



Device manual
RFID compact device
EtherNet/IP

UK

DTE8x2

DTE9x2

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1 Preliminary note

1.1 Symbols used

- ▶ Instruction
- > Reaction, result
- [...] Designation of pushbuttons, buttons or indications
- Cross-reference, Important note
-  Non-compliance can result in malfunction or interference
-  Information Supplementary note

2 Safety instructions

Please read the operating instructions prior to setup of the device. Ensure that the device is suitable for your application without any restrictions

If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property can occur

3 Functions and features

The RFID Compact device integrates UHF Read-/Write head and a EtherNet/IP interface to communicate with a EtherNet/IP IO-Controller. Additionally, 2 IO channels are available which can be configured as input/output to IEC 61131.

The device

- can detect up to 16 ID tags simultaneously
- control up to 2 IEC 61131 input /outputs
- communicates with the higher control level via EtherNet/IP.
- allows device configuration via a web server.

Application examples:

- Material flow control in production lines
- Warehouse management by the automatic detection of stored products
- Tank management, order picking or product tracking

3.1 Configuration via Ethernet interface

- 10 Mbps and 100 Mbps
- TCP / IP - Transport Control Protocol / Internet Protocol
- IT functionality: HTTP server
- M12, twisted pair

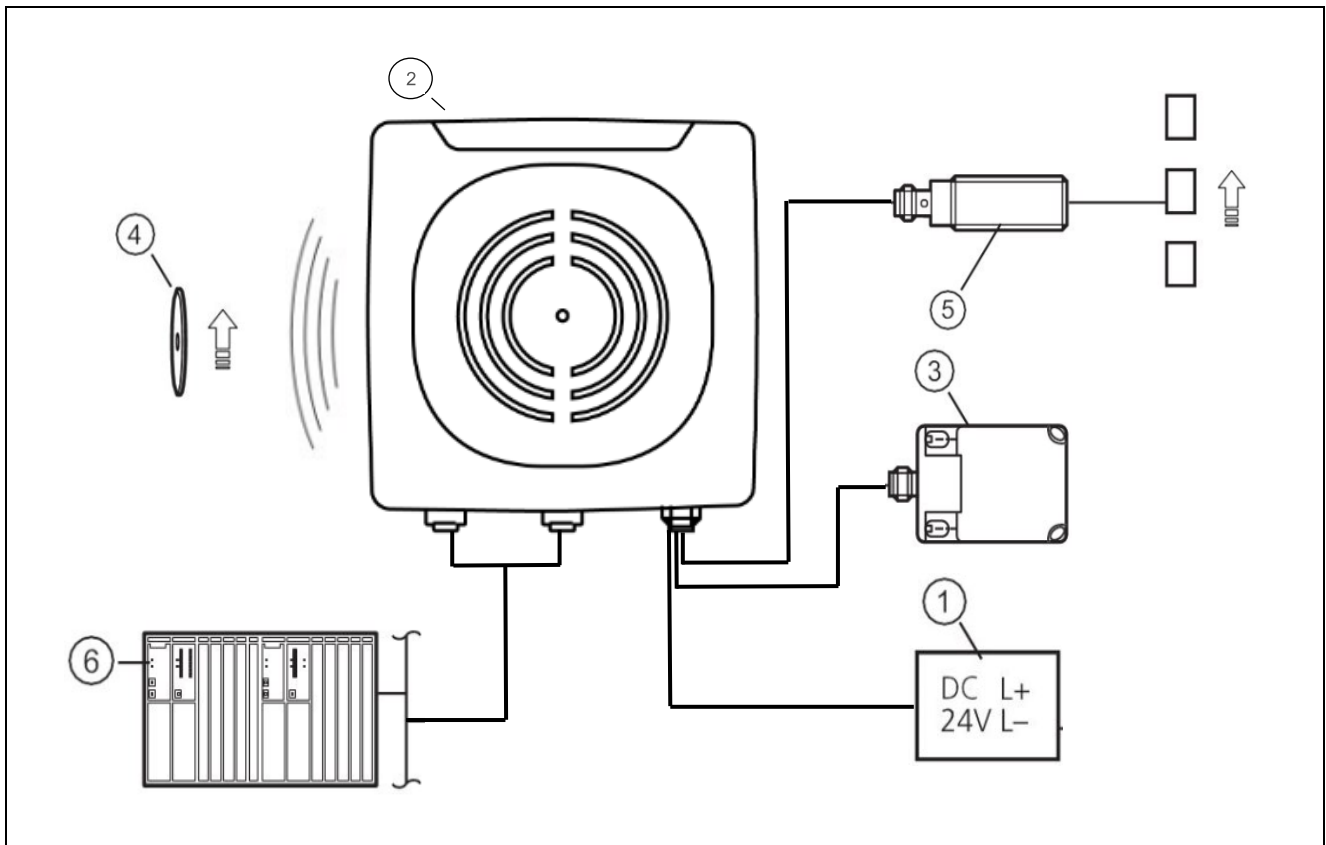
3.2 Functions for commissioning

Via the integrated Webserver it is possible to

- read and write the EPC data of the ID tag
- read and write the User data area of the ID tag
- write to the User data area of the ID tag
- read the input of the IO channels
- write to the output of the IO channels
- read the device information of the device

- read the device information of the integrated Read-/Write head
- update the firmware of the integrated Read-/Write head

4 Function



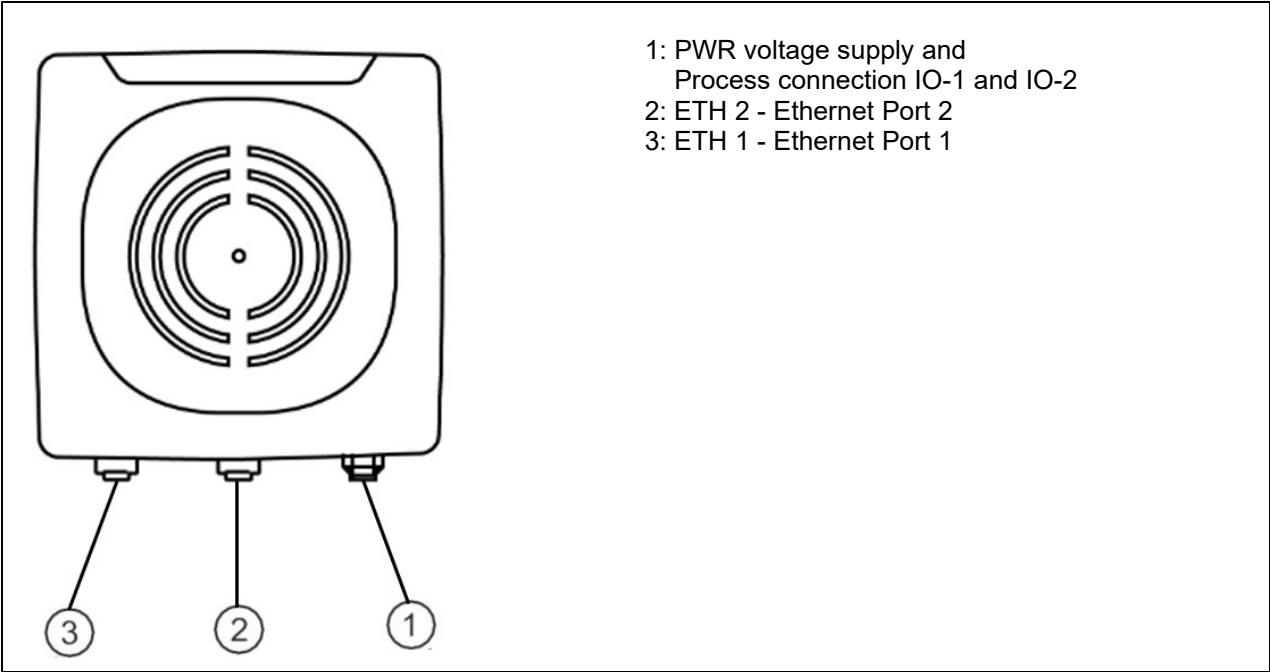
- 1: Voltage supply
- 2: DTE8x2/DTE9x2 device unit
- 3: Actuator
- 4: ID tag

- 5: Sensor
- 6: Ethernet host

The device processes data from the integrated Read-/Write head and the two IEC 61131 inputs / outputs. The mode of operation for the two IO channels can be set individually via the EtherNet/IP Scanner or the integrated Webserver.

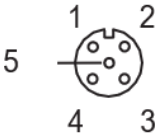
For further information about port configuration, see → [Module setting within the PLC](#)

4.1 Connection



4.2 "PWR" voltage supply and digital input / output

► Connect the device to the voltage supply using an M12 connection cable.

	Pin	Connection
	1	24V DC
	2	Switching output (C/Qo) or input (C/Qi) 2
	3	0V
	4	Switching output (C/Qo) or input (C/Qi) 1
	5	not used

 Please note that the total current consumption of the device must not exceed the value of 0,5 A.

4.3 Field bus connection ETH1 / ETH2

► Connect the device to an EtherNet/IP Scanner using a suitable M12 Ethernet connection cable.

	Pin	Connection
	1	TD+
	2	RD+
	3	TD-
	4	RD

 Note: screened connection cable required.

4.4 Factory setting of the Ethernet parameters

The following values are preset on delivery of the device:

Parameters	Factory setting
IP address	192.168.0.79
Gateway address	192.168.0.100
Subnet mask	255.255.255.0
Auto-negotiation	on
DHCP	Off

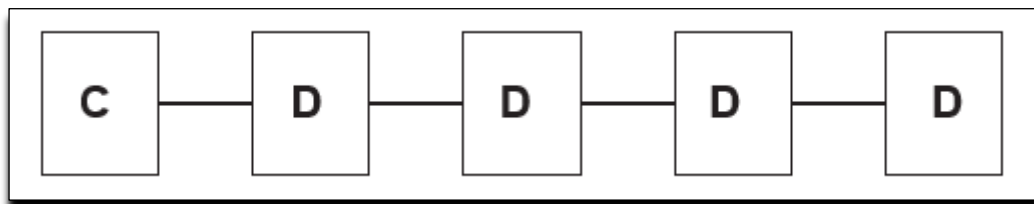


These values are only valid if the device start up with the “Emergency System”.
By default, the Ethernet parameters are set by the Fieldbus controller.

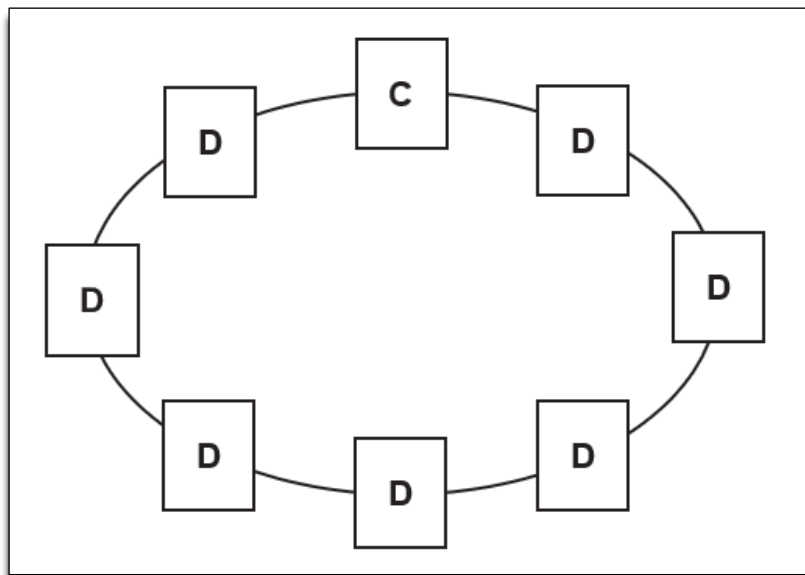
4.4.1 Allowed network infrastructures

The device can be integrated into following network infrastructures.

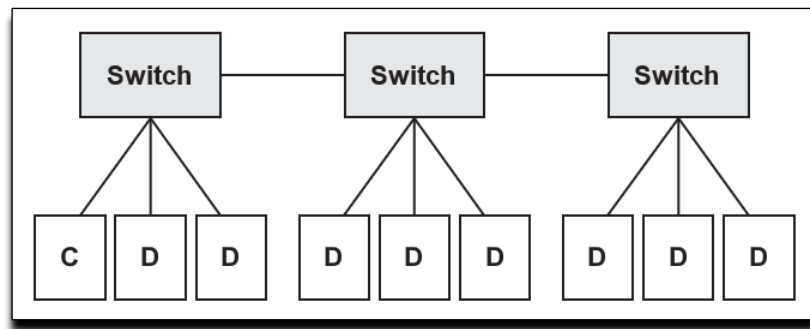
4.4.2 Linear structure:



4.4.3 Ring structure:



4.4.4 Star structure:



C = Controller D = Device

5 Installation

You can find information about installation and electrical connection in the operating instructions for the device at: <https://www.ifm>

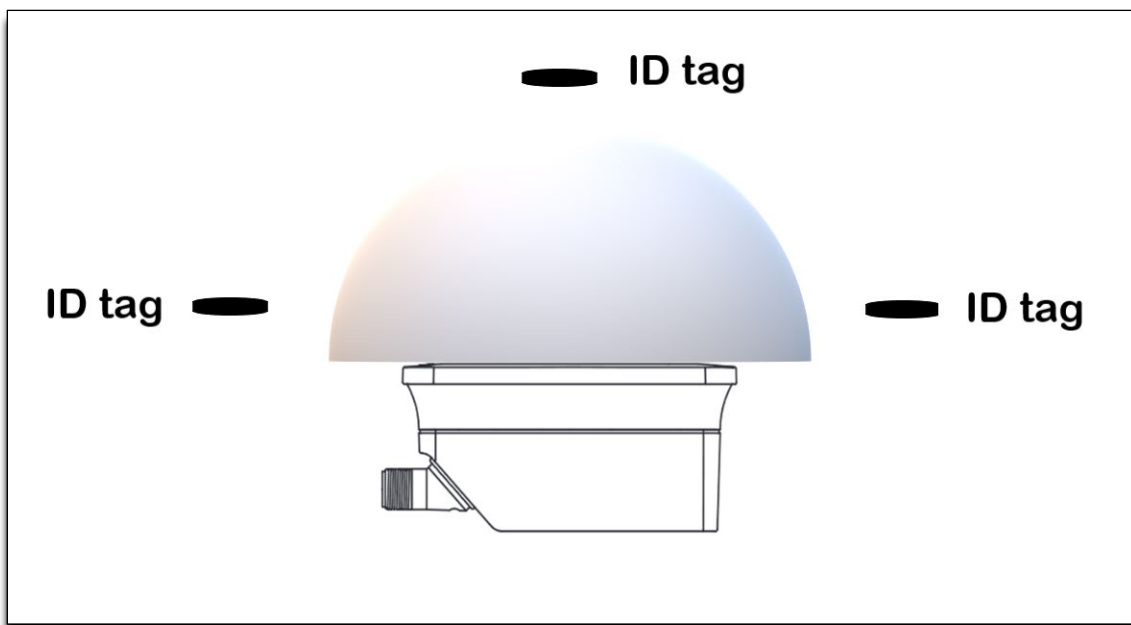


To avoid malfunctions of the UHF functions, do not place any electrically conductive objects within 10 cm of the built-in UHF antenna.



The ID tags should be placed outside a hemisphere, see table below, so that an error-free reading or writing is possible.

Device	Radius for ID Tags	Remark
DTE8x2/DTE9x2	$r = 10 \text{ cm}$	Placement within the hemisphere may exceed the limits for the ID tag



6 Operating and display elements

6.1 Reset to factory settings

The Ethernet parameters and the password of the device can be reset to the factory settings. Take the following steps:

- ▶ Remove all cable connections from the device.
- ▶ Insert an electrically conductive bridge between pin 2 and pin 4 on the process connection voltage supply PWR.
- ▶ Connect the unit to the voltage supply.
 - The LEDs of the signal bar (yellow) are on one after the other. Then LED 4 of the signal bar (yellow) flashes at 8 Hz.
- ▶ As soon as the LEDs of the signal bar (yellow) flash at 8 Hz, disconnect the unit
- ▶ Remove the bridge.
- ▶ Connect the device to the voltage.
- ▶ The settings are reset.

6.2 LED indicators

The device indicates the current status of the interface via the status LEDs.

7 LED PWR

LED PWR (1x green)	State	Note
On	Voltage supply OK	$18\text{ V} \leq U_{PWR} \leq 36\text{ V}$
Flashing at 2 Hz	Antenna (HF field) is deactivated	In this case the

7.1.1 LED Signal

LED signal bar LED 1	LED signal bar LED 2	LED signal bar LED 3	LED signal bar LED 4	State
Off	Off	Off	Off	No ID tag detected
On	Off	Off	Off	1 ID tag detected
On	On	Off	Off	2 ID tag detected
On	On	On	Off	3 ID tag detected
On	On	On	On	4 or more ID tags detected

7.1.2 LED LINK/ACT on interface ETH1/ETH2

LED green	LED yellow	Status	Note
Off	Off	No connection to another Ethernet counterpart	Link status "no link"
On	Off	Connection to Ethernet counterpart exists, no data exchange	Link status "link", "no traffic"
On	Flashes sporadically	Connection to Ethernet counterpart exists, data exchange running	Link status "link", "traffic"

7.1.3 Special device LED indicators

LED	State	Note
PWR LED (green) ON LEDs of signal bar (yellow) flashing at 8 Hz	Device is in the service mode "emergency system started"	A firmware update is necessary and can be executed via the web server
PWR LED (green) On LEDs of signal bar (yellow) flashing at 8 Hz	Major error, device has to be returned	Hardware fault or permanent data in the device are corrupt
PWR LED (green) On The LEDs of the signal bar (yellow) are on one after the other. Then LED 4 of the signal bar (yellow) flashes at 8 Hz	Reset to factory settings	-

7.1.4 LED Mod EtherNet/IP

LED red	LED green	State	Note
Off	Off	No voltage supply or fault state	Check the voltage supply.
Off	Flashes	Ready for operation	Device is not configured. There is no exchange of data: ► Check the connection of the EtherNet/IP Scanner. ► Check the parameter setting of the configuration assembly.
Off	On	Normal operation	Connection to the EtherNet/IP Scanner is established. The device is configured. The data transfer is running.
Flashes	Off	Minor fault	A connection to the EtherNet/IP Scanner was not established. ► Check the voltage supply. ► Check the configuration of the device.
On	Off	Major fault	Software / hardware error of the device ► Restart the device. If the error remains, send the device for service
Flashes	Flashes	Selftest	Starting phase of the device

7.1.5 LED Net EtherNet/IP

LED red	LED green	State	Note
Off	Off	No IP address or no voltage supply	► Check the voltage supply. ► If DHCP is activated, check presence of a DHCP server in the network.
Off	Flashes	No connection	The device has an IP address. An Ethernet link was not detected. ► Check the configuration of the device via EtherNet/IP Scanner.
Off	On	Connection available	At least an Ethernet link from one of the Ethernet ports was detected
Flashes	Off	Timeout of the connection	A timeout was found with one of the existing EtherNet/IP connections. ► Check the status of the connection in the EtherNet/IP Scanner.
On	Off	IP address exists already	The same IP address as that of the device was detected in the EtherNet/IP network. ► Activate DHCP or set a new IP address.
Flashes	Flashes	Self-test	Starting phase of the device

8 Putting into operation

- Connect the device according to the operating instructions.



After connecting the operating voltage, the device is ready for use. The green PWR and BF LEDs of the device will light up after the device is ready and connected to the EtherNet/IP network.

9 Web interface

The device is equipped with an integrated web server that allows to

- read and write EPC data of the ID tag
- read from the User data area of the ID tag
- write to the User data area of the ID tag
- update the firmware of the device
- update the firmware of the built-in Read-/Write head
- update the firmware of the UHF module

The settings are made via a web browser, e.g. Microsoft Internet Explorer® as from V7.0

To access the web server, connect the device to a PC using a suitable M12 Ethernet connection cable.

Please note that the device and the PC must be set to the same IP address range.

Default after factory reset: 192.168.0.79, see → [Verify and set the IP address of the PC](#).

