connect power supply

- ☞ Re-connect the power supply.

5.3.8. Start Dataeagle Wizard

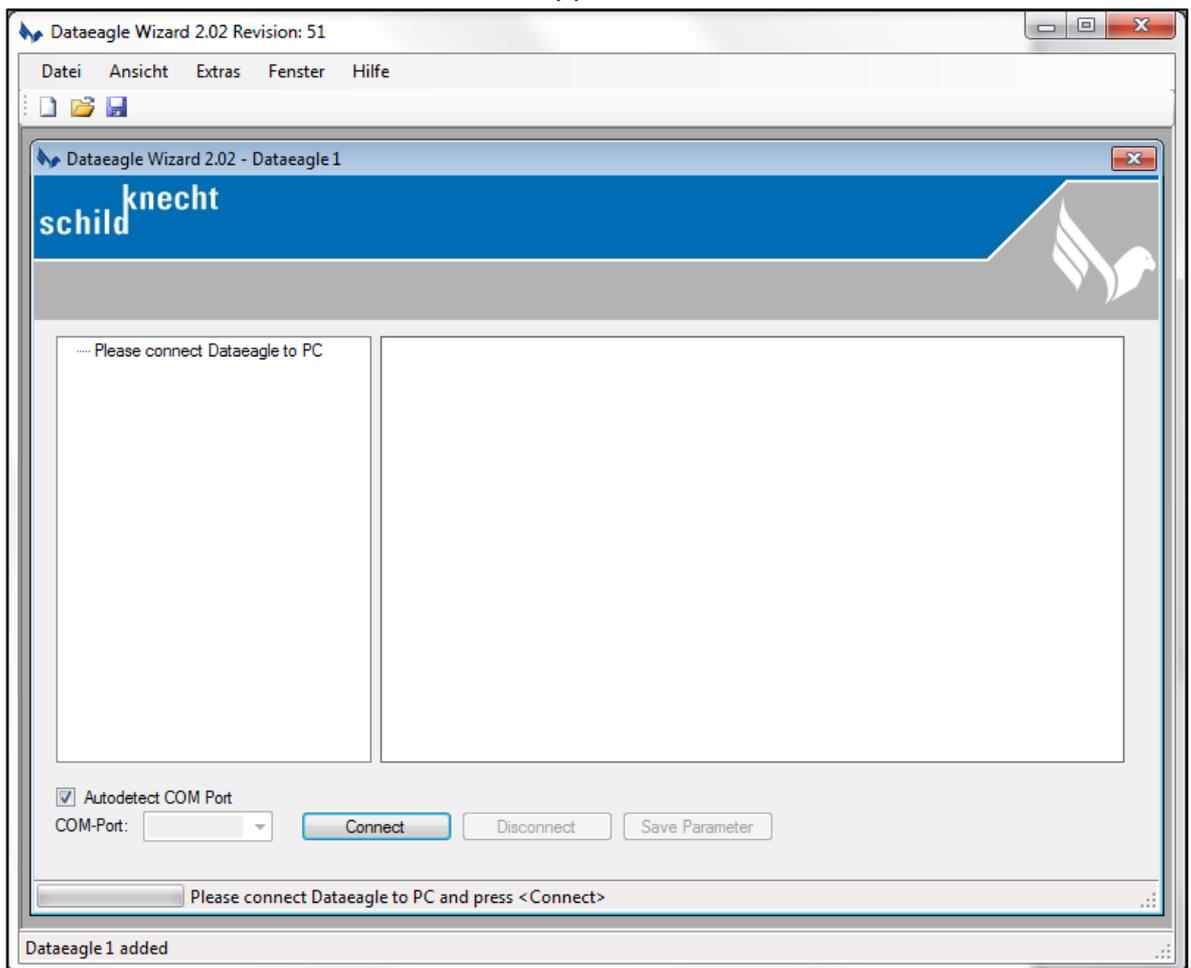
No configuration with the Dataeagle Wizard is necessary when an I/O module has been exchanged.

☞ Start the Dataeagle Wizard.



The Dataeagle Wizard is stored in the folder „Schildknecht AG“ during installation.

The start screen appears:



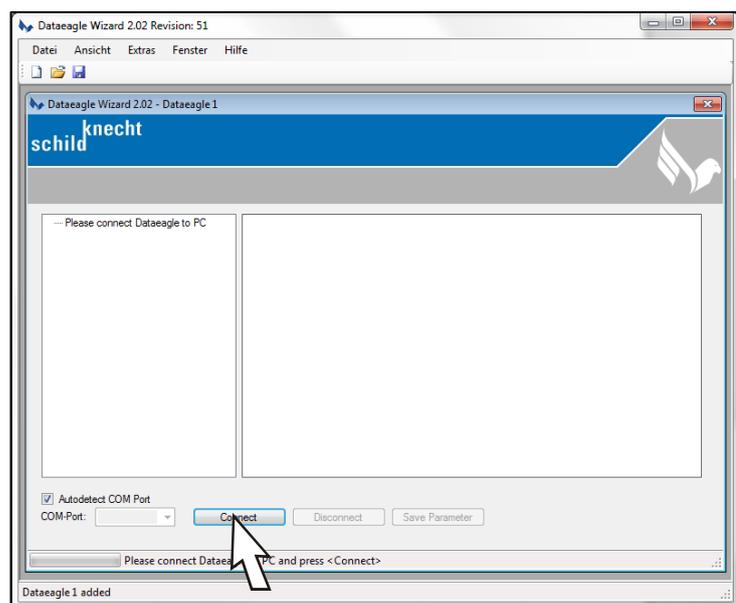
5.3.9. Which one is the Master, and which one the Slave?

In each radio system one radio module is defined as Master and the other one as Slave. In case you don't know which module is defined as Master and which one as Slave you have to carry out the following steps:

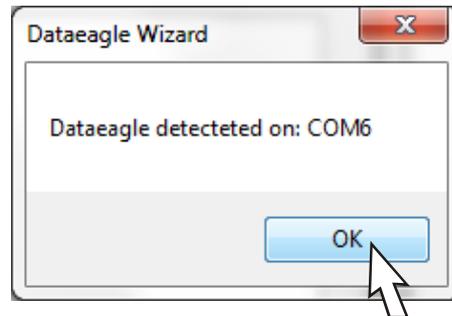
- ☞ Connect the radio module **which has not been exchanged** with the USB cable to the PC.



