Device manual
RFID evaluation unit

DTE104

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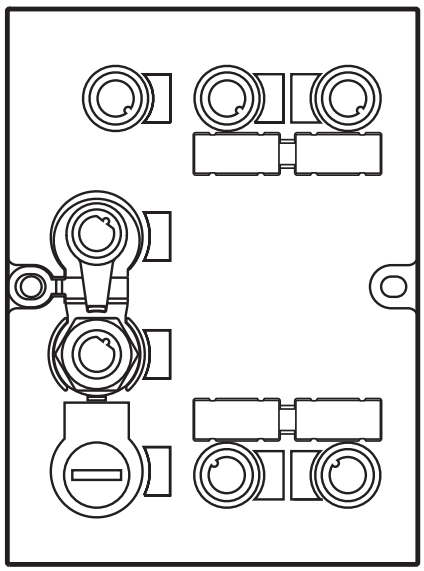

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1 Preliminary note

1.1 Symbols used

►	Instruction
>	Reaction, result
[…]	Designation of pushbuttons, buttons or indications
→	Cross-reference
	Important note Non-compliance may result in malfunction or interference
	Information Supplementary note

2 Safety instructions

- The device described is a subcomponent for integration into a system.
  - The manufacturer is responsible for the safety of the system.
  - The system manufacturer undertakes to perform a risk assessment and to create a documentation in accordance with legal and normative requirements to be provided to the operator and user of the system. This documentation must contain all necessary information and safety instructions for the operator, the user and, if applicable, for any service personnel authorised by the manufacturer of the system.
- Read these operating instructions before setting up the device and keep it during the entire service life.
- The device must be suitable for the corresponding applications and environmental conditions without any restrictions.
- The device should be used only for its intended purpose (→ 3 Functions and features).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the device or incorrect use by the operator.
- Installation, electrical connection, set-up, operation and maintenance of the device must be carried out by qualified personnel authorised by the machine operator.
- Protect the device and the cables against damage.

3 Functions and features

The RFID evaluation unit integrates an Ethernet interface and 4 channels for the connection of field devices. Each channel can be used either for the connection of a read/write head or as input/output to IEC 61131.

The device

- controls the data exchange with the read/write heads or the sensor/actuator level.
- communicates with the higher-level control level via Ethernet.
- 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 set-up

Via the integrated web server it is possible to

- read the UID of the ID tag
- read 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 evaluation unit
- read the device information of the connected read/write heads

4 System requirements

4.1 Firmware

The functions described in the device manual require the following firmware on the RFID evaluation unit:

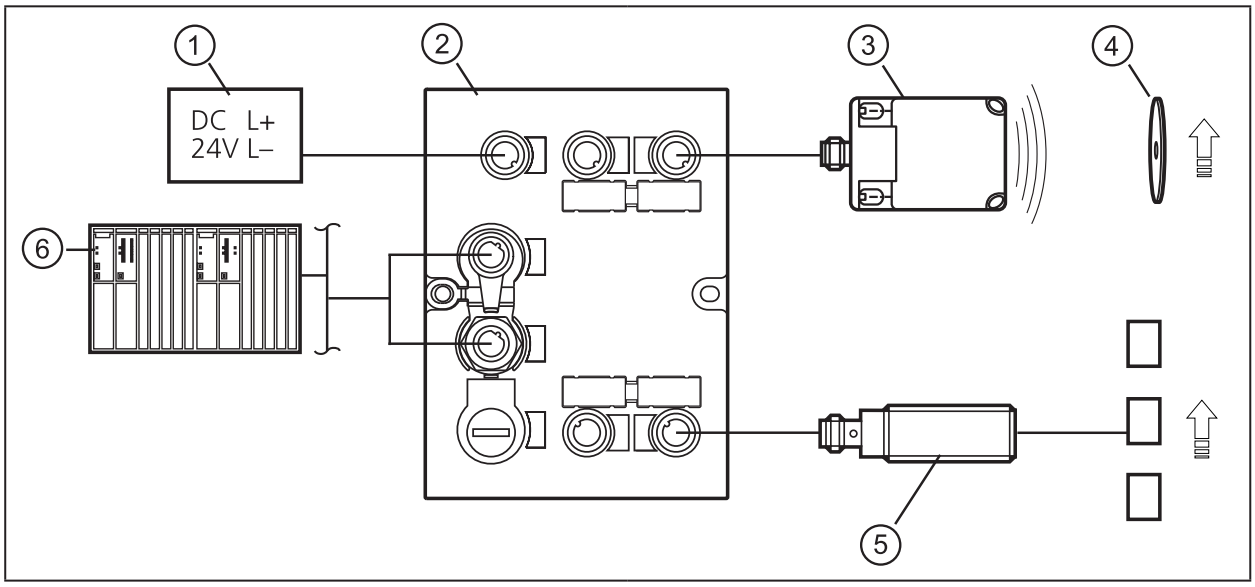
- DTE104: V3.1.3

Other versions of the firmware may contain changed or new functions which are not documented.