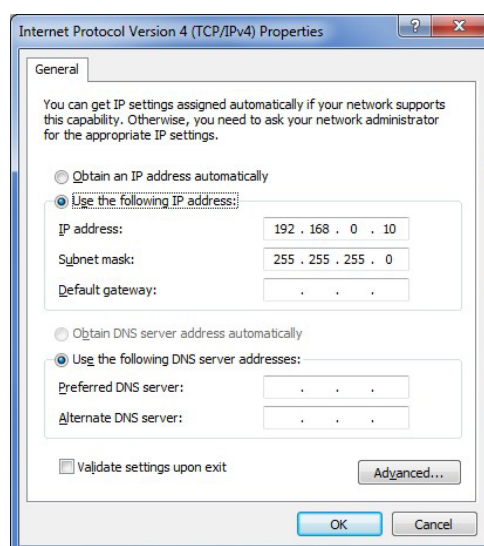
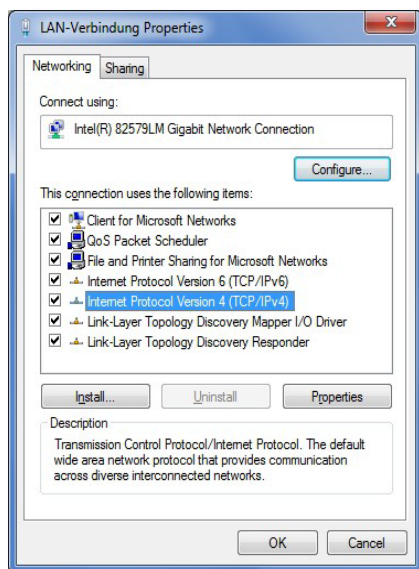
9.1 Verify and set the IP address of the PC

- Activate menu "Internet Protocol Version 4 (TCP/IPv4) Properties".

The Windows menu "Internet protocol (TCP/IP) Properties" is accessible for example via:

Start → Control Panel → Network and Sharing Center → Change adapter settings → Local Area Connection → Properties.

- Select the menu item "Use the following IP address".
- Verify and set the IP address, if necessary (here e.g. 192.168.0.10).
- Enter the subnet mask (255.255.255.0).
- Leave default gateway blank.
- Confirm the settings with [OK].



Changes in the network settings of the PC require extended user rights. Contact your system administrator.

9.2 Tab "Home"



Web Interface DTE902

Home | Network | Firmware | RWH | IO-Port | Monitor | System | SNTP | Info | Reset

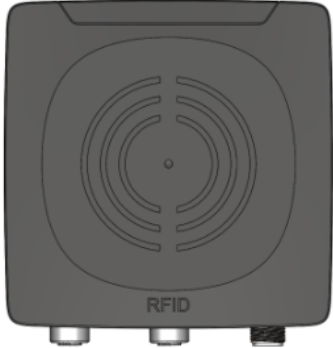
**Welcome to the web interface
for administration and
configuration of the DTE902**

Select language: English | English ▼

EDS file: [EDS.ZIP](#)

Library and documentation
available at: <http://www.ifm.com>

Radio approvals for
Canada, United States



- This is the main menu from where all functions of the device can be accessed. The user can select the language of the device web interface.
- Additionally, the EtherNet/IP EDS file of the device can be downloaded to configure the device within a PLC.

9.3 Tab "Network"

Network settings:

TCP/IP parameter	Current settings	New settings
IP address	192.168.0.79	. . .
Subnet mask	255.255.255.0	. . .
Default gateway	192.168.0.100	. . .
DHCP	off	☐ on ☒ off
BOOTP	off	☐ on ☒ off
Port 1 parameter		
Autonegotiation	on	☒ on ☐ off
Port speed	Duplex 100MB	Duplex 100MB ▾
Port 2 parameter		
Autonegotiation	on	☒ on ☐ off
Port speed	Simplex 10MB	Simplex 10MB ▾

WARNING: Changing the IP parameters may cause a loss of connection.

This menu allows different settings Ethernet interface the device to be changed. Ask what settings for the integration of the device into the existing network needed your network administrator.

If the device is connected directly to the PC, a static IP address setting is recommended. Check → [Verify and set the IP address of the PC](#) .



Make sure that the network address of the PC is located within the address range of the device and that it differs from it.

Example:

Red marked address settings must be the same, if Subnet Mask of the device is 255.255.255.0

Ethernet IP address of the PC: **192.168.0.10**

IP address of the evaluation: **192.168.0.79**



Attention: Be careful when setting the IP address of the device. This address should not exist in the Ethernet network.

9.4 Tab "Firmware – firmware update"

Firmware

Firmware identification

Name	Number	Version	Date
DTE Firmware	113	V4.	2021-
Emergency System	112	4.	-
Bootloader	-	1.	-

Firmware update

Choose the new firmware file (.nxf) you want to install:

No file selected.

Submit your file by clicking on 'transfer'. The transfer will take a few seconds.

WARNING: Do not interrupt power or disconnect the network cable while the transfer is in progress!

Read-/ Write head firmware

[For update of the Read-/Write head firmware click here.](#)



Please update the Read-/Write head firmware always before update the device firmware !

This menu allows to update the firmware of the device.

- ▶ Open the "Firmware" tab on the browser interface.
- ▶ Choose firmware file of the device and commit via button [transfer].
- ▶ Note: For update of the device firmware only files with extension ".nxf" are accepted.
- ▶ For update of the Read-/Write head firmware select the Link "For update of the Read-/Write head firmware click here". (Check → Tab "Firmware – Read-/Write head update")



Do not power off the device while the firmware update is running. A firmware update can take up to 3 minutes.

In case of an incomplete firmware update, the device will start up with the Emergency system. From there a new firmware update can be started.

After the firmware update process is finished following information is displayed.

- ▶ To take effect of the new firmware set the checkbox and press the button "Reset".

Firmware

Firmware transfer and update succeeded!

You should reset the device to apply the changes.

Firmware is being restarted and connections may be interrupted or time out!

☐ Please confirm you want to reset the device.



Please note that the device needs up to 2 minutes to restart after a firmware update. During this time the LEDs of the device are switched off.

9.5 Tab "Firmware – Read-/Write head update"

Read-/Write head information:

RWH		
Device type:	DTE	
Hardware version:	1	
IDLink SW:	12	
Firmware version:	1.026	Update
Reader Type:	RS500	1-1740 4515
Reader Firmware Version:	1.8.12.240	Update
Reload		

This menu shows under section "Read-/Write head information" following information.

- Device type
- Hardware and IDLINK software version
- Firmware version
- Reader type
- Reader firmware version

Button	Function
Update	Update the firmware of the Read-/Write head or update the firmware of the UHF module (Reader firmware) Check → Tab Firmware Read Write head update
Reload	Reload of this page

9.5.1 Update of the Read-/Write head or the UHF module

Antenna firmware

Firmware identification

Type of antenna	Firmware version
DTE	1.
RS500	1.8.

Firmware update

Choose the new antenna firmware file (.afw) you want to install:

DTE0X_1_026.afw

Submit your file by clicking on the button. The transfer will take a few seconds.

WARNING: Do not interrupt power or disconnect the network cable while the transfer is in progress!

Button	Function
Browse	Select the firmware file for the update process Note: For update of the Read-/Write firmware only files with extension ".afw" are accepted. For update of the UHF module firmware only files with extension ".rfw" are accepted.
Transfer	Start the firmware update process

After the firmware update process is finished following information is displayed.

Antenna firmware

Firmware transfer and update succeeded!



If the firmware update fails or the Read-/Write head is not detected by the device at the selected IO- port, the Read-/Write head is accessible via web browser and the following URL:

`http://<IP-ADDRESS>/rwhupdate?ioport=<IO-CHANNEL>1&anttype=<ANTENNA_TYPE>
&fwVersion=<NUMBER>&setLng=<LANGUAGE>`

Parameter name	Description	Remark
IP-ADDRESS	IP address of the device [XXX.XXX.XXX.XXX]	IPV4 address
IO-CHANNEL	IO-Channel number [1...4]	-
ANTENNA_TYPE	Article number of the Read-/Write head [e.g. DTE90x]	6-digit article number
NUMBER	Firmware number [01]	2-digit number. Shall be set to "01"
LANGUAGE	Language of the website [de, en, es, fr, it, ko, pt, ru, zh]	-

Example of URL: <http://192.168.0.79/rwhupdate?ioport=1&anttype=DTE90x&fwVersion=01&setLng=en>



After finishing the firmware update of the Read-/Write head, enter the URL of the device to return to the main menu (→ Tab "Home").

9.6 Tab "RWH" – Adaptation of the device to the application

This menu allows the device to be adapted to the application-specific conditions. To enable quick and easy adjustment, the device offers two basic settings, the "Stable mode" and "Quick mode".

9.6.1 Stable mode

This setting is intended for the simultaneous and stable detection of up to 16 ID tags. The ID tags should be in the reading field of the device for at least 500 ms.

9.6.2 Quick mode

This setting is intended for the quick acquisition of 2 ID tags. The ID tags should be in the reading field of the device for at least 40 ms.

9.6.3 Customized mode

For special applications the "Customized mode" offer additional parameter to fine tune the ID tag detection of the device.

With this setting, the device can be precisely adapted to the application-specific requirements. In order to achieve the best performance for speed and stability, the following application parameters must be recorded.

- Number of ID tags which are simultaneously in the HF field of the device.
 - ➔ This value shall be entered in the UHF parameter field "Estimated ID tag count".
- Time span how long the ID tags are at least in the HF field of the device.
 - ➔ This value shall be entered in the parameter field "Inventory time".

9.6.4 Common RWH UHF parameter settings

- "HF power"

In all modes, the type of memory access to the ID tag can be set over "HF power" setting.



When writing to the ID tag, more HF power is required because it must be supplied with enough energy to change the content of the memory banks.

The "HF Power Write" should be set to higher value than the "HF power read" in case the write process is not stable.

In order to reduce the radiation in the immediate vicinity, the "HF power read" can be reduced.

- RSSI value

The detection range of the ID tags can be restricted by setting the UHF parameters "Minimum RSSI value" and "Maximum RSSI value" to the required range.

9.6.5 Tab RWH – UHF setting “stable”

UHF settings: Identification: ☐ quick ☒ stable ☐ customized

UHF parameter	Current settings	New settings
Antenna field	on	☒ on ☐ off
HF power read	20 dBm	10 23 20 dBm
HF power write	20 dBm	10 23 20 dBm
minimum RSSI value	-120 dBm	-120 ... 0 -120 dBm
maximum RSSI value	0 dBm	-120 ... 0 0 dBm



This setting is intended for the simultaneous and stable detection of up to 16 ID tags. The ID tags should be in the reading field of the device for at least 500 ms.

UHF Parameter	Range	Mode “stable” setting
Antenna field	on/off	on
HF power read	10...23 dBm	20 dBm
HF power write	10...23 dBm	20 dBm
Idle time	10...255 ms	50 ms
Inventory time	40...1000 ms	200 ms
Estimated ID tag count	1...32767 ID tags	16 ID tags
Inventory mode	0 = small population of tags 1 = big population of tags	1 = big population of tags
LDI timeout	0...65535 ms	500 ms
Minimum RSSI value	-120...0 dBm	-120 dBm
Maximum RSSI value	-120...0 dBm	0 dBm

9.6.6 Tab RWH – UHF setting “quick”

UHF settings: Identification: ☒ quick ☐ stable ☐ customized

UHF parameter	Current settings	New settings
Antenna field	on	☒ on ☐ off
HF power read	20 dBm	10 23 20 dBm
HF power write	20 dBm	10 23 20 dBm
minimum RSSI value	-120 dBm	-120 ... 0 -120 dBm
maximum RSSI value	0 dBm	-120 ... 0 0 dBm



This setting is intended for the quick acquisition of 2 ID tags. The ID tags should be in the reading field of the device for at least 40 ms.

UHF Parameter	Range	Mode “quick” setting
Antenna field	on/off	On
HF power read	10...23 dBm	20 dBm
HF power write	10...23 dBm	20 dBm
Idle time	10...255 ms	10 ms
Inventory time	40...1000 ms	40 ms
Estimated ID tag count	1...32767 ID tags	2 ID tags
Inventory mode	0=small population of tags 1=big population of tags	0=small population of tags
LDI timeout	0...65535 ms	40 ms
Minimum RSSI value	-120...0 dBm	-120 dBm
Maximum RSSI value	-120...0 dBm	0 dBm

9.6.7 Tab RWH – UHF setting “customized”

UHF settings: Identification: ☐ quick ☐ stable ☒ customized

UHF parameter	Current settings	New settings
Antenna field	on	☒ on ☐ off
HF power read	20 dBm	10 23 20 dBm
HF power write	20 dBm	10 23 20 dBm
Idle time	50 ms	10 ... 255 20 ms
Inventory time	200 ms	40 ... 1000 80 ms
Estimated ID tag count	16	1 ... 32767 2
Inventory mode	1: big population of tags	0: small population of tags
LDI timeout	500 ms	0 ... 65535 200 ms
minimum RSSI value	-120 dBm	-120 ... 0 -60 dBm
maximum RSSI value	0 dBm	-120 ... 0 0 dBm



This setting is intended to setup the device for application-specific requirements which are not covered by UHF setting “stable” and “quick”.

UHF Parameter	Range	Mode “quick” setting
Antenna field	on/off	Allow to switch on or off the HF field. Helpful in commissioning phase to check the reading distance when more than one device is active.
HF power read	10...23 dBm	Allow the adjustment of the transmission power in case of reading the ID tag
HF power write	10...23 dBm	Allow the adjustment of the transmission power in case of writing the ID tag
Idle time	10...255 ms	Allow an automatic switch off the HF field for XX ms.
Inventory time	40...1000 ms	Allow an automatic switch on of the HF field for XX ms.
Estimated ID tag count	1...32767 ID tags	Number of ID tags which are simultaneously in the HF field
Inventory mode	0=small population of tags 1=big population of tags	Setup of the UHF module for scanning of small or big population.
LDI timeout	0...65535 ms	Time after an ID tag is dropped from the List of ID tags when he is non more detected in the HF field.
Minimum RSSI value	-120...0 dBm	Setup of minimum RSSI value which an ID Tag must be detected to be entered in the List of ID tags
Maximum RSSI value	-120...0 dBm	Setup of maximum RSSI value which an ID Tag must be detected to be entered in the List of ID tags

9.6.8 Detailed description of the UHF parameter

- UHF Parameter “HF power read”
Allow the adjustment of the transmission power in case of reading the ID tag.
Note: In near range area 0,01 ... 1m less power is necessary than in far field range > 1 meter.

Example for optimum setting of the HF power read level with ID tag E80386

Distance	HF power read	Remark
0,1 ... 0,5 m	17 dBm	Near range area
0,5 ... 1 m	20 dBm	...
1 m ... 2 m	23 dBm	Far range area

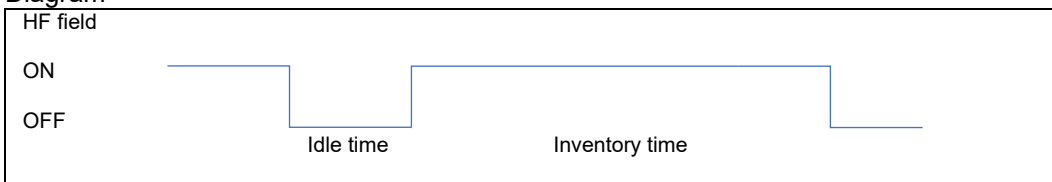
- UHF Parameter “HF power write”
Allow the adjustment of the transmission power in case of writing to the ID tag.
Note: In near range area 0,01 ... 1m less power is necessary than in far field range > 1 meter.

Example for optimum setting of the HF power write level with ID tag E80386, 512 Bit, 64 Byte, 56 bytes user memory.

Distance	HF power write	Remark
0,1 ... 0,5 m	20 dBm	Near range area
0,5 ... 1 m	23 dBm	Medium range
> 1 m	23 dBm	Stable writing critical with ID tag E80386 Other ID tag, e.g. E80413, achieve a greater writing distance. For details see → www.ifm.com

- UHF Parameter “Idle time”
This time describe how long the HF field will be automatically switched off.
Useful to reduce the power dissipation of the device.
- UHF Parameter “Inventory time”
This time define how long the HF field will be automatically switched on.

Diagram



- UHF Parameter “Estimated ID tag count”
Number of ID tags which are simultaneously in the HF field.
- UHF Parameter “Inventory mode”
Setup of the UHF module for scanning of small or big population of ID tags
Small population = 1 ... 8 ID tags
Big population = 8 ... 16 ID tags
- UHF Parameter “LDI timeout”
Time after an ID tag is dropped from the List of ID tags when he is non more detected in the HF field.
- UHF Parameter “Minimum RSSI value” / “Maximum RSSI value”
Setup of minimum/maximum RSSI value which an ID Tag must be detected to be entered in the List of ID tags

9.7 Tab "IO-Port"

IO-Port Configuration

Global	Current settings	New settings
Fail-safe	off	☐ on ☒ off
Mode	RWH CMD (26 bytes)	RWH CMD (26 bytes) ▾
Data hold time	0	0 ▾ ms
IO-1	Current settings	New settings
Mode	Off (0 bytes)	Input (2 bytes) ▾
Data hold time	0	0 ▾ ms
IO-2	Current settings	New settings
Mode	Off (0 bytes)	Output (2 bytes) ▾
Data hold time	0	0 ▾ ms

Activate and save
 Cancel

This menu allows to configure the Read-/Write head and the IO-Ports of the device.

9.7.1 Read-/Write head

The module size of the payload data of the Read-/Write head can be checked or configured over parameter "mode".

Mode	Function
RWH CMD (26 bytes)	Module size 26 bytes
RWH CMD (46 bytes)	Module size 46 bytes
RWH CMD (66 bytes)	Module size 66 bytes
RWH CMD (86 bytes)	Module size 86 bytes
RWH CMD (106 bytes)	Module size 106 bytes
RWH CMD (126 bytes)	Module size 126 bytes
RWH CMD (146 bytes)	Module size 146 bytes
RWH CMD (166 bytes)	Module size 166 bytes



If the EtherNet/IP Scanner is connected with the device, the module size can't be modified.

Parameter "Data hold time" define how long the RFID data are kept stable. This is helpful if the time interval, in which the ID tag data are available, is shorter than the EtherNet/IP Scanner can read these over the fieldbus.

9.7.2 IO-PORT IO-1 and IO-2

The IO-channels can be configured to mode “Off”, “Input” or “Output”.

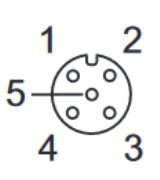
Mode	Function
Off	No function, inactive
Input	IEC 61131 input, payload size 20 bytes
Output	IEC 61131 output, payload size 20 bytes
Input (2 bytes)	IEC 61131 input, payload size 2 bytes
Output (2 bytes)	IEC 61131 output, payload size 2 bytes

Parameter “Data hold time” define how long the IO input data are kept stable. This is helpful if the time interval, in which the IO input is sampled, is shorter than the EtherNet/IP Scanner can read these over the fieldbus.

Button	Function	Remark
Activate and save	The settings are activated and stored non-volatile	After next power-on the stored settings are activated. If the host connect to the device and write a new IO-Port configuration the stored values are overwritten
Cancel	Discard changes	-



Please note, that IO-1 and IO-2 channels are located on M12 connector PWR, Pin 2 and Pin 4.

	Pin	Connection
	1	24 V DC
	2	Digital input / output 2
	3	0 V
	4	Digital input / output 1
	5	Not connected

Pin connection voltage supply

9.8 Tab "Monitor"

Port monitoring					Fieldbus state:
RWH					
No	Length	EPC	RSSI	Readings	
1	8	eb 80 b0 44 3c 00 00 1a	-51	54268	
2	16	e2 00 40 80 71 11 00 00 00 00 00 30 18 30 58 33	-45	54271	
3	8	e0 04 01 00 0b ad f6 8a	-39	54250	
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

This menu shows the data of the Read-/Write head and the state of IO ports of the device.

9.8.1 Section RWH

RWH					
No	Length	EPC	RSSI	Readings	
1	16	e2 00 40 80 71 11 00 00 00 00 00 30 18 30 58 33	-41	387	
2	8	eb 80 b0 44 3c 00 00 1a	-33	387	
3	8	e0 04 01 00 0b ad f6 8a	-38	387	

- Column "No"
Show the entry number of the ID tag.
In case one ID tag is non more detected within the specified LDI time, the entry is cleared and ready to take over a new ID tag.
- Column "Length"
Show the EPC data length in bytes of the ID tag.
- Column "EPC"
Show the EPC data of the ID tag.
► Click on the EPC data to get more information of the ID Tag or to modify the memory.
- Column "RSSI"
Show the RSSI value in [dBm] of the ID tag.
- Column "Readings":
Show the number of Readings of the EPC data within the specified LDI time.
If the ID tag is non more detected within this time span, the Column Readings is set to 0.



By increasing the LDI timeout the display of the monitor page can be stabilized. The display of the monitor page can be stabilized by increasing the LDI timeout. Please note that the number of ID tags is limited to 16, which should be recognized simultaneously within the set LDI time.

9.8.2 Section IO-1 / IO-2 port

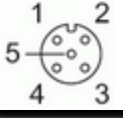
In this example the IO-1 port is configured as Input, IO-2 as output.

IO-1 Input 



Pin	Connection	State
4	switching input (C/Qi)	 1

IO-2 Output 



Pin	Connection	State
2	switching output (C/Qo)	☒ 1

- IO- input
The state of the input can be checked over signal "State".
- IO- output
The state of the output can be set to "0" = 0V or "1" = U_{Power} by click on checkbox "State".



The maximum output current in IO mode "Output" is limited to 100 mA.