- ☞ Click on „Connect“

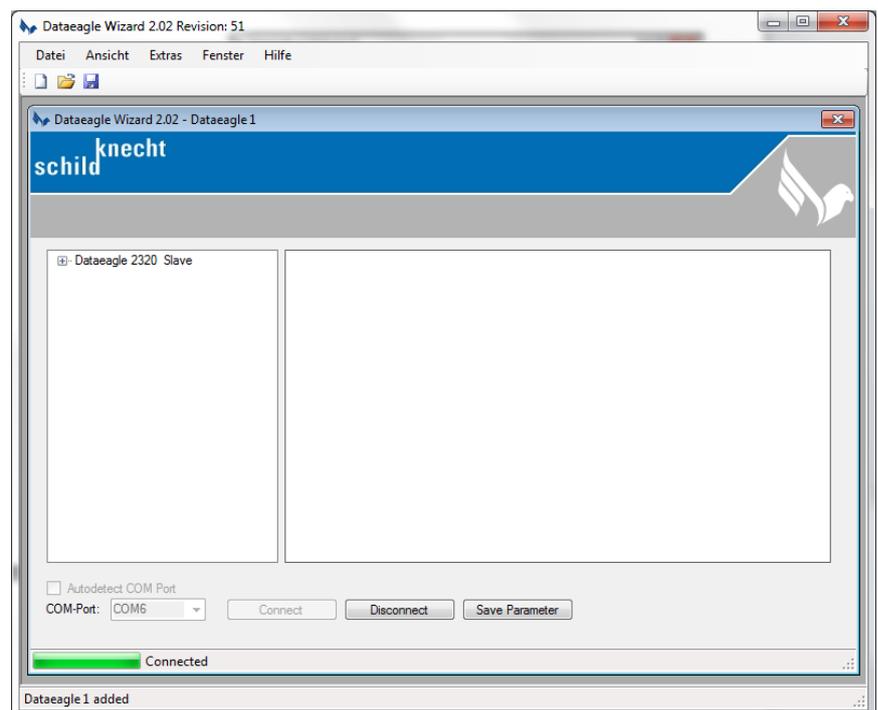


After the radio module is detected the following message appears:



☞ Acknowledge with „OK“.

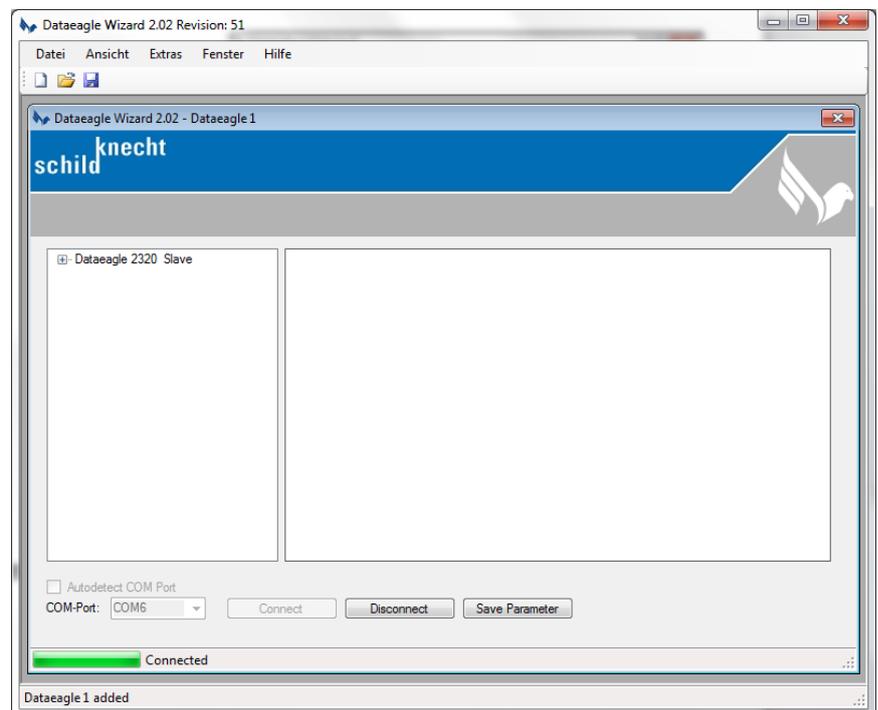
The radio module is shown, e.g. **Dataeagle 2320 Slave**.



This means that the exchanged radio modem must be configured as **Master**.

- ☞ Now connect the radio module **which has been exchanged** with the USB cable to the PC.
- ☞ Click on „Connect“.
- ☞ Acknowledge with „OK“.

The newly installed radio module is shown.



If, for example Dataeagle 2320 **Master** is shown, continue with chapter 5.3.10.

If, for example Dataeagle 2320 **Slave** is shown, you must configure the radio module as **Master**.

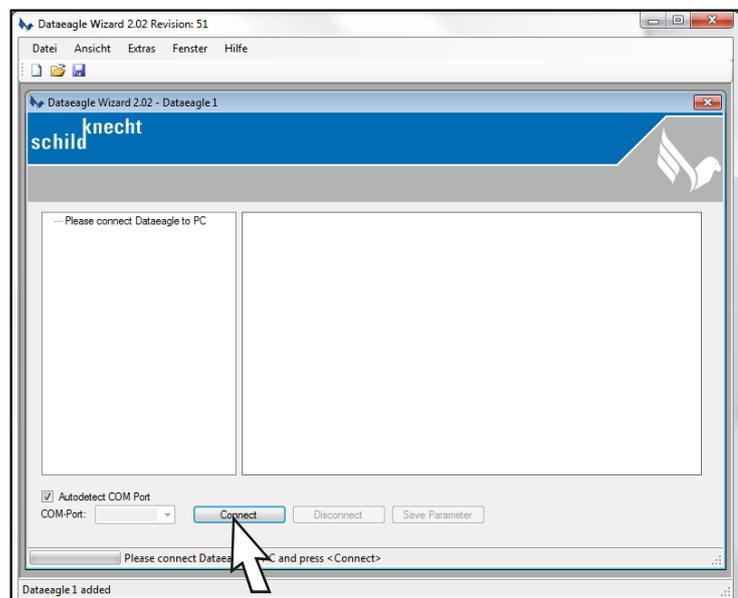
- ☞ Please contact the product specialists at Schildknecht AG. We will lead you step by step through the configuration.

