

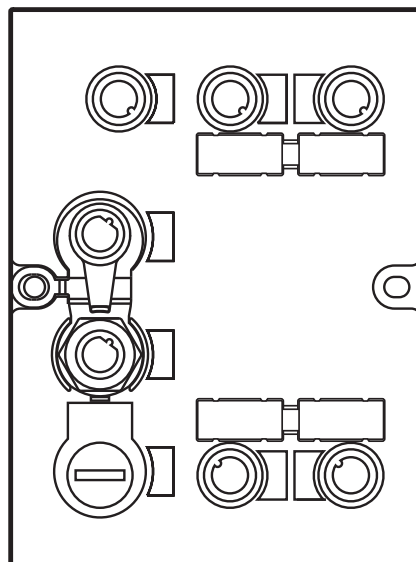


Device Manual  
RFID evaluation unit

**DTE102**

**UK**

706357 / 01 07 / 2016



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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 set-up 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 evaluation unit DTE102 integrates an EtherNet/IP interface and 4 channels for the connection of field devices. Each channel can be used either for the connection of an RFID antenna or as input/output to IEC 61131.

The device

- controls the data exchange to the RFID antennas or the sensor/actuator level.
- communicates with the higher-level 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
- UDP - User Datagram Protocol
- IT functionality: HTTP server
- M12, twisted pair

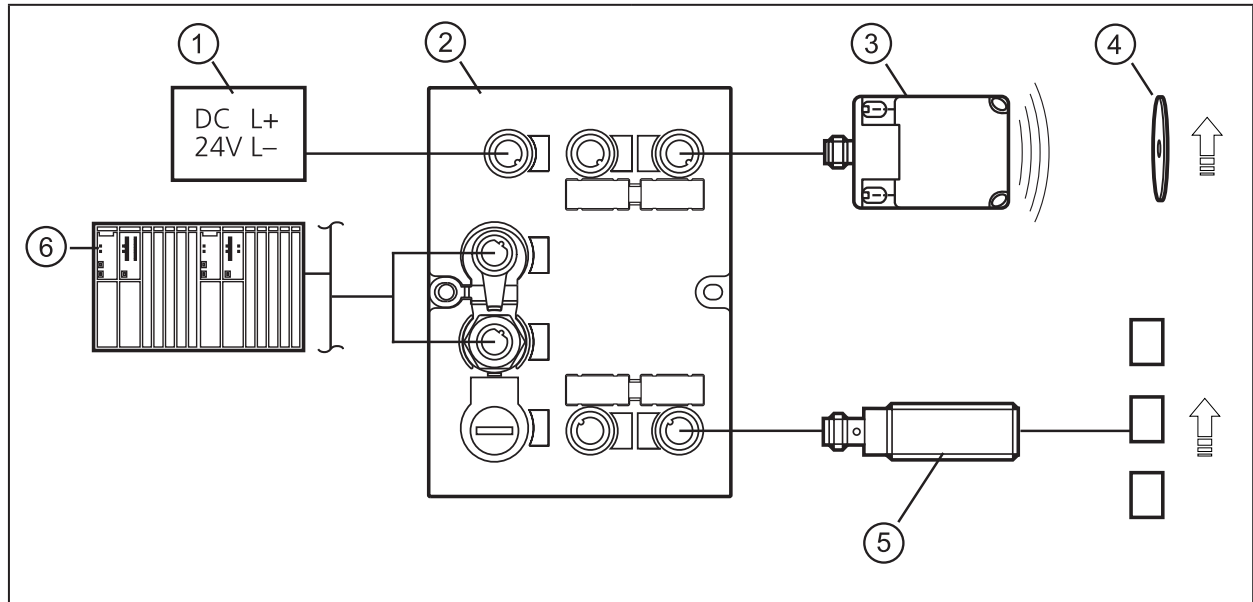
### 3.2 Functions for commissioning

Via the integrated Webserver it is possible to

- read the UID of the transponder
- read the user data area of the transponder
- write to the user data area of the transponder

- read the input of the IO channels
- write to the output of the IO channels
- read the device information of the evaluation unit
- read the device information of the connected RFID antennas

## 4 Function

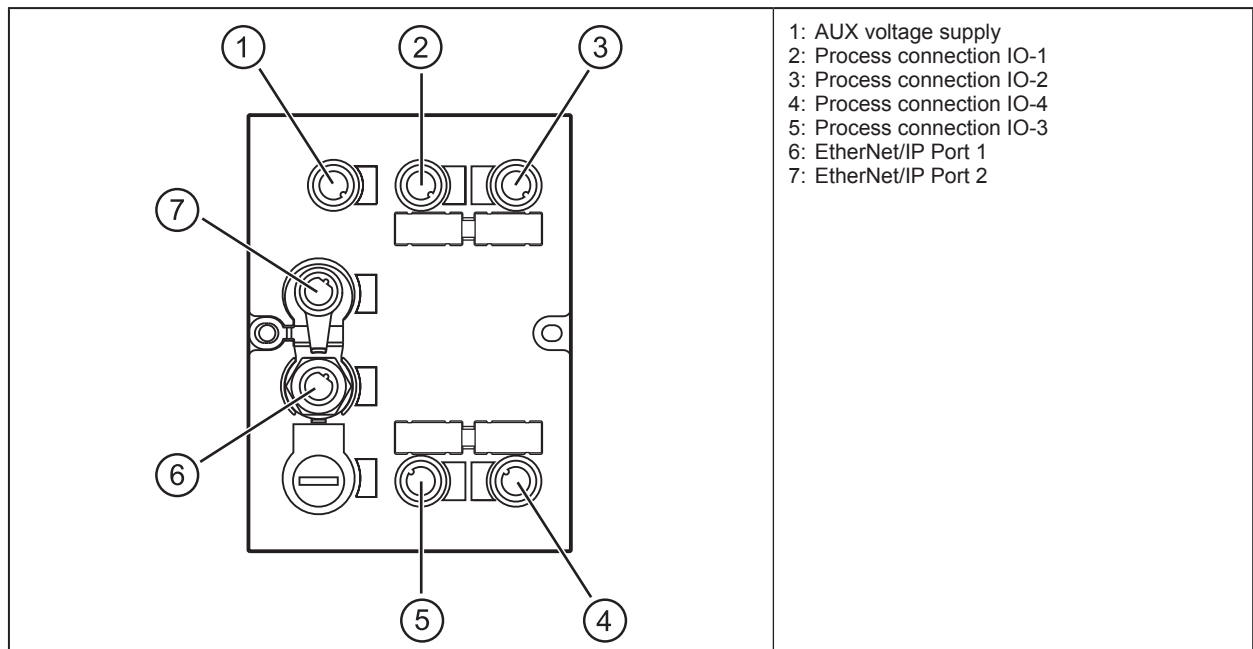


- |   |                       |
|---|-----------------------|
| 1: Voltage supply                       | 5: Sensor             |
| 2: DTE102 RFID evaluation unit          | 6: EtherNet/IP master |
| 3: Read/write head type ANT51x / ANT41x |                       |
| 4: RFID tag                             |                       |

The evaluation unit DTE102 processes data from up to 4 RFID read/write heads (type ANT51x/ANT41x) or IEC 61131 inputs / outputs. The mode of operation for each port can be set individually via the EtherNet/IP master.

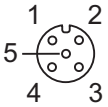
For further information about port configuration, see → 9 Configuration

### 4.1 Connection




### 4.1.1 "AUX" voltage supply

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

	Pin	Connection
	1	24 V DC
	2	not used
	3	0 V
	4	not used
	5	not used

### 4.1.2 Field bus connection EtherNet/IP Port 1 / Port 2

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

 <p>Note: screened connection cable required</p>	Pin	Connection
	1	TD+
	2	RD+
	3	TD-
	4	RD-

### Factory setting of the Ethernet parameters

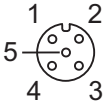
The following values are preset on delivery of the device:


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


The settings can be changed via the webserver of the device or via the TCP/IP interface object of the EtherNet/IP bus.

### 4.1.3 Process connections "IO-1 ... IO-4"

Each process connection can be used as input/output to IEC 61131 or for connection of an RFID read/write head type ANT51x/ANT41x.

	Pin	Connection
	1	L+
	2	switching input (I/Q)
	3	L-
	4	switching output (C/Qo) or input (C/Qi)
	5	not used

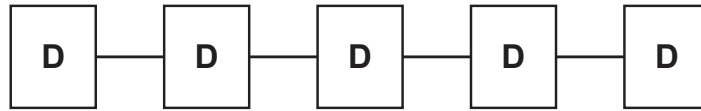
 The evaluation unit has to be disconnected before field units are connected.

 Please note that the total current consumption of the device must not exceed the value of 3 A.

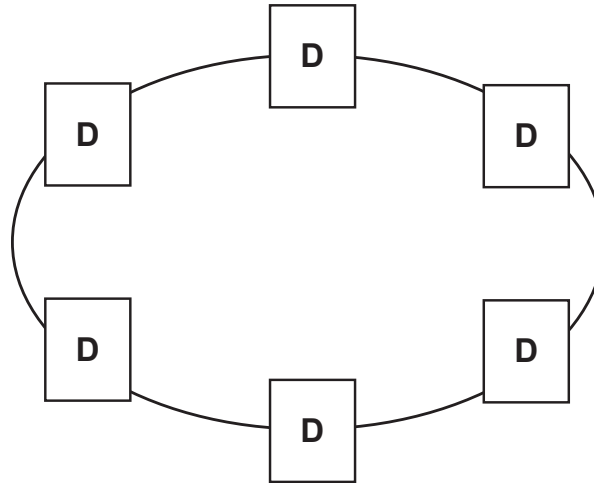
You can find information about the matching read/write heads on our website at: [www.ifm.com](http://www.ifm.com)

## 4.2 Allowed network infrastructures

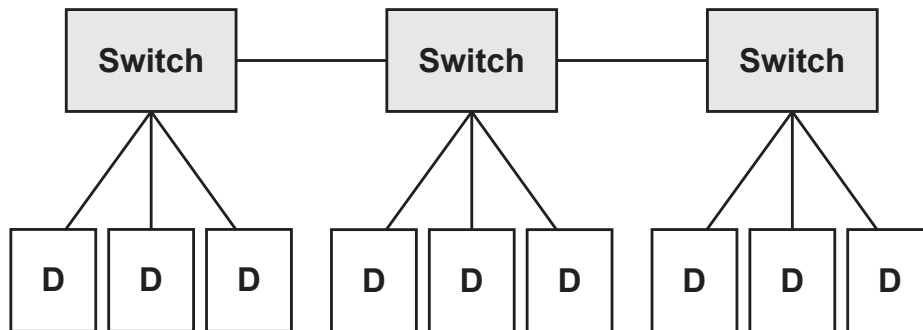
Linear structure:



Ring structure:



Star structure:



UK

## 5 Installation

You can find information about installation and electrical connection in the operating instructions for the unit at: [www.ifm.com](http://www.ifm.com)

## 6 Operating and display elements

### 6.1 Reset to factory settings

The Ethernet parameters 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 1 and pin 3 on the process connection IO-3.
  - ▶ Connect the device with the voltage supply and wait until the yellow LED indication on AUX and IO-3 flashes at approx. 8 Hz.
  - ▶ Remove the conductive bridge from process connection IO-3.
  - ▶ Disconnect the device from the voltage supply and connect it again.
- > The settings are reset.