9.8.3 Tab "Monitor" -Tag monitoring

This menu allows to:

- read and write the EPC from the ID tag
- read from or write to the User data area of the ID tag
- read the TID from the ID tag

9.8.4 Tab "Monitor" – Reading of the ID tag

The screenshot shows a software interface for monitoring an RFID tag. At the top, there is a 'Tag' icon and a text box labeled 'EPC' containing the hexadecimal value 'eb80b0443c00001a'. Below this is a section titled 'Read / Write Tag'. It contains three radio buttons: 'EPC Memory' (unselected), 'User Memory' (selected), and 'TID Memory' (unselected). To the left of these buttons are labels for 'Data format:', 'Offset:', and 'Length:'. The 'Data format:' is set to 'HEX' in a dropdown menu. The 'Offset:' is set to '0 bytes' and the 'Length:' is set to '64 bytes'. To the right of these settings are two icons: a green arrow pointing into a tag (representing 'Write') and a green arrow pointing out of a tag (representing 'Read'). Below these icons is a large text box labeled 'Data:' containing a long hexadecimal string: '48656C6C6F20576F726C64206920616D2061204944205461672100110D0E0F10001100120013001400150016001700180019001A001B001C001D001E001F0020'. Below the 'Data:' label, it says '64 bytes'. At the bottom right of the interface is a 'Back' button.

The EPC data is displayed in real time with an update interval of approximately 0,5 seconds.

- ▶ Click  to read from the User data area of the ID tag.
The data length can be set from 1 ...240 bytes. The address offset can be set from 0 bytes up to the last accessible address of the ID tag.
- ▶ Click [Back] to return to the main menu.

With the selection field „Data format“ the received ID tag data can be displayed in two formats:

- „HEX“: Data displayed in hexadecimal format.
Example: „4D41544455249414C3A2038303332333435333132“
- „ASCII“: Data displayed as ASCII character string.
Example: „MATERIAL: 8032345312“

9.8.5 Tab "Monitor" - Writing to the ID tag

Tag  EPC

Read / Write Tag

☐ EPC Memory ☒ User Memory ☐ TID Memory

Data format:

Offset: bytes

Length: bytes

Data:

20 bytes

- ▶ Click  to write to the User data area of the ID tag.
The data length to be written can be set from 1 to 240 bytes. The address offset can be set from 0 bytes up to the last accessible address of the ID tag. The data length to be written must correspond to the set number of bytes.
- ▶ Click [Back] to return to the main menu.
With the selection field „Data format“ the ID tag data can be input in two formats:
 - „HEX“: Data input in hexadecimal format.
Example: „4D4154455249414C3A2038303332333435333132“
 - „ASCII“: Data input as ASCII character string.
Example: „MATERIAL: 8032345312“

 The parameter “Length” is automatically calculated.

9.9 Tab "System"

System settings
Password protection configuration

Parameter	Current settings	New settings
Password protection:	off	☒ on ☐ off

Parameter	Value
User name:	admin
Old password:	
New password:	
Confirm new password:	

This menu allows to define a password to protect the device against unauthorized access. To enable the password protection the button "New settings" has to be set to "on".

Parameter	Setting	Note
Username	admin	User name could not be changed
Old password	XXXXXX	Default password is "admin". For setting the password for the first, please enter the default password
New password	XXXXXX	Up to 10 characters are allowed
Confirm new password	XXXXXX	Must correspond to the parameter setting "New password"

- Click [Submit] to save the password
- Click [Cancel] to delete all parameter settings



If the password is lost the default password "admin" can be retrieved by a reset to factory settings (→ [Reset to factory settings](#)).

9.10 Tab “SNTP”

SNTP settings

To change the settings fill out the form in the table below and press 'submit'.

Parameter	Current settings	New settings
NTP support:	off	☒ on ☐ off
IP address from NTP server:	0.0.0.0	172 . 19 . 55 . 37
Offset to UTC:	UTC	UTC +0 v
State	not used	
Last sync	-	

If an SNTP server is present in the Ethernet network the internal clock of the device can be synchronized with the external time server.

- Click on button [Submit] to transmit the settings to the device.

SNTP settings

Parameter	Current settings
NTP support:	on
IP address from NTP server:	172.19.55.37
Offset to UTC:	UTC

9.11 Tab "Info"

This menu shows the following information about the device.

Hardware:

Parameter	Value
Power supply state:	fully operable
Temperature:	55°C 131°F
Reader temperature:	45°C 113°F
System time:	00:27:26.308
System date:	2011-01-01

- Temperature of the device



At temperatures > 85° C / 194° F, a heat sink must be mounted on the back of the device.

- Temperature of the UHF module

► For a proper operation of the device the UHF module temperature shall not exceed 85°C.



At temperatures > 85° C / 194° F, reduce the HF power read and write.

- System time

Time gone since device powered up.

In case of setting time by SNTP service, the System date and System time is set automatically.

Production parameters:

Parameter	Value
Product article number:	DTE
Production number:	12345678
Version PermData:	1

- Show the ifm article and production number. Version PermData is used for compatibility checks if newer software is installed

Read-/Write head information:

RWH		
Device type:	DTE	
Hardware version:	1	
IDLink SW:	12	
Firmware version:	1.026	<button>Update</button>
Reader Type:	RS500	1-1740 4515
Reader Firmware Version:	1.8.12.240	<button>Update</button>

Reload

- Shows the information about the integrated Read-/Write head and the UHF module. Additionally, the firmware update of both units can be done here. Details see → [Update of the Read-/Write head or the UHF module](#).

9.12 Tab "Reset"

Device restart
Firmware is being restarted and connections may be interrupted or time out!
☒ Please confirm you want to reboot the device.

Restart

This menu allows the user to restart the device remotely.
If the device is restarted, all connections are closed and the outputs are switched off.

To restart the device

- ▶ check "Please confirm you want to reboot the device"
- ▶ Click [submit]



If the device does not actualize the Web page, enter the URL of the device in the address line of the Web client to actualize the display.

9.13 Open Source license information

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10 Device configuration

10.1 Determining the MAC address

To determine the MAC address of the device several options are available.

1. Finding the MAC address on the type label

- The type label is located on the front side of the device.



2. Finding the MAC address via the integrated web server

- The MAC address is located on the "Network" tab below the hardware information.

3. Reading the MAC address via the Controller.

10.2 Parameter setting of the Ethernet interface

10.2.1 Configuration over the web server

Factory Settings of the Ethernet interface

Function	Default value	Remark
DHCP function	off	-
BOOTP	Off	-
IP address	192.168.0.79	See ⁽¹⁾
Gateway address	192.168.0.100	-
Subnet mask	255.255.255.0	-
Autonegotiation	on	See ⁽²⁾
Port speed	10 MBit/s	See ⁽²⁾
Duplex mode	Half duplex	See ⁽²⁾

- (1) If the device does not detect a EtherNet/IP Scanner on the connected Ethernet network, the device has no valid IP address.
By setting the device to the factory settings the IP address can be forced to be set to the default address 192.168.0.79. (→ Reset to factory settings).

- (2) If Autonegotiation between the Compact device and the connected Ethernet node fails, the device is set to 10 MBit/s, half duplex.

10.3 Socket connection ETH1 / ETH2

Pin connection of M12 Ethernet socket, D-coded. The colors refer to the standard T568B.

Signal	Name	Core color	Pin
TD +	Transmission Data +	White/orange	1
TD -	Transmission Data -	Orange	3
RD +	Receive Data +	White/green	2
RD -	Receive Data -	Green	4
Screen	Shield	-	Housing

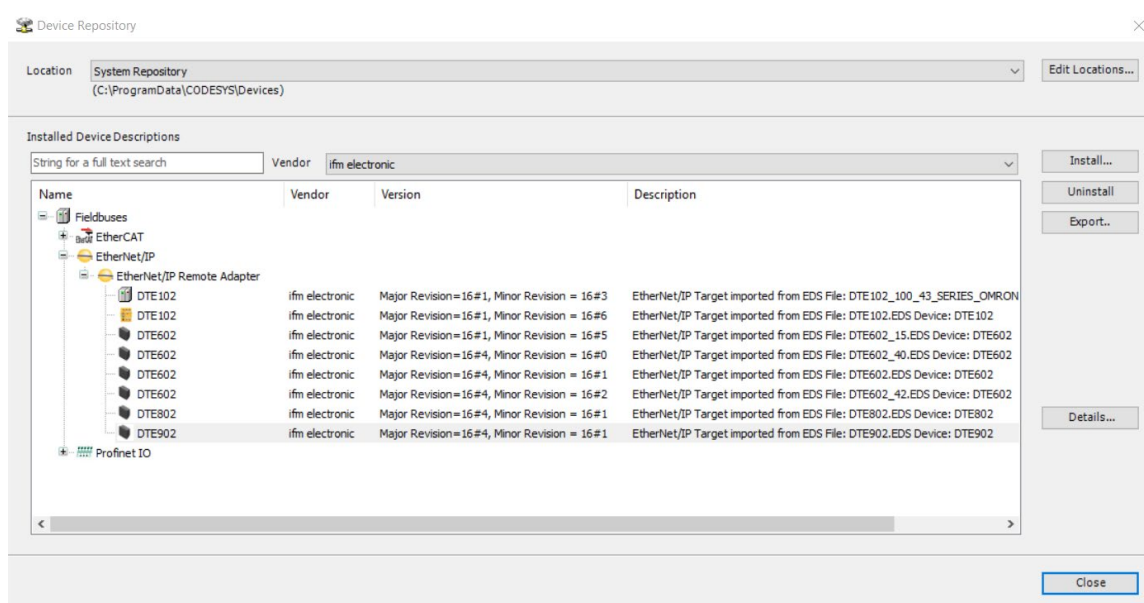
10.4 Connection concept of the EtherNet/IP interface

The device can be connected to two Ethernet lines, one for each of the connectors "ETH1" and "ETH2". The integrated Ethernet switch allows to build a line structure, an external switch is not required.

The device has one MAC address according to the EtherNet/IP specification. Both Ethernet ports have the same functionality, excluding software updates via the web server.

10.5 Device integration into the PLC via EDS file

The EDS file of the device need to be integrated in the device repository / hardware catalog of the PLC.



10.6 EtherNet/IP network integration of the device

The device needs to be added in the device tree of the EtherNet/IP Scanner.



10.7 EtherNet/IP communication parameter of the device

The EtherNet/IP communication parameter of the device need to be set

The screenshot shows the DTE902 configuration software interface. The top menu bar includes 'DTE902', 'Device', 'CHANNEL_TEST', 'EtherNet_IP_Scanner', and 'Ethernet'. The left sidebar contains a tree view with the following items: 'General' (selected), 'Connections', 'Assemblies', 'User-Defined Parameters', 'Log', 'EtherNet/IP I/O Mapping', 'EtherNet/IP IEC Objects', 'Status', and 'Information'. The main area is divided into two sections: 'Address Settings' and 'Electronic Keying'. The 'Address Settings' section has an 'IP address' field set to '192 . 168 . 0 . 79' and the 'EtherNet/IP' logo. The 'Electronic Keying' section has a 'Compatibility check' checkbox checked, and five fields: 'Vendor ID' (322), 'Device type' (43), 'Product code' (902), 'Major revision' (4), and 'Minor revision' (1).

Function	Default value	Remark
IP address	192.168.0.79	Must match to IP address of the device
Electronic Keying	Checked	If set, the “Vendor ID” ... “Minor revision” must match to the settings of the device, otherwise the connection is rejected by the device.

10.8 EtherNet/IP Product type

The device is classified as “Generic device”, product type 43.

10.9 EtherNet/IP device profile

The device has no specific device profile.

10.10 Device specific configuration

The device allows the configuration of the Read-/Write head and the both IO channels.

10.10.1 Configuration of the device

Parameters	Value	Unit	Data Type	Minimum	Maximum	Default	Help String
Exclusive Owner							
Connection Path parameters							
Output_CP	100		USINT	100	100	100	Output Connection Point
Input_CP	101		USINT	101	101	101	Input Connection Point
Target Config data							
Device							
Fail Safe Mode	Off		SINT	0	1	0	Keep output states when fieldbus is offline
Device Reserved-2	0		SINT	0	0	0	Reserved device parameter
Device Reserved-3	0		SINT	0	0	0	Reserved device parameter
Device Reserved-4	0		SINT	0	0	0	Reserved device parameter
Device Reserved-5	0		SINT	0	0	0	Reserved device parameter
Country code	DE		SINT	78	78	78	Country code of the UHF device
Device Reserved-7	0		SINT	0	0	0	Reserved device parameter
Device Reserved-8	0		SINT	0	0	0	Reserved device parameter

Details see → [Device parameters](#)

10.10.2 Configuration of the Read-/Write head

Parameters	Value	Unit	Data Type	Minimum	Maximum	Default	Help String
Input_CP	101		USINT	101	101	101	Input Connection Point
Target Config data							
Device							
RWH Channel							
RWH Identifier	1		SINT	1	1	1	Channel selector
RWH module identifier	RWH_CMD 026 Bytes		SINT	12	19	12	Module selector
RWH data hold time	0		SINT	0	127	0	Data hold time [x 10ms]
RWH UHF ID tag data block size	2 bytes		SINT	2	2	2	Only for information
RWH reserved-1	0		SINT	0	0	0	-
RWH reserved-2	0		SINT	0	0	0	-
RWH reserved-3	0		SINT	0	0	0	-
UHF user memory size	2...65535 bytes		SINT	0	0	0	[bytes]

Details see → [Module RWH_CMD](#) and [Module "RWH_CMD", general description](#)

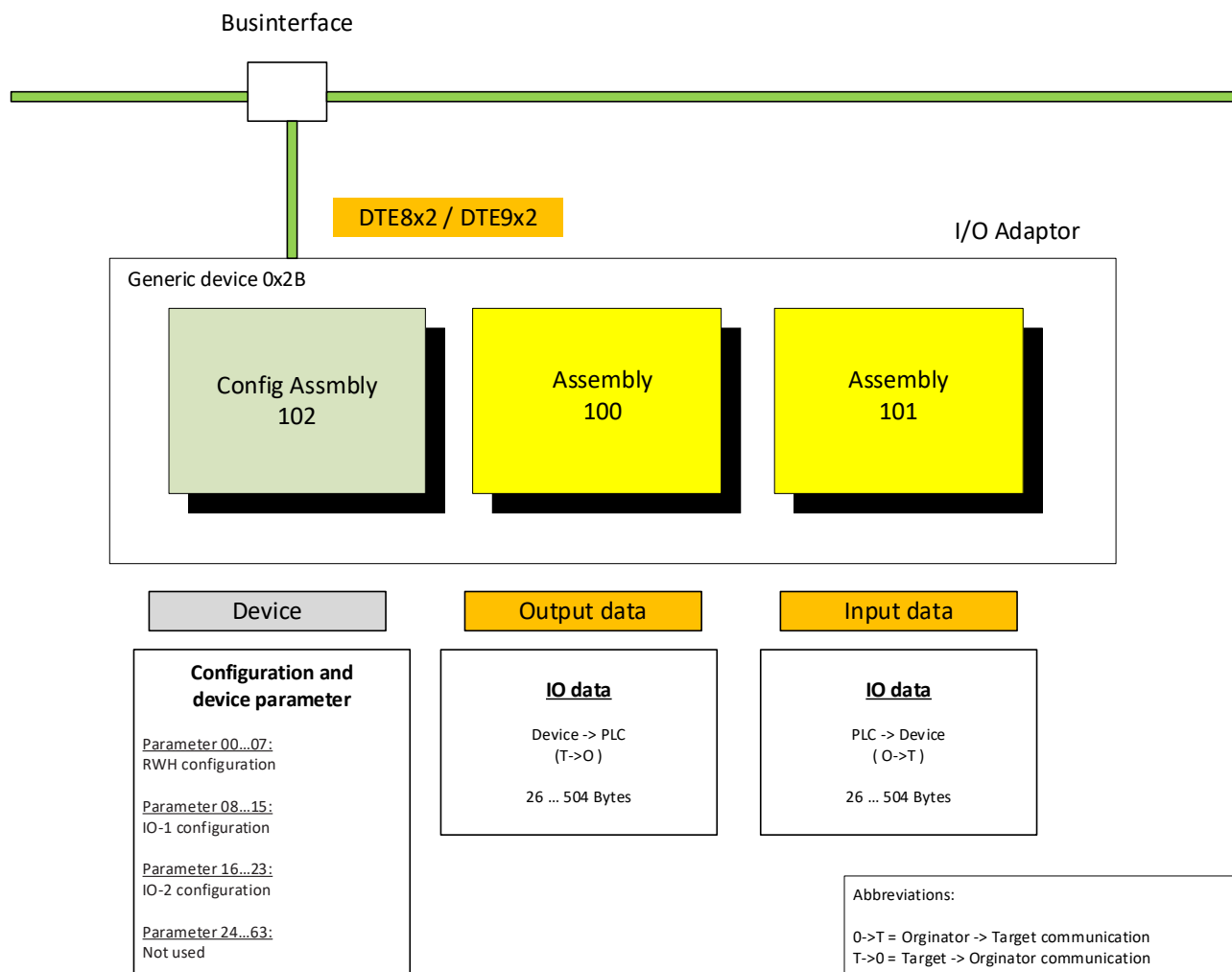
10.10.3 Configuration of the IO channel 1 and 2

IO-1 channel							
IO-1 Identifier	2		SINT	2	2	2	Channel selector
IO-1 module identifier	OFF		SINT	0	21	0	Module selector
IO-1 data hold time	0		SINT	0	127	0	Data hold time [x 10ms]
IO-1 reserved 4	0		SINT	0	0	0	-
IO-1 overload detection	On		SINT	0	1	1	Overload detection
IO-1 reserved 6	0		SINT	0	0	0	-
IO-1 reserved 7	0		SINT	0	0	0	-
IO-1 reserved 8	0		SINT	0	0	0	-
IO-2 channel							
IO-2 Identifier	3		SINT	3	3	3	Channel selector
IO-2 module identifier	OFF		SINT	0	21	0	Module selector
IO-2 data hold time	0		SINT	0	127	0	Data hold time [x 10ms]
IO-2 reserved 4	0		SINT	0	0	0	-
IO-2 overload detection	On		SINT	0	1	1	Overload detection
IO-2 reserved 6	0		SINT	0	0	0	-
IO-2 reserved 7	0		SINT	0	0	0	-
IO-2 reserved 8	0		SINT	0	0	0	-

Details see → [EtherNet/IP module description](#)

11 EtherNet/IP PLC process data image

11.1 Address model of the RFID Compact device with EtherNet/IP interface



The configuration data and the process data of the device are transferred over the EtherNet/IP connection. The PLC act as requestor, the device as responder.

11.2 Process data input and output image

- The data size of the PLC process data input and output image can be set in steps from 26 ... 504 bytes in steps of 2 bytes

Connection Name	RPI (ms)	O->T Size (Bytes)	T->O Size (Bytes)	Proxy Config Size (Bytes)	Target Config Size (Bytes)	Connection Path
1. Exclusive Owner	10	504	504		64	20 04 24 66 2C 64 2C 65



The Process data input and output image include the data of the Read-/Write head and the digital IO channels IO-1 and IO-2.

11.3.2 Manual configuration without EDS file

The Output connection path need to be set to value 100, the input connection path to value 101.

The 'Edit Connection' dialog box is divided into several sections:

- Connection Path Settings:**
 - ☒ Automatically generated path
 - ☐ Configuration assembly
 - Class ID: 16#4 Instance ID: 16#0 Attribute ID: 16#3
 - ☒ Consuming assembly (O-->T)
 - Class ID: 16#4 Instance ID: 16#64 Attribute ID: 16#3
 - ☒ Producing assembly (T-->O)
 - Class ID: 16#4 Instance ID: 16#65 Attribute ID: 16#3
 - ☐ User-defined path
 - ☐ Path defined by symbolic name
- General Parameters:**
 - Connection Path: 20 04 2C 64 2C 65
 - Trigger type: Application
 - RPI (ms): 10
 - Transport type: Exclusive owner
 - Timeout multiplier: 4
- Scanner to Target (Output):**
 - O-->T size (bytes): 26
 - Proxy config size (bytes): 0
 - Target config size (bytes): 0
 - Connection type: Point to Point
 - Connection Priority: Scheduled
 - Fixed/Variable: Fixed
 - Transfer format: 32-bit run/idle
 - Inhibit time (ms): 0
 - Heartbeat multiplier: 1
- Target to Scanner (Input):**
 - T-->O size (bytes): 26
 - Connection type: Multicast
 - Connection priority: Scheduled
 - Fixed/Variable: Fixed
 - Transfer format: 32-bit run/idle
 - Inhibit time (ms): 0

Buttons: OK, Cancel



In this case the device itself need to be configured by the Webserver.