5.3.10. Configure radio module

- ☞ Connect the radio module **which has not been exchanged** with the USB cable to the PC.



- ☞ Click on „Connect“

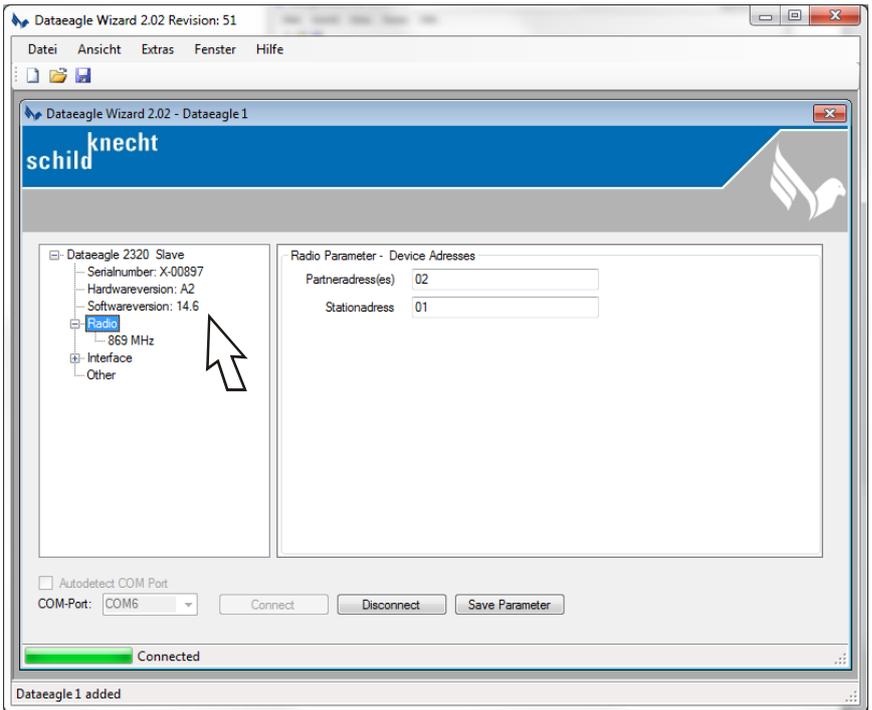


☞ Double-click on the device name and then double-click on „Radio“.

The radio module addresses are shown:

Station address =
Address of the radio module to which you are currently connected.

Partner address =
Address of the radio module which you have just exchanged.



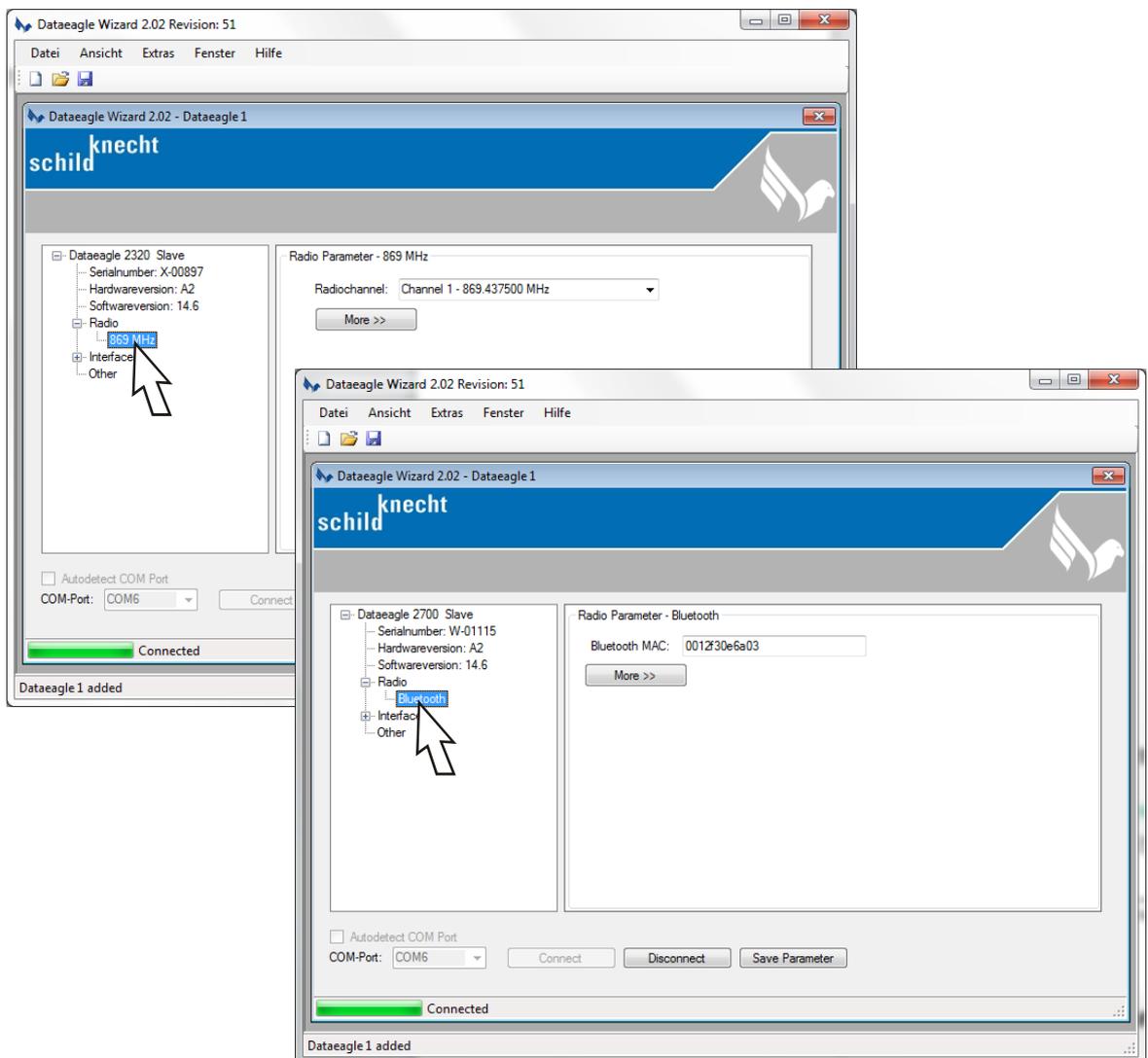
☞ Note both addresses, e.g. station address 01, partner address 02.