### 6.2 LED indicators

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

#### 6.2.1 LED AUX

LED green	LED yellow	Status	Note
off	off	no voltage supply	$U_{AUX} < 5 \text{ V}$
on	flashes at 2 Hz	voltage supply too low	$5 \text{ V} \leq U_{AUX} \leq 18 \text{ V}$
on	off	voltage supply OK	$18 \text{ V} \leq U_{AUX} \leq 36 \text{ V}$

#### 6.2.2 LED EtherNet/IP Port 1 / Port 2

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"

#### 6.2.3 LED Mod (module status)

LED red	LED green	Status	Note
Off	Off	No voltage supply	Check the voltage supply.
Off	Flashing	Ready for operation	Device has not yet been configured. There is no exchange of data. Check if the connection was established by the EtherNet/IP scanner. Check if Configuration Assembly was configured.
Off	On	Normal operation	Connection to the EtherNet/IP scanner was established and the device was configured. Data transfer running.
Flashing	Off	Minor error	A connection to the EtherNet/IP scanner could not be established:  - voltage error - device could not be configured.



LED red	LED green	Status	Note
On	Off	Major error	Software error, hardware error of the device Restart the device. If the error still exists, return the device.
Flashing	Flashing	Self-test	Starting phase of the device

### 6.2.4 LED Net (network status)

LED red	LED green	Status	Note
Off	Off	No IP address available or no voltage supply	Check the voltage supply. If DHCP is switched on, check if a DHCP server is available in the network.
Off	Flashing	No connection	The device has received an IP address; an EtherNet/IP connection was not established. Check if the device was configured by the EtherNet/IP scanner.
Off	On	Connection exists	At least one EtherNet/IP connection to the device was established.
Flashing	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. Check if DHCP is switched off and a static IP address was assigned which is already used in the network.
Flashing	Flashing	Self-test	Starting phase of the device.

### 6.2.5 LEDs IO1 ... IO4

The LED indications of the process connections differ with each connection configuration.

#### Use as input to IEC 61131

LED green	LED yellow	Status	Note
Off	Off	Interface deactivated	Interface in EtherNet/IP master not configured
On	Off	Interface activated, input on L level (0 V)	-
On	On	Interface activated, input on H level (24 V)	-
Flashes at 8 Hz	Flashes at 8 Hz	Overload or short circuit	-

#### Use as output to IEC 61131

LED green	LED yellow	Status	Note
Off	Off	Interface deactivated	Interface in EtherNet/IP master not configured
On	Off	Interface activated, output L-active (0 V)	-
On	On	Interface activated, output H-active (24 V)	-
Flashes at 8 Hz	Flashes at 8 Hz	Overload or short circuit	-

## Use with RFID read/write heads

LED green	LED yellow	Status	Note
Off	Off	Interface deactivated	Interface in EtherNet/IP master not configured
Flashes at 2 Hz	Off	Interface activated, antenna off	-
On	Off	Interface activated, tag not in the field	-
On	On	Interface activated, tag in the field	-
Flashes at 8 Hz	Flashes at 8 Hz	Overload, short-circuit or communication error	-

## 6.2.6 Special device- LED indications

LED	Status	Note
Green AUX LED on  Yellow AUX LED flashes at 8 Hz  Yellow IO1...IO4 LEDs flash 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.
Green AUX LED on  Yellow AUX LED flashes at 8 Hz  Green IO1...IO4 LEDs flash at 8 Hz  Yellow IO1...IO4 LEDs flash at 8 Hz	Major error, device has to be returned.	Hardware fault or permanent data in the device are corrupt.
Green AUX LED on  Yellow AUX LED Flashes at 8 Hz  Yellow IO3 LED flashes at 8 Hz	Reset to factory settings	-

## 7 Putting into operation

- ▶ Connect the device according to the operating instructions.
- > After connecting the operating voltage, the unit is ready for use.



The green power supply LEDs of the read/write heads will light up after enabling the corresponding module in the module configuration.

## 8 Web server

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

- configure the IP settings of the unit
- update the firmware

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.

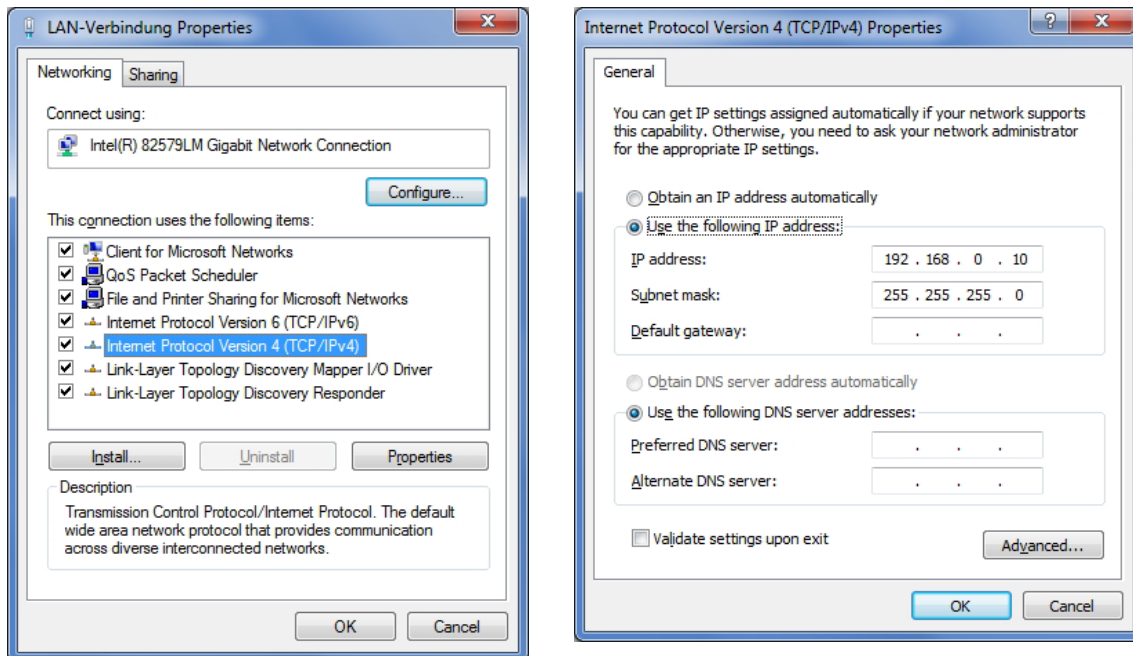
Please note that the evaluation unit and the PC must be set to the same IP-address range.  
Default: 192.168.0.x (→ 8.1 Verify and set the IP address of the PC)

- ▶ Open the web browser on the PC and enter the IP-address of the evaluation unit

Default: <http://192.168.0.79>


### 8.1 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.

## 8.2 Tab "Home"



# Web Interface DTE102


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

**Welcome to the web interface for administration and configuration of the DTE102**

Select language:

EDS file: [EDS.ZIP](#)

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



This is the main menu from where all functions of the evaluation unit can be accessed. Additionally the Ethernet/IP EDS file of the RFID evaluation unit can be downloaded to configure the device within a PLC.

## 8.3 Tab "Network"

# Web Interface DTE102

Home
Network
Firmware
IO-Port
Monitor
System
SNTP
Info
Reset

**Network settings:**

TCP/IP parameter	Current settings	New settings
IP address	192.168.0.79	<input type="text" value="."/> <input type="text" value="."/> <input type="text" value="."/> <input type="text" value=""/>
Subnet mask	255.255.255.0	<input type="text" value="."/> <input type="text" value="."/> <input type="text" value="."/> <input type="text" value=""/>
Default gateway	192.168.0.100	<input type="text" value="."/> <input type="text" value="."/> <input type="text" value="."/> <input type="text" value=""/>
DHCP	off	<input type="radio"/> on <input checked="" type="radio"/> off
BOOTP	off	<input type="radio"/> on <input checked="" type="radio"/> off
Port 1 parameter		
Autonegotiation	on	<input checked="" type="radio"/> on <input type="radio"/> off
Port speed	Duplex 100MB	<input type="text" value="Duplex 100MB"/>
Port 2 parameter		
Autonegotiation	on	<input checked="" type="radio"/> on <input type="radio"/> off
Port speed	Simplex 10MB	<input type="text" value="Simplex 10MB"/>

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

**Hardware information**

Article: DTE102  
 Hardware version: 1  
 Firmware version: V1.5.6  
 Serial number: 15722  
 Production date: 2016-08-17 10:27  
 MAC-address: 00:02:01:40:3D:6A

UK

This menu allows to change various Ethernet interface settings of the evaluation unit.

Consult your network administrator which settings are necessary to integrate the device into the existing network.

If the evaluation unit is directly connected with the PC a static IP address setting is recommended. (→ 8.1 Verify and set the IP address of the PC)



The network address of the PC must reside within the address range of the evaluation unit.

Example:

PC Ethernet IP address: 192.168.0.10

Evaluation unit IP address: 192.168.0.79

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



Be careful when setting the IP address of the evaluation unit. This address should not exist in the EtherNet/IP network.

## 8.4 Tab "Firmware"

Web Interface DTE102

HomeNetworkFirmwareIO-PortMonitorSystemSNTPInfoReset

### Firmware

**Firmware identification**

Name	Number	Version	Date
DTE102 Firmware	11081150	V1.5.6	2016-04-05
Emergency System	11042895	1.1.0	-
Bootloader	-	1.4.13	-


**Firmware update**

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

Keine ausgewählt

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!



Hardware information

Article: DTE102  
Hardware version: 1  
Firmware version: V1.5.6  
Serial number: 15722  
Production date: 2016-08-17 10:27  
MAC-address: 00:02:01:40:3D:6A

This menu allows to update the firmware of the evaluation unit.

- ▶ Open the "Firmware" tab on the browser interface.
- ▶ Choose firmware file DTE102.nxf and commit via button [transfer]



Do not interrupt power or disconnect cables from the system while the firmware transfer is in progress.

## 8.5 Tab "IO-Port"

Web Interface DTE102

Home
Network
Firmware
IO-Port
Monitor
System
SNTP
Info
Reset

**IO-Port Configuration**

Global	Current settings	New settings
Fail-safe	off	<input type="radio"/> on <input checked="" type="radio"/> off
<b>IO-1</b>	<b>Current settings</b>	<b>New settings</b>
Mode	Inactive	Inactive ▾
<b>IO-2</b>	<b>Current settings</b>	<b>New settings</b>
Mode	Inactive	Inactive ▾
<b>IO-3</b>	<b>Current settings</b>	<b>New settings</b>
Mode	Inactive	Inactive ▾
<b>IO-4</b>	<b>Current settings</b>	<b>New settings</b>
Mode	Inactive	Inactive ▾

**Hardware information**

Article: DTE102  
Hardware version: 1  
Firmware version: V1.5.6  
Serial number: 15722  
Production date: 2016-08-17 10:27  
MAC-address: 00:02:01:40:3D:6A

UK

This menu allows to configure the IO-Ports of the evaluation unit.