5 Function

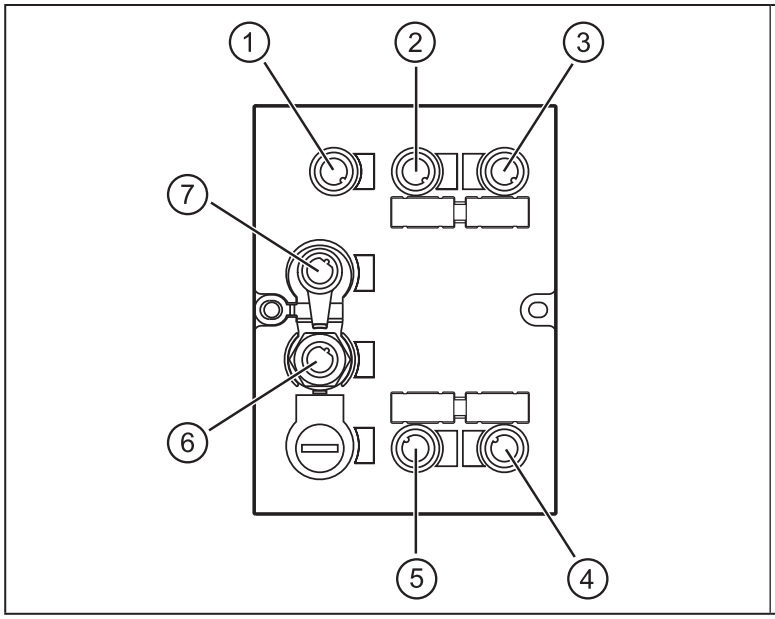
The evaluation unit processes data of up to 4 read/write heads (type ANT51x/ANT41x) or IEC 61131 inputs / outputs. The mode of operation for each port is set individually via the Ethernet controller.

More information about the port configuration → 11 Configuration.



1: Power supply
2: Evaluation unit
3: ANT51x / ANT41x read/write head
4: ID tag
5: Sensor
6: Ethernet host

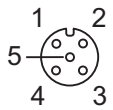
5.1 Connection



1: AUX voltage supply
2: Process connection IO-1
3: Process connection IO-2
4: Process connection IO-4
5: Process connection IO-3
6: Ethernet port 1
7: Ethernet port 2

5.1.1 "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

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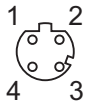
5.1.2 Field bus connection Ethernet port 1 / port 2

► Connect the device to the Ethernet host using a suitable M12 Ethernet connection cable.



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

Screened connection cable required.

Factory setting of the Ethernet parameters

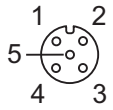
The following values are preset at the factory:

Parameter	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 are changed via the web server of the unit or via the Ethernet host.

5.1.3 Process connections "IO-1..IO-4"

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



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

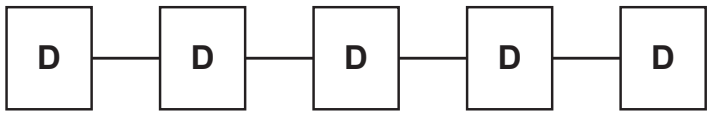
The evaluation unit has to be disconnected before field devices are connected.

The total current consumption of the device must not exceed 3 A.

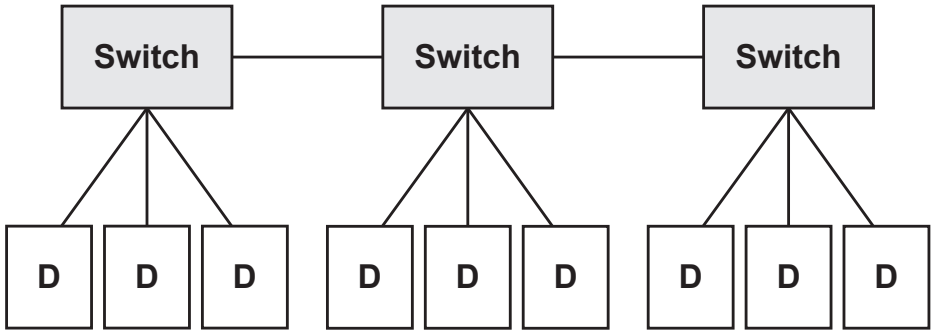
Information about the suitable read/write heads on our website at: www.ifm.com

5.2 Allowed network infrastructures

Linear structure:



Star structure:



D: Device

6 Installation

Installation and electrical connection are described in the operating instructions: www.ifm.com

7 Operating and display elements

7.1 Reset to factory settings

The Ethernet parameters can be reset to the factory settings:

► Disconnect all cables.

► Insert an electrically conductive bridge between pin 1 and pin 3 on the process connection IO-3.

► Switch on the device again and wait until the yellow LED 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.