See setting "Web interface"

→ [Tab "RWH" – Adaptation of the device to the application](#)

→ [Tab "IO-Port"](#)

12 EtherNet/IP device parameter setting

The parameters of the unit are set via the device view of the PLC with the integrated EtherNet/IP Scanner. The Read-/Write head and the 2 IO channels of the device can be configured depending on the application.

12.1 Device parameters

The device-specific parameters can be set within the PLC settings.

12.1.1 Failsafe mode

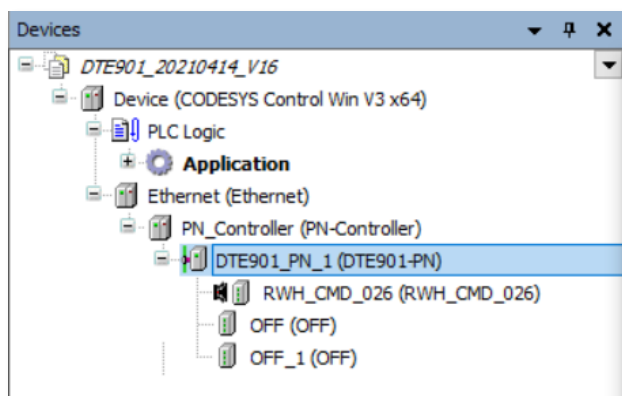
Failsafe mode	Description
Off	The IO channel is deactivated if no connection to the EtherNet/IP Scanner is established (default).
On	The IO channels remain activated and the outputs keep the state received last if no connection to the EtherNet/IP Scanner is established.

12.1.2 Country code

Country code	Function
DE, FR, ...	The country code can be set depending on the device. On some devices the country code is permanently set.

12.2 Module setting within the PLC

The module-specific parameters can be set at Properties of the device.
By default the Read-/Write head is activated, the IO ports are deactivated.



The available module sizes of the modules RWH_CMD, IO-1 and IO-2 can be obtained from the EDS file of the device.

12.3 Module parameters

The parameters of the modules RWH_CMD, Input, Output and RWH_RW can be set.

12.3.1 Module Off

This module is only a placeholder for the IO channels. Parameters are not available.

12.3.2 Module Inactive

This module is only a placeholder for the IO channels. Parameters are not available.

12.3.3 Module input

Parameter	Value
Data hold time	Hold time of the inputs I/Q can be set in milliseconds. 0 ms (default)

12.3.4 Module output

Parameter	Value
Data hold time	Hold time of the input I/Q can be set in milliseconds. 0 ms (default)

12.3.5 Module RWH_CMD

Parameter	Value
Data hold time	Hold time of the TP bit and EPC data information of the ID tag in milliseconds. 0 ms (default).

13 EtherNet/IP module description

Following functions are available:

- Detection if an ID tag is in front of the Read-/Write head.
- Control of Read-/Write head to switch on or off the RFID antenna field.
- Read of the Unique Identifier number (EPC) of the ID tag.
- Read of the User data of the ID tag.
 - ▶ Reading started via control bit "RD". Maximum read length with one command depends on the size of the selected module.
- Write to the User data of the ID tag.
 - ▶ Writing started via control bit "WR". Maximum write length with one command depends on the size of the selected module.
- Write verified to the User data of the ID tag.
 - ▶ Writing verified started via control bit "WR" and "RD". Maximum write length with one command depends on the size of the selected module.
- Simple diagnostics of the IO channels of the device.
- Simple notification of Device diagnostics.
- Remote restart of the Device

Module ID	Module name	Description	Remark
0	Off (0 Byte In/Out)	Spare module	No data
1	Inactive (20 Byte In/Out) ⁽¹⁾	Cyclic transmission	High impedance
2	Input (20 Byte In/Out) ⁽²⁾	Cyclic transmission	IEC61131 Input
3	Output (20 Byte In/Out) ⁽²⁾	Cyclic transmission	IEC61131 Output
12	RWH_CMD (26 Byte In/Out)	Cyclic command channel	Payload size 20 bytes
13	RWH_CMD (46 Byte In/Out)	Cyclic command channel	Payload size 40 bytes
14	RWH_CMD (66 Byte In/Out)	Cyclic command channel	Payload size 60 bytes
15	RWH_CMD (86 Byte In/Out)	Cyclic command channel	Payload size 80 bytes
16	RWH_CMD (106 Byte In/Out)	Cyclic command channel	Payload size 100 bytes
17	RWH_CMD (126 Byte In/Out)	Cyclic command channel	Payload size 120 bytes
18	RWH_CMD (146 Byte In/Out)	Cyclic command channel	Payload size 140 bytes
19	RWH_CMD (166 Byte In/Out)	Cyclic command channel	Payload size 160 bytes
20	Input (2 Byte In/Out)	Cyclic transmission	IEC61131 Input
21	Output (2 Byte In/Out)	Cyclic transmission	IEC61131 Output

⁽¹⁾ Not recommended, available only for compatibility with DTE10x devices

⁽²⁾ Only needed if diagnostic information of the IO-1 and IO-2 channel want to be read out.

The PLC input and output data image size depends on the selection of the module by the user for each IO channel. Each IO channel can be set individually to one of the available modules.

Example:

No.	RFID channel	Channel IO-1	Channel IO-2	PLC Input / Output data image size [bytes]
1	RWH_CMD (26 Byte In/Out)	OFF (0 Byte In/Out)	OFF (0 Byte In/Out)	26
2	RWH_CMD (46 Byte In/Out)	INPUT (2 Byte In/Out)	OUTPUT (2 Byte In/Out)	50
3	RWH_CMD (166 Byte In/Out)	INPUT (20 Byte In/Out)	OUTPUT (20 Byte In/Out)	206



If the number of bytes of all IO channels exceed the limits of the device, the configuration is rejected and no data exchange with the PLC will be possible.



It is in the PLC programmer's responsibility to calculate the correct address offsets and the maximum possible data size of the IO channels within the PLC input/output data image, see chapter → "Module RWH_CMD, general description".

13.1 Module "OFF"

This module is only a placeholder for the IO channels. Data size is 0 bytes.

13.2 Module "Inactive"

This module allows the user to

- switch off an unused process interface IO-1 ... IO-2.
- read the diagnostic information of the Device

PLC process data output (Module Inactive):

Byte No	Bit							
	7	6	5	4	3	2	1	0
1	0	DR	0	0	0	0	0	0
2	0x00							
3	0x00							
5	0x00							
6	0x00							
...	0x00							
20	0x00							

Description Byte 1 "Control byte"

Bit	Value	Description	Remark
DR (1)	0	No read request	Data bytes 2 ... 20 of the PLC process data input is set to 0x00
	0 -> 1	Read diagnostics of the Device	
	1	Diagnostics read request active	DR must be kept on 1 until the diagnostics response is available

⁽¹⁾ Diagnostic information from the Device is only available if bit "Diag" within the response data is set.

Description Bytes 2...20

Not used. Should be set to 0x00 within the PLC process data output.

PLC process data input image (Module Inactive):

Byte No	Bit							
	7	6	5	4	3	2	1	0
1	Diag	DR-RDY	0		0		0	0
2	0x00 / Number of diagnostic messages							
3	0x00 / Function_Num							
5	0x00 / Error_Decode							
6	0x00 / Error_Code_1							
...	0x00 / Error_Code_2							
20	0x00							

Description Byte 1 "Status byte"

Bit	Value	Description	Remark
DR-RDY	0	No read request	Data bytes 2 ... 20 of the PLC process data input is set to 0x00
	1	Diagnostics read request active	DR must be kept on 1 until the diagnostics response is available
Diag	0	No diagnostics available	-
	1	Device diagnostics occurred	Data not yet written in the response buffer. The response buffer still contains default values 0x00. The diagnostic data will be copied to the response buffer after detecting the DR control bit is set

Description Byte 2 "Number of diagnostic messages"

0x0 = no diagnostics,

0x1...0x4 = 1...4 diagnostic message(s)

Each diagnostic message consists of 4 bytes:



Function_Num, Error_Decode, Error_Code_1, Error_Code_2

Description Bytes 3...n

If bit "DR-RDY" within the status byte is set, these bytes contain the error codes of the device. Otherwise these bytes are set to the default value 0x00 by the device.

If more than one diagnostic message is available, all will be transferred. Up to 4 diagnostic messages can be transferred (→ [Error codes of the device](#)).

Description Bytes (n+1)...20

Will be set to default value 0x00 by the Device.

13.3 Module "Input_002"

This module allows the user to

- read the binary inputs of the process interfaces IO-1 ... IO-2.
- read the diagnostic information of the Device.

PLC process data output (Module Input)

Byte No	Bit							
	7	6	5	4	3	2	1	0
1	0	DR	0	0	0	0	0	0
2	0x00							
3	0x00							
5	0x00							
6	0x00							
..	0x00							
20	0x00							

Description Byte 1 "Control byte"

Bit	Value	Description	Remark
DR (1)	0	No read request	Data bytes 2 ... 20 of the PLC process data input is set to 0x00
	0 -> 1	Read diagnostics of the Device	
	1	Diagnostics read request active	DR must be kept on 1 until the diagnostics response is available

⁽¹⁾ Diagnostic information from the Device is only available if bit "Diag" within the response data is set.

Description Byte 2

Not used. Should be set to 0x00 within the PLC process data output image.

PLC process data input image (Module Input)

Byte No	Bit							
	7	6	5	4	3	2	1	0
1	Diag	DR-RDY	0		0		0	C/Qi
2	0x00 / Number of diagnostic messages							
3	0x00 / Function_Num							
5	0x00 / Error Decode							
6	0x00 / Error_Code_1							
..	0x00 / Error_Code_2							
20	0x00							

Description Byte 1 "Status byte"

Bit	Value	Description	Remark
C/Qi	0	Input voltage at C/Qi < 8 V	Level of C/Qi is measured by hardware
	1	Input voltage at C/Qi > 11 V	Level of C/Qi is measured by hardware
DR-RDY	0	Reading not started or Device or diagnostic data not ready	Data bytes 2 ... 20 of the PLC process data input is set to 0x00
	1	Diagnostics read ready	DR must be kept on 1 until the diagnostics response is available
Diag ⁽¹⁾	0	No diagnostics available	-
	1	Device diagnostics occurred	Data not yet written in the response buffer. The response buffer contains still default values 0x00. The diagnostics data will be copied in the response buffer, after detecting that the DR controlbit is set within the control byte.

⁽¹⁾ Diagnostics is only available, if bit "Diag" within the response data is set.

Description Byte 2 "Number of diagnostic messages"

0x0 = no diagnostics,
0x1...0x4 = 1...4 diagnostic message(s)



Each diagnostic message consists of 4 bytes:
Function_Num, Error_Decode, Error_Code_1, Error_Code_2

Description Bytes 3...n

If bit "DR-RDY" within the status byte is set, these bytes contain the error codes of the device. Otherwise these bytes are set to the default value 0x00 by the device.

If more than one diagnostic message is available, all will be transferred. Up to 4 diagnostic messages can be transferred (→ [Error codes of the device](#)).

Description Bytes (n+1)...20

Will be set to default value 0x00 by the Device.

13.4 Module "Output_002"

This module allows the user to

- write to binary output of the process interfaces IO-1 or IO-2.
- read the diagnostic information of the Device.

PLC process data output image (Module Output)

Byte No	Bit							
	7	6	5	4	3	2	1	0
1	0	DR	0	0	0	0	0	C/Qo
2	0x00							
3	0x00							
5	0x00							
6	0x00							
...	0x00							
20	0x00							

Description Byte 1 "Control byte"

Bit	Value	Description	Remark
C/Qo	0	Output set to C/Qo low	Low = 0V (Sink current)
	1	Output set to C/Qo high	High = 24V (Source current)
DR ⁽¹⁾	0	No read request	Data bytes 2 ... 20 of the PLC process data input is set to 0x00
	0 -> 1	Read diagnostics of the Device	
	1	Diagnostics read request active	DR must be kept on 1 until the diagnostics response is available

⁽¹⁾ Diagnostic information from the Device is only available if bit "Diag" within the response data is set.

Description Byte 2

Not used. Should be set to 0x00 within the PLC process data output image.

PLC process data input image (Module Output)

Byte No	Bit							
	7	6	5	4	3	2	1	0
1	Diag	DR-RDY	0		0		0	C/Qo
2	0x00 / Number of diagnostic messages							
3	0x00 / Function Num							
5	0x00 / Error Decode							
6	0x00 / Error Code 1							
7	0x00 / Error Code 2							
...	...							
20	0x00							

Description Byte 1 "Status byte"

Bit	Value	Description	Remark
C/Qo	0	Output level set to Low level	Level of C/Qi is not measured but taken from the output value C/Qo
	1	Output level set to High level	Level of C/Qi is not measured but taken from the output value C/Qo
DR-RDY	0	Reading not started or Device or diagnostic data not ready	Data bytes 2 ... 20 of the PLC process data input is set to 0x00
	1	Diagnostics read ready	DR must be kept on 1 until the diagnostics response is available

Diag ⁽¹⁾	0	No diagnostics available	-
	1	Device diagnostics occurred	Data not yet written in the response buffer. The response buffer contains still default values 0x00. The diagnostics data will be copied in the response buffer, after detecting that the DR controlbit.is set within the control byte.

⁽¹⁾ Diagnostics is only available, if bit "Diag" within the response data is set.

Description Byte 2 "Number of diagnostic messages"

0x0 = no diagnostics,
0x1...0x4 = 1...4 diagnostic message(s)



Each diagnostic message consists of 4 bytes:
Function_Num, Error_Decode, Error_Code_1, Error_Code_2

Description Bytes 3...n

If bit "DR-RDY" within the status byte is set, these bytes contain the error codes of the device. Otherwise these bytes are set to the default value 0x00 by the device.

If more than one diagnostic message is available, all will be transferred. Up to 4 diagnostic messages can be transferred (→ [Error codes of the device](#)).

Description Bytes (n+1)...20

Will be set to default value 0x00 by the Device.

13.5 Module “RWH_CMD”, general description

This module allows the user to communicate with the ID tag and the device. Following mode are available

- Read the RSSI, phase and EPC data of the ID tag.
Read EPC automatically whenever the Device detect a change of the EPC data (Asynchronous mode).
- Read the memory bank of the selected ID tag.
Two different modes are available:
 - ▶ Read EPC, TID or User data of the ID tag once on request (Synchronous mode).
 - ▶ Read User data of the ID tag automatically whenever the Device detect a change of the EPC data (Asynchronous mode).
- Write to the memory bank of the selected ID tag.
 - ▶ Write EPC or User data of the ID tag once on request (Synchronous mode).
- Read the diagnostic information of the Device.
- Switch off and on the antenna field of the Read-/Write head.
- Execute commands to read or write different parameters of the Device and the Read-/Write head.



To read and write the user memory of the ID tag as fast as possible, the module size of the IO-channel shall be set to the maximum value.

Available module sizes N of the RWH channel ⁽¹⁾	Transferable number of bytes
26	18
46	38
66	58
86	78
106	98
126	118
146	138
166	158

⁽¹⁾ Please check, that the number of bytes, which are transferred by all activated IO-channels, do not exceed the limit of the PLC data input and output image.

Data format of the command parameter

The data are transferred in the Big Endian format.

C language data type	PLC data type	Bit size	Value range (decimal)	Byte order	Remark
Signed Char	SINT	8	-128 ... +127	-	-
Unsigned Char	BYTE	8		-	-
Signed Int	INT	16	-32.768 ... +32.767	MSB / LSB	-
Unsigned Int	WORD	16	0 ... 65535	MSB / LSB	
Signed Long	DINT	32	- 2.147.483.648 ... +2.147.483.647	MSB...LSB	-
Unsigned Long	DWORD	32	0 ... 4294967295	MSB...LSB	-
Float	LREAL	64	+/- 1.797E+308	MSB...LSB	-

PLC process data output image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Res	DR	ER	UR	RD	WR	AO	Res
2	CR	Res	Res	Res	Res	Res	Res	TR
3	Data byte 1							
...	...							
N-1	Data byte (N-3)							
N	Data byte (N-2)							

Description Byte 1, "Control byte 1":

Bit	Bit name	Description
0	Res	Reserved. Has to be set to default value 0.
1	AO	"Antenna field Off " request
2	WR	Mode " WR ite data" to the Device
3	RD	Mode " ReaD data" from the Device
4	UR	Mode " UseR / EPC / TID bank data access" to the ID tag
5	ER	Mode " E vent controlled ReaD ing" of User memory of the ID tag
6	DR	Mode " D iagnostics ReaD " Set by the controller to fetch the diagnostics, signaled by the Device in the
7	Res	Reserved. Has to be set to default value 0.



The bits WR, RD, DR and ER are level controlled bits to activate the corresponding mode. The state "1" transfer the mode to the Device, but it does not activate a command request. This is done by the control bit TR in Control byte 2. Once these bits are set in the control bytes, the corresponding bits in the status bytes are acknowledged, regardless of the setting of the bit TR.

Description Byte 2, "Control byte 2":

Bit	Bit name	Description
0	TR ⁽¹⁾	Toggle Request
1..6	Res	Reserved. Has to be set to default value 0.
7	CR	Mode " C ommand Re quest" Activate the command channel of the Device. If this bit is set, all other modes must be deactivated.

⁽¹⁾ Bit TR is the main control bit to start the commands of the selected mode. When the Controller set the bit TR to the complement of the bit TA in status byte 2 of the PLC process data image, the command is started.

Example:

Bit TA	BIT TR	Description
0	0	No toggle request, command execution not started
0	1	Toggle request, command execution started
1	1	No toggle request, command execution not started
1	0	Toggle request, command execution started



The bit CR activate the command channel mode of the Device. Several commands can be executed to read out or set various parameters of the device or the Read-/Write heads. The execution of the command is controlled by bit TR of control byte 2.

Description Byte 3...n, "Data byte 1...(N-2)":

Dependent on the selected mode, this data area contains the command data to send to the Device.

Default value "Control byte 1 and 2": 0x00

Mode: Read EPC automatically, antenna field on

PLC process data input image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	DA	EA	UA	RA	WA	AI	TP
2	CA	Res	Res	Res	Res	GO	CM	TA
2	Data byte 1							
3	Data byte 2							
.	...							
N-1	Data byte (N-3)							
N	Data byte (N-2)							

Description Byte 1, "Status byte 1":

Bit	Bit name	Description
0	TP ⁽¹⁾	ID Tag Present Bit is set to 1 as long as at least one ID tag is detected by the integrated Read-/Write head. With the channel parameter "data hold time" the status of the bit can be extended.
1	AI ⁽¹⁾	Antenna field Inactive
2	WA ⁽²⁾	Mode "Write data" to the Device Active
3	RA ⁽²⁾	Mode "Read data" from the Device Active
4	UA ⁽²⁾	Mode "User data access" Active
5	EA ⁽²⁾	Mode "Receive User data on Event change" Active
6	DA ⁽²⁾	Mode "Diagnostics read" Active
7	DIAG ⁽¹⁾	DIAG nostic data present, but not yet written in the response buffer. The response buffer contains still ID tag data. The diagnostics data will be copied in the response buffer after detecting that DR control bit is set and the bit TR has been toggled by the controller

⁽¹⁾ Bits TP, AI and DIAG show the current state of the ID tag / antenna field / diagnostic data.

⁽²⁾ Bits WA, RA, UA, EA, DA are immediately set when the Device detect the setting of the corresponding bits in the control bytes 1 and 2 of the PLC data output image. Any change in the settings of these bits to prior received states set the data bytes 1 ... (n-2) to the default value 0x00. The bit TR does not influence this behavior.