Each IO-channel can be configured to mode „Inactive“, „Input“, „Output“ and „RWH“.

Mode	Function
Inactive	No function, inactive
Input	IEC 61131 input
Output	IEC 61131 output
RWH	RFID read/write head (Type ANT4xx or ANT5xx)



## Web Interface DTE102

Home Network Firmware **IO-Port** Monitor System SNTP Info Reset

**IO-Port Configuration**

Global	Current settings	New settings
Fail-safe	off	<input type="radio"/> on <input checked="" type="radio"/> off
IO-1	Current settings	New settings
Mode	Inactive	RWH
Data hold time	0	0 ms
Overload detection	on	<input checked="" type="radio"/> on <input type="radio"/> off
Overcurrent detection	on	<input checked="" type="radio"/> on <input type="radio"/> off
Number of blocks	256	256 1...256
Block size	4	4 Byte
UID edge triggered reading	off	<input type="radio"/> on <input checked="" type="radio"/> off
IO-2	Current settings	New settings
Mode	Inactive	Input
Data hold time	0	0 ms
Overload detection	on	<input checked="" type="radio"/> on <input type="radio"/> off
IO-3	Current settings	New settings
Mode	Inactive	Output
Data hold time	0	0 ms
Overload detection	on	<input checked="" type="radio"/> on <input type="radio"/> off
Overcurrent detection	on	<input checked="" type="radio"/> on <input type="radio"/> off



**Hardware information**

Article: DTE102  
 Hardware version: 1  
 Firmware version: V1.5.6  
 Serial number: 15722  
 Production date: 2016-08-17 10:27  
 MAC-address: 00:02:01:40:3D:6A

“Data hold time” define how long the RFID data are kept stable. This is helpful if the time interval, in which the RFID tag data are available, is shorter than the host can read these from the RFID unit.

“Number of blocks” define the number of blocks available on the ID tag.

“Block size” define the number of bytes per block available on the ID tag.



If the value "Block size" does not match the physically value of the ID tag, the read and write commands will fail.

“UID edge controlled” allow the reading of the UID of the ID tag once by setting bit "RD" from 0 to 1 in the process data output image of the controller. This mode is suitable if the user knows when the tag is present in front of the Read-/Write head. The read UID is kept in the data bytes 2...18 stable while bit RD is set to 1.

- ▶ Set “Overload detection” to “off” if the load on terminal “L+” is above 0,5 A.



The current is limited to 0,7 A by hardware.

- ▶ Set “Overcurrent detection” to “off” if load on terminal “C/Co” is above 0,5 A.



The current is limited to 0,6 A by hardware.

- ▶ Set "High Current" to “on” if the current on ports IO-3 and/or IO-4, terminal “C/Co”, shall be possible to 1 A.



The maximum power input shall not exceed 3,0 A, otherwise the device can be damaged.

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 evaluation unit and write a new IO-Port configuration the stored values are overwritten
Cancel	Discard changes	-



## 8.6 Tab "Monitor"

Web Interface DTE102

Home
Network
Firmware
IO-Port
Monitor
System
SNTP
Info
Reset

**Port monitoring** Fieldbus state:

---

**IO-1 RWH**

---

**IO-2 Input**

Pin	Connection	Pin	Connection	State
1	L+	2	switching input (I/Q)	<input type="radio"/>
3	L-	4	switching input (C/Qi)	<input type="radio"/>

---

**IO-3 Output**

Pin	Connection	Pin	Connection	State
1	L+	2	switching input (I/Q)	<input type="radio"/>
3	L-	4	switching output (C/Qo)	<input type="checkbox"/>

---

**IO-4 Inactive**

Channel configured as inactive.

**Hardware information**

Article: DTE102

Hardware version: 1

Firmware version: V1.5.6

Serial number: 15722

Production date: 2016-08-17 10:27

MAC-address: 00:02:01:40:3D:6A

UK

This menu shows the data of each port which is detected by the evaluation unit.

In this example the IO-1 port is configured as RFID read/write head, IO-2 port as input, IO-3 port as output and IO-4 port as inactive.

- ▶ Click to switch to submenu "Read/write head information".
- ▶ Click to switch to submenu "Tag monitoring - read and write".

## 8.6.1 Read/write head information

# Web Interface DTE102

Home
Network
Firmware
IO-Port
Monitor
System
SNTP
Info
Reset

**Read/write header information:**

RWH	IO-1
Article number:	ANT512
Device type:	2
Hardware version:	6
Firmware version:	9 <span style="float: right; border: 1px solid #ccc; padding: 2px 5px;">Update</span>
IDLink SW:	5
Production date:	2016-01-12

Back

**Hardware information**

Article: DTE102  
 Hardware version: 1  
 Firmware version: V1.5.6  
 Serial number: 15722  
 Production date: 2016-08-17 10:27  
 MAC-address: 00:02:01:40:3D:6A

This menu shows the following information about the selected read/write head:

- Article number
- Device type
- Hardware version
- Firmware version
- ID link software
- Production date

Button	Function	Remark
Update	Go to menu "Antenna firmware"	-
Back	Return to the main menu	-

## 8.6.2 Antenna firmware

UK

This menu allows to update the firmware of the Read-/Write head connected at the selected port.

- ▶ Open the “Firmware” tab on the browser interface.
- ▶ Choose firmware file "xxx.afw" and submit via button [Transfer].



Do not interrupt power or disconnect cables from the system while the firmware transfer is in progress.

Button	Function	Remark
Browse	Open new dialog window to browse to the Read-/Write head firmware file	-
Transfer	Send antenna firmware to connected Read-/Write head	If the update process is finished the evaluation unit reboots the Read-/Write head automatically. A restart of the evaluation unit is not necessary.
Back	Return to the main menu.	-

If the firmware update fail or the Read-/Write head is not detected by the evaluation unit 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
<b>IP-ADDRESS</b>	IP address of the evaluation unit [XXX.XXX.XXX.XXX]	IPV4 address
<b>IO-CHANNEL</b>	IO-Channel number [1..4]	-
<b>ANTENNA_TYPE</b>	Article number of the Read-/Write head [e.g. ANT512]	6 digit article number
<b>NUMBER</b>	Firmware number [01]	2 digit number. Shall be set to "01"
<b>LANGUAGE</b>	Language of the website [de, en, es, fr, it, ko, pt, ru, zh]	-

Example of URL:

`http://192.168.0.79/diagrwh?ioport=1&anttype=ANT513&fwVersion=01&setLng=en`



After finishing the firmware update of the Read-/Write head, enter the URL of the evaluation unit to return to the main menu (→ 8 Web server).

### 8.6.3 Tag monitoring


This menu allows to:

- read the UID from the tag
- read from or write to the user data area of the tag

### 8.6.4 Reading from the tag

The screenshot shows the 'Web Interface DTE102' with a navigation bar containing 'Home', 'Network', 'Firmware', 'IO-Port', 'Monitor', 'System', 'SNTP', 'Info', and 'Reset'. The 'Monitor' tab is active, displaying the 'Tag RWH IO-1' interface. This interface includes a 'Tag RWH IO-1' icon, a 'UID' field with the value '8C:F8:F4:75', and input fields for 'Number of blocks' (6) and 'Block size' (4 bytes). Below this is a 'Read / Write Tag' section with 'Length' (20 bytes), 'Offset' (0 bytes), and 'Data format' (HEX). A 'Data' field shows the hexadecimal string '4D4154455249414C3A2038303332333435333132'. A 'Back' button is located at the bottom right of this section. To the right of the interface is a photograph of the DTE102 hardware device, which is orange and features various ports including AUX, IO1, IO2, Ethernet/IP, Port2, Port1, IO3, IO4, Mod, and Nat. Below the hardware image is a 'Hardware information' box containing the following details: Article: DTE102, Hardware version: 1, Firmware version: V1.5.6, Serial number: 15722, Production date: 2016-08-17 10:27, and MAC-address: 00:02:01:40:3D:6A.

The UID 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 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 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: „4D4154455249414C3A2038303332333435333132“
- „ASCII“: Data displayed as ASCII character string.  
Example: „MATERIAL: 8032345312“

## 8.6.5 Writing to the tag



# Web Interface DTE102


Home Network Firmware IO-Port Monitor System SNTP Info Reset

**Tag RWH**  
IO-1

UID:

Number of blocks:

Block size:  bytes





---

**Read / Write Tag**

Length:  bytes (1..240)

Offset:  bytes

Data format: ASCII




Data:

20 bytes

Back

**Hardware information**

Article: DTE102  
Hardware version: 1  
Firmware version: V1.5.6  
Serial number: 15722  
Production date: 2016-08-17 10:27  
MAC-address: 00:02:01:40:3D:6A

- ▶ Click  to write to the User data area of the tag.

The data length to be written can be set from 1...240 bytes. The address offset can be set from 0 bytes up to the last accessible address of the 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 tag data can be input in two formats:

- „HEX“ : Data input in hexadecimal format.  
Example: „4D41544455249414C3A20383033332333435333132“
- „ASCII“: Data input as ASCII character string.  
Example: „MATERIAL: 8032345312“



The parameter “Length” is automatically calculated.

## 8.7 Tab "System"

# Web Interface DTE102

Home
Network
Firmware
IO-Port
Monitor
System
SNTP
Info
Reset

**System settings**

Password protection configuration

Parameter	Current settings	New settings
Password protection:	off	<input checked="" type="radio"/> on <input type="radio"/> off

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

**Hardware information**

Article: DTE102  
 Hardware version: 1  
 Firmware version: V1.5.6  
 Serial number: 15722  
 Production date: 2016-08-17 10:27  
 MAC-address: 00:02:01:40:3D:6A

UK


This menu allows to define a password to protect the evaluation unit against unauthorised 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"
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 (→ 6.1 Reset to factory settings).

## 8.8 Tab "SNTP"




# Web Interface DTE102

Home Network Firmware IO-Port Monitor System SNTP Info Reset

### 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	<input checked="" type="radio"/> on <input type="radio"/> off
IP address from NTP server:	0.0.0.0	<input type="text" value="192"/> . <input type="text" value="168"/> . <input type="text" value="0"/> . <input type="text" value="210"/>
Offset to UTC:	UTC	<input type="text" value="UTC+1 CET"/> ▾
State	not used	
Last sync	-	



#### Hardware information


Article: DTE102  
Hardware version: 1  
Firmware version: V1.5.6  
Serial number: 15722  
Production date: 2016-08-17 10:27  
MAC-address: 00:02:01:40:3D:6A

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

- ▶ Click [Submit] to transfer the settings to the evaluation unit.