7.2 LED indicators

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

7.2.1 LED AUX

Green LED	Yellow LED	Status	Note
Off	Off	No voltage supply	UAUX < 5 V
On	Flashes at 2 Hz	Voltage supply too low	5 V ≤ UAUX ≤ 18 V
On	Flashes at 8 Hz	Firmware update running	Do not switch off power supply
On	Off	Voltage supply OK	18 V ≤ UAUX ≤ 36 V

7.2.2 LED Ethernet port 1 / port 2

Green LED	Yellow LED	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"

7.2.3 LED SF (system failure)

Red LED	Green LED	Status	Note
Off	Off	No voltage supply	Check the voltage supply
Off	On	Normal operation	-
Flashes	Off	Error at channel level	- Overload - Temperature - Internal fault
On	Off	Error at device level	- Undervoltage - Temperature
Flashes	Flashes	Self-test	Start phase of the device

7.2.4 LED BF (bus error)

Read LED	Green LED	Status	Note
Off	Off	No voltage supply	Check the voltage supply
Off	Flashes	Connection to the host controller is established, there is no data exchange	-
Off	On	Connection to the host controller is established, there is data exchange	-
Flashes	Off	Connection to the host controller is established, no valid configuration	Check configuration
On	Off	No connection to the host controller	Check connection
Flashes	Flashes	Self-test	Start phase of the device

7.2.5 LEDs IO1..IO4

The LED indications of the process connections are different for each connection configuration.

Use as input to IEC 61131

Off	Off	Interface deactivated	Interface via Ethernet host 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

Off	Off	Interface deactivated	Interface via Ethernet host not configured
On	Off	Interface activated, output low-active (0 V)	-
On	On	Interface activated, output high-active (24 V)	-
Flashes at 8 Hz	Flashes at 8 Hz	Overload or short circuit	-

Use with read/write heads

Off	Off	Interface deactivated	Interface via Ethernet host not configured
Flashes at 2 Hz	Off	Interface activated, read/write head deactivated	-
On	Off	Interface activated, ID tag not in the field	-
On	On	Interface activated, ID tag in the field	-
Flashes at 8 Hz	Flashes at 8 Hz	Overload, short-circuit or communication error	-

7.2.6 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 is 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, the device has to be maintained by the manufacturer.	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	-

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8 Set-up

► Connect the device according to the operating instructions.

> After connection of the operating voltage, the unit is ready for use.

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

9 Web server

The device is equipped with an integrated web server that

- reads the UID of the ID tag
- reads from the user data area of the ID tag
- writes to the user data area of the ID tag
- configures the IP settings of the device
- updates the firmware

The settings are made via a web browser.

► 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 setting: 192.168.0.x (→ 9.1 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 setting: 192.168.0.79

9.1 Verify and set the IP address of the PC

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

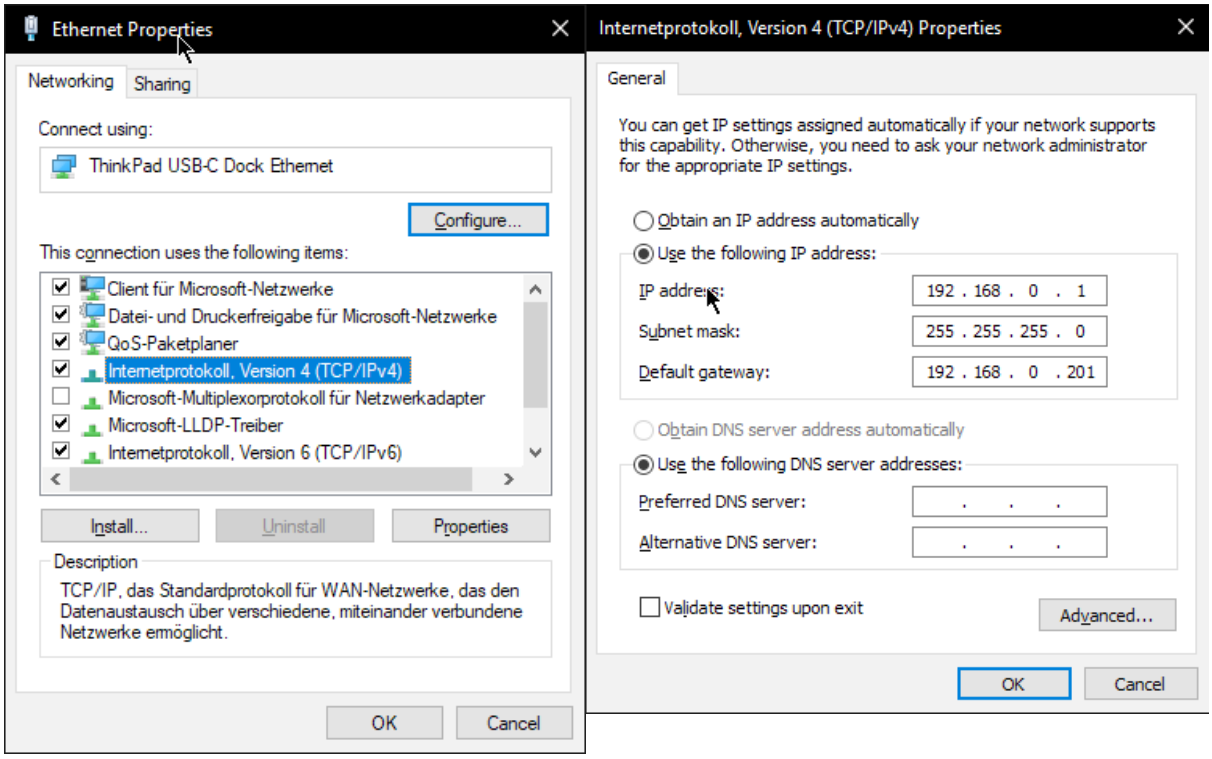
► Select the menu item "Use the following IP address".