The further procedure depends on the type of the radio module (DEC 2320 with 869 MHz or DEC 2700 Bluetooth) and whether the Master or the Slave was exchanged.

Procedure for the exchange of a DEC 2320 with 869 MHz (Master or Slave) or a DEC 2700 Bluetooth Slave.

- ☞ Click once on „869 MHz“ (for DEC 2320) or on “Blue-tooth” (for DEC 2700).

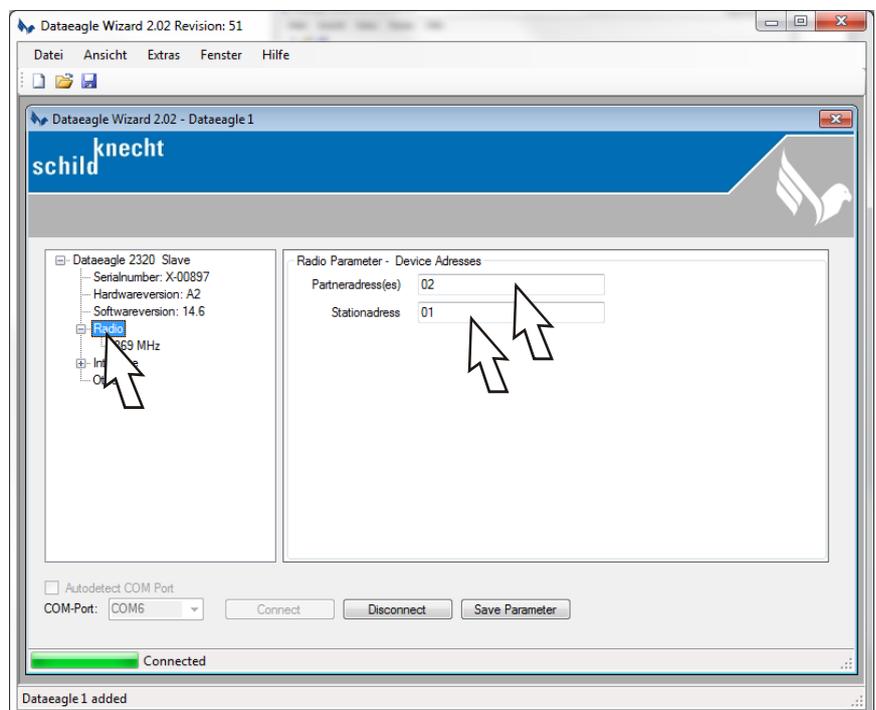
The set channel or the Bluetooth MAC address is shown:



- ☞ Note the channel, e.g. Channel 1 or the Bluetooth MAC address, e.g. 0012f30e6a03

- ☞ Now connect the radio module **which has been exchanged** with the USB cable to the PC.
- ☞ Click on „Connect“.
- ☞ Acknowledge with „OK“.
- ☞ Double-click on the device name and then double-click on „Radio“.

The radio module addresses are shown:



- ☞ Enter the correct addresses.

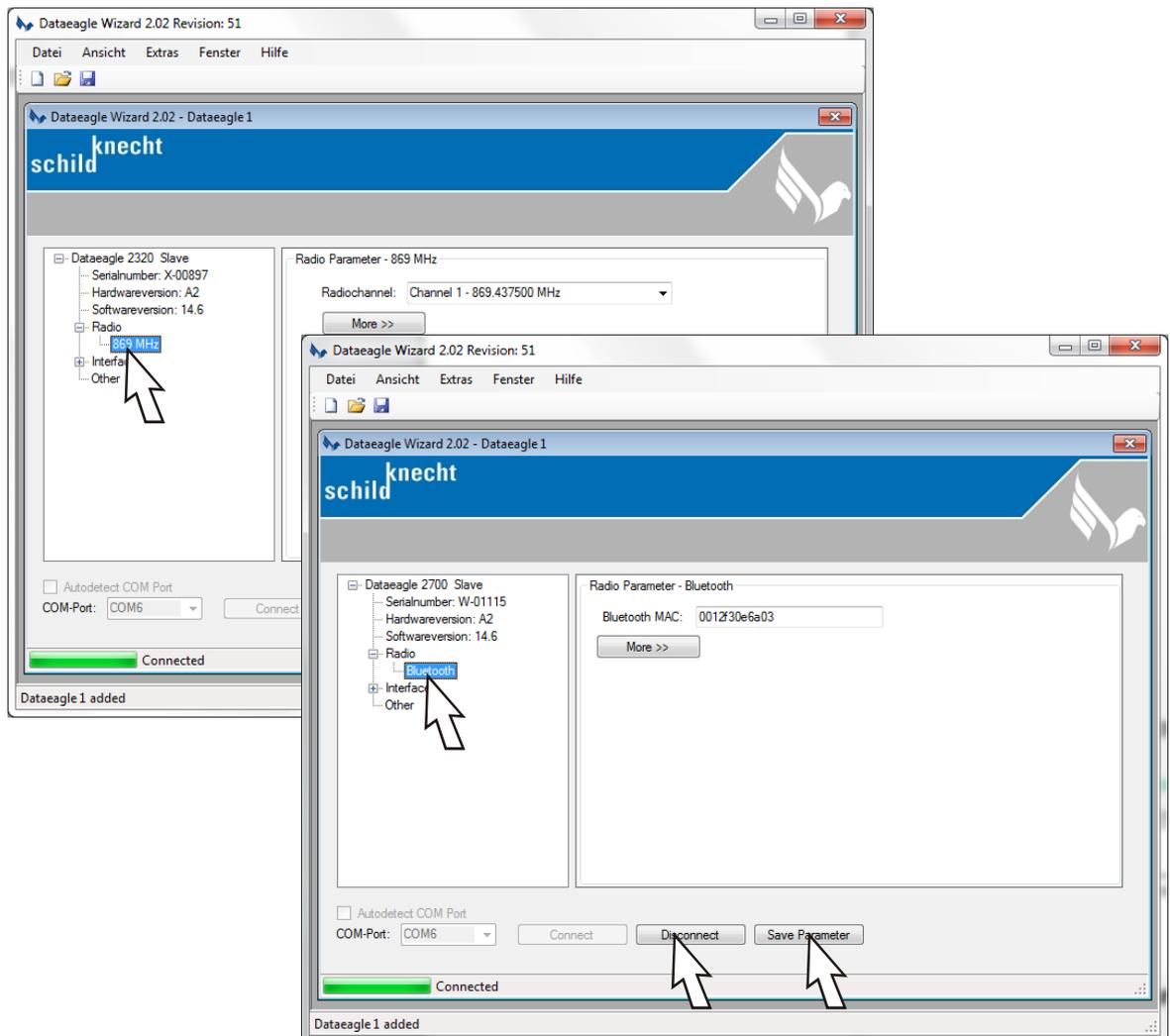
The other radio module had the addresses:
Station address 01 und Partner address 02.