## 8.9 Tab "Info"



# Web Interface DTE102

Home Network Firmware IO-Port Monitor System SNTP **Info** Reset

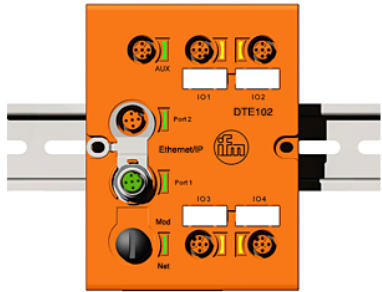
**Hardware:**

Parameter	Value
Power supply state:	fully operable
Temperature:	40°C 104°F
System time:	00:44:16.761
System date:	2011-01-01

**Production parameters:**

Parameter	Value
Product article number:	DTE102AD
Production number:	2508821
Version PermData:	1

Reload



**Hardware information**

Article: DTE102  
Hardware version: 1  
Firmware version: V1.5.6  
Serial number: 15722  
Production date: 2016-08-17 10:27  
MAC-address: 00:02:01:40:3D:6A

This menu shows the following information about the evaluation unit:

- Power supply state
- Temperature
- System time
- System date
- Production parameters



For a proper operation of the evaluation unit the "Power Supply State" should show as "fully operable".

## 8.10 Tab "Reset"



# Web Interface DTE102

Home Network Firmware IO-Port Monitor System SNTP Info **Reset**

### Device reset

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

Please confirm you want to reboot the device.

Reset



### Hardware information

Article: DTE102  
Hardware version: 1  
Firmware version: V1.5.6  
Serial number: 15722  
Production date: 2016-08-17 10:27  
MAC-address: 00:02:01:40:3D:6A

This menu allows the user to reset the evaluation unit remotely.

If the device is reset all connections are closed and the outputs are switched off.

- ▶ To reset the evaluation unit, check "Please confirm you want to reset the device".
- ▶ Click [submit].

## 9 Configuration

### 9.1 Parameter setting of the EtherNet/IP process interface

The following settings can be configured via the webserver or the EtherNet/IP TCP/IP object:

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

**Table 1: Factory Settings of the Ethernet interface**

- (1) If the device does not detect a DHCP server on the connected Ethernet network the default address 192.168.0.79 is set. After rebooting the device the DHCP function is disabled and the default address is active. It is also possible to disable the DHCP function and to set the default address by resetting the device to the factory settings. (→ 6.1 Reset to factory settings)
- (2) If autonegotiation between the evaluation unit and the connected Ethernet node fails, the device is set to 10MBit/s, half duplex.

### 9.2 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 top of the device above the AUX connector.



#### 2. Scanning the MAC address with a data matrix code reader

The code is located on the type label and can be read with any data matrix code scanner.



### 3. Finding the MAC address via the integrated webserver

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

The screenshot shows the web interface for the DTE102 device. The browser address bar shows the URL `192.168.0.79/awe/main.sht?ipconfig`. The page title is "Web-Interface DTE102". The "Network" tab is selected in the navigation menu. The "Network Settings" section contains a table for IP parameters and port settings. The "Hardware Information" section is visible on the right, with the MAC address `00:02:01:40:02:44` circled in red.

IP Parameter	Current Settings	New Settings
IP Address	192.168.0.79	<input type="text"/> . <input type="text"/> . <input type="text"/> . <input type="text"/>
Subnet Mask	255.255.255.0	<input type="text"/> . <input type="text"/> . <input type="text"/> . <input type="text"/>
Gateway	192.168.0.100	<input type="text"/> . <input type="text"/> . <input type="text"/> . <input type="text"/>
DHCP	off	<input type="radio"/> on <input checked="" type="radio"/> off
BOOTP	off	<input type="radio"/> on <input checked="" type="radio"/> off

Port 1 Parameter	Current Settings	New Settings
Autonegotiation	on	<input checked="" type="radio"/> on <input type="radio"/> off
Port Speed	DUPLEX_100MB	<input type="text" value="DUPLEX_100MB"/>

Port 2 Parameter	Current Settings	New Settings
Autonegotiation	on	<input checked="" type="radio"/> on <input type="radio"/> off
Port Speed	SIMPLEX_10MB	<input type="text" value="SIMPLEX_10MB"/>

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

Hardware Information	
Article:	DTE102
Hardware Version:	1
Firmware Version:	V1.3.0.6666
Serial Number:	580
Production Date:	2013-02-04 11:18
MAC-Address:	00:02:01:40:02:44

### 4. Reading the MAC address via the EtherNet/IP Ethernet link object

The Ethernet link object, 0xF6, instance 2, attribute 3 returns the MAC address of the device with a length of 6 Bytes.

Example: 00 02 01 40 02 5E

### 9.3 Connection concept of the Ethernet interface

The device can be connected to two Ethernet lines, one for each of the connectors "Port 1" and "Port 2". The integrated Ethernet switch allows to build a line structure, an external switch is not required. The device only has one MAC address, enabling the system to address the evaluation unit with a single IP address.

Both Ethernet ports have the same functionality, excluding software updates via the webserver which are only possible via "Port 1".

#### Socket connection Port 1 and Port 2:

M12 Ethernet socket, D-coded

Signal	Name	Core colour	Pin
<b>TD +</b>	Transmission Data +	White/orange	1
<b>TD -</b>	Transmission Data -	Orange	3
<b>RD +</b>	Receive Data +	White/green	2
<b>RD -</b>	Receive Data -	Green	4
<b>Screen</b>	Shield	-	housing

**Table 2: Pin connection Ethernet interface**



The colours refer to the standard T568B.

### 9.4 Ethernet/IP device profile

The device uses the Ethernet profile "Generic Device, Device Type: 2Bh"

### 9.5 Supported CIP objects

Class	Name	Instances	Instance Attribute	Remark
01h	Identity Object	1	1...9	
02h	Message Router Object	1		
04h	Assembly Object <sup>(1)</sup>	100	3,4	SPS -> Evaluation Unit (O->T)
		101	3,4	SPS <- Evaluation Unit (T->O)
		102	-	SPS -> Evaluation Unit (O->T)
06h	Connection Manager Object	1		

**Table 3: CIP objects**

<sup>(1)</sup> The length of the data array is invariable to allow for an unambiguous address range of the channels.

### 9.6 Supported EtherNet/IP objects

Class	Name	Instances	Instance Attribute	Remark
47h	Device Level Ring Object <sup>(1)</sup>	1	1,2,10,12	-
48h	Quality of Service Object	1	1,4,5,6,7,8	-
F5h	TCP/IP Interface Object	1	1...6,10,11,	-
F6h	Ethernet Link Object	2 <sup>(2)</sup>	1..3,4 <sup>(3)</sup> ,5 <sup>(3)</sup> ,6,10	2 ports

**Table 4: EtherNet/IP objects**

<sup>(1)</sup> The evaluation unit is designed as a "Non Supervisor Device, Beacon based".

<sup>(2)</sup> 2 instances for the EthernetLink Object, one for each port.

<sup>(3)</sup> Interface- and mediacounter are not supported.

### 9.7 Supported CIP services

The following services are supported: „Get\_Attribute\_Single“, „Set\_Attribute\_Single“ and „Get\_Attribute\_All“

## 9.8 Number of the CIP connections

Connection type	Number	Access
IO-Messaging	3	1 * Exclusive Owner (Multicast) 2 * Listen Only

**Table 5: Number of CIP connections**

## 9.9 RUN/IDLE flag functionality

When establishing the connection between the EtherNet/IP scanner and the evaluation unit the 32 Bit realtime header is exchanged via the EtherNet/IP connection manager. Within the header the RUN/IDLE flag is transmitted which allows to control the functions of the evaluation unit.

EtherNet/IP Connection	Run/Idle flag	Parameter failsafe	Function
Active	Off	Not relevant	Channel IO-1 ... IO-4 deactivated
Active	On	Off	Channel IO-1 ... IO-4 activated
Active	On	On	Channel IO-1 ... IO-4 activated
Switch from active to inactive	Off	On	Channel IO-1 ... IO-4 remain activated, the outputs keep the last received state.

**Table 6: Assembly 100 (Output image of the PLC)**

## 9.10 Setting the Requested Packet Interval (RPI)

It is recommended to set the RPI within the PLC to half of the desired update time of the evaluation unit.

Example: Requesting the transponder UID every 60 ms => RPI = 30 ms



The outputs / RFID communication of the evaluation unit have a data update rate of 12 ms, therefore the shortest sensible RP interval is 6 ms.

## 9.11 Configuration assembly 102 structure

The assembly 102 is used to transfer the configuration- and parameter data of the evaluation unit. The length of the configuration data is fixed to 64 bytes (32 words), only the first 40 bytes are used. Each channel requires 8 bytes (4 words).

Assembly	Byte	Content	Dataflow	Access
102d	00...07	Channel IO-1 Konfiguration/Parameter	O->T T->O	Read/Write Read
	08...15	Channel IO-2 Konfiguration/Parameter	O->T T->O	Read/Write Read
	16...23	Channel IO-3 Konfiguration/Parameter	O->T T->O	Read/Write Read
	24...31	Channel IO-4 Konfiguration/Parameter	O->T T->O	Read/Write Read
	32...39	Parameter evaluation unit	O->T T->O	Read/Write Read
	40...63	not used	O->T T->O	Read/Write Read

**Table 9: Assembly 102 (PLC configuration output)**



On PLCs manufactured by Schneider Electric it is possible to create the configuration assembly via the ESD file.

On PLCs manufactured by Rockwell this is only possible if the version of the programming software RSLOGIX is > 19.

If the PLC does not support configuration via an EDS file, the user is required to program the PLC manually. (→ 9.11.1 Coding of the channel configuration),

(→ 9.12 Examples of configuration data for the configuration assembly 102)

### 9.11.1 Coding of the channel configuration

All 4 channels IO-1...IO-4 of the evaluation unit are configured identically.

The following table shows the coding of the 8 bytes per channel:

Byte	Content	Remark
N+0 (CN)	<b>Channel IO-x number</b> [ 01h ... 04h ]	Used to identify the channel within the configuration assembly 102
N+1 (MO)	<b>Module identifier</b> 01h für <b>INACTIVE</b> (20 Bytes In/Out) 02h für <b>INPUT</b> (20 Bytes In/Out) 03h für <b>OUTPUT</b> (20 Bytes In/Out) 0Bh für <b>RWH_RW</b> (20 Bytes In/Out) Default: INACTIVE	Channel is deactivated Channel is configured as IEC61136 input Channel is configured as IEC61136 output Channel is configured as communication channel to the read-/write head
N+2 DH	<b>Data hold time</b> [ 00h ... FFh ] in 10 x milliseconds Default: 0 ms	Hold time I/Q, UID
N+3 (TL)	<b>Transponder data block length</b> [1,2,4,8,16,32,64,128,255] Default: 4 bytes	-
N+4 (OL)	<b>Overload detection</b> [ 01h=on/ 00=off ] Default : on	Overload at output L+ > 500 mA
N+5 (OC)	<b>Overcurrent detection</b> [ on/off ] Default : on	Overcurrent at output C/Qo > 300 mA
N+6 (RU)	<b>Read of UID edge controlled [on/off]</b> Default : off	Edge-controlled reading of the UID via bit RD in the controlword of the module RWH_RW.
N+7 (-)	<b>Reserved</b> for future use	-

**Table 10: Coding of the channel configuration**

#### Setting the offsets off the channels IO-1 ... IO-4

Description	Byte offset within the configuration assembly
Channel 1	N=0
Channel 2	N=8
Channel 3	N=16
Channel 4	N=24

### 9.11.2 Coding of the evaluation unit parameters

Byte	Content	Remark
32	Failsafe mode [ on/off ] Default: off	Failsafe mode = off: The IO-Channel is deactivated if no connection to the Ethernet/IP scanner is established. Failsafe mode = on: The IO-Channels remain activated and the outputs keep the last received state if no connection to the Ethernet/IP scanner is established.
33 .. 39	Reserved.	-
40 .. 63	Reserved	-

**Table 11: Coding of the evaluation unit parameters**

## 9.12 Examples of configuration data for the configuration assembly 102

### 9.12.1 Channel-related configuration

Byte 0 ...7 per channel								Function
CH	MOD	DH	TL	OL	OC	RU	-	
01	<b>01</b>	00	00	00	00	00	00	Channel 1 is set as <b>"inactive"</b> .