► 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 the system administrator.

9.2 "Home" tab

This is the main menu from where all functions of the evaluation unit are accessed. The language of the web interface can be set.

9.3 "Network" tab

The network is set via the menu.

The responsible IT support provides the necessary network settings.

If the evaluation unit is directly connected to the PC, a static IP address setting is recommended (→ 9.1 Verify and set the IP address of the PC).

The network address of the PC must be within the address range of the evaluation unit and differ from the address of the evaluation unit.

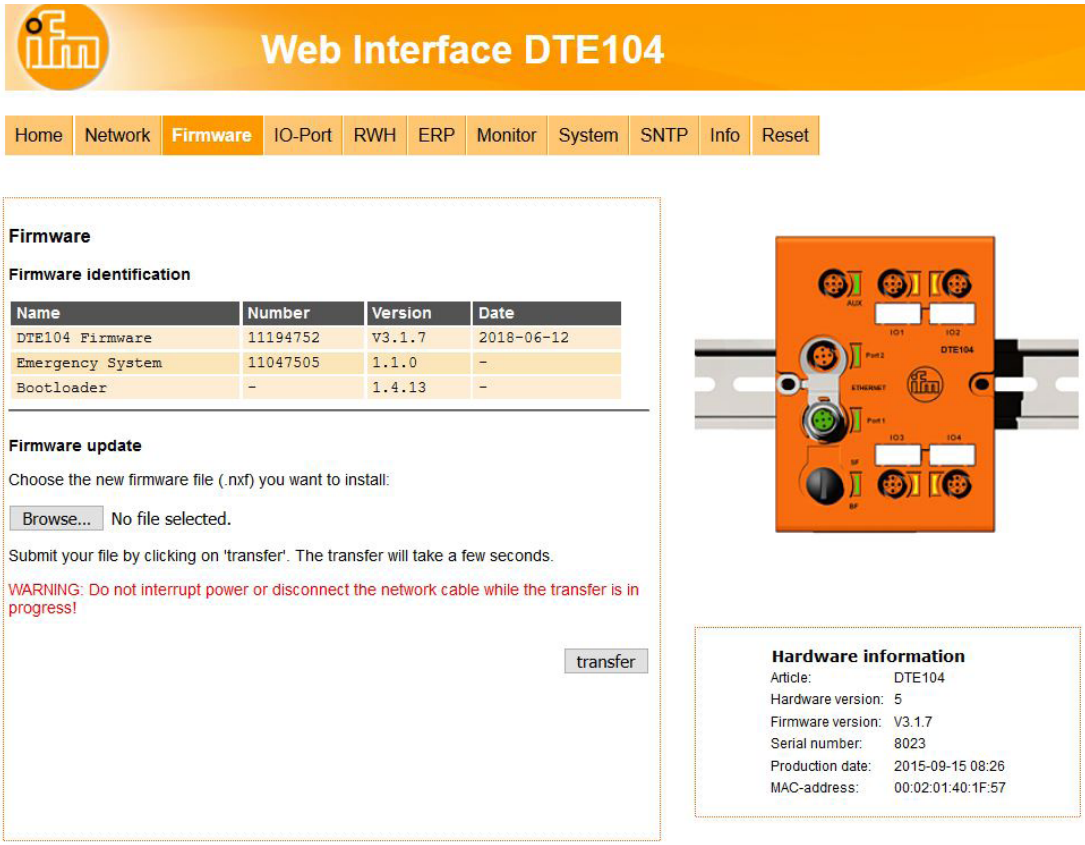
Example:

For the subnet mask 255.255.255.0 the address settings highlighted in red must be identical for the PC and the evaluation unit.

Ethernet IP address of the PC: 192.168.0.10
IP address of the evaluation unit: 192.168.0.79

The IP address of the evaluation unit must not be used again in the Ethernet network.

9.4 "Firmware" tab



Update the firmware of the evaluation unit:

► Open the "Firmware" tab on the browser interface.

► Choose the firmware file DTE104.nxf and send it via the [transfer] button.

Do not cut power supply or the network connection during transfer.