Therefore you have to enter Station address 02 and Partner address 01.

Of course you may assign other Station and Partner addresses. The addresses must only correspond to each other.

- ☞ Click once on „869 MHz“ (for DEC 2320) or on “Blue-tooth” (for DEC 2700).

The set channel or the Bluetooth MAC address is shown:

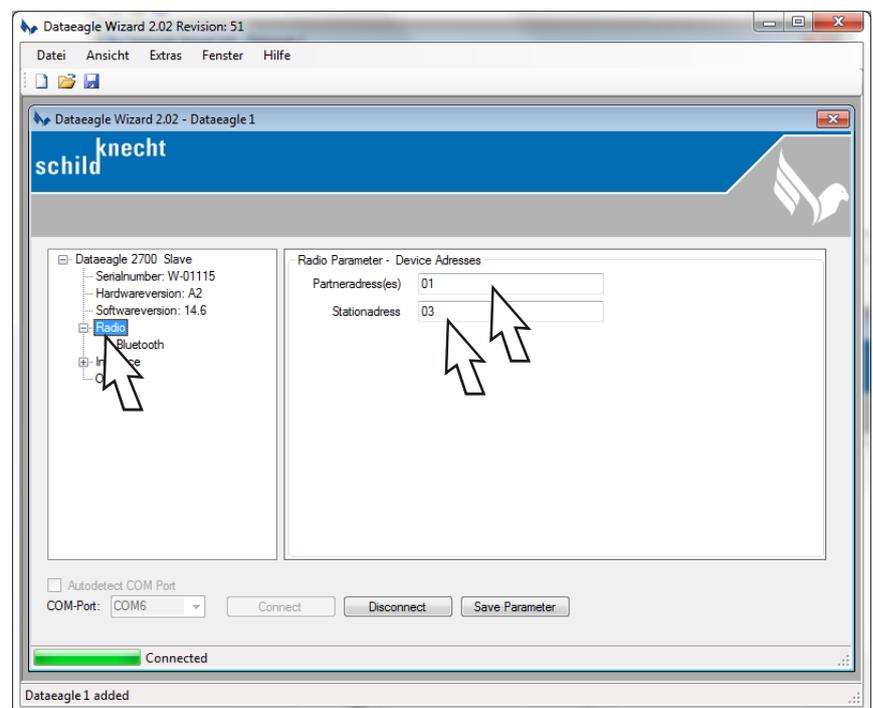


- ☞ Enter the channel you have noted before, e.g. Channel 1 (for DEC 2320) or enter the Bluetooth MAC address you have noted before, e.g. 0012f30e6a03 (for DEC 2700).
- ☞ Click on „Save Parameter“.
- ⇒ The new configuration is saved.
- ☞ Click on „Disconnect“.
- ⇒ The configuration is finished.

Procedure for the exchange of a DEC 2700 Bluetooth Master.

- ☞ Connect the radio module **which has been exchanged** with the USB cable to the PC.
- ☞ Click on „Connect“.
- ☞ Acknowledge with „OK“.
- ☞ Double-click on the device name and then double-click on „Radio“.

The radio module addresses are shown:



- ☞ Enter the correct addresses.

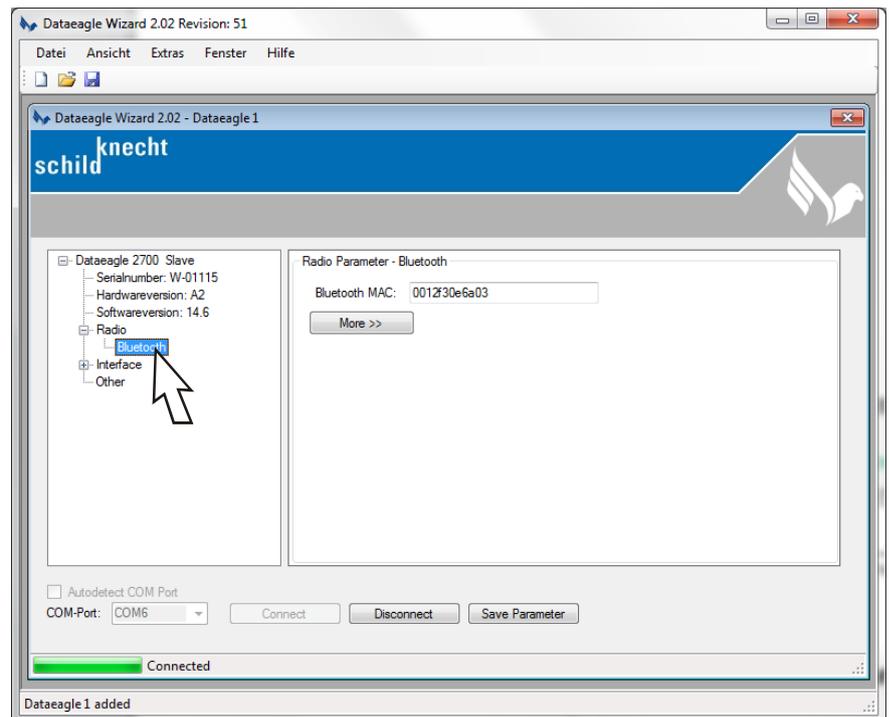
The other radio module had the addresses:
Station address 01 und Partner address 02.