**Table 12: Channel configuration module "inactive"**

Byte 0 ...7 per channel								Function
CH	MOD	DH	TL	OL	OC	RU	-	
04	<b>02</b>	0A	00	01	01	00	00	Channel 4 is set as <b>"INPUT"</b> . <ul style="list-style-type: none"> <li>• The port C/Qi and I/Q is used as switching input signal.</li> <li>• The datahold time for the switching input signals is set to 100 ms.</li> <li>• "Overload detection" and "Overcurrent detection" is activated.</li> </ul>

**Table 13: Channel configuration module "INPUT"**

Byte 0 ...7 per channel								Function
CH	MOD	DH	TL	OL	OC	RU	-	
04	<b>03</b>	03	00	01	01	00	00	Channel 4 is set as <b>"OUTPUT"</b> . <ul style="list-style-type: none"> <li>• The switching signal is output at the M12 port of the C/Qo channel.</li> <li>• Additionally the port I/Q can be used as an input signal</li> <li>• The datahold time for the switching input I/Q is set to 100 ms.</li> <li>• "Overload detection" and "Overcurrent detection" is activated.</li> </ul>

**Table 14: Channel configuration module "OUTPUT"**

Byte 0 ...7 per channel								Function
CH	MOD	DH	TL	OL	OC	RU	-	
04	<b>0B</b>	02	00	01	01	00	00	Channel 4 is set as <b>"RWH_RW"</b> . <ul style="list-style-type: none"> <li>• The M12 port of the channel is used for communication with an RFID antenna.</li> <li>• The datahold time for the transponder UID is set to 20 ms.</li> <li>• "Overload detection" and "Overcurrent detection" is activated.</li> <li>• The UID can be read cyclically by the PLC.</li> </ul>

**Table 15: Channel configuration module "RWH\_RW"**

Byte 0 ...7 per channel								Function
CH	MOD	DH	TL	OL	OC	RU	-	
04	<b>0B</b>	00	00	01	01	01	00	Channel 4 is set as <b>"RWH_RW"</b> . <ul style="list-style-type: none"> <li>• The M12 port of the channel is used for communication with an RFID antenna.</li> <li>• The datahold time for the transponder UID is set to 20 ms.</li> <li>• "Overload detection" and "Overcurrent detection" is activated.</li> <li>• The UID can be read edge-controlled by the PLC.</li> </ul>

**Table 16: Channel configuration module "RWH\_RW" (edge-controlled)**





### 9.13 Assembly 100 structure

The assembly 100 (output, consumer) is used to transfer the output data for the channels IO-1...IO-4 to the evaluation unit. The data length of each channel is fixed to 20 bytes (10 words). Inactive channels or unused data fields should be filled with the default value 0x00 by the PLC.

Assembly	Byte	Content	Dataflow	Access
100d	00...19	IO-1 data request	O->T	Read/Write
	20...39	IO-2 data request	O->T	Read/Write
	40...59	IO-3 data request	O->T	Read/Write
	60...79	IO-4 data request	O->T	Read/Write

**Table 7: Assembly 100 (output image of the PLC)**

A class 1, exclusive owner (EO) connection is used to access the assembly 100.

### 9.14 Assembly 101 structure

The assembly 101 (input, producer) is used to transfer the response data from the channels IO-1...IO-4 to the PLC. The data length of each channel is fixed to 20 bytes (10 words). Inactive channels or unused data fields are to be filled with the default value 0x00.

Assembly	Byte	Content	Dataflow	Access
101d	00...19	IO-1 data response	T->O	Read only
	20...39	IO-2 data response	T->O	Read only
	40...59	IO-3 data response	T->O	Read only
	60...79	IO-4 data response	T->O	Read only

**Table 8: Assembly 101 (PLC input)**

- Access via class 1 exclusive owner (EO).
- Access via class 1 listen only (LO).
- The listen only heartbeat connection point is supported on the assembly 192.



Channel specific data with a length of 20 bytes per channel is accessed via the implicit messaging (IO messaging) of EtherNet/IP.

## 10 Module description

The 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 (UID) 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 is 16 bytes. (1)
- Write to the User data of the ID tag.  
Writing started via control bit "WR". Maximum write length with one command is 16 bytes. (1)
- 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 is 16 bytes. (1)
- Simple diagnostics of the IO-x channels of the evaluation unit.
- Simple notification of evaluation unit diagnostics.
- Remote restart of the evaluation unit

(1) If more data than 16 bytes had to be read or written, the user must repeat the command with changed offset parameter.

Module name	Description	Remark
Inactive ( 20 Byte In/Out )	Cyclic transmission	High impedance
Input ( 20 Byte In/Out )	Cyclic transmission	IEC61131 Input
Output ( 20 Byte In/Out )	Cyclic transmission	IEC61131 Output
RWH_RW (20 Byte In/Out)	Cyclic command channel	Command channel

The PLC input data image and output data image has a size of 4 x 20 bytes = 80 bytes.

## 10.1 Module “Inactive”

This module allows the user to:

- switch off an unused process interface IO-1 ... IO-4
- read the diagnostic information of the evaluation unit

### PLC process data output image (Module Inactive)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	<b>DR</b>	0	0	0	0	0	0
2	0x00							
3	0x00							
..	..							
19	0x00							
20	0x00							

### Description byte 1, “Control byte”:

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

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

### Description Byte 2...20:

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

### PLC process data input image (Module Inactive)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Diag	<b>DR-RDY</b>	0	0	0	0	0	0
2	0x00 / Number of diagnostic events							
3	0x00 / Error code byte 1							
4	0x00 / Error code byte 2							
5	0x00 / Error code byte 3							
6	0x00 / Error code byte 4							
..	..							
20	Not used							

**Description byte 1, "Status byte":**

Bit	Value	Description	Remark
DR-RDY	0	Reading not started or evaluation unit diagnostics data not ready	-
	1	Diagnostics read ready	Diagnostics read response from evaluation unit is ready and available in byte 2 ... n.
Diag	0	No diagnostics available.	-
	1	evaluation unit 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 control bit is set within the control byte.

**UK****Description Byte 2, "Number of diagnostic events":**

Number of diagnostic events.

(0 = No diagnostics, 1...4 = 1...4 diagnostics event(s))

**Description Byte 3...n:**

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

If more than one diagnostics event is available this is appended. Up to 4 diagnostics messages could be transferred. Error codes see chapter 14.

**Description Byte (n+1)...20:**

Will be set to default value 0x00 by the evaluation unit.

## 10.2 Module “Input”

This module allows the user to

- read the binary inputs of the process interface IO-1 ... IO-4.
- read the diagnostic information of the evaluation unit.

### PLC process data output image (Module Input)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	<b>DR</b>	0	0	0	0	0	0
2	0x00							
3	0x00							
..	..							
19	0x00							
20	0x00							

### Description byte 1, “Control byte”:

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

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

### Description Byte 2...20:

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	OL	0	I/Q	C/Qi
2	0x00 / Number of diagnostic events							
3	0x00 / Error code byte 1							
4	0x00 / Error code byte 2							
5	0x00 / Error code byte 3							
6	0x00 / Error code byte 4							
..	...							
20	Not used							

**Description byte 1, "Status byte":**

Bit	Value	Description	Remark
C/Qi	0	Input at C/Qi < 8 V	The level of C/Qi is measured by hardware
	1	Input at C/Qi > 11 V	The level of C/Qi is measured by hardware
I/Q	0	Input I/Q < 8 V	The level of I/Q is measured by hardware
	1	Input I/Q > 11 V	The level of I/Q is measured by hardware
OL	0	L+ o.k.	Set by hardware
	1	Overload on L+	Set by hardware
DR-RDY	0	Reading not started or evaluation unit diagnostics data not ready	-
	1	Diagnostics read ready	Diagnostics read response from evaluation unit is ready and available in byte 2 ... 5.
Diag	0	No diagnostics available.	-
	1	evaluation unit 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 control bit is set within the control byte.

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**Description Byte 2, "Number of diagnostic events":**

Number of diagnostic events.

(0 = No diagnostics, 1...4 = 1...4 diagnostics event(s))

**Description Byte 3...n:**

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

If more than one diagnostics event is available this is appended. Up to 4 diagnostics messages could be transferred. Error codes see chapter 14.

**Description Byte (n+1)...20:**

Will be set to default value 0x00 by the evaluation unit.

### 10.3 Module “Output”

This module allows the user to

- read the binary inputs of the process interface IO-1 ... IO-4.
- write to binary outputs of the process interface IO-1 ... IO-4.
- read the diagnostic information of the evaluation unit.

#### PLC process data output image (Module Output)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	<b>DR</b>	0	0	0	HC	0	C/Go
2	0x00							
3	0x00							
..	...							
19	0x00							
20	0x00							

#### Description byte 1, “Control byte”:

Bit	Value	Description	Remark
C/Go	0	Drive output at C/Go low	-
	1	Drive output at C/Go high	-
HC	0	Allow lowside and highside output current of max. 0.5A at C/Go	Bit HC only valid on channel IO-3 and channel IO-4. (Output driver is in Push/Pull mode)
	1	Allow highside output current of max. 1A at C/Go	Bit HC only valid on channel IO-3 and channel IO-4. (Output driver is in Push mode)
DR (1)	0	No read request	Data byte 2 ... 20 of the PLC process data input image is set to 0x00.
	0->1	Read diagnostics of the evaluation unit	-
	1	Diagnostics read request active	DR must be kept on 1 until the diagnostics response is available.