9.5 "IO-port" tab

This menu configures the IO ports of the evaluation unit.

Each IO channel can be configured to the following modes:

Mode	**Function**	**Process data volume**
Off	Channel deactivated. No memory location is reserved in the process data.	0 bytes
Inactive	Channel activated. No user data is transferred.	20 bytes
Input	Channel activated. IEC 61131 input	20 bytes
Output	Channel activated. IEC 61131 output	20 bytes
RWH_RW / RWH_CMD	Channel activated. Read/write head (ANT4xx or ANT5xx)	20 bytes / 26..166 bytes

Field	**Function**
Number of blocks	Number of the blocks on the ID tag.
Block size	Number of bytes per block on the ID tag. If the block size does not correspond to the physical value of the ID tag, the read and write commands do not function correctly.
Data hold time	Time in ms how long the RFID data is held stable. This is helpful if the time interval in which the RFID data is available is shorter than the time the host needs to read the data from the RFID evaluation unit.
Overload detection	• [on]: If the option field [on] is active, an overload of more than 0.5 A is detected on terminal "L+". The current is limited to 0.7 A. • [off]: If the option field [off] is active, an overload of more than 0.5 A is detected on terminal "C/Qo". The current is limited to 0.6 A.
High current	If the option field [on] is active, an overload of more than 1 A is detected on IO-3, IO-4 and C/Qo. The maximum current is 3.0 A. If the maximum current is exceeded, the unit may be damaged.

Button	**Function**
Activate and save	The settings are activated and saved permanently. After the next power-on, the saved settings are activated. If the host is connected to the evaluation unit and writes a new IO port configuration, the saved values are overwritten.
Cancel	Discard changes

9.6 "RWH" tab

This menu displays the current settings of the IO channels.

For further information about the settings: (→ 9.9 "Monitor" tab - Read/write head information)

9.7 "ERP" tab

9.7.1 "Web" mode

The menu allows the set-up of the ERP connection of the evaluation unit.

The network administrator provides the settings to connect the evaluation unit to the ERP system.

Field ERP server	**Function**
IP address	IP address of the ERP server where the software package LR Agent CP is installed [XXX.XXX.XXX.XXX]
Port	Port address of the ERP server [1000..65535] Default: port 34000
Mode: off	No function, inactive
Mode: WEB / RWH / input	After connection of the evaluation unit to the ERP server, the evaluation unit automatically executes the command specified in the fields IO-1..IO-2. The command result is sent to the ERP system.

Field IO-1..IO-4	**Function**
Mode	Under "Current settings", the active mode of the IO channel is displayed. With the button "IO port config", the mode of the IO channel is changed. Mode: RWH -> see table "RWH mode" Mode: Input -> see table "Input mode"
Command	Depends on the mode of the IO channel, different commands can be selected

RWH mode	**Function**
not used	No data is sent to the ERP server
UID	Each time the evaluation unit detects an ID tag, the UID information is sent to the ERP server.

Data	Each time the evaluation unit detects an ID tag, the user memory is read according to the settings of the following parameter: Offset = address where the evaluation unit starts to read the user memory of the ID tag

Input mode	**Function**
not used	No data is sent to the ERP server
IQ & CQ	Each time the evaluation unit detects a change of status of the inputs C/Qi and I/Q, the status of these inputs is sent to the ERP server.

9.7.2 "Fieldbus" mode

Field ERP server	**Function**
IP address	IP address of the ERP server where the software package LR Agent CP is installed [XXX.XXX.XXX.XXX]
Port	Port address of the ERP server [1000..65535] Standard port: 34000
Mode: off	No function, inactive
Mode: Fieldbus	If the host sends a command request to the evaluation unit, the command response of the evaluation unit is also sent to the ERP server.

9.8 "Monitor" tab

The menu shows the data of the ports detected by the evaluation unit.

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

► Click the button to open the submenu "Read/write head information" (→ 9.9 "Monitor" tab - Read/write head information).

► Click the button to open the submenu "Read/write ID tag (→ 9.11 "Monitor" tab)

9.9 "Monitor" tab - Read/write head information

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

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

Field RWH IO-1	**Function**
HF Power	Set the transmission power of the read/write head. This setting is only available for certain read/write heads.
Bar graph	Activate or deactivate the level indication of the RSSI value. The level indication indicates the signal strength with the LED of the read/write head. If the level indication is deactivated, detected ID tags are displayed with the LED of the read/write head. This setting is only available for certain read/write heads.
Save settings	"yes": The settings are saved on the unit and restored after rebooting. "no": The settings are sent to the unit once and not restored after rebooting.

Button	**Function**
Update	Go to the "Antenna firmware" menu
Transfer	Send the settings to the read/write head

9.10 "Monitor" tab - Antenna firmware

With this menu, the firmware of the read/write head of the selected port is updated.

► Click the [Browse] button to select the firmware file for the read/write head.