Description Byte 2, "Status byte 2":

Bit	Bit name	Description
0	TA ⁽¹⁾	Toggle request Acknowledge
1	CM	Co Ming event If set to 1, the ID tag has entered the transmission window of the Read-/Write head. (Only used for asynchronous commands)
2	GO	GO ing event. If set to 1, the ID tag has left the transmission window of the Read-/Write head. (Only used for asynchronous commands)
3...6	Res	Reserved. Will be set to default value 0
7	CA	Mode "Command mode Active "

⁽¹⁾ Bit TA reflect the state of the command execution of the Device. When the Device receives the bit TR from the controller with a complement state of the bit TA, a request to start the command of the selected mode is received from the controller. While the command execution is running, the bit TA will not change its state. When the command has been processed by the Device, the bit TA will be set to the state of the bit TR

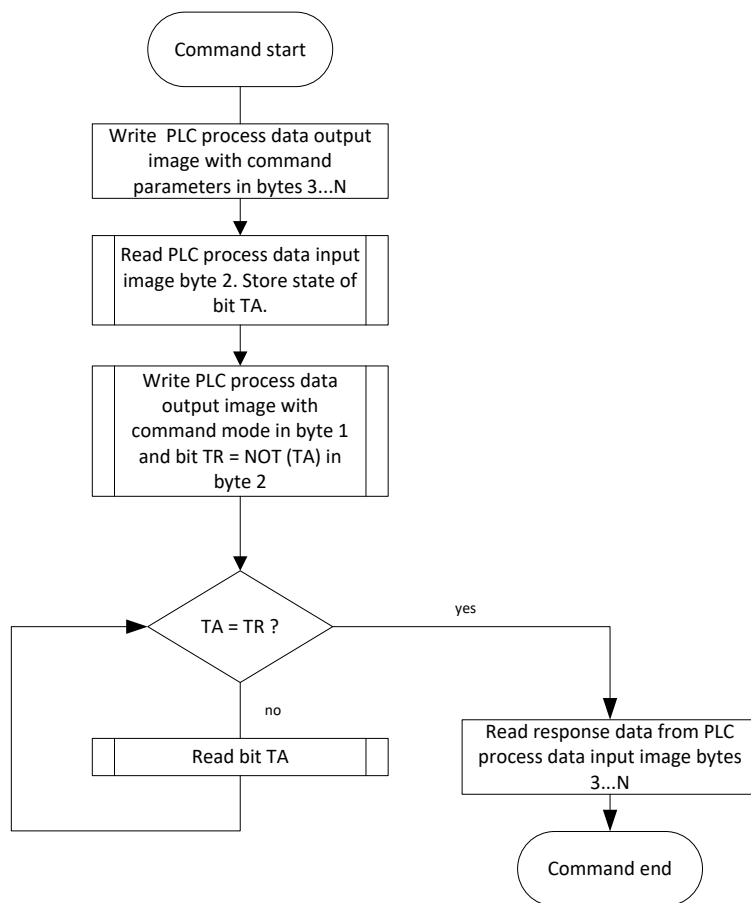
Example:

Bit TR	BIT TA	Description
0	0	Command execution not started or command execution is finished
1	0	Toggle request, command execution started
1	1	Command execution not started or command execution is finished
1	0	Toggle request, command execution started

Description Byte 3...N, "Data byte 1...(N-2)":

Dependent on the selected mode, this data area contains the response data read from the Device or the diagnostics information.

13.5.1 Command activation with bit TR in PLC process data output image



It is allowed to setup the command mode and the command parameter in one PLC cycle, together with bit TR = NOT (TA), to activate the command.



After change of the TR bit, the PLC process data output **must be kept stable** until the device responds with bit TA = TR. Otherwise the command is terminated and the PLC process data input bytes 3...N will be set to default data = 0x00.

13.5.2 Data hold time calculation for asynchronous commands

The setting of the IO-channel parameter “Data hold time” influence the time, how long the bits TP, CM and GO and the response data are kept stable in the process data input image when executing asynchronous command.



By default this data is transmitted for 3 milliseconds only. After that time, the default data = 0x0 is transmitted.

► Please setup the data hold time according to following formula.

Formula for data hold time calculation



Data hold time = 2 x PLC maximum cycle time

13.6 Module “RWH_CMD”, Read EPC data of the ID tag asynchronously

In this mode the EPC data and the RSSI value of the ID tag can be read automatically without sending any read request.



This mode is suitable if the user does not know when the ID tag is present in front of the Read-/Write head. Additionally this mode allows the fastest detection of ID tag cause no command request need to be send to the Device.



Please note that the EPC is transmitted in real time and the PLC cycle time need to be about factor 2 shorter as the ID tag is detected by the Read-/Write head.



The setting of the IO-channel parameter “Data hold time” influence the time how long the RSSI value and the EPC data bytes are kept stable in the process data input image.

PLC process data output image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	DR=0 ⁽¹⁾	0	0	0	0	AO=0	0
2	0	0	0	0	0	0	0	TR ⁽²⁾
3	Not used							
...	...							
N-1	Not used							
N	Not used							

Description byte 1, “Control byte 1”:

Bit	Value	Description	Remark
AO	0 1	“Antenna field on” request “Antenna field off” request	Activate the antenna field. Necessary to communicate with the ID tag.

⁽¹⁾ Diagnostics is only available, if bit “Diag” is set with in the response data. Otherwise the response data will return default data “0x00” within byte 3...N.

Description byte 2, “Control byte 2”:

Bit	Bit name	Description
0	TR ⁽²⁾	Toggle Request. Controls the execution of the selected mode
1..7	-	Has to be set to default value 0

⁽²⁾ Bit TR = NOT (TA): Command execution is started. For further readings of the EPC data, the TR need not to be changed.

Description bytes 3..N:

Has to be set to default value 0x00.

PLC process data input image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	0	0	0	0	0	AI	TP
2	0	0	0	0	0	GO	CM	TA=TR
3	RSSI value (high byte)							
4	RSSI value (low byte)							
5	Phase value (high byte)							
6	Phase value (low byte)							
7	0x00							
8	EPC data length							
9	EPC data byte 1 (MSBy)							
...	...							
9+(n-1)	EPC data byte n (LSBy)							
9+n	0x00							
...	...							
N	0x00							

Description Byte 1, “Status byte 1”:

Bit	Value	Description	Remark
TP	0	No ID tag detected in front of the Read-	-
	1	ID tag is detected in front of the Read-/Write head	Bit is set to 1 as long as the ID tag is detected by the R/W head. With the channel parameter "data hold time" the
AI	0	"Antenna field on"	In this state the device can detected DID
AI	1	"Antenna field off"	In this state the device can not detected
Diag	0	No error detected	-
	1	Device diagnostics available	Channel related or channel independent error occurred.

Description Byte 2, "Status byte 2":

Bit	Bit name	Description
0	TA (1)	Toggle Request. Controls the execution of the selected mode
1	CM (2)	CoMing event If set to 1, the ID tag has entered the transmission window of the Read-
2	GO (2)	GOing event. If set to 1, the ID tag has left the transmission window of the Read-/Write
3..7	-	Set to default value 0

(1) Bit TR = NOT (TA) Command execution is started.

(2) Bits CM and GO are kept stable in the process data input image according to the settings of the IO-channel parameter "Data hold time". **If Bits CM and GO are set simultaneously, the device signal, that the ID tag was detected before the connection to the PLC was established.**

Description Byte 3.4, "RSSI value":

RSSI value in [dBm * 10E-2].

Data type: 16 Bit signed integer, e.g. 0xE890 => -60,00 dBm

Remark: If no ID tag is detected by the Read-/Write head these bytes are set to 0x00.

Description Byte 5.6, "Phase value":

Phase value in [degree].

Data type: 16 Bit unsigned integer, e.g. 0x00B4 => 180°

Remark: If no ID tag is detected by the Read-/Write head these bytes are set to 0x00.

Description Byte 7.8, "EPC data length":

Length of the EPC data [bytes].

Data type: 16 Bit unsigned integer.

Remark: If the Read-/Write head has no RSSI value present, these bytes are set to 0x00.

Description Byte 9.(9+n-1), "EPC data byte 1.n":

Read EPC data of the ID tag.

Data type: Array of unsigned char

Remark: If no ID tag is detected by the Read-/Write head this data field is set to 0x00.

Description Byte (9+n).N:

Always set to default value 0x00.



When no ID tag is detected or an error occur, while the command is executed, bytes (3...N) are set to default value 0x00.

13.7 Module “RWH_CMD”, Read memory bank of the selected ID tag synchronously

In this mode the UHF memory banks of the ID tag can be read by setting the bit TR in the PLC process data output image to the complement state of bit TA in the PLC process data input image.



This mode is suitable if the user knows when the ID tag is present in front of the Read-/Write head. The read data of the UHF memory bank are kept in the data bytes 3...N stable while bit TR is not changed.

PLC process data output image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	0	UR=1	RD=1	0	AO=0	0
2	0	0	0	0	0	0	0	TR
3	0x00							
4	Length n of EPC data (ID tag to be read)							
5	EPC data byte 1 (ID tag to be read)							
...	...							
5+(n -1)	EPC data byte n (ID tag to be read)							
5+ n	UHF memory bank [D15...D8]							
6+ n	UHF memory bank [D7...D0]							
7+ n	16 Bit start address [D15...D8]							
8+ n	16 Bit start address [D7...D0]							
9+ n	16 Bit read length [D15...D7]							
10+ n	16 Bit read length [D7...D0]							
11+ n	0x00							
...	...							
N	0x00							

Description byte 1, “Control byte 1”:

Bit	Value	Description	Remark
AO	0	“Antenna field on” request	Activate the antenna field. Necessary to communicate with the ID tag.
RD (1)	1	Activate mode “Read data”	Command is started after bit TR is set to NOT (TA) in status byte 2 of the PLC data input image.
UR (1)	1	Activate mode “User data access”	

⁽¹⁾ Bits RD and UR must have been set to level 1 when the bit TR change its state. It is allowed to set bits WR, UR and TR simultaneously in one PLC cycle.

Description byte 2, “Control byte 2”:

Bit	Bit name	Description
0	TR ⁽²⁾	Toggle Request. Controls the execution of the selected mode
1..7	-	Has to be set to default value 0

⁽²⁾ Bit TR = NOT (TA): Command execution is started.

Description Byte 3...4, “Length of EPC data (ID tag to be read)”:

Length of the EPC data of the ID tag to be written
Data type: 16 Bit unsigned integer.

Description Byte 5...(5+n-1), “EPC data byte 1 ... n (ID tag to be read)”:

EPC data of the ID tag be read

Description Byte (5+n)...(6+n), “UHF memory bank”:

0x0002 = TID data bank

0x0003 = User data memory bank

Description Byte (7+n)...(8+n), "16 Bit start address":

16 Bit start address from which to read from the UHF memory bank.

Description Byte (9+n)...(10+n), "16 Bit read length":

Number of bytes to read from the selected UHF memory bank.

Description Byte (11+n)...N, "Not used":

Has to be set to default value 0x00.

PLC process data input image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	0	0	UA=1	RA=1	0	AI=0	TP=1
2	0	0	0	0	0	0	0	TA
3	0x00							
4	Length of EPC data (ID tag read)							
5	EPC data byte 1 (ID tag read)							
...	...							
5+(n-1)	EPC data byte n (ID read)							
5+n	UHF memory bank [D15...D8]							
6+n	UHF memory bank [D7...D0]							
7+n	16 Bit start address [D15...D8]							
8+n	16 Bit start address [D7...D0]							
9+n	16 Bit read length [D15...D7]							
10+n	16 Bit read length [D7...D0]							
11+n	Data byte 1 read							
...	...							
11+(n+m-1)	Data byte m read							
11+(n+m)	0x00							
...	...							
N	0x00							

Description Byte 1, "Status byte 1":

Bit	Value	Description	Remark
TP	0	No ID tag detected in front of the Read-/Write head	-
	1	ID tag is detected in front of the Read-/Write head	Bit is set to 1 as long as the ID tag is detected by the R/W head. With the channel parameter "data hold time" the status of the bit can be extended.
AI	0	"Antenna field on" active	Reflect the current state of the antenna field setting.
RA	1	Mode "Read data" from the Device active	Reflect the state of bit RD.
UA	1	Mode "User data" active	Reflect the state of bit UR.
DIAG	0	No error detected	-
	1	Device diagnostics available	Diagnostic information can be read out with mode "Diagnostics read"

Description Byte 2, "Status byte 2":

Bit	Bit name	Description
0	TA ⁽¹⁾	Toggle request Acknowledge
1..7	-	Will be set to default value 0 by the Device

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.

⁽²⁾ Bit TA = TR : Command has been processed by the Device. Bytes 3...N contain the command response data.

Description Byte 3...4, "Length of EPC data (ID tag read)":

Length of the EPC data of the ID tag read

Description Byte 5...(5+n-1), "EPC data byte 1...n (ID tag read)":

EPC data of the ID read

Description Byte (5+n)...(6+n) "UHF memory bank":

0x0002 = TID data bank

0x0003 = User data memory bank

Description Byte (7+n)...(8+n), "16 Bit start address":

16 Bit start address from which the bytes are read from the UHF memory bank.

Description Byte (9+n)...(10+n), "16 Bit read length ":

Number of bytes read successfully from the selected UHF memory bank.

Description Byte (11+n)...(11+n+m-1), "Byte 1...m read ":

Byte 1 ... m read from the selected UHF bank of the ID tag.

Description Byte (11+n+m)...N, "Not used":

Are set to default value 0x00.



When no ID tag is detected or an error occur while the command is executed, the command parameter in Byte 3...N are set to default value 0x0000.

13.8 Module “RWH_CMD”, Read memory bank of the ID tag asynchronously

In this mode the memory bank of the ID tag can be read automatically.



This mode is suitable if the user does not know when the ID tag is present in front of the Read-/Write head.

After activation of the mode with bit TR = NOT (TA) the Device start the reading of the detected selected UHF memory bank of all detected ID tags. When the Device detects a change in the inventory of the ID tags a reading process is started. If the status of the ID tag change with TP=1->0, the data length, the address value and the read data of the PLC data input image is set to default value = 0x0. The setting of the IO-channel parameter “Data hold time” influence the time, how long the TP bit and the read data from the ID tag is kept stable in the process data input image.

PLC process data output image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	ER=1	UR=1	RD=1	0	AO=0	0
2	0	0	0	0	0	0	0	TR
3	UHF memory bank [D15...D8]							
4	UHF memory bank [D7...D0]							
5	16 Bit start address [D15...D8]							
6	16 Bit start address [D7...D0]							
7	16 Bit read length [D15...D7]							
8	16 Bit read length [D7...D0]							
9...N	0x00							

Description byte 1, “Control byte 1”:

Bit	Value	Description	Remark
AO	0	“Antenna field on” request	Activate the antenna field. Necessary to communicate with the ID tag.
RD ⁽¹⁾	1	Activate mode “Read data”	Command is started after bit TR is set to NOT (TA) instatus byte 2 of the PLC data input image.
UR ⁽¹⁾	1	Activate mode “User data access”	
ER ⁽¹⁾	1	Activate mode “Receive User data automatically” selected	

⁽¹⁾ Bits RD, UR and ER must have been set to level 1 when the bit TR change its state. It is allowed to set bits RD, UR, ER and TR simultaneously in one PLC cycle.

Description byte 2, “Control byte 2”:

Bit	Bit name	Description
0	TR ⁽¹⁾	Toggle Request. Controls the execution of the selected mode
1..7	-	Has to be set to default value 0

⁽¹⁾ Bit TR = NOT (TA): Command execution is started. This has to be done only once. Further commands are executed automatically when the Device detects a state change of the ID tag from “not present” to “present”.

Description Byte 3...4, “UHF memory bank”:

0x0002 = TID data bank

0x0003 = User data memory bank

Description Byte 5...6, “16 Bit start address”:

16 Bit start address from which to read from the UHF memory bank.

Description Byte 7...8, "16 Bit read length":

Number of bytes to read from the selected UHF memory bank.



The maximum read length in this mode is limited to 64 bytes.

Description Byte 9...N, "Not used":

Has to be set to default value 0x00.



The command is executed continuously until it is finished by another command request with setting of TR=NOT (TA).



If the command parameter "16 Bit read length" and "16 Bit start address" shall be changed, the bit TR need to be set to NOT (TA) to restart the command with the changed command parameter.

PLC process data input image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	0	0	UA=1	RA=1	0	AI=0	TP=1
2	0	0	0	0	0	GO	CM	TA
3	0x00							
4	Length of EPC data (ID tag read)							
5	EPC data byte 1 (ID tag read)							
...	...							
5+(n-1)	EPC data byte n (ID read)							
5+n	UHF memory bank [D15...D8]							
6+n	UHF memory bank [D7...D0]							
7+n	16 Bit start address [D15...D8]							
8+n	16 Bit start address [D7...D0]							
9+n	16 Bit read length [D15...D7]							
10+n	16 Bit read length [D7...D0]							
11+n	Data byte 1 read							
...	...							
11+(n+m-1)	Data byte m read							
11+(n+m)	0x00							
...	...							
N	0x00							

Description Byte 1, "Status byte1":

Bit	Value	Description	Remark
TP	0	No ID tag detected in front of the Read-/Write head	-
	1	ID tag is detected in front of the Read-/Write head	Bit is set to 1 as long as the ID tag is detected by the R/W head. With the channel parameter "data hold time" the status of the bit can be extended.
AI	0	"Antenna field on" active	Reflect the current state of the antenna
RA	1	Mode "Read data" from the Device	Reflect the state of bit RD.
UA	1	Mode "User data" active	Reflect the state of bit UR.
EA	1	Mode "Receive User data automatically"	Reflect the state of bit ER.
Diag	0	No error detected	-
	1	Device diagnostics available	Diagnostic information can be read out with mode "Diagnostics read"

Description Byte 2, "Status byte 2":

Bit	Bit name	Description
0	TR ⁽¹⁾	Toggle Request. Controls the execution of the selected mode
1	CM ⁽²⁾	CoMing event If set to 1, the ID tag has entered the transmission window of the Read-/Write head
2	GO ⁽²⁾	GOing event. If set to 1, the ID tag has left the transmission window of the Read-/Write head
3..7	-	Set to default value 0

⁽¹⁾ Bit TR = NOT (TA): Command execution is started.

If Bits CM and GO are set simultaneously, the device signal, that the ID tag was detected before the connection to the PLC was established

Description Byte 3...4, "Length of EPC data (ID tag read)":

Length of the EPC data of the ID tag read

Description Byte 5...(5+n-1), "EPC data byte 1 ... n (ID tag read)":

EPC data of the ID read

Description Byte (5+n)...(6+n) "UHF memory bank":

0x0002 = TID data bank

0x0003 = User data memory bank

Description Byte (7+n)...(8+n), "16 Bit start address":

16 Bit start address from which the bytes are read from the UHF memory bank.

Description Byte (9+n)...(10+n), "16 Bit read length ":

Number of bytes read successfully from the selected UHF memory bank.

Description Byte (11+n)...(11+n+m-1), "Byte 1...m read ":

Byte 1 ... m read from the UHF bank of the ID tag.



The maximum read length in this mode is limited to 64 bytes.

Description Byte (11+n+m)...N, "Not used":

Are set to default value 0x00.



When no ID tag is detected or an error occur while the command is executed, bytes (3..N) are set to default value 0x00.



The setting of the IO-channel parameter "Data hold time" influence the time, how long the TP bit and the read data from the ID tag is kept stable in the process data input image.

13.9 Module “RWH_CMD”, Write memory bank of the selected ID tag synchronously

In this mode the EPC data and the User data of the ID tag can be written by setting the bit TR in the PLC process data output image to the complement state of bit TA in the PLC process data input image.



This mode is suitable if the user knows when the ID tag is present in front of the Read-/Write head.



During the execution of the command, no changes to the ID tags can be seen in the read field of the Read-/Write head. After executing the command, a waiting time of 500 ms should be inserted in order to recognize all ID tags in the reading field of the device again.

PLC process data output image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	0	UR=1 ⁽¹⁾	0	WR=1 ⁽¹⁾	AO=0	0
2	0	0	0	0	0	0	0	TR ⁽²⁾
3	0x00							
4	Length of EPC data (ID tag to be written)							
5	EPC data byte 1 (ID tag to be written)							
...	...							
5+(n-1)	EPC data byte n (ID tag to be written)							
5+n	UHF memory bank [D15...D8]							
6+n	UHF memory bank [D7...D0]							
7+n	16 Bit start address [D15...D8]							
8+n	16 Bit start address [D7...D0]							
9+n	16 Bit read length [D15...D7]							
10+n	16 Bit read length [D7...D0]							
11+n	Data byte 1 to be written							
...	...							
11+(n+m-1)	Data byte m to be written							
11+(n+m)...N	0x00							

Description byte 1, “Control byte 1”:

Bit	Value	Description	Remark
AO	0	“Antenna field on” request	Activate the antenna field. Necessary to communicate with the ID tag.
WR ⁽¹⁾	1	Activate mode “Write data”	Command is started after bit TR is set to NOT (TA) in status byte 2 of the PLC data input image.
UR ⁽¹⁾	1	Activate mode “User data access”	

⁽¹⁾ Bits WR and UR must have been set to level 1 when the bit TR change its state. It is allowed to set bits WR, UR and TR simultaneously in one PLC cycle.

Description byte 2, “Control byte 2”:

Bit	Bit name	Description
0	TR ⁽²⁾	Toggle Request. Controls the execution of the selected mode
1..7	-	Has to be set to default value 0

⁽²⁾ Bit TR = NOT (TA): Command execution is started.

Description Byte 3...4, “Length of EPC data (ID tag to be written)”:

Length of the EPC data of the ID tag to be written

Description Byte 5...(5+n-1), "EPC data byte 1 ... n (ID tag to be written)":

EPC data of the ID tag to be written

Description Byte (5+n)...(6+n), "UHF memory bank":

0x0003 = User data memory bank

Description Byte (7+n)...(8+n), "16 Bit start address":

16 Bit start address from which to read from the UHF memory bank.

Data type: 16 Bit unsigned integer.

Description Byte (9+n)...(10+n), "16 Bit write length":

Number of bytes to read from the selected UHF memory bank.

Data type: 16 Bit unsigned integer.

Description Byte (11+n)...(11+n+m-1), "Bytes 1...m to write":

Byte 1...m to be written to the UHF memory bank of the ID tag.