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

#### Description Byte 2...20:

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	OL	HC	I/Q	C/Qi
2	0x00 / Number of diagnostic events							
3	0x00 / Error code byte 1							
4	0x00 / Error code byte 2							
5	0x00 / Error code byte 3							
6	0x00 / Error code byte 4							
..	...							
20	Not used							



**Description byte 1, “Status byte”:**

Bit	Value	Description	Remark
C/Qi	0	Level at C/Qo = L	The level of C/Qi is not measured, but taken from the output value C/Qo
	1	Level at C/Qo = H	The level of C/Qi is not measured, but taken from the output value C/Qo
I/Q	0	Input I/Q < 8V	The level of I/Q is measured by hardware
	1	Input I/Q > 11V	The level of I/Q is measured by hardware
HC	0	Current of max. 0.5A enabled at C/Qo	-
	1	Current of max. 1A enabled at C/Qo	Only valid on channel IO-3 and IO-4
OL	0	L+ o.k.	Set by hardware
	1	Overload on L+	Set by hardware
DR-RDY	0	Reading not started or evaluation unit diagnostics data not ready	-
	1	Diagnostics read ready	Diagnostics read response from evaluation unit is ready and available in byte 2 ... 5.
Diag	0	No diagnostics available.	-
	1	evaluation unit 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 control bit is set within the control byte.

**Description Byte 2, ”Number of diagnostic events”:**

Number of diagnostic events.

(0 = No diagnostics, 1...4 = 1...4 diagnostics event(s))

**Description Byte 3...n:**

If bit “DR-RDY” within the Status byte is set these bytes contain the error codes of the evaluation unit. Otherwise these bytes are set to default value 0x00 by the evaluation unit.

If more than one diagnostics event is available this is appended. Up to 4 diagnostics messages could be transferred. Error codes see chapter 14.

**Description Byte (n+1)...20:**

Will be set to default value 0x00 by the evaluation unit.

## 10.4 Module “RWH\_RW”, general description

This module allows the user to

- read the UID of the ID tag over the Read-/Write head at process interface IO-1 ... IO-4. Two different modes are available:
  - Read UID once on request (Synchronous mode).
  - Read UID automatically whenever the evaluation unit detect a change of the UID data (Asynchronous mode).
- read the User data of the ID tag over the Read-/Write head at process interface IO-1 ... IO-4. Two different modes are available:
  - Read User data of the ID-tag once on request (Synchronous mode).
  - Read User data of the ID-tag automatically whenever the evaluation unit detect a change of the UID data (Asynchronous mode).
- Write to the User data of the ID tag over the Read-/Write head at process interface IO-1 ... IO-4.
- Write verified to the User data of the ID tag.
- Read the diagnostic information of the evaluation unit.
- Switch off and on the antenna field of the Read-/Write head

### PLC process data output image (Module RWH\_RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Res	<b>DR</b>	ER	UR	RD	WR	AO	Res
2	Data byte 1							
3	Data byte 2							
..	...							
19	Data byte 18							
20	Data byte 19							

### Description Byte 1, “Control byte”:

Bit	Bit name	Description
0	Res	Reserved
1	AO	„Antenna field Off” request
2	WR	WRite data to the User data of the ID tag
3	RD	ReaD data from the User data of the ID tag
4	UR	Mode “Access to the UseR data of the ID tag”
5	ER	Mode “Event controlled Reading of User memory of the ID tag”
6	DR	evaluation unit Diagnostics Read, set by the controller to fetch the diagnostics, signaled by the evaluation unit in the Diag status bit
7	Res	Reserved

Remark:

The bits WR, RD, DR are edge controlled bits. The change from state “0->1” activates the command request. The state “1” forces the evaluation unit to hold the response data or to execute the command automatically. The state “0” forces the evaluation unit to set the data within the Process data input image from Byte 2...20 to default value “0x00”.



It is not allowed to the set bit DR with the bits WR or RD or ER simultaneously, because the module can handle only one command request. Otherwise an error message is created (Diag bit = 1).

**Description Byte 2...20, "Data byte 1...19":**

Dependent on the selected mode this data memory contains command data to send to the evaluation unit.

Default value "Control byte": 0x00

Mode: Read UID automatically, antenna field on

**PLC process data input image (Module RWH\_RW)**

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	<b>DR-RDY</b>	EA	UD	RD-RDY	WR-RDY	AI	TP
2	Data byte 1							
3	Data byte 2							
..	...							
19	Data byte 18							
20	Data byte 19							

**Description Byte 1, "Status byte":**

Bit	Bit name	Description
0	TP	ID Tag Present
1	AI	Antenna field Inactive
2	WR-RDY	WRite to User data of the ID tag ReaDY
3	RD-RDY	ReaD from the User data of the ID tag ReaDY
4	UD	Mode "Access to the User Data of the ID tag" active
5	EA	Mode "Receive User data on Event change Active"
6	DR-RDY	Diagnostics Read response ReaDY and available in the response buffer. Coding: Byte 2: Number of diagnostic events Byte 3-6: Diagnostic message 1 Byte 7..10: Diagnostic message 2 Byte 11..14: Diagnostic message 3 Byte 15..18: Diagnostic message 4
7	DIAG	Evaluation unit DIAGNOSTICS occurred, 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 the DR control bit is set by the controller

**Description Byte 2...20, "Data byte 1...19":**

Dependent on the selected mode this data memory contains the response data read from the evaluation unit or the diagnostics information.

## 10.5 Module “RWH\_RW”, Read UID of the ID tag synchronously

In this mode the UID of the ID tag can be read once by setting the bit RD from 0 to 1. This mode is suitable if the user knows when the ID-tag is present in front of the Read-/Write head. The read UID is kept in the data bytes 2...18 stable while bit RD is set to 1.

### PLC process data output image (Module RWH\_RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	DR (2)	0	0	RD (1)	0	AO=0	0
2	Not used							
..	..							
20	Not used							

### Description byte 1, “Control byte”:

Bit	Value	Description	Remark
AO	0	“Antenna field on” request	Activate the antenna field
RD (1)	0	UID no read request	UID length/data is cleared in data bytes 2...20 of the PLC process data input
	0->1	Edge: UID read request	Starts the reading of the UID.
	1	UID hold request	RD must be kept on 1 until the command response is available. The UID length/data is transmitted in data byte 2...20 of the PLC process data input.
DR (2)	0	No read request	Data byte 2 ... 20 of the process data input image is set to 0x00
	0->1	Read diagnostics of the evaluation unit	-
	1	Diagnostics read request active	DR must be kept on 1 until the command response is available

(1) Bit RD is only evaluated if the channel parameter “UID edge controlled” is set. Otherwise the UID will be read continuously regardless of the setting of bit RD.

(2) Diagnostics is only available, if bit “Diag” within the response data is set. Otherwise the response data will return default data “0x00” within byte 2...20. The setting of bit DR to 1 is only allowed when bit RD is set to 0.

### PLC process data input image (Module RWH\_RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Diag	<b>DR-RDY</b>	0	0	RD-RDY	0	AI=0	TP
2	UID data length read							
3	UID data byte 1 ( MSBy )							
4	UID data byte 2							
..	...							
18	UID data byte 16							
19	0x00							
20	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	"Antenna field on" request active	-
RD-RDY	0	No read request started or read request not ready	Data in Byte 2 ... 18 is set to default values 0x00
	1	Read request from evaluation unit ready	Data in Byte 2 ... 18 valid.
DR-RDY	0	No diagnostic read request or diagnostic data not ready.	-
	1	Diagnostics read request from evaluation unit ready.	Error code: Byte 2: Number of diagnostic events Byte 3-6: Diagnostic message 1 Byte 7..10: Diagnostic message 2 Byte 11..14: Diagnostic message 3 Byte 15..18: Diagnostic message 4
Diag	0	No error detected	-
	1	evaluation unit diagnostics available	-

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**Description Byte 2, "UID data length read":**

UID data length read. Data length of the UID read from ID tag [bytes].

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

**Description Byte 3 ... 6/10/14/18, "UID data byte":**

Read UID of the ID tag with length of 32/64/96/128 bit. Unused bytes are set to 0x00. If no ID tag is detected by the Read-/Write head this data field is set to 0x00.

**Description Byte 19 ... 20:**

Always set to 0x00.

## 10.6 Module “RWH\_RW”, Read UID of the ID tag asynchronously

In this mode the UID of the ID tag can be read automatically without sending any read request. This mode is suitable if the user do not know when the ID tag is present in front of the Read-/Write head. Additionally this mode allow the fastest detection of ID-tag cause no command request need to be send to the evaluation unit. Please note that the UID 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.

### PLC process data output image (Module RWH\_RW)

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

### Description byte 1, “Control byte”:

Bit	Value	Description	Remark
AO	0	“Antenna field on” request	Activate the antenna field
DR (1)	0	No read request	Data byte 2 ... 20 of the process data input image is set to 0x00
	0->1	Read diagnostics of the evaluation unit	-
	1	Diagnostics read request active	DR must be kept on 1 until the command response is available

(1) Reading of the diagnostics is only possible if ER is set to 0. Diagnostics is only available, if bit “Diag” within the response data is set. Otherwise the response data will return default data “0x00” within byte 2...20 of the response data.

### PLC process data input image (Module RWH\_RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Diag	<b>DR-RDY</b>	0	0	0	0	AI=0	TP
2	UID data length read							
3	UID data byte 1 ( MSBy )							
4	UID data byte 2							
..	...							
18	UID data byte 16							
19	0x00							
20	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	"Antenna field on" request active	-
DR-RDY	0	No diagnostic read request or diagnostic data not ready.	-
	1	Diagnostics read request from evaluation unit ready.	Error code: Byte 2: Number of diagnostic events Byte 3-6: Diagnostic message 1 Byte 7..10: Diagnostic message 2 Byte 11..14: Diagnostic message 3 Byte 15..18: Diagnostic message 4
Diag	0	No error detected	-
	1	evaluation unit diagnostics available	-

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### Description Byte 2, "UID data length read":

Data length of the UID read from the ID tag [bytes].

Remark: If no ID tag is detected by the Read-/Write head this byte is set to 0x00. The data length is held according to the setting of the channel parameter "Data Hold Time"

### Description Byte 3 ... 6/10/14/18, "UID data byte":

Read UID of the ID tag with length of 32/64/96/128 bit. Unused bytes are set to 0x00. If no ID tag is detected by the Read-/Write head this data field is set to 0x00.

Remark: . UID data bytes are held according to the setting of the channel parameter "Data Hold Time"

### Description Byte 19 ... 20:

Always set to 0x00.

## 10.7 Module “RWH\_RW”, Read User data of the ID tag synchronously

In this mode the User data of the ID tag can be read edge controlled by setting the bit RD from 0 to 1. This mode is suitable if the user knows when the ID-tag is present in front of the Read-/Write head. The read User data is kept in the data bytes 2...18 stable while bit RD is set to 1.

### PLC process data output image (Module RWH\_RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	DR (3)	ER=0	UR=1 (1)	RD (2)	0	AO=0	0
2	Read data length							
3	16 bit start address [D15...D8]							
4	16 bit start address [D7...D0]							
5	Not used							
..								
20	Not used							

### Description Byte 1, “Control byte”:

Bit	Value	Description	Remark
AO	0	“Antenna field on” request inactive	Activate the antenna field.
RD (2)	0	No read request of User data	User data length/data is cleared in data byte 2...20 of the PLC process data input image.
	0->1	edge: User data read request	Starts the reading of the User data.
	1	User data hold request	RD must be kept on 1 until the command response is available. The User data length/data is transmitted in data byte 2...20 of the PLC process data input image.
UR (1)	1	Mode “User data” selected	Must be set to 1 to access the User data of the ID tag
ER	0	Mode “Read user data synchronously” selected	Must be set to 0 for reading the User data synchronously
DR (3)	0	No read request	Data byte 2 ... 20 of the process data input image is set to 0x00.
	0->1	Read diagnostics of the evaluation unit	-
	1	Diagnostics read request active	DR must be kept on 1 until the command response is available.