> Example of a firmware file: 11017564.afw

Button	**Function**
Select file	Open new dialogue window to browse the read/write head firmware file
Transfer	Send the firmware to the connected read/write head When the update process is finished, the evaluation unit reboots the read/write head automatically. A restart of the evaluation unit is not necessary.

Do not interrupt the power supply or disconnect the cables from the evaluation unit during the firmware transfer.

9.10.1 Web server of the read/write head

If the firmware update fails or the read/write head is not detected by the evaluation unit at the selected IO port, the following direct link of the web server to the read/write head can be used:

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

Parameter name	Meaning
IP-ADDRESS	IPV4 address of the evaluation unit [XXX.XXX.XXX.XXX]
IO-CHANNEL	IO channel number [1..4]
ANTENNA TYPE	6-digit article number of the read/write head [ANT512,ANT513,ANT410, ANT411..]
NUMBER	Firmware version [01]
LANGUAGE	Language of the website [de, en, es, fr, it, ko, pt, ru, zh]

Example of a URL:

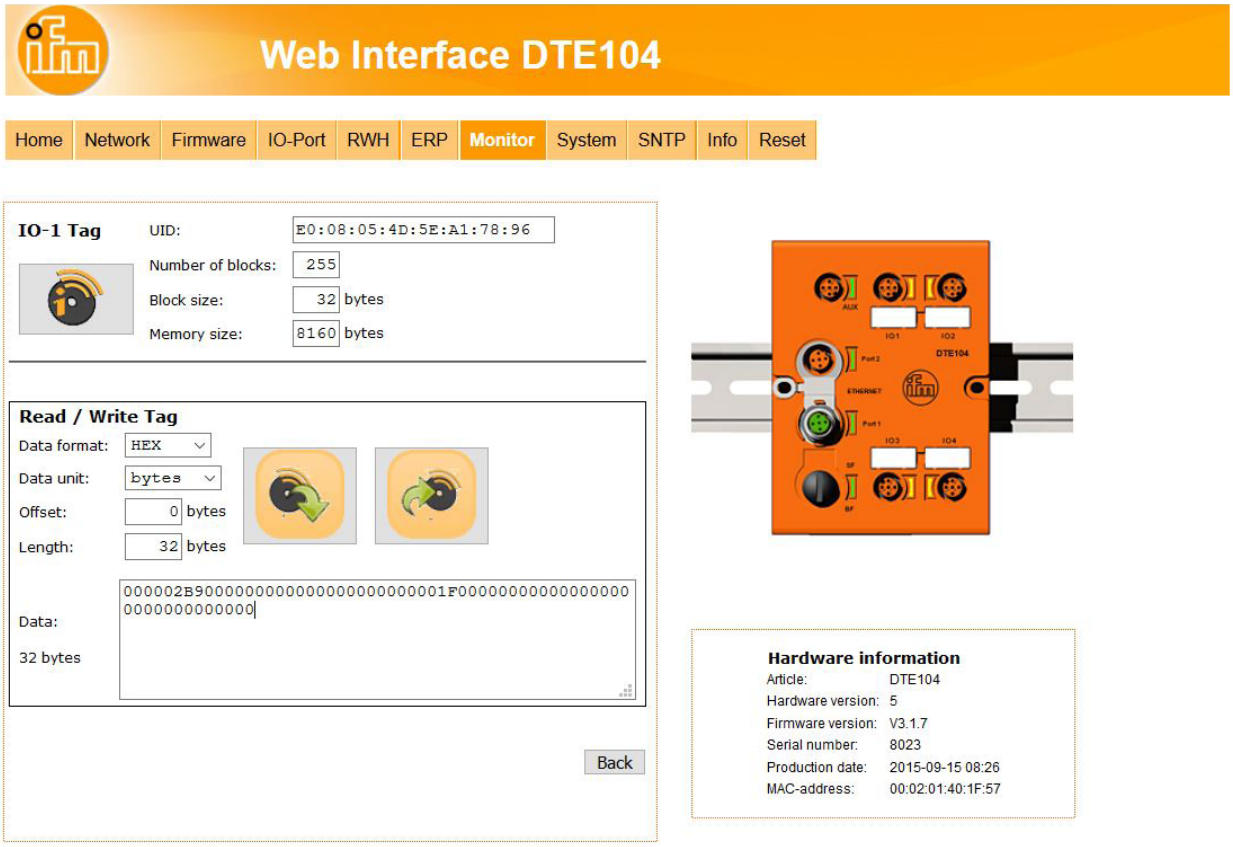
http://192.168.0.79/rwhupdate?ioport=1&anttype=ANT513&fwVersion=01&setLng=en

9.11 "Monitor" tab

This menu allows to:

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

9.11.1 Read the ID tag



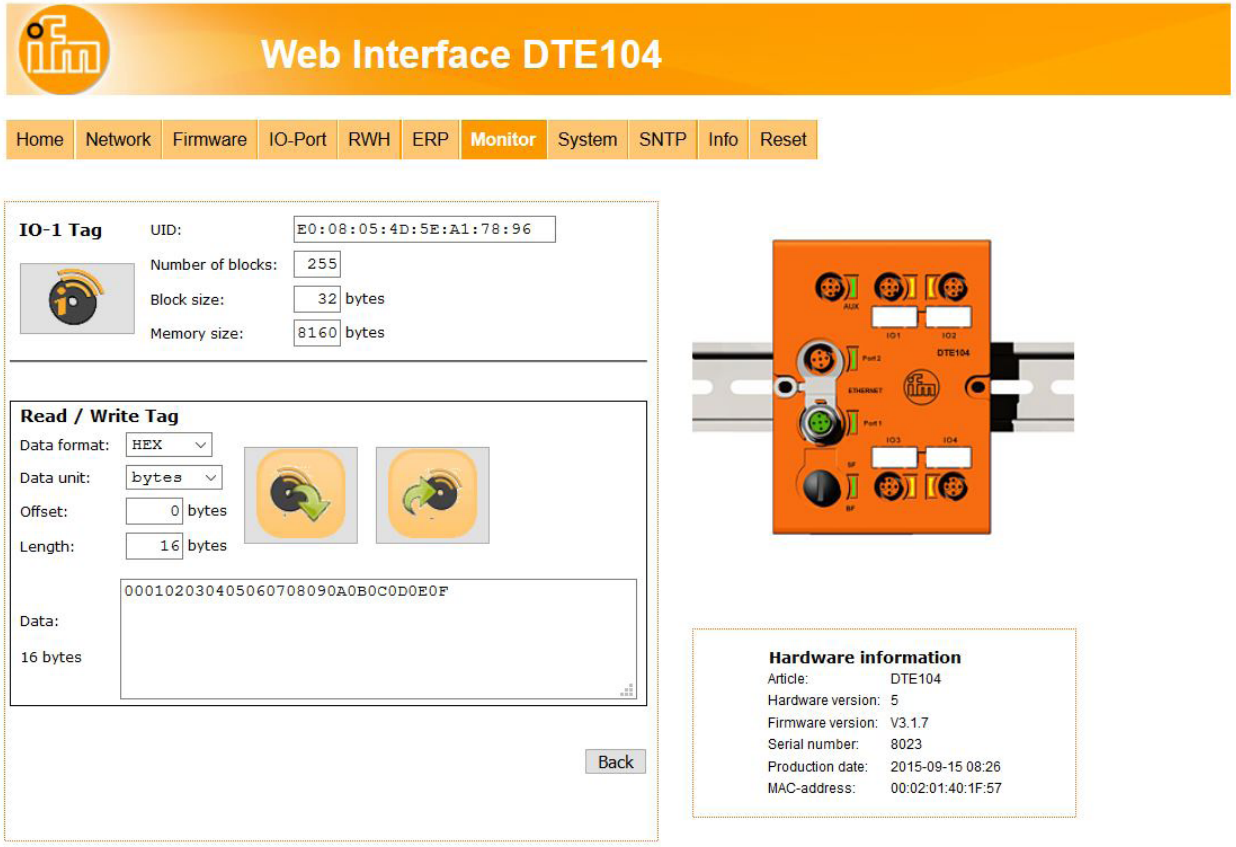
The UID data is displayed in real time with an update interval of 0.2 seconds.

Field read/write tag	**Function**
Data format	• [HEX]: Hexadecimal representation of the data contents on the ID tag. Example: "416E6C6167652031322C2056656E74696C2033" • [ASCII]: Readable representation of the data contents on the ID tag by means of ASCII characters. Example: "System 12, valve 3"
Data unit	• [Bytes]: Number of bytes to be read by the ID tag. • [Blocks]: Number of the blocks to be read by the ID tag.
Offset	The address offset can be set from 0 bytes up to the last accessible address of the ID tag.
Length	The data length is set from 1..240 bytes.

► Click the button to read the user data area of the ID tag.

► Click the [Back] button to navigate to the main menu.

9.11.2 Write data to the ID tag



Field read/write tag	**Function**
Data format	• [HEX]: Hexadecimal data content to be written to the ID tag. Example: "416E6C6167652031322C2056656E74696C2033" • [ASCII]: Readable representation of the data contents on the ID tag by means of ASCII characters. Example: "System 12, valve 3"
Data unit	• [Bytes]: Number of bytes to be written to the ID tag. • [Blocks]: Number of blocks to be written to the ID tag.
Offset	The address offset can be set from 0 bytes up to the last accessible address of the ID tag.
Length	The data length is set from 1..240 bytes.

► Click the button to write to the user data area of the ID tag.

► Click the [Back] button to navigate to the main menu.

9.12 "System" tab

This menu allows to define a password to protect the evaluation unit against unauthorised access.

To activate the password protection, the option field "New settings" has to be set to [on].

Parameter	Setting
User name	"admin" User name cannot 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 the [Submit] button to save the password.