Therefore you have to enter Station address 02 and Partner address 01.

Of course you may assign other Station and Partner addresses. The addresses must only correspond to each other.

☞ Click once on “Bluetooth” (for DEC 2700).

The Bluetooth MAC address is shown:



☞ Note the Bluetooth MAC address, e.g. 0012f30e6a03.

☞ Click on „Save Parameter“.

⇒ The new configuration is saved.

☞ Click on „Disconnect“.

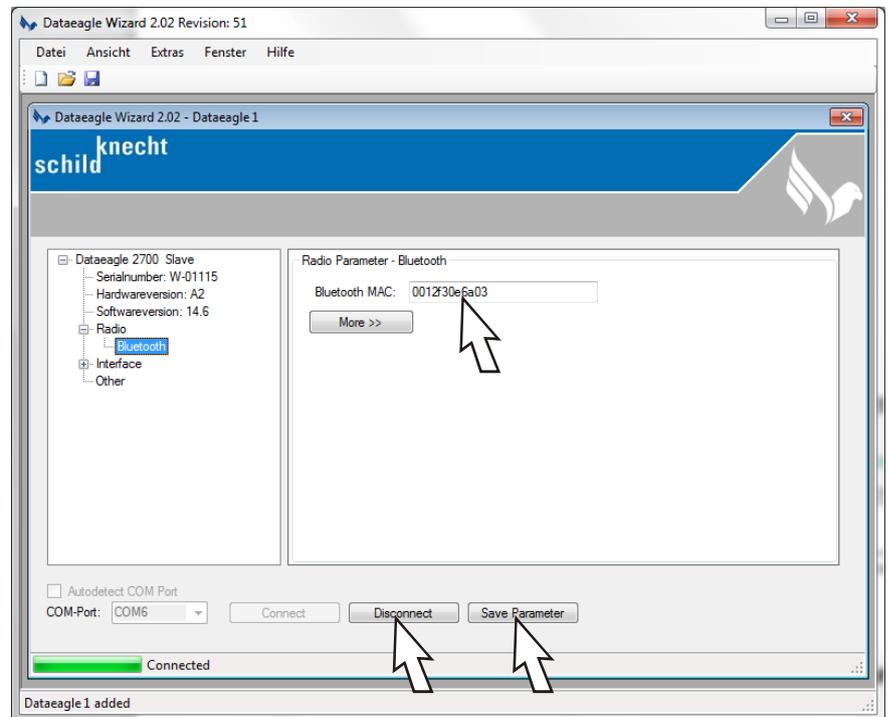
☞ Now connect the radio module **which has not been exchanged** with the USB cable to the PC.

☞ Click on „Connect“.

☞ Acknowledge with „OK“.

☞ Double-click on the device name, double-click on „Radio“ and click once on „Bluetooth“.

⇒ The Bluetooth MAC address is shown:



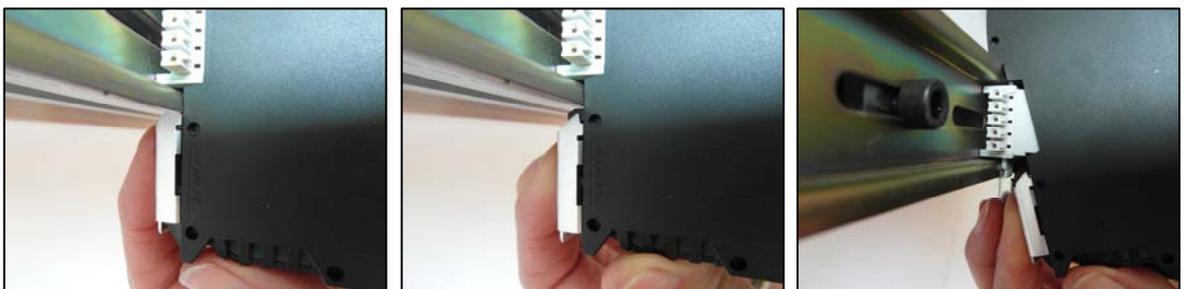
- ☞ Enter the Bluetooth MAC address you have noted before, e.g. 0012f30e6a03.
- ☞ Click on „Save Parameter“.
- ⇒ The new configuration is saved. .
- ☞ Click on „Disconnect“.
- ⇒ The configuration is finished.

6. Dismantling and disposal

- ☞ Remove the I/O plugs and the antenna cable.
- ☞ Remove the power supply (best with a small screw driver).



- ☞ Pull the foot catch downwards and tilt the module upwards.



☞ Remove the T-bus plug.



☞ Dispose the devices correctly.



Observe the applicable local waste disposal regulations and legislation when disposing the devices.

7. Tips and Tricks

7.1. *Improving the EMC safety*

7.1.1. Introduction

The wireless data systems DATAEAGLE are electronic devices which are built according to the latest state of technology. The ruggedly mechanical structure as well as the construction of the electronic components is designed for industrial applications.

Nevertheless some measurements have to be taken during installation, which are important for an error free operation. If these are not observed, the measurements which have been taken within the devices for achieving a higher interference resistance and surge immunity will become partly inefficient. The interference resistance of the complete system depends highly on the correct installation, place of installation and wiring. Before installation, always check which installation instructions are required by the supplier of the controller for a safe operation. These instructions should be consistent with the recommendations given here.