(1) Mode can be changed every time if bit “RD” and “DR” is set to 0 => no command active.

(2) A simultaneous activation of bit DR and RD is not allowed!

(3) Reading of the diagnostics is only possible if bit RD is set to 0. Diagnostics is only available, if bit “Diag” within the response data is set. Otherwise the response data will return default data “0x00” within byte 2...20 of the response data.

### Description Byte 2, “Read data length”:

Read data length, limited to a maximum number of 16 bytes.

### Description Byte 3... 4, “16 bit start address”:

Start address of the ID tag User data where the data has to be read from.

### Description Byte 5... 20, “Not used ”:

These bytes are ignored.



## PLC process data input image (Module RWH\_RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Diag	<b>DR-RDY</b>	EA=0	UD=1	RD-RDY	0	AI	TP
2	Read data length							
3	Read data byte 1							
4	Read data byte 2							
..	...							
18	Read data byte 16							
19	0x00							
20	0x00							

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### 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	"Antenna field on" request active	-
	1	"Antenna field off" request active	-
RD-RDY	0	No command request detected or command execution active	Read length / Read data byte is cleared in data byte 2...17 of the PLC process data input image.
	1	Command execution is ready.	Diag bit is not set: Command execution ok. Read length / Read data byte is set in data byte 2...17 of the PLC process data input image.  Diag bit is set: Command execution not ok. Read length / Read data bytes are set to zero.
UD	1	Mode "Read/write used data of the ID tag" active	Feedback of the selected mode.
EA	0	Mode "Receive User data of the ID tag on request" active	Feedback of the selected mode.
DR-RDY	0	No diagnostic read request or diagnostic data not ready.	-
	1	Diagnostics read request from evaluation unit ready.	Error code: Byte 2: Number of diagnostic events Byte 3-6: Diagnostic message 1 Byte 7..10: Diagnostic message 2 Byte 11..14: Diagnostic message 3 Byte 15..18: Diagnostic message 4
Diag	0	No error detected	-
	1	evaluation unit diagnostics available	Maybe channel related or channel independent error occurred.

### Description Byte 2, "Read data length":

Read data length

### Description Byte 3... 20, "Read data byte 1 ... 16":

In mode "User data" this data area contains the data of the User data of the ID tag. Unused bytes are set to 0x00.

In read diagnostics mode this data area contains detailed error codes.

## 10.8 Module “RWH\_RW”, Read User data of the ID tag asynchronously

In this mode the User data of the ID tag can be read automatically without sending any read request. This mode is suitable if the user knows when the ID-tag is present in front of the Read-/Write head. Additionally, this mode allows the fastest detection of ID-tag because no command request needs to be sent to the evaluation unit. Please note that the User data is transmitted in real time and the PLC cycle time needs to be about factor 2 shorter as the ID tag is detected by the Read-/Write head.

### PLC process data output image (Module RWH\_RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	DR (3)	ER=1 (2)	UR=1 (1)	RD=1 (2)	0	AO=0	0
2	Read data length							
3	16 bit start address [D15...D8]							
4	16 bit start address [D7...D0]							
5	Not used							
..								
20	Not used							

### Description Byte 1, “Control byte”:

Bit	Value	Description	Remark
AO	0	“Antenna field on” request inactive	Activate the antenna field
RD (2) UR (1) ER (2)	1	Mode “Receive User data automatically” selected	(1) Must be set to 1 to access the User data of the ID tag
DR (3)	0	No read request	Data byte 2 ... 20 of the process data input image is set to 0x00.
	0->1	Read diagnostics of the evaluation unit	-
	1	Diagnostics read request active	DR must be kept on 1 until the command response is available.

(1) Mode can be changed every time if bit “RD”, “ER” and “DR” is set to 0 => no command active.

(2) If bit ER and bit RD is set to 1 a reading process of the User data of the ID tag is started when a change of the bit TP is detected. So the user gets only a message from the evaluation unit if the state of the ID tag changes from “not present to present” and from “present to not present”. This helps to limit the requests which are needed to be sent from the PLC.

(3) Reading of the diagnostics is only possible if ER and RD is set to 0. Diagnostics is only available, if bit “Diag” within the response data is set. Otherwise the response data will return default data “0x00” within byte 2...20 of the response data.

### Description Byte 2, “Read data length”:

Read data length, limited to a maximum number of 16 bytes.

### Description Byte 3... 4, “16 bit start address”:

Start address of the ID tag User data where the data has to be read from.

### Description Byte 5... 20, “Not used”:

These bytes are ignored.

## PLC process data input image (Module RWH\_RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Diag	DR-RDY	EA	UD=1	RD-RDY	0	AI	TP
2	Read data length							
3	Read data byte 1							
4	Read data byte 2							
..	...							
18	Read data byte 16							
19	0x00							
20	0x00							

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### 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	"Antenna field on" request active	-
	1	"Antenna field off" request active	-
RD-RDY	0	No command request detected or command execution active	Read length / Read data byte is cleared in data byte 2...17 of the PLC process data input image.
	1	Command execution is ready.	Diag bit is not set: Command execution ok. Read length / Read data byte is set in data byte 2...17 of the PLC process data input image.  Diag bit is set: Command execution not ok. Read length / Read data bytes are set to zero.
UD	1	Mode "Read/write used data of the ID tag" active	Feedback of the selected mode.
EA	0	Mode "Receive User data of the ID tag on request" active	-
	1	Mode "Message controlled reception of the User data of the ID tag" active	-
DR-RDY	0	No diagnostic read request or diagnostic data not ready.	-
	1	Diagnostics read request from evaluation unit ready.	Error code: Byte 2: Number of diagnostic events Byte 3-6: Diagnostic message 1 Byte 7..10: Diagnostic message 2 Byte 11..14: Diagnostic message 3 Byte 15..18: Diagnostic message 4
Diag	0	No error detected	-
	1	evaluation unit diagnostics available	Maybe channel related or channel independent error occurred.

### Description Byte 2, "Read data length":

Read data length.

Remark: The data length is held according to the setting of the channel parameter "Data Hold Time".

### Description Byte 3... 20, "Read data byte 1 ... 16":

This data area contains the data of the User data of the ID tag. Unused bytes are set to 0x00.

In read diagnostics mode this data area contains detailed error codes. The User data are held according to the setting of the channel parameter "Data Hold Time".

## 10.9 Module “RWH\_RW”, Write User data of the ID tag

In this mode the User data of the ID tag can be written.

### PLC process data output image (Module RWH\_RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	DR (3)	0	UR=1 (1)	0	WR (2)	AO=0	0
2	Write data length							
3	16 bit start address [D15...D8]							
4	16 bit start address [D7...D0]							
5	Write data byte 1							
..	..							
20	Write data byte 16							

### Description Byte 1, “Control byte”:

Bit	Value	Description	Remark
AO	0	“Antenna field on” request active	Activate the antenna field.
WR (2)	0	No write request	-
	0->1	Write “user data to the ID tag” request	Data byte 5 ... 20 is written to the User data of the ID tag.
	1	Write request active	WR must be kept on 1 until the command response is available.
UR (1)	1	Mode “User data” selected	Must be set to 1 to access the User data of the ID tag
DR (3)	0	No read request	Data byte 2 ... 20 of the process data input image is set to 0x00.
	0->1	Read diagnostics of the evaluation unit	-
	1	Diagnostics read request active	DR must be kept on 1 until the command response is available.

(1) Mode can be changed every time if bit DR, WR = 0 (no command active.)

(2) A simultaneously activation of bit DR and WR is not allowed!

(3) Diagnostics is only available, if bit “Diag” within the response data is set. A simultaneously activation of bit DR with bit WR not allowed! Otherwise the evaluation unit will return default data “0x00” within byte 2...20 of the response data.

### Description Byte 2, “Write data length”:

Write data length, limited to a maximum number of 16 bytes.

### Description Byte 3... 4, “16 bit start address”:

Start address of the ID tag User data where the data has to be written to.

### Description Byte 5... 20, “Write data byte”:

In write mode the data to be written has to be copied in this data area. (Write data bytes 1 ... 16)

## PLC process data input image (Module RWH\_RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Diag	DR-RDY	0	UD=1	0	WR-RDY	AI	TP
2	Write data length							
3	0x00							
„	...							
20	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	“Antenna field on” request active	-
	1	“Antenna field off” request active	-
WR-RDY	0	No command request detected or command execution active or error occurred.	-
	1	Command execution is ready.	-
UD	1	Mode “Write User data to the ID tag” active	Feedback of the selected mode.
DR-RDY	0	No diagnostic read request or diagnostic data not ready.	-
	1	Diagnostics read request from evaluation unit ready.	Error code: Byte 2: Number of diagnostic events Byte 3-6: Diagnostic message 1 Byte 7..10: Diagnostic message 2 Byte 11..14: Diagnostic message 3 Byte 15..18: Diagnostic message 4
Diag	0	No error detected	-
	1	evaluation unit diagnostics available	Maybe channel related or channel independent error occurred.

### Description Byte 2, “Write data length”:

Write data length. If the write data length matches to the write data length in the command response and bit Diag is set to 0 the write process could be finished without failure.

### Description Byte 3... 20:

In write mode this bytes are set 0x00.

In read diagnostics mode this data area contains detailed error codes.

## 10.10 Module “RWH\_RW”, Write verified User data of the ID tag

In this mode the User data of the ID tag can be written and read back with one command request.

In the first step the command data is written to the ID tag, in the second step it is read back from the ID tag. In the third step the evaluation unit compares the written data with the read data and sends back the result to the PLC.

### PLC process data output image (Module RWH\_RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	DR (3)	0	UR=1 (1)	RD (2)	WR (2)	AO=0	0
2	Write data length							
3	16 bit start address [D15...D8]							
4	16 bit start address [D7...D0]							
5	Write data byte 1							
..	..							
20	Write data byte 16							

### Description Byte 1, “Control byte”:

Bit	Value	Description	Remark
AO	0	“Antenna field on” request active	Activate the antenna field.
WR (2) RD (2)	0	No write verified request active	Data byte 2 ... 20 of the process data input image is set to 0x00.
	0->1	Write verified to the “user data of the ID tag” request	Data byte 5 ... 20 are written to the User data of the ID tag. Afterwards the data bytes are read back from the ID tag.
	1	Write verified request active	WR must be kept on 1 until the command response is available.
UR (1)	1	Mode “User data” selected	Must be set to 1 to access the User data of the ID tag
DR (3)	0	No read request	Data byte 2 ... 20 of the process data input image is set to 0x00.
	0->1	Read diagnostics of the evaluation unit	-
	1	Diagnostics read request active	DR must be kept on 1 until the command response is available.