Data type: Array of unsigned char.

Description Byte (11+n+m)...N, "Not used":

Has to be set to default value 0x00.

PLC process data input image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	0	0	UA=1	RA=1	0	AI	TP
2	0	0	0	0	0	0	0	TA
3	0x00							
4	Length of EPC data (ID tag read)							
5	EPC data byte 1 (ID tag read)							
...	...							
5+(n-1)	EPC data byte n (ID read)							
5+n	UHF memory bank [D15...D8]							
6+n	UHF memory bank [D7...D0]							
7+n	16 Bit start address [D15...D8]							
8+n	16 Bit start address [D7...D0]							
9+n	16 Bit write length [D15...D7]							
10+n	16 Bit write length [D7...D0]							
11+n	Byte 1 to written							
...	...							
11+(n+m-1)	Byte m written							
11+(n+m) ... N	0x00							

Description Byte 1, “Status byte 1”:

Bit	Value	Description	Remark
TP	0	No ID tag detected in front of the Read-/Write head	-
	1	ID tag is detected in front of the Read-/Write head	Bit is set to 1 as long as the ID tag is detected by the R/W head. With the channel parameter “data hold time” the status of the bit can be extended.
AI	0	“Antenna field on” active	Reflect the current state of the antenna
WA	1	Mode “Write data” to the Device active	Reflect the state of bit WR.
UA	1	Mode “User data” active	Reflect the state of bit UR.
Diag	0	No error detected	-
	1	Device diagnostics available	Diagnostic information can be read out with mode “Diagnostics read”

Description Byte 2, “Status byte 2”:

Bit	Bit name	Description
0	TA ⁽¹⁾	Toggle request A cknowledge
1..7	-	Will be set to default value 0 by the Device

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.
 Bit TA = TR : Command has been processed by the Device. Bytes 3...N contain the command response data.

Description Byte 3...4, “Length of EPC data (ID tag read)”:

Length of the EPC data of the ID tag read
 Data type: 16 Bit unsigned integer.

Description Byte 5...(5+n-1), “EPC data byte 1 ... n (ID tag read)”:

EPC data of the ID read
 Data type: Array of unsigned char.

Description Byte (5+n)...(6+n) “UHF memory bank”:

Memory bank of ID tag written to. 0x0003 = User data memory bank
 Data type: 16 Bit unsigned integer.

Description Byte (7+n)...(8+n), “16 Bit start address”:

16 Bit start address of the bytes written to the UHF memory bank.
 Data type: 16 Bit unsigned integer.

Description Byte (9+n)...(10+n), “16 Bit write length “:

Number of bytes written successfully from the selected UHF memory bank.
 Data type: 16 Bit unsigned integer.

Description Byte (11+n)...(11+n+m-1), “Byte 1...m written “:

Byte 1 ... m written to the selected UHF bank of the ID tag.
 Data type: Array of unsigned char.

Description Byte (11+n+m)...N, “Not used”:

Are set to default value 0x00.



When no ID tag is detected or an error occur while the command is executed, bytes (3..N) are set to default value 0x00.

13.10 Module “RWH_CMD”, Diagnostics read

In this mode the diagnostic information of the Device can be read.

PLC process data output image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	DR ⁽¹⁾	ER	UR	0	0	AO	0
2	0	0	0	0	0	0	0	TR ⁽²⁾
3	Not used							
..	...							
N-1	Not used							
N	Not used							

Description byte 1, "Control byte 1":

Bit	Value	Description	Remark
AO	0/1	"Antenna field on" request	Can be left unchanged while mode Diagnostic Read is active
UR	0/1	Mode "User data" access to the ID tag	Can be left unchanged while mode Diagnostic Read is active
ER	0/1	Mode "Event controlled reading" of User memory of the ID tag	Can be left unchanged while mode Diagnostic Read is active
DR ⁽¹⁾	1	Mode "Diagnostics read" active	Diagnostic read is started after bit TR is set to NOT (TA) in status byte 2 of the PLC data input image.

⁽¹⁾ Diagnostics is only available, if bit "Diag" within the response data is set. Otherwise the response data will return default data "0x00" within byte 3...n.

Description byte 2, "Control byte 2":

Bit	Bit name	Description
0	TR ⁽¹⁾	Toggle Request. Controls the execution of the selected mode
1..7	-	Has to be set to default value 0

⁽²⁾ Bit TR = NOT (TA): Command execution is started.

Description byte 3..N:

Not used. These data area can be left unchanged to allow a faster return to the previously executed mode.

PLC process data input image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	DA	EA	UA	0	0	AI	TP
2	0	0	0	0	0	0	0	TA ⁽¹⁾
3	0x00							
4	Number of error codes							
5	0x00							
6	0x00							
7..10	Error code 1							
11..x	Error code 2..4							
(x+1)..N	0x00							

Description Byte 1, "Status byte":

Bit	Value	Description	Remark
TP	0	No ID tag detected in front of the Read-/Write head	-
	1	ID tag is detected in front of the Read-/Write head	Bit is set to 1 as long as the ID tag is detected by the R/W head. With the channel parameter "data hold time" the status of the bit can be extended.
AI	0/1	"Antenna field on" active	Reflect the current state of the antenna field setting.
UA	0/1	Mode "User data" Active	Reflect the current state.
EA	0/1	Mode "Receive User data on Event change" Active	Reflect the current state.
DA	0	Mode "Diagnostics Read" inactive	-
	1	Mode "Diagnostics Read" active	-
Diag	0	No error detected	-
	1	Device diagnostics available	If more than 4 error codes are present, this bit is kept in state 1. The user need to initiate a new diagnostic read to read out the error codes.

Description Byte 2, "Status byte 2":

Bit	Bit name	Description
0	TA ⁽¹⁾	Toggle request Acknowledge
1..7	-	Will be set to default value 0 by the Device

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.
 Bit TA = TR : Command has been processed by the Device. Bytes 3...N contain the command response data.

Description Byte 3..4, "Number of error codes":

Number of error codes present in the Device. Maximum number of error codes to read with one diagnostic read request is 4.

Description Byte 5..6:

Always set to default value 0x00.

Description Byte 7..x, "Error code 1..4":

Error codes of the Device. Details see chapter → "Error codes of the Device". One error code has always a length of 4 bytes. Remark: If less than 4 error codes are present, the unused bytes are set to default value 0x00.

Description Byte (x+1) ... N:

Always set to default value 0x00.

13.11 Module “RWH_CMD”, Execute command synchronously

In this mode several commands can be send to the Device to read out or to write data.

PLC process data output image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	0	0	RD ⁽¹⁾	WR ⁽¹⁾	0	0
2	CM=1	0	0	0	0	0	0	TR ⁽²⁾
3	16 Bit command length, MSBy							
4	16 Bit command length, LSBy							
5	16 Bit command code, MSBy							
6	16 Bit command code, LSBy							
7	Command parameter 1, MSBy							
8	Command parameter 1, LSBy							
9	Command parameter 2, MSBy							
10	Command parameter 2, LSBy							
...	...							
N	0x00							

Description byte 1, “Control byte 1”:

Bit	Value	Description	Remark
WR ⁽¹⁾	1	Activate mode “PUT” command	Command is started after bit TR is set to NOT (TA) in status byte 2 of the PLC data input
RD ⁽¹⁾	1	Activate mode “GET” response	Command is started after bit TR is set to NOT (TA) in status byte 2 of the PLC data input

- ⁽¹⁾ Bit WR or RD must have been set to level 1 when the bit TR change its state.
It is allowed to set bits WR and TR or RD and TR simultaneously in one PLC cycle.

Description byte 2, “Control byte 2”:

Bit	Bit name	Description
0	TR ⁽¹⁾	Toggle Request. Controls the execution of the selected mode
1..6	-	Has to be set to default value 0
7	CM	Command Mode active Has to be set to 1 to activate “command mode”

- ⁽²⁾ Bit TR = NOT (TA): Command execution is started.

Description Byte 3...4, “16 Bit command length X”:

Command data length, including length of command code. Limited to a maximum number of (N-6) bytes.

Description Byte 5...6, “16 Bit command code”:

Command code. Available commands see section → “Overview of the available commands”.

Description Byte 7...N, “16 Bit command parameter 1...X”:

Command parameter. Unused bytes are set to 0x00.

PLC process data input image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG ⁽¹⁾	0	0	0	RA	WA	AI ⁽¹⁾	TP ⁽¹⁾
2	CA	0	0	0	0	0	0	TA
3	16 Bit response data length, MSBy							
4	16 Bit response data length, LSBy							
5	16 Bit response code, MSBy							
6	16 Bit response code, LSBy							
7	16 Bit response data 1, MSBy							
8	16 Bit response data 1, LSBy							
9	16 Bit response data 2, MSBy							
10	16 Bit response data 2, LSBy							
...	16 Bit response data length, MSBy							
N	16 Bit response data length, LSBy							

Description Byte 1, "Status byte1":

Bit	Value	Description	Remark
TP ⁽¹⁾	0	No ID tag detected in front of the Read-	-
	1	ID tag is detected in front of the Read-/Write head	Bit is set to 1 as long as the ID tag is detected by the R/W head. With the channel parameter "data hold time" the status of the bit can be extended.
AI ⁽¹⁾	0	"Antenna field on" active	Reflect the current state of the antenna field setting.
WA	1	Mode "PUT" command to the Device	Reflect the state of bit WR.
RA	1	Mode "GET" data from the Device active	Reflect the state of bit RD.
DIAG ⁽¹⁾	0	No error detected	-
	1	Device diagnostics available	Diagnostics information can be read out with mode "Diagnostics read"

- ⁽¹⁾ Bits TP, AI and DIAG show the current state of the ID tag / HF antenna field / diagnostic data, independent of the setting of bit TR. Bits WA, RA are immediately set when the Device detect the setting of the corresponding bits WR and RD in the control byte 1 of the PLC data output image. Any change in the settings of these bits to prior received states set the data bytes 3 ... (N) to the default value 0x00. The bit TR does not influence this behavior.

Description Byte 2, "Status byte 2":

Bit	Bit name	Description
0	TA ⁽¹⁾	Toggle request Acknowledge
1..6	-	Will be set to default value 0 by the Device
7	CA ⁽²⁾	Command mode Active

- ⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.
 Bit TA = TR : Command has been processed by the Device. Bytes 3...N contain the command response data.
- ⁽²⁾ Bit CA is immediately set when the Device detect the setting of bit CR in the control bytes 2 of the PLC data output image. Any change of bit CR to prior received state set the data bytes 3 ... (N) to the default value 0x00. The bit TR does not influence this behavior.

Description Byte 3...4, "16 Bit response data length X":

Response data length include response code. Limited to a maximum number of (N-4) bytes.

Description Byte 5...6, "16 Bit response code":

Response code of the command request.

Description Byte 7...(N), "16 Bit response data 1...X":

This data area contains the response data of the command. Unused bytes are set to 0x00.



If an error occurs, the bytes 7...N are set to 0x0000 and the bit DIAG is set to 1.

13.11.1 Overview GET / SET commands

Command	Control word ⁽¹⁾	Command length	Command code	Parameter 1	Parameter 2	Parameter 3 .. (N-6)
GET IDENT DIAGNOSIS	0x0880	0x0002	0x62C8	0x0000	0x0000	0x0000
GET MAC ADDRESS	0x0880	0x0002	0x62C9	0x0000	0x0000	0x0000
GET UHF POWER LEVEL	0x0880	0x0002	0x6280	0x0000	0x0000	0x0000
GET EPC data	0x0880	0x0002	0x6281	0x0000	0x0000	0x0000
GET Reverse / Forward power	0x0880	0x0002	0x6288	0x0000	0x0000	0x0000
GET ID tag highest RSSI value	0x0880	0x0002	0x6292	0x0000	0x0000	0x0000
GET BARGRAPH STATE	0x0880	0x0002	0x62D0	0x0000	0x0000	0x0000

SET UHF POWER LEVEL	0x0480	0x0006	0x6580	RX Power	TX Power	0x0000
SET EPC DATA	0x0480	0x000x	0x6581	EPCL	EPC_1 EPC_2	...
SET ID TAG PRESENCE TIME	0x0480	0x0004	0x6582	LHT_1LHT_2	0x0000	0x0000
SET ID TAG RSSI LEVELS	0x0480	0x0006	0x6587	RSSI_MHRS SI ML	RSSI_XH RSSI_XL	0x0000
SET ID TAG ACCESS PASSWORD	0x0480	0x000x	0x658B	EPCL	EPC_1 EPC_2	...
SET RWH ACCESS PASSWORD	0x0480	0x0006	0x658F	RAP_D1 RAP_D2	RAP_D3 RAP_D4	0x0000
SET BARGRAPH STATE	0x0480	0x0004	0x65D7	State	0x0000	0x0000
SET DEVICE RESET	0x0480	0x0004	0x65D9	Countdown value	0x0000	0x0000
SET DATA HOLD TIME	0x0480	0x0004	0x65E0	DHT	0x0000	0x0000

⁽¹⁾ = TR bit in control byte must be set to NOT (TA) to activate the command.

13.11.2 Command “GET DIAGNOSIS”

With this command the diagnostic data of the Device can be read by the controller.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Control byte 1
2	0x80 ⁽¹⁾	Control byte 2
3	0x00	Command length (MSBy)
4	0x02	Command length (LSBy)
5	0x62	Command code (MSBy)
6	0xC8	Command code (LSBy)
7...N	0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 ⁽¹⁾	Status byte 2
3	0x00	Response length (MSBy)
4	0x04 + (4*X)	Response length (LSBy), X=Number of error codes
5	0x62	Response code (MSBy)
6	0xC8	Response code (LSBy)
7	0x00	Not used
8	0x00 ... (4*X)	Number of error codes [X= 0x0...0x4]
9...12	Error code 1	Error code 1. See chapter → “Error codes of the Device”
13...X	...	...
(X+1)..N	0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.
Bit TA = TR : Command has been processed by the Device. Bytes 3...N contain the command response data.

13.11.3 Command “GET MAC ADDRESS”

With this command the media access control (MAC) address of the Device can be read by the controller.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Control byte 1
2	0x80 ⁽¹⁾	Control byte 2
3	0x00	Command length (MSBy)
4	0x02	Command length (LSBy)
5	0x62	Command code (MSBy)
6	0xC9	Command code (LSBy)
7...N	0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 ⁽¹⁾	Status byte 2
3	0x00	Response length (MSBy)
4	0x08	Response length (LSBy)
5	0x62	Response code (MSBy)
6	0xC9	Response code (LSBy)
7	Octet 1	Media access control address, octet 1
8	Octet 2	Media access control address, octet 2
9	Octet 3	Media access control address, octet 3
10	Octet 4	Media access control address, octet 4
11	Octet 5	Media access control address, octet 5
12	Octet 6	Media access control address, octet 6
13...N	0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.
Bit TA = TR : Command has been processed by the Device. Bytes 3...N contain the command response data.

13.11.4 Command “GET UHF POWER LEVEL”

This command is supported in channel mode “RWH”.

With this command the controller can read out the currently set HF power of the Read-/Write head.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Control byte 1
2	0x80 ⁽¹⁾	Control byte 2
3	0x00	Command length (MSBy)
4	0x02	Command length (LSBy)
5	0x62	Command code (MSBy)
6	0x80	Command code (LSBy)
7...N	0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 ⁽¹⁾	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSBy)
5	0x62	Response code (MSBy)
6	0x80	Response code (LSBy)
7..8	RX-PWR	Currently set RX power level of the Read-/Write head [dBm *10E-2] Range: 10,00...23,00 dBm e.g. 0x03E8 = 1000 => 10,00 dBm
9..10	TX-PWR	Currently set TX power level of the Read-/Write head [dBm *10E-2] Range: 10,00...23,00 dBm e.g. 0x08FC = 2300 => 23,00 dBm
11...N	0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.
Bit TA = TR : Command has been processed by the Device. Bytes 3...N contain the command response data.

13.11.5 Command “GET BARGRAPH STATE”

With this command the controller can read out the LED bar graph state of the Read-/Write head.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Control byte 1
2	0x80 ⁽¹⁾	Control byte 2
3	0x00	Command length (MSBy)
4	0x02	Command length (LSBy)
5	0x62	Command code (MSBy)
6	0xD0	Command code (LSBy)
7...N	0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 ⁽¹⁾	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSBy)
5	0x62	Response code (MSBy)
6	0xD0	Response code (LSBy)
7	0x00	Not used
8	State ⁽²⁾	Current setting of the LED bar graph of the Read-/Write head 0x00 = Binary mode 0x01 = Count mode (default value)
9...N	0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.

Bit TA = TR : Command has been processed by the Device. Bytes 3...N contain the command response data.

⁽²⁾ State = Binary: If one or more ID tags are detected, the bargraph LED's 1...4 are switched on

State = Count: The number of detected ID tags are displayed by the number of LED's turned on. (0 ... 4 or more ID tags detected)



If the command is not supported by the Read-/Write head, the Device set the flag DIAG in status byte 2. The error code can be read out with command “GET IDENT DIAGNOSIS”.

13.11.6 Command “GET EPC DATA”

This command is supported in channel mode “RWH”.

With this command the controller can read out the EPC data of the detected ID tags.



If the data of the recognized ID tags do not fit into the RWH_CMD module, only a part of the recognized ID tags will be transferred in the command response.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
01	0x08	Control byte 1
02	0x80 ⁽¹⁾	Control byte 2
03	0x00	Command length (MSBy)
04	0x02	Command length (LSBy)
05	0x62	Command code “Get EPC data” (MSBy)
06	0x81	Command code “Get EPC data” (LSBy)
07...N	0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
01	0x08	Status byte 1
02	0x80 ⁽¹⁾	Status byte 2
03	0x00	Response length (MSBy)
04	N-0x04	Response length (LSBy)
05	0x62	Response code (MSBy)
06	0x81	Response code (LSBy)
07..08	NoE ⁽²⁾	Number of EPC elements [0x00...nn]
09 .. xx	EPC element 1	See description → “Structure of an EPC element”
(xx+1)...(yy)	EPC element 2	See description → “Structure of an EPC element”
...	...	...
N	EPC element (NoE) or 0x00	See description → “Structure of an EPC element”

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.

Bit TA = TR : Command has been processed by the Device. Bytes 3...N contain the command response data.

⁽²⁾ If more ID tags are recognized than fit in the module, the NoE parameter only shows the number of transferred elements, not the number of detected ID tags in the system.

If the EPC elements are smaller than the module size, the remaining data is set to the default value of 0x00

Structure of an EPC element

Rel. Byte No.	Content	Remark
00..01	RSSI	RSSI value [dBm*10 ⁻²] Range: 0x0000...0xD120 = 0dBm ... -120,00 dBm Data type: 16 Bit signed integer
02..03	EL	EPC data length [bytes] Range: 02,04,...,14,16 Data type: 16 Bit unsigned integer
13...(13+ EL-1)	D0 ...D(EL-1)	EPC data byte 00...EL1 Data type: Array of unsigned char

13.11.7 Command "GET ID TAG WITH HIGHEST RSSI"

This command is supported in channel mode "RWH".

With this command the controller can read the EPC data from the ID tag with the highest RSSI value currently detected.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Control byte 1
2	0x80 ⁽¹⁾	Control byte 2
3	0x00	Command length (MSBy)
4	0x02	Command length (LSBy)
5	0x62	Command code (MSBy)
6	0x92	Command code (LSBy)
07...N	0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
01	0x08	Status byte 1
02	0x80 ⁽¹⁾	Status byte 2
03	0x00	Response length (MSBy)
04	N-0x04	Response length (LSBy) ⁽¹⁾
05	0x62	Response code (MSBy)
06	0x92	Response code (LSBy)
07..08	RSSI	RSSI value [dBm*10 ⁻²] Range: 0xD120 ... 0xFFFF = -120,00 dBm ... -000,01 dBm Data type: 16 Bit signed integer
09..10	EL	EPC data length [bytes] Range: 02,04,...,14,16 Data type: 16 Bit unsigned integer
11..(11+ EL-1)	D0 ...D(EL-1)	EPC data byte D0...D(EL-1) Data type: Array of unsigned char
(11+EL)...N	0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.
Bit TA = TR : Command has been processed by the Device. Bytes 3...N contain the command response data.

13.11.8 Command "GET REVERSE / FORWARD POWER"

This command is supported in channel mode "RWH".

With this command the controller can read out the Reverse Power and the Forward Power of the Read-/Write head.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
01	0x08	Control byte 1
02	0x80 ⁽¹⁾	Control byte 2
03	0x00	Command length (MSBy)
04	0x02	Command length (LSBy)
05	0x62	Command code (MSBy)
06	0x88	Command code (LSBy)
07...N	0x00	Not used

⁽¹⁾ Bit TR must be set to NOT (TA) to start the command.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
01	0x08	Status byte 1
02	0x80 ⁽¹⁾	Status byte 2
03	0x00	Response length (MSBy)
04	0x06	Response length (LSBy)
05	0x62	Response code (MSBy)
06	0x88	Response code (LSBy)
07..08	RP	Reverse power [dBm*10 ⁻²] ⁽²⁾ -50.00 dBm ... +23.00 dBm e.g., 0xEC78 = -5000 => -50.00 dBm Data type: 16 Bit signed integer
09..10	FP	Forward power [dBm*10 ⁻²] ⁽³⁾ +00.00 dBm ... +25.00 dBm e.g., 0x08FC = +2300 => +23.00 dBm Data type: 16 Bit signed integer
11...N	0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.
Bit TA = TR : Command has been processed by the Device. Bytes 3...N contain the command response data.