7.1.2. Basic guidelines

Grounding

Noise voltages which are injected by supply and signal lines into the device as well as electrostatic voltages caused by contact will be discharged to the grounding point. The grounding point has to be connected with a preferably short copper cable (with little resistance) to the protective earth conductor connection of the device.

Shielding	<p>Use always screened cables for the interface cable and the supply cable. Thereby you reduce the interference probability by a ratio of 100 compared to unshielded cables and even up to a ratio of 1000 if you also avoid loops.</p> <p>The density of the shield netting should be at least 85%. To avoid that the injected interference current on the shielded cable becomes a source of interference itself, a connection with low impedance to the grounding point is very important.</p> <p>Connect the shield always on both sides to EMC grounding (in general PE).</p>
Bus and power cables	<p>Place the bus cables at least 20 cm away from the power cables, if possible in separate cable ducts</p>
Unused leads	<p>Connect all unused leads of a cable always on both sides to PE.</p>
Plug housing	<p>Use metallic or metallised plug housing. The shielding of the cable should always be connected to the plug housing.</p>
Mounting plate	<p>Always mount all electronic devices on a galvanized mounting plate in the control cabinet. This mounting plate functions as EMC earth (neutral point) and is significant for the interference suppression. That is the only way the interference energy can flow back to the source of interference. Avoid coated surfaces such as Eloxal, yellow chromated.</p> <p>A sufficient discharge of the HF fields through the PE net is not possible due to the high cable impedance. Therefore the PE net cannot be compared with EMC earth, even though they are directly electrically connected.</p>

Connections to EMC earth

Design all connections with EMC earth as short as possible and as extensive as possible. Pay attention that all metallic housings have good contact to the galvanized mounting surface.

Housing for sources of interference

Pay attention that all electronic or electric parts which should be considered as possible source of HF interferences are installed in a closed metallic housing.

Protective earth conductor

Run the protective earth conductors of the individual system components star-shaped towards the potential equalization rail. Thereby you avoid that interferences are injected by PE loops which act as antennas. Unfavourable earth protection connections and loops may bridge EMC measurements and will make them inefficiently

Control cabinet wiring

Pay unconditional attention to a separation of N (neutral conductor) and PE (earth protection) inside the control cabinet. Measure with a clamp-on ammeter if equalizing currents flow across the PE control cabinet cable. Here, no currents should flow permanently.

Legend

Geschirmte Profibusleitung
= screened Profibus cable

Potentialausgleichsleitung
= potential equalization cable

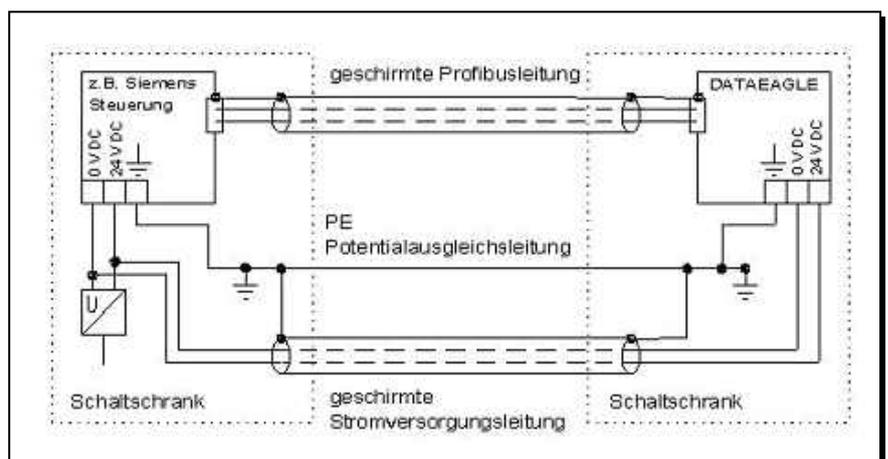


Fig. 5.1: Control cabinet wiring

In highly disturbed environmental conditions, which may occur for example in industry buildings with induction furnaces we recommend a PE free installation (see illustration). The galvanized mounting plate cannot be grounded due to the high voltage drop of the different grounding points within the building. Because the radio modem is only supplied with 24V DC grounding is not necessarily requested. Only HF earth is required. If a circular current across the screen is measured (measure with a clamp-on ammeter) a DC isolation should be realized by using a X capacitor 100nF /230V. The capacitor acts with low impedance against high frequent interferences but avoids circular currents.



In this installation the mounting plate may not be grounded through PE.

Legend

Geschirmte Profibusleitung
= screened
Profibus cable

Referenz Massefläche!
Verzinkte Montageplatte
des Schaltschranks =

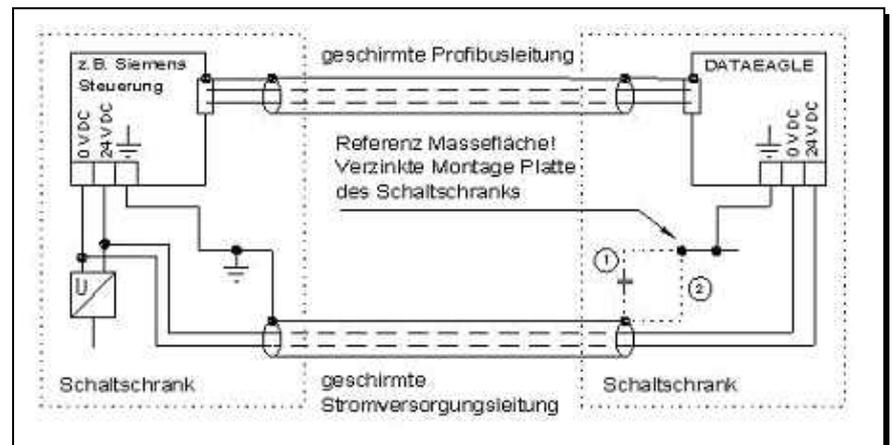
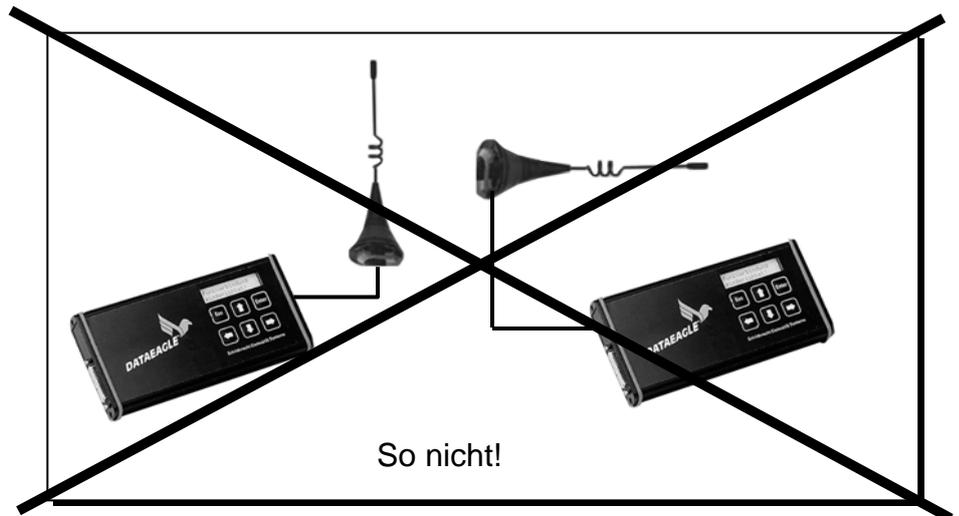