(1) Mode can be changed every time if bit DR, WR = 0 (no command active.)

(2) Bits WR and RD must be set simultaneously in the command request.

(3) Diagnostics is only available, if bit “Diag” within the response data is set. A simultaneously activation of bit DR with bits WR and RD is not allowed! Otherwise the evaluation unit will return default data “0x00” within byte 2...20 of the response data.

### Description Byte 2, “Write data length”:

Write data length, limited to a maximum number of 16 bytes.

### Description Byte 3... 4, “16 bit start address”:

Start address of the ID tag User data where the data has to be written to.

### Description Byte 5... 20, “Write data byte”:

In write mode the data to be written has to be copied in this data area. (Write data bytes 1 ... 16)

## PLC process data input image (Module RWH\_RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Diag	<b>DR-RDY</b>	0	UD=1	RD-RDY	WR-RDY	AI	TP
2	Write data length							
3	0x00							
„	...							
20	0x00							

UK

### 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	"Antenna field on" request active	-
	1	"Antenna field off" request active	-
WR-RDY RD-RDY	0	No command request detected or command execution active.	-
	1	Command execution is ready.	Result of the comparison is given back in byte 2.
UD	1	Mode "Write User data of the ID tag" active	Feedback of the selected mode.
DR-RDY	0	No diagnostic read request or diagnostic data not ready.	-
	1	Diagnostics read request from evaluation unit ready.	Error code: Byte 2: Number of diagnostic events Byte 3-6: Diagnostic message 1 Byte 7..10: Diagnostic message 2 Byte 11..14: Diagnostic message 3 Byte 15..18: Diagnostic message 4
Diag	0	No error detected	-
	1	evaluation unit diagnostics available	Maybe channel related or channel independent error occurred.

### Description Byte 2, "Read data length":

If the comparison of the written and read data is successful the read data length is identical to the write data length.

### Description Byte 3... 20:

These bytes contain the User data read back from the ID tag.

In read diagnostics mode this data area contains detailed error codes.

## 10.11 Restart of the evaluation unit

The evaluation unit can be remotely restarted.

The device shut off the fieldbus interface and the IO ports and execute than a power on cycle.



The command can be executed in all modules.



The control and status byte must have value 0x0 before the command is started.

### PLC process data output image (Command Restart)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	1	1	1	1	1	1	1	1
2	Restart delay time [ms*10]							
..	...							
20	0x00							

### Description Byte 1, "Control byte":

Bit	Value	Description	Remark
D0...D7	0	No restart request	Dependent of the activated module, the response data may contain ID tag data
	0->1	Restart request initiated	-
	1	Restart request active	-

### Description Byte 2:

0x0 = Restart evaluation unit immediately (Default value)

0x1 .. 0xFF = Restart delay time. Time in [ms\*10]

### Description Byte 3...20:

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

### PLC process data input image (Command Restart)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	1	1	1	1	1	1	1	1
2	Restart delay time [ms*10]							
..	...							
20	0x00							

### Description Byte 1, "Status byte":

Bit	Value	Description	Remark
D0...D7	0	No restart active	-
	0->1	Restart initiated	-
	1	Restart active	-



**Description Byte 2:**

0x0 .. 0xFF Actualized restart delay time [ms\*10]. Value is decremented from “Restart delay time” set in Control byte to 0x0. After that, the restart sequence is executed.

**Description Byte 3...20:**

Not used. Set to default value 0x0 by the evaluation unit.



## 11 Error codes of the evaluation unit

Error codes are signaled with bit “Diag” within the status byte of the response data of the evaluation unit. 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.



Inactive channels can only transfer hardware diagnostic events.

Example:

Command response of the evaluation unit for command “DR”

C001**F4FE9000**

### 11.1 Error group ID tag (F1FE)

Error group F1	Error code	Description
Tag/transponder	F1FE0200	Tag not present, tag has left the transmission window
Tag/transponder	F1FE0300	Address or command does not match the tag characteristics, memory size invalid
Tag/transponder	F1FE0400	Tag is defective, replace tag or battery
Tag/transponder	F1FE0500	Overflow of the tag memory UID > 16 bytes
Tag/transponder	F1FE0900	Command not supported by the tag
Tag/transponder	F1FE0A00	Access error, e.g. block locked. See ISO18000-x
Tag/transponder	F1FE0B00	General tag error which is not specified in detail
Tag/transponder	F1FE0C00	Unknown internal error

### 11.2 Error group evaluation unit (F4FE)

Error group F4	Error code	Description
Evaluation unit	F4FE0100	Power supply failure
Evaluation unit	F4FE0200	Hardware failure, short circuit and overload
Evaluation unit	F4FE0201	Allowed temperature exceeded
Evaluation unit	F4FE0300	Read/write head does not function because time out occurred
Evaluation unit	F4FE0400	Command buffer overflow of the IO server queue (Internal error)
Evaluation unit	F4FE0500	Data buffer overflow, memory allocation (internal error)
Evaluation unit	F4FE0600	Command is not supported in this mode (internal error)
Evaluation unit	F4FE8100	ID-Link Master inactive. i.e. after power on (internal error)
Evaluation unit	F4FE8200	Internal IO port server error (internal error)
Evaluation unit	F4FE8300	Invalid IO port parameter, e.g. channel (internal error)
Evaluation unit	F4FE8400	Vendor-specific error with the command PUT
Evaluation unit	F4FE8500	IO port server resets channel
Evaluation unit	F4FE8600	Data not available for delayed C/Q inputs or delayed UID (Internal fault)
Evaluation unit	F4FE8700	Reconfiguration of the IO port channel not yet allowed (internal error )
Evaluation unit	F4FE8800	Parameter flag of the IO port not set (internal error )
Evaluation unit	F4FE8900	General error detected by ID-Link master
Evaluation unit	F4FE8A00	CRC error detected by ID-Link Master
Evaluation unit	F4FE8B00	Object not found detected by ID-Link Master
Evaluation unit	F4FE8C00	Data read/write area in the command not valid
Evaluation unit	F4FE8D00	IO port channel reconfigured
Evaluation unit	F4FE8E00	The read/write head could not process the command, i.e. read/write length exceeded, tag memory error, write to locked block
Evaluation unit	F4FE8F00	Tag data length exceeded (block size * block number)
Evaluation unit	F4FE9001	Short circuit at output driver detected (C/Qo)
Evaluation unit	F4FE9002	Undervoltage at output driver detected (AUX or L+)
Evaluation unit	F4FE9003	Overload at output driver detected (L+ or C/Qo)
Evaluation unit	F4FE9004	Over temperature at output driver detected

Evaluation unit	F4FE9005	Wire break on the read/write head
Evaluation unit	F4FE9006	Upper limit reached at output driver.
Evaluation unit	F4FE9007	Undervoltage at C/Qo detected
Evaluation unit	F4FE9008	General read/write head error detected
Evaluation unit	F4FE9009	Read/write head communication error
Evaluation unit	F4FE900A	I <sup>2</sup> C communication error (internal error)
Evaluation unit	F4FE900B	I <sup>2</sup> C communication parity error (internal error)
Evaluation unit	F4FE9401	Frontend error detected by the read/write head
Evaluation unit	F4FE9402	General error detected by the read/write head
Evaluation unit	F4FE9403	ID-Link error detected by the read/write head
Evaluation unit	F4FE9404	Buffer overrun (overflow???) error detected by the read/write head
Evaluation unit	F4FEA000	Invalid command code detected
Evaluation unit	F4FEA001	Invalid command parameter detected
Evaluation unit	F4FEA002	Invalid command data detected
Evaluation unit	F4FEA003	Invalid ticket number or ticket length detected
Evaluation unit	F4FEA100	Configuration of the evaluation unit failed (CR1 / CR2 )
Evaluation unit	F4FEA200	Configuration of the IO channel failed (internal error)
Evaluation unit	F4FEA300	Reading of C/Qi / IQ inputs (internal error)
Evaluation unit	F4FEA400	Write to output C/Qo failed (internal error)
Evaluation unit	F4FEA500	High current setting failed (internal error)
Evaluation unit	F4FEA600	Reading of UID failed (internal error)
Evaluation unit	F4FEA700	Reading of the user data memory of the tag failed (internal error)
Evaluation unit	F4FEA800	Writing to the user data memory of the tag failed, command WU (internal error)
Evaluation unit	F4FEA900	Writing to the user data memory of the tag failed, command WV (internal error)
Evaluation unit	F4FEAA00	Verification of the user data memory of the tag failed, command "WV" (internal error)
Evaluation unit	F4FEAB00	Setting of the antenna field on/off failed, command "AN"
Evaluation unit	F4FEAC00	ID-Link master could not read the tag blocks (internal error)

### 11.3 Error group Communication User – evaluation unit (F5FE )

Error group F5	Error code	Description
Communication user - evaluation unit	F5FE0800	Command is processed by another user (indicated by the evaluation unit)
Communication user - evaluation unit	F5FE8000	More than one command requested by user (DR, WR, Diag)
Communication user - evaluation unit	F5FE8100	It is attempted to abort the command for synchronous reading or writing
Communication user - evaluation unit	F5FE8300	Command parameter for asynchronous reading invalid

## 12 List of abbreviations

Definition	Remark
ACD	Address Conflict Detection. Procedure to detect IPv4 address conflicts as well as duplicate addresses. See RFC 5227.
Antenna	RFID antenna built in a Read-/Write head
Assembly Instance	Assembly instances are instances of an I/O data block with predefined functionality which can be exchanged between several communication participants. It is known to the communication participants which data at which length is to be exchanged.
Block size	Size of one block of the ID tag, e.g. 4/8/32 bytes
CIP	Common Industrial Protocol. Object-oriented description of a communication protocol for industrial requirements which is currently used by four different field buses (CompoNet, DeviceNet, ControlNet and EtherNet/IP).
Connection	Describes the logical connection between two application objects.
Controller	PLC e.g. Allen Bradley Compact Logix
DLR	Device Level Ring protocol. Supports the media redundancy in a ring structure Ethernet environment.
EDS	Electronic Data Sheet is a device description file.
EIP	EtherNet/IP
Emergency system	Web server with reduced functionality to download the firmware of the evaluation unit
evaluation unit	RFID Identification unit DTE102
Explicit Messaging	Acyclic data exchange between I/O scanner and I/O adapter based on TCP/IP communication.
Hexadecimal	Numerical format, which uses 16 values to represent a numeric value: 0..9, A, B, C, D, E, F
I/O Adapter	Comparable to a slave system (Target in EIP)
I/O Messaging oder Implicit Messaging	Cyclic data exchange between I/O scanner and I/O adapter based on UDP/IP communication.
I/O Scanner	Comparable to a master system (Originator in EIP)
ID Tag, transponder	RFID ID tag, e.g. E80360, E80370
ODVA	Open Device Net Vendor Association
PC	Personal computer, e.g. desktop computer, notebook
PermData	Nonvolatile data area of the evaluation unit for storage of user specific settings, like fieldbus parameter, address settings and so on.
PLC	Programmable Logic Controller, e.g. Allen Bradley Compact Logix
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, e.g. ANT411, ANT513
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