Notes to the measured Reverse power

⁽²⁾ This value shows the current measured reverse output level of the Read-/Write head.
Please note, the values are only updated when the ID tags are inventoried by the Read-/Write head. If the UHF transmitter is shut off, the last measured values are transmitted.

Notes to the measured Forward power

⁽³⁾ Deviations from the set output level +0/-3dBm are normal.
Please note, the values are only updated when the ID tags are inventoried by the Read-/Write head. If the UHF transmitter is shut off, the last measured values are transmitted.

Reverse power [dBm*10 ⁻²]	Reverse power [mW]	Rating	Meaning
+2000 ... +2300	100 ... 200	bad	50% ... 100% of the output power is reflected to the UHF antenna, so very low power will reach the ID tag and the reading distance will be short This may happen, if an object is directly placed before the UHF antenna or the ID tag is near at the UHF antenna
+0300 ... +2000	20 ... 100	poor	10% ... 50% of the output power is reflected to the HF antenna
-5000 ... +0300	10E-6 ... 20	good	Most of the output power is send out from the antenna, so the ID tag can be read well

13.11.9 Command "SET UHF POWER LEVELS"

This command is supported in channel mode "RWH".

With this command the controller can set the transmission power levels of the UHF transmitter.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
01	0x04	Control byte 1
02	0x80 ⁽¹⁾	Control byte 2
03	0x00	Command length (MSBy)
04	0x06	Command length (LSBy)
05	0x65	Command code (MSBy)
06	0x80	Command code (LSBy)
07..08	RX PW	Power level for reading from the ID tag [dBm*10 ⁻²] Range: +10.00 dBm ... +23.00 dBm e.g. 0x03E8 = +10.00 dBm Data type: 16 Bit signed integer
09..10	TX PW (2)	Power level for writing to the ID tag [dBm*10 ⁻²] Range: +10.00 dBm ... +23.00 dBm e.g. 0x08FC = +23.00 dBm Data type: 16 Bit signed integer
11...N	00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
01	0x04	Status byte 1
02	0x80 ⁽¹⁾	Status byte 2
03	0x00	Response length (MSBy)
04	0x06	Response length (LSBy)
05	0x65	Response code (MSBy)
06	0x80	Response code (LSBy)
07..08	RX PW	Power level for reading from the ID tag [dBm*10 ⁻²] Range: +10.00 dBm ... +23.00 dBm e.g. 0x08FC = +23.00 dBm Data type: 16 Bit signed integer
09..10	TX PW	Power level for writing to the ID tag [dBm*10 ⁻²] Range: +10.00 dBm ... +23.00 dBm e.g. 0x08FC = +23.00 dBm Data type: 16 Bit signed integer
11...N	0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.

⁽²⁾ The writing to the ID tag need more energy than the reading. Therefore, the TX level can be adjusted if writing to the ID tag fails.

13.11.10 Command “SET EPC DATA”

This command is supported in channel mode “RWH”.

With this command the controller can write the EPC data on the ID tag.



During the execution of the command, no changes to the ID tags can be seen in the read field of the Read-/Write head. After executing the command, a waiting time of 500 ms should be inserted in order to recognize all ID tags in the reading field of the device again.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 ⁽¹⁾	Control byte 2
3	0x00	Command length (MSBy)
4	N-4	Command length (LSBy)
5	0x65	Command code (MSBy)
6	0x81	Command code (LSBy)
07..08	EL _c	Current EPC data length [bytes] Range: 02,04...,14,16 Data type: 16 Bit unsigned integer
09 .. (09+EL _{c-1})	EPC _c	Current EPC data byte 00...EL _c Data type: Array of unsigned char
(09+EL _c) .. (10+EL _c)	EL _n	New EPC data length [bytes] Range: 02,04...,14,16 Data type: 16 Bit unsigned integer
(11+EL _c) .. (11+EL _c +EL _{n-1})	EPC _n	New EPC data byte 00...EL _n Data type: Array of unsigned char
(11+EL _c +EL _n) ... N	0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.



The ID tag need more energy for the write process. The distance from the ID tag to the device is therefore less than during the reading process.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
01	0x04	Status byte 1
02	0x80 ⁽¹⁾	Status byte 2
03	0x00	Response length (MSBy)
04	N-4	Response length (LSBy)
05	0x65	Response code (MSBy)
06	0x81	Response code (LSBy)
07..08	EL _c	Current EPC data length [bytes] Range: 02,04...,14,16 Data type: 16 Bit unsigned integer
09 .. (09+EL _c -1)	EPC _c	Current EPC data byte 00...EL _c Data type: Array of unsigned char
(09+EL _c) .. (10+EL _c)	EL _n	New EPC data length [bytes] Range: 02,04...,14,16 Data type: 16 Bit unsigned integer
(11+EL _c) .. (11+EL _c +EL _n -1)	EPC _n	New EPC data byte 00...EL _n Data type: Array of unsigned char
(11+EL _c +EL _n) ... N	0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00. Bit TA = TR : Command has been processed by the Device. Bytes 3...N contain the command response data.

13.11.11 Command “SET ID TAG PRESENCE TIME“

This command is supported in channel mode “RWH”.

With this command the “ID tag presence time” hold time can be set.

If an ID tag is no longer physically recognized by the Read-/Write head, the data of the ID tag is stored in the List of detected ID tags (LDI) until the “ID tag presence time” has expired. The ID tag is then deleted from the LDI and a GOING event is sent to the host.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 ⁽¹⁾	Control byte 2
3	0x00	Command length (MSBy)
4	0x04	Command length (LSBy)
5	0x65	Command code (MSBy)
6	0x82	Command code (LSBy)
7 ... 8	LHT	LDI hold time [ms] Range: 0x0 ... 0xFFFF -> 0 ... 65535 ms Data type: 16 Bit unsigned integer
9 ... N	0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.



The LDI hold time is stored non volatile in the device.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 ⁽¹⁾	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSBy)
5	0x65	Response code (MSBy)
6	0x82	Response code (LSBy)
7 ... 8	LHT	LDI hold time [ms] Range: 0x0 ... 0xFFFF -> 0 ... 65535 ms Data type: 16 Bit unsigned integer
9 ... N	0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00. Bit TA = TR : Command has been processed by the Device. Bytes 3...N contain the command response data.

13.11.12 Command “SET ID TAG RSSI levels “

This command is supported in channel mode “RWH”.

With this command the detection area of the Read-/Write head can be controlled, without changing the HF power level. This function is useful when ID tags pass the detection area of the read / write head at different distances, and therefore different RSSI levels.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 ⁽¹⁾	Control byte 2
3	0x00	Command length (MSBy)
4	0x06	Command length (LSBy)
5	0x65	Command code (MSBy)
6	0x87	Command code (LSBy)
07...08	R_min ⁽²⁾	Minimum RSSI value [dBm*10 ⁻²] Range: 0xD8F1... 0xFFFF ... 0x0000 = -99,99 ... -0,01 ... 0,00 dBm Data type: 16 Bit unsigned integer
09...10	R_max ⁽²⁾	Maximum RSSI value [dBm*10 ⁻²] Range: 0xD8F1... 0xFFFF ... 0x0000 = -99,99... -0,01 ... 0,00 dBm Data type: 16 Bit unsigned integer
11...N	0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.

⁽²⁾ R_max must be 3.00 dBm greater than R_min.

Formula for calculation R_MIN or R_MAX)

$R_{xxx} = 65535 - (|RSSI| [dBm] * 100) + 1$. Valid for range -99,99 <= R_xxx <= -0,01 dBm

Example for RSSI = -99,99 dBm

$R_{MIN} (-99,99 \text{ dBm}) = 65535 - 9999 + 1 = 55537 = 0xD8F1$



The value R_max and R_min is stored volatile.

When the device is powered off, the stored values over the Webserver, Tab "RWH" are taken.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 ⁽¹⁾	Status byte 2
3	0x00	Response length (MSBy)
4	0x06	Response length (LSBy)
5	0x65	Response code (MSBy)
6	0x87	Response code (LSBy)
07...08	R_min	Minimum RSSI value [dBm*10 ⁻²] Range: 0xD8F1... 0xFFFF ... 0x0000 = -99,99... -0,01 ... 0,00 dBm Data type: 16 Bit unsigned integer
09...10	R_max	Maximum RSSI value [dBm*10 ⁻²] Range: 0xD8F1... 0xFFFF ... 0x0000 = -99,99... -0,01 ... 0,00 dBm Data type: 16 Bit unsigned integer
11...N	0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00. Bit TA = TR : Command has been processed by the Device. Bytes 3...N contain the command response data.

13.11.13 Command “SET ID TAG WRITE ACCESS PASSWORD”

This command is supported in channel mode “RWH”.

The ID tag write access password is used to protect the memory banks against writing.



If the Read-/Write head access password does not match the ID tag write access password, data can't be written on the memory bank “EPC and “USER”. The memory banks “EPC”, “USER” and “TID” can always be read, except the Read-/Write head access password is set and no ID tag write password is set. Details see command → “SET ID TAG LOCK STATE”.



During the execution of the command, no changes to the ID tags can be seen in the read field of the Read-/Write head. After executing the command, a waiting time of 500 ms should be inserted in order to recognize all ID tags in the reading field of the device again.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 ⁽¹⁾	Control byte 2
3	0x00	Command length (MSBy)
4	0x08+EL	Command length (LSBy)
5	0x65	Command code (MSBy)
6	0x8B	Command code (LSBy)
7	PW[0] ⁽²⁾	ID tag access password
...	...	Range: 0x00000000 ... 0xFFFFFFFF
10	PW[3]	Data type: Array of unsigned char
11 ... 12	EL	EPC data length [bytes] Range: 02, 04, ..., 14, 16 Data type: 16 Bit unsigned integer
13 ... (13+ EL-1)	E ₀ ... E _(EL-1)	EPC data byte E ₀ ...E _(EL-1) of the ID tag to set the password Data type: Array of unsigned char
(13+ EL) ... N	0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.

⁽²⁾ Numeric values passwords

Password	Numeric value
NO SET	0x00000000
SET	0x00000001 ... 0xFFFFFFFF

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 ⁽¹⁾	Status byte 2
3	0x00	Response length (MSBy)
4	0x08+EL	Response length (LSBy)
5	0x65	Response code (MSBy)
6	0x8B	Response code (LSBy)
7	PW[0]	ID tag access password
...	...	Range: 0x00000000 ... 0xFFFFFFFF
10	PW[3]	Data type: Array of unsigned char
11 ... 12	EL	EPC data length [bytes] Range: 02, 04, ..., 14, 16 Data type: 16 Bit unsigned integer
13 ... (13+ EL-1)	E ₀ ... E _(EL-1)	EPC data byte E ₀ ...E _(EL-1) of the ID tag to set the password Data type: Array of unsigned char
(13+ EL) ... N	0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.

Bit TA = TR : Command has been processed by the Device. Bytes 3...N contain the command response data.

13.11.14 Command “SET ID TAG LOCK STATE”

This command is supported in channel mode “RWH”.

The ID tag lock state is used to activate the read / write access of the memory banks of the ID tag.



During the execution of the command, no changes to the ID tags can be seen in the read field of the Read-/Write head. After executing the command, a waiting time of 500 ms should be inserted in order to recognize all ID tags in the reading field of the device again.

ID tag lock state (1)	ID tag password (2)	Read-/Write head password	Memory bank read	Memory bank write
UNLOCKED	NO SET	NO SET	Full access	Full access
UNLOCKED	NO SET	SET	No access	No access
UNLOCKED	SET	NO SET	Full access	Full access
UNLOCKED	SET	SET	Full access	Full access
LOCKED (3)	NO SET (3)	Don't care (3)	-	-
LOCKED	SET	NO SET	Full access	No access
LOCKED	SET	SET	Full access	Full access

► Numeric ID tag lock state (1)

ID tag lock state	Numeric value	ID tag LOCK behavior	Remark
UNLOCKED	0x0001	UNLOCKED	State changeable
LOCKED	0x0003	LOCKED	State changeable

► Numeric values passwords (2)

Password	Numeric value
NO SET	0x00000000
SET	0x00000001 ... 0xFFFFFFFF

► Without ID tag password, the ID tag can't be locked (3)

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSBy)
4	0x0A + EL	Command length (LSBy)
5	0x65	Command code (MSBy)
6	0x8D	Command code (LSBy)
7...8	BANK	Bank to lock 0x0000 – USER 0x0002 – EPC 0x0003 – ACCESS_PASSWORD 0x0004 – KILL_PASSWORD Data type: 16 Bit unsigned integer
09 ... 10	LS	Lock state 0x0001 – UNLOCKED 0x0003 – LOCKED Attention: Be careful with following lock states These lock states can never be changed. 0x0002 – PERMA_UNLOCKED 0x0004 – PERMA_LOCKED Data type: 16 Bit unsigned integer
11 ... 12	EL	EPC data length [bytes] Range: 02, 04, ..., 14, 16 Data type: 16 Bit unsigned integer
13 ... 14	E ₀ ... E _(EL-1)	EPC data byte E ₀ ...E _(EL-1) of the ID tag to lock the memory bank Data type: Array of unsigned char
(15+ EL) ... N	0x00	Not used

(2) Bit TR has to be set to NOT (TA) to start the command.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 ⁽¹⁾	Status byte 2
3	0x00	Response length (MSBy)
4	0x0A + EL	Response length (LSBy)
5	0x65	Response code (MSBy)
6	0x8D	Response code (LSBy)
7...8	BANK	Bank selected 0x0000 – USER 0x0002 – EPC 0x0003 – ACCESS_PASSWORD 0x0004 – KILL_PASSWORD Data type: 16 Bit unsigned integer
09 ... 10	LS	Lock state 0x01 – UNLOCKED 0x02 – PERMA_UNLOCKED 0x03 – LOCKED. 0x04 – PERMA_LOCKED Data type: 16 Bit unsigned integer
11 ... 12	EL	EPC data length [bytes] Range: 02, 04, ...,14,16 Data type: 16 Bit unsigned integer
13 ... 14	E ₀ ... E _(EL-1)	EPC data byte E ₀ ...E _(EL-1) of the ID tag locked Data type: Array of unsigned char
(15 + EL) ... N	0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.
Bit TA = TR : Command has been processed by the Device.

13.11.15 Command “SET READ-/WRITE HEAD ACCESS PASSWORD”

This command is supported in channel mode “RWH”.

The Read-/Write head access password is used to get write access to memory banks of the ID tags which are write protected by password.

If the Read-/Write head access password does not match the password of the write protected ID tags, data can't be written on the memory bank "EPC" and "USER".

The memory banks "EPC", "USER" and "TID" can always be read, except the Read-/Write head access password is set and no ID tag write password is set. Details see command "SET ID TAG LOCK STATE".

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 ⁽¹⁾	Control byte 2
3	0x00	Command length (MSBy)
4	0x06	Command length (LSBy)
5	0x65	Command code (MSBy)
6	0x8F	Command code (LSBy)
7	PW[0] ⁽²⁾	Read-/Write head access password
...	...	Range: 0x00000000 ... 0xFFFFFFFF
10	PW[3]	Data type: Array of unsigned char
11 ... N	0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.

⁽²⁾ Numeric values passwords

Password	Numeric value
NO SET	0x00000000
SET	0x00000001 ... 0xFFFFFFFF

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 ⁽¹⁾	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSBy)
5	0x65	Response code (MSBy)
6	0x8F	Response code (LSBy)
7	PW[0]	Read-/Write head access password
...	...	Range: 0x00000000 ... 0xFFFFFFFF
10	PW[3]	Data type: Array of unsigned char
9 ... N	0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.
Bit TA = TR : Command has been processed by the Device.

13.11.16 Command “SET BARGRAPH STATE”

With this command the controller can set the LED bar graph state of the Read-/Write head.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 ⁽¹⁾	Control byte 2
3	0x00	Command length (MSBy)
4	0x04	Command length (LSBy)
5	0x65	Command code (MSBy)
6	0xD7	Command code (LSBy)
7	0x00	Not used
8	State ⁽²⁾	Current setting of the LED bar graph of the Read-/Write head 0x00 = Binary mode 0x01 = Count mode (default value)
9...N	0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 ⁽¹⁾	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSBy)
5	0x65	Response code (MSBy)
6	0xD7	Response code (LSBy)
7	0x00	Not used
8	State ⁽²⁾	Current setting of the LED bar graph of the Read-/Write head 0x00 = Binary mode 0x01 = Count mode (default value)
9...N	0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.
Bit TA = TR: Command has been processed by the Device

⁽²⁾ State = Binary: If one or more ID tags are detected, the bargraph LED's 1...4 are switched on
State = Count: The number of detected ID tags are displayed by the number of LED's turned on. (0 ... 4 or more ID tags detected)



If the command is not supported by the Read-/Write head, the Device set the flag DIAG in status byte 2. The error code can be read out with command “GET IDENT DIAGNOSIS”.

13.11.17 Command “SET DEVICE RESET”

With this command the controller can restart the device by software.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 ⁽¹⁾	Control byte 2
3	0x00	Command length (MSBy)
4	0x04	Command length (LSBy)
5	0x65	Command code (MSBy)
6	0xD9	Command code (LSBy)
7	0x00	Not used
8	RDT	Restart Delay Time [ms*10] 0x00 = Restart of the Device without delay 0x01... 0xFF = Restart of the Device within XX * 10 ms
9...N	0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 ⁽¹⁾	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSBy)
5	0x65	Response code (MSBy)
6	0xD9	Response code (LSBy)
7	0x00	Not used
8	CRT	Countdown Restart delay Time [ms*10] Value is decremented from “Restart delay time”, set in byte RTD of the PLC process data output image, to 0x0. After that, the restart sequence is executed.
9...N	0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.
Bit TA = TR : Command has been processed by the Device.



It is sufficient to execute this command at one IO channel.

Once the command is started, the other active IO channels will not be actualized in the process data input image.

13.11.18 Command “SET DATA HOLD TIME“

This command is supported in channel mode “RWH”.

With this command the Data hold time of the process data input image can be set.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 ⁽¹⁾	Control byte 2
3	0x00	Command length (MSBy)
4	0x04	Command length (LSBy)
5	0x65	Command code (MSBy)
6	0xE0	Command code (LSBy)
7 ... 8	DHT	Data hold time [ms] Range: 0x0 ... 0xFFFF -> 0 ... 65535 ms Data type: 16 Bit unsigned integer
9 ... N	0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.



The Data hold time is stored volatile in the device. When the device is reconfigured over the fieldbus, the data hold time is set accordingly to the defined value in the device description files.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 ⁽¹⁾	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSBy)
5	0x65	Response code (MSBy)
6	0xE0	Response code (LSBy)
7 ... 8	DHT	Data hold time [ms] Range: 0x0 ... 0xFFFF -> 0 ... 65535 ms Data type: 16 Bit unsigned integer
9 ... N	0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.
Bit TA = TR : Command has been processed by the Device.

13.11.19 Command "READ UHF MEMORY BANK SELECTIVE"

This command is supported in channel mode "RWH".

With this command the controller can read out the UHF memory banks of a selected ID tag.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
01	0x08	Control byte 1
02	0x80 ⁽¹⁾	Control byte 2
03	0x00	Command length (MSBy)
04	0x0A+EL	Command length (LSBy)
05	0x62	Command code (MSBy)
06	0x94	Command code (LSBy)
07	EL	EPC data length [bytes] Range: 02,04,...,14,16
..		
08		Data type: 16 Bit unsigned integer
09 ... (09+ EL-1)	E0 ...E(EL-1)	EPC data byte E0...E(EL-1) Data type: Array of unsigned char
(09+ EL) ... (10+ EL)	BANK	UHF Memory bank of the ID tag to read 0x0002 = TID data bank 0x0003 = User data memory bank Data type: 16 Bit unsigned integer
(11+ EL) ... (12+ EL)	ADD	16 Bit start address [D15...D0] Data type: 16 Bit unsigned integer
(13+ EL) ... (14+ EL)	RL	16 Bit read length [D15...D0] Data type: 16 Bit unsigned integer
(15+ EL) ... N	0x00 ... 0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
01	0x08	Control byte 1
02	0x80 ⁽¹⁾	Control byte 2
03	0x00	Command length (MSBy)
04	0x0A+EL	Command length (LSBy)
05	0x62	Command code (MSBy)
06	0x94	Command code (LSBy)
07	EL	EPC data length [bytes] Range: 02,04,...,14,16
..		
08		Data type: 16 Bit unsigned integer
09 ... (09+ EL-1)	E0 ...E(EL-1)	EPC data byte E0...E(EL-1) Data type: Array of unsigned char
(9+ EL) ... (10+ EL)	BANK	UHF Memory bank of the ID tag to read 0x0002 = TID data bank 0x0003 = User data memory bank
(11+ EL) ... (12+ EL)	ADD	16 Bit start address [D15...D0] Data type: 16 Bit unsigned integer
(13+ EL) ... (14+ EL)	RL	16 Bit read length [D15...D0] Data type: 16 Bit unsigned integer
(15+ EL) ... (15+ EL+RL-1)	D0 ... D(RL-1)	Data byte D0...D(RL-1) read
(15+ EL+RL) ... N	0x00...0x00	Not used

⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.
Bit TA = TR : Command has been processed by the Device.