Fig. 5.2: PE-free installation

7.2. Guidelines for optimized installation of antennas

Orientation

All antennas should have the same orientation, e.g. vertical.

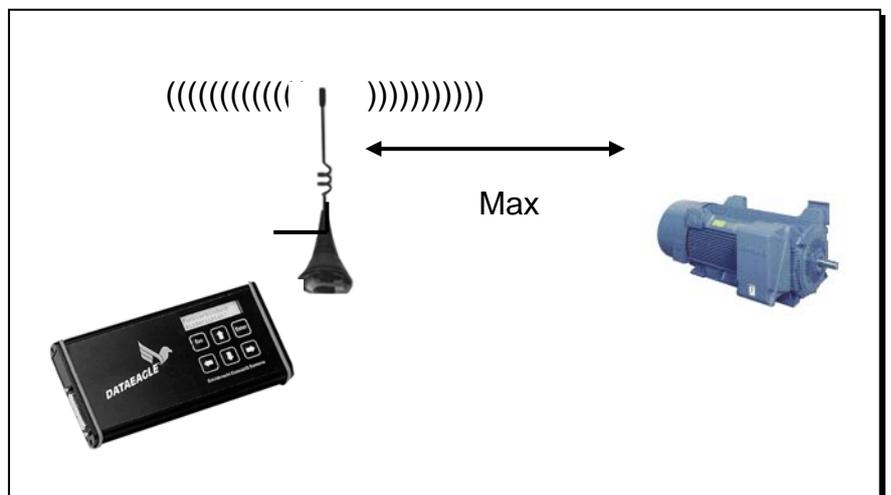


Distance and free radiation

Keep sufficient distance to metal parts and walls.

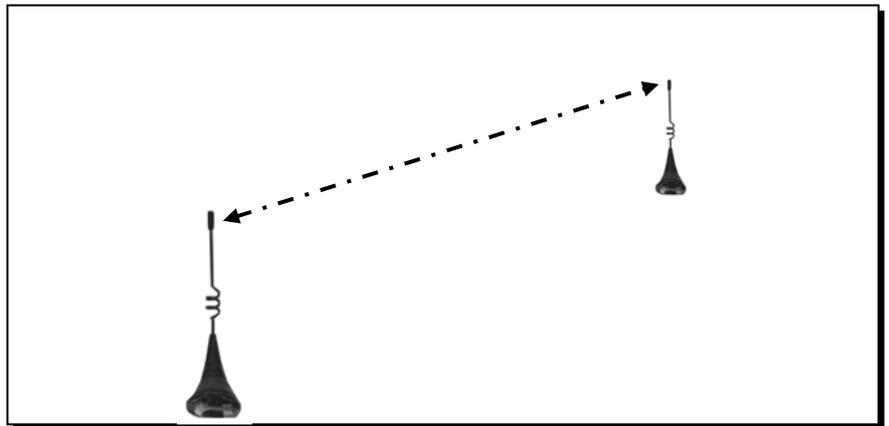
Keep maximum distance to motors and frequency converters.

Provide free radiation.



Line of sight

The best data transmission quality will be achieved when the antennas are installed in a line of sight at an elevated and free location.



Out-off the control cabinet

Install antennas outside of the control cabinet.



Electromagnetic radiation.

Keep at least a distance of 20 cm to the antennas when the devices are in operation.

7.3. *Advices for troubleshooting*

Settings	Check the setting of all modems. Pay attention to correct settings of channel, Profibus master and slave address and radio station and radio partner address.
Distance	Check the distance towards the partner station. Select first a distance of a few meters and increase the distance step by step up to the intended distance.
Antennas	Check the antenna connection. Check if all antennas are connected correctly. Pay attention that coax antenna cable is not flexed. Check next if all antennas are installed according to the guidelines described in chapter 7.2.
Sources of interference	Check if there are any interferences on the transmission side.

8. Technical specifications

Mechanical data

Dimensions	Depth = 140 mm (with cable) Height = 100 mm Width= 23 mm
Protection	IP20

Electrical data

Power supply	9-33 V DC max. 500 mA @ 24 V DC
Inputs/outputs	Max. 6 digital 9-33 V DC inputs
	Max. 6 digital open collector outputs
	2 analog inputs 0-10 V or 4-20 mA, 12-bit resolution
	2 analog outputs 0-10 V or 4-20 mA, 12-bit resolution
	Max. 8 digital relay outputs or max. 8 / 6 digital 24 V DC- inputs

Environmental data

Operating temperature range	-20°C to + 60° C
	Optionally + 70° C

Transmitting power

Radio transmission	Transmitting power	EN
869 MHz	500 mW	EN 300220
2,4 GHz Bluetooth	100 mW	EN 300328