13.11.20 Command “WRITE UHF MEMORY BANK SELECTIVE”

This command is supported in channel mode “RWH”.
With this command the UHF memory banks can be written.



During the execution of the command, no changes to the ID tags can be seen in the read field of the Read-/Write head. After executing the command, a waiting time of 500 ms should be inserted in order to recognize all ID tags in the reading field of the device again.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
01	0x04	Control byte 1
02	0x80 ⁽¹⁾	Control byte 2
03	0x00	Command length (MSBy)
04	0x0A+EL+WL	Command length (LSBy)
05	0x65	Command code (MSBy)
06	0x95	Command code (LSBy)
07	EL	EPC data length [bytes] Range: 02,04,...,14,16
..		
08		Data type: 16 Bit unsigned integer
09 ... (09+ EL-1)	E0 ...E(EL-1)	EPC data byte E0...E(EL-1) Data type: Array of unsigned char
(09+ EL)	BANK	UHF Memory bank of the ID tag to be written 0x0003 = User data memory bank
...		
(10+ EL)		Data type: 16 Bit unsigned integer
(11+ EL) ...	ADD	16 Bit start address [D15...D0]
(12+ EL)		Data type: 16 Bit unsigned integer
(13+ EL)	WL	16 Bit write length [D15...D0]
...		Data type: 16 Bit unsigned integer
(14+ EL)		
(15+ EL) ...	W0 ...W(WL-1)	Data byte to be written W0...W(WL-1)
(15+ EL+WL-1)		Data type: Array of unsigned char
(15+ EL+WL) ... N	0x00 ... 0x00	Not used

⁽¹⁾ Bit TR has to be set to NOT (TA) to start the command.

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 ⁽¹⁾	Status byte 2
3	0x00	Response length (MSBy)
4	0x0A+EL+WL	Response length (LSBy), X=Number of error codes
5	0x65	Response code (MSBy)
6	0x95	Response code (LSBy)
07 .. 08	EL	EPC data length [bytes] Range: 02,04,...,14,16 Data type: 16 Bit unsigned integer
09 ... (09+ EL-1)	E ₀ ...E _(EL-1)	EPC data byte E ₀ ...E _(EL-1) Data type: Array of unsigned char
(09+ EL) ... (10+ EL)	BANK	UHF Memory bank of the ID tag written 0x0003 = User data memory bank Data type: 16 Bit unsigned integer
(11+ EL) ... (12+ EL)	ADD	16 Bit start address [D15...D0] Data type: 16 Bit unsigned integer
(13+ EL) ... (14+ EL)	WL	16 Bit write length [D15...D0] Data type: 16 Bit unsigned integer
(15+ EL) ... (15+ EL+WL-1)	W ₀ ...W _(WL-1)	Data byte written W ₀ ...W _(WL-1) Data type: Array of unsigned char
(15+ EL+WL) ... N	0x00 .. 0x00	Not used

- ⁽¹⁾ Bit TA = NOT (TR): Command execution is running. Bytes 3...N are set to default value 0x00.
Bit TA = TR : Command has been processed by the Device.

14 Data frame examples

The values shown in the payload traffic view are in hexadecimal notation. **30** = 0x30 = 48 decimal

14.1 Module “RWH_CMD”, Read EPC, RSSI and phase asynchronously

The example shows the RFID channel with a configuration of 26 bytes in length.

14.1.1 Payload traffic view

Last response from the device:

Byte	01	02	03	04	05	06	07	08	09 ... 26
Response	00	00	00	00	00	00	00	00	000000000000000000000000 ... 00

Note: The evaluation of the response of the device is necessary to get the state of the bit **TA** in byte 2 for the RFID channel, here bit **TA** is reset.

Command request send by Controller:

Byte	01	02	03	04	05	06	07	08	09 ... 26
Command	00	01	00	00	00	00	00	00	000000000000000000000000 ... 00

Controller: **TR** bit set, read RSSI, phase and EPC data of the ID tag

Response send by device when command finished:

Byte	01	02	03	04	05	06	07	08	
Response	00	03	E9	80	00	65	00	0C	e20040807111003518205a49 ... 00

Byte 2 : CM=1 -> ID tag coming event detected, TP=1 -> at least one ID tag detected

Byte 3...4: RSSI = 0xE980 => -57,59 dBm

Byte 5...6: Phase = 0x0065 => 101°

Byte 7...8: EPC data length of 0x0C

Byte 9...26: EPC data “e2 00 40 80 71 11 00 35 18 20 5a 49.”

14.1.2 Payload traffic view, read diagnostics

Command request send by Controller:

Byte	01	02	03	04	05	06	07	08	09 ... 26
Command	40	00	00	00	00	00	00	00	000000000000000000000000 ... 00

Controller: Read diagnostics information. Activate mode by sending bit TR = NOT (TA).

Response send by device when command finished:

Byte	01	02	03	04	05	06	07	08	09 ... 26
Response	40	00	00	00	00	00	00	00	000000000000000000000000 ... 00

Device: RFID channel has no diagnostics information.

Note:

Before the EPC can be read again, the DR bit within the Control byte must be reset.

Here an example how to reset the DR bit.

Command request send by Controller:

Byte	01	02	03	04	05	06	07	08	09 ... 26
Command	00	01	00	00	00	00	00	00	000000000000000000000000 ... 00

Controller: Remove diagnostics read request, Read RSSI, phase and EPC data of the ID tag, activate mode by sending bit TR = NOT (TA).

14.2 Module “RWH_CMD”, Read memory bank of the ID tag synchronously

The example shows the RFID channel with a configuration of 86 bytes in length.

14.2.1 Payload traffic view

Last response from the device:

Byte	01	02	03	04	05	06	07	08	09 ... 86
Response	01	00	00	00	00	00	00	00	000000000000000000000000 ... 00

Note: The evaluation of the response of the device is necessary to get the state of the bit TA in byte 2 for the RFID channel, here bit TA is reset.

Command request send by Controller:

Byte	01	02	03	04	05...16	17...18	19...20	21...22	23...86
Command	18	01	00	0C	E200...5A49	0003	0000	0010	00...00

Controller: Read User memory bank = 0x0003 of the ID tag with EPC data 0xE200...5A49 from address 0x0000 with data length of 0x0010 = 16 bytes

Response send by device when command finished:

Byte	01	02	03	04	05 ... 16	17...18	19...20	21...22	23...38	39...86
Response	19	01	00	0C	E200...5A49	0003	0000	0010	5573...6B25	00...00

Device: Send User data read from ID tag with EPC data 0xE200...5A49 from User memory bank = 0x0003, address 0x0000 with data length of 0x0010 bytes, payload data 0x5573...6B25.

14.2.2 Payload traffic view, read diagnostics

Command request send by Controller:

Byte	01	02	03	04	05	06	07	08	09 ... 86
Command	50	00	00	00	00	00	00	00	000000000000000000000000 ... 00

Controller: Read diagnostics information. Activate mode by sending bit TR = NOT (TA).

Response send by device when command finished:

Byte	01	02	03	04	05	06	07	08	09 ... 86
Response	50	00	00	00	00	00	00	00	000000000000000000000000 ... 00

Device: RFID channel has no diagnostics information.

14.3 Module “RWH_CMD”, Write memory bank of the ID tag synchronously

The example show two IO channels with a length of 86 bytes per channel.

14.3.1 Payload traffic view

Last response from the device:

Byte	01	02	03		04	05	06	07	08	09 ... 86
Response	01	01	00		00	00	00	00	00	000000000000000000000000 ... 00

Note: The evaluation of the response of the device is necessary to get the state of the bit **TA** in byte 2 for the RFID channel, here bit TA is set.

Command request send by Controller:

Byte	01	02	03	04	05 ... 16	17... 18	19... 20	21...22	23...38	39...86
Command	15	00	00	0C	E200...5A49	0003	0000	0010	0102...0F10	00...00

Controller: Write to User memory bank of the ID tag with EPC data 0xE200...5A49 from address 0x0 with data length of 16 bytes the payload data bytes 0x0102...0F10.

Response send by Device when command has been processed:

Byte	01	02	03	04	05 ... 16	17... 18	19... 20	21...22	23...38	39...86
Response	15	00	00	0C	E200...5A49	0003	0000	0010	0102...0F10	00...00

Device: Write to User memory bank of the ID tag with EPC data 0xE200...5A49 from address 0x0 with data length of 16 bytes with payload data bytes 0x0102...0F10 executed.

Note: The payload data bytes 0x0102...0F10 are not read from the User memory bank, but only mirrored from the command request.

14.3.2 Payload traffic view, read diagnostics

Command request send by Controller:

Byte	01	02	03	04	05	06	07	08	09 ... 86
Command	50	01	00	00	00	00	00	00	000000000000000000000000 ... 00

Controller: Read diagnostics information. Activate mode by sending bit TR = NOT (TA).

Response send by Device when command finished:

Byte	01	02	03	04	05	06	07	08	09 ... 86
Response	50	01	00	00	00	00	00	00	000000000000000000000000 ... 00

Device: RFID channel has no diagnostics information.

14.4 Module “RWH_CMD”, Execute command synchronously

The example show two IO channels with a length of 26 bytes per channel.

14.4.1 Payload traffic view

Last response from the Device:

Byte	01	02	03	04	05	06	07	08	09 ... 26
Response	01	00	00	00	00	00	00	00	00...00

Note: The evaluation of the response of the Device is necessary to get the state of the bit **TA** in byte 2 for the RFID channel, here bit TA is set.

Command request send by Controller:

Byte	01	02	03	04	05	06	07...08	09...10	11...26
Command	08	81	00	06	65	80	03E8	08FC	00...00

Controller: Send command “Set UHF power level” of the Device to RX power level 0x03E8 = 10,00 dBm and TX power level to 0x08FC = 23,00 dBm.

Response send by Device when command has been processed:

Byte	01	02	03	04	05	06	07...08	09...10	11...26
Response	08	81	00	06	65	80	03E8	08FC	00...00

Device: TA = TR, command execution completed.

14.4.2 Payload traffic view, read diagnostics

Command request send by Controller:

Byte	01	02	03	04	05	06	07...26
Command	08	80	00	02	62	C8	00...00

Controller: Read diagnostics information. Activate mode by sending bit TR = NOT (TA).

Response send by Device when command has been processed:

Byte	01	02	03	04	05	06	07...08	09...26
Response	08	80	00	04	62	00	00...00	00...00

Device: RFID channel has no diagnostics information.

15 Error codes of the device

Error codes are signaled with bit “Diag” within the status byte of the response data of the Device. If more diagnostic events are available, the channel can transfer up to 4 diagnostics simultaneously. The hardware diagnostic events, which are device relevant, are indicated by the Diag bit on all channels. Note: Inactive channels can only transfer hardware diagnostic events.

Examples:

- Command response of the Device for diagnostic read over bit “DR”:
5101 0001 0000 **F4FE9000**

- Command response of the Device for command “GET IDENT DIAGNOSIS”
0880 0008 62C8 0001 **F4FE9000**

15.1 Error group ID tag (F1FE)

Error group	Error Code	Description
ID Tag	F1FE0200	ID tag presence error or R/W head communication error with the ID tag
ID Tag	F1FE0300	Address or command does not fit the ID tag characteristics, memory size invalid
ID Tag	F1FE0400	ID tag is defective, replace ID tag or battery
ID Tag	F1FE0500	ID tag memory overflow. EPC > 16 bytes
ID Tag	F1FE0900	Command not supported by the ID tag
ID Tag	F1FE0A00	Access violation e.g. block locked. Refer to ISO18000-x
ID Tag	F1FE0B00	General ID tag error which is not specified in detail
ID Tag	F1FE0C00	Unknown internal error

15.2 Error group Device (F4FE)

Error group	Error Code	Description
Device	F4FE0100	Power supply failure
Ident Unit	F4FE0200	Hardware failure, short circuit and overload
Device	F4FE0201	Allowed temperature exceeded
Device	F4FE0300	Read-/Write head not operating cause time out occurred
Device	F4FE0400	Command buffer overflow IO-Server Queue (Internal error)
Device	F4FE0500	Data buffer overflow, memory allocation (Internal error)
Device	F4FE0600	Command in this mode not supported (Internal error)
Device	F4FE8100	ID-Link Master inactive. e.g. after power (Internal error)
Device	F4FE8200	Internal IO-Port server error (Internal error)
Device	F4FE8300	IO-Port invalid parameter Internal error, e.g. channel (Internal error)
Device	F4FE8400	Vendor specific error on PUT
Device	F4FE8500	IO-Port server reset channel
Device	F4FE8600	Data not available for delayed C/Q inputs or delayed EPC (Internal error)
Device	F4FE8700	IO-Port channel reconfiguration not allowed yet (internal error)
Device	F4FE8800	IO-Port parameter selector flag not set (internal error)
Device	F4FE8900	General error detected from ID-Link Master
Device	F4FE8A00	CRC error detected from ID-Link Master

Device	F4FE8B00	Object not found detected from ID-Link Master
Device	F4FE8C00	Data Read-/Write size within command not valid
Device	F4FE8D00	IO-Port channel is reconfigured
Device	F4FE8E00	Read-/Write head could not process command e.g. Read-/Write length exceeded, ID tag memory error, write to locked block
Device	F4FE8F00	ID tag data length exceed (Block size * Block number)
Device	F4FE9001	Short circuit at output driver detected
Device	F4FE9002	Under voltage at output driver detected
Device	F4FE9003	Overload at output driver detected
Device	F4FE9004	Over temperature at output driver detected
Device	F4FE9005	Line break to Read-/Write head
Device	F4FE9006	Upper limit reached at output driver
Device	F4FE9007	Under voltage at C/Qo detected
Device	F4FE9008	Read-/Write head failure detected
Device	F4FE9009	Read-/Write head communication error
Device	F4FE900A	I ² C communication error (Internal error)
Device	F4FE900B	I ² C communication parity error (Internal error)
Device	F4FE900C	Command rejected cause antenna field switched off
Device	F4FE900D	Internal data of PROFNET stack corrupt (Internal error)
Device	F4FE900E	R/W head do not support this object
Device	F4FE9401	Frontend Error detected by Read-/Write head
Device	F4FE9402	General error detected by Read-/Write head
Device	F4FE9403	ID-Link Error detected by Read-/Write head
Device	F4FE9404	Buffer overrun Error detected by Read-/Write head
Device	F4FE9405	Over temperature at front end detected
Device	F4FE9406	R/W head error detect reverse power to high
Device	F4FE9407	Reset of R/W head detected
Device	F4FE9408	R/W head HAL error detected
Device	F4FEA000	Invalid command code detected
Device	F4FEA001	Invalid command parameter detected
Device	F4FEA002	Invalid command data detected
Device	F4FEA003	Ticket number or ticket length detected

Error group	Error Code	Description
Device	F4FEA100	Configuration of device failed (CR1 / CR2)
Device	F4FEA200	Configuration of IO-channel failed (Internal error)
Device	F4FEA300	Reading of Inputs C/Qi / IQ (Internal error)
Device	F4FEA400	Write of output C/Qo failed (Internal error)
Device	F4FEA500	Setting of high current failed (Internal error)
Device	F4FEA600	Read of EPC failed (Internal error)
Device	F4FEA700	Read of User data memory of the ID tag failed (Internal error)
Device	F4FEA800	Write to user memory of the ID tag failed, command WU (Internal error)
Device	F4FEA900	Write to user memory of the ID tag failed, command WV (Internal error)
Device	F4FEAA00	Verification of the user memory of the ID tag failed, commands "WV" (Internal error)
Device	F4FEAB00	Setting of Antenna field on/off failed, command "AN"
Device	F4FEAC00	ID-Link master could not read the ID tag blocks (Internal error)
Device	F4FEAD00	Block size/number of blocks could not be read from the ID tag

Error group	Error Code	Description
Device	F4FED100	Internal command execution failure

	... F4FEFF00	
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15.3 Error group Communication User – Device (F5FE)

Error group	Error Code	Description
Communication User - Device	F5FE0800	Command from another user being processed (indicated by device)
Communication User - Device	F5FE8000	More than one command requested by User (DR,WR,Diag)
Communication User - Device	F5FE8100	Synchronous read or write command is tried to abort
Communication User - Device	F5FE8300	Asynchronous read command parameter invalid
Communication User - Device	F5FE8400	Invalid command request in module RWH_CMD detected
Communication User - Device	F5FE8500	Module size too short to execute commands

15.4 Error group Command error – Device (F6FE)

Error group	Error Code	Description
Communication User - Device	F6FE0300	Invalid command parameter (e.g. data range) (indicated by device)

16 Glossary

Definition	Remark
Adaptor	Participant of an EtherNet/IP network, listening to an EtherNet/IP Scanner.
Antenna	RFID antenna.
Asynchronously	Data of the command response is updated after the device detects a state change of the ID tag from “not present” to “present” or vice versa.
Block size	Size of one block of the ID tag, for UHF ID tags always 2 bytes.
CodeSYS	Soft PLC from 3S-Smart Software Solutions GmbH.
Compact device	RFID Identification unit with integrated Read-Write head. e.g. DTE8x1, DTE8x2, ...
Connection	Describes the logical connection between two objects, e.g. Controller and slave.
Controller	See definition PLC.
Event	Events can occur in several ways: COMing event: An ID tag or a signal change from L-> H level on the I/O is newly detected. UPDate event: An event that has already been signaled is repeated. GOIn g event: An ID tag is no longer recognized within a period of time or a signal change from H-> L level is detected.
EDS	E lectronic D ata S heet. Device description file for EtherNet/IP.
Emergency system	Web server with reduced functionality to download the firmware of the device.
EPC	E lectronic P roduct C ode.
EtherNet/IP	EtherNet Industrial Protocol from ODVA.
ETSI	E uropean T elecommunications S tandards I nstitute.
FCC	F ederal C ommunications C ommission. Responsible for standardization of Information and Communication in North America.
Hexadecimal	Numeral format, which use 16 values to represent a numeric value. 0...9, A, B, C, D, E, F
ID tag, transponder	RFID ID tag, e.g. E80393, E80409, ...
LDI	L ist of D etected I D tags. A list in which all ID tags are collected that were recognized at least once within the LDI timeout period.
Memory bank	The memory of the UHF ID is separated into 4 memory banks. EPC = Contain EPC data. Read-/write access. TID = Contain TID data. Read access only. User = Contain User data. Read-/write access. Reserved = Access and kill password data. Read-/write access.
N	Selected module size N of the IO-channel.
ODVA	O pen D evice N et V endors A ssociation. User organization representing the EtherNet/IP fieldbus system.
PC	P ersonal C omputer, e.g. desktop computer, notebook.
PermData	P ermanent D ata Nonvolatile data area of the device for storage of user specific settings, like fieldbus parameter, address settings and so on.
PLC	P rogrammable L ogic C ontroller. e.g. Allen Bradley Compact Logix, Beckhoff CX5020, Siemens CPU 315-2 DP/PN.
Process data input image	Data area where the PLC can read the outputs of the external periphery devices. (%IBx)

Process data output image	Data area where the PLC can write to the inputs of the external periphery devices. (%QBx)
Read-/Write head	RFID Read-/Write head. In Compact devices already integrated.
RSSI	Receive Signal Strength Indicator. Reflect the received signal quality of the ID tag. Higher values mean a better reception of the ID tag signal.
Scanner	Bus master of a EtherNet/IP or EtherNet/IP network.
Synchronously	Data of the command response is updated immediately with the currently detected state of the ID tag.
TID	T ransponder I dentifier. Unique number of the UHF ID tag, read only.
UHF	U ltra H igh F requency. Frequency range 300MHz 3GHz ETSI range: 865 ... 868 MHz FCC range: 902 ... 928 MHz
User data	Data area of the ID tag which can be read and written randomly.
Web client	PC program to send "http protocol" requests, e.g. Firefox, Internet Explorer.
Web server	Built in "http protocol" server to service request from a PC.

Reference:

- [1] EPC™ Radio-Frequency Identity Protocols Generation-2 UHF RFID, Specification for RFID Air Interface Protocol for Communications at 860 MHz – 960 MHz Version 2.0.0 Ratified