► Click the [Cancel] button to delete the settings.

If the password is lost, the default password "admin" can be retrieved via "reset to factory settings" (→ 7.1 Reset to factory settings).

9.13 "SNTP" tab

If there is a SNTP server in the Ethernet network, the internal clock of the evaluation unit is synchronised with the external time server.

► Click the [Submit] button to send the settings to the evaluation unit.

9.14 "Info" tab

This menu shows the following information about the unit:

- Power supply state
- Temperature
- System time
- System date
- Product article number
- Production number
- Version PermData (non-volatile memory of the device)

For proper operation of the evaluation unit, the "power supply state" must be "fully operable".

► Click the [Reload] button to update the displayed values.

9.15 "Reset" tab

This menu allows a remote reset of the evaluation unit.

Reset the evaluation unit:

► Activate the checkbox "Please confirm you want to reboot the device".

► Click the [Reset] button.

When the evaluation unit is reset, all connections are closed and the outputs are switched off.

10 Operating mode of the evaluation unit

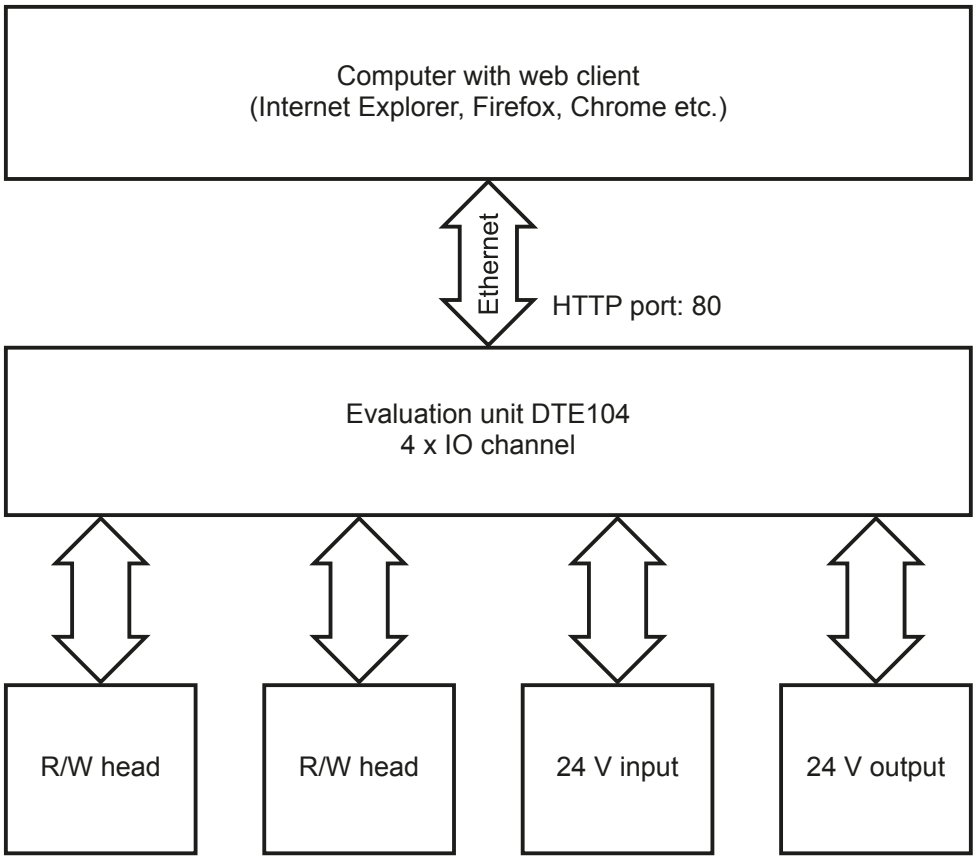
The evaluation unit can be set to different modes according to the application.

Mode	Function	Remark
Set-up	Configuration of the evaluation unit via the integrated web server.	The configuration is saved permanently and has to be done once. TCP port of the evaluation unit 80
Controller	The evaluation unit is configured via the controller. The data communication is carried out via the protocol of the evaluation unit.	With each connection establishment of the controller, the configuration is sent to the evaluation unit. (1) TCP port of the evaluation unit 32000
Host system	The evaluation unit is configured via the host. The data communication is performed via the ASCII protocol of the evaluation unit	With each connection establishment of the host, the configuration is sent to the evaluation unit. (1) TCP port of the evaluation unit 33000
ERP system	The evaluation unit is configured via the web server. The data communication is performed via the ASCII protocol of the evaluation unit	The configuration is saved permanently and has to be done once. TCP port of the host 34000 (preset)
	The evaluation unit is configured via the host. The data communication is performed via the ASCII protocol of the evaluation unit	With each connection establishment of the host, the configuration is sent to the evaluation unit. (1) TCP port of the host 34000 (preset)

(1) Recommended for an easy replacement of the evaluation unit in case of a fault. Another possibility is to save the configuration of the evaluation unit via the web server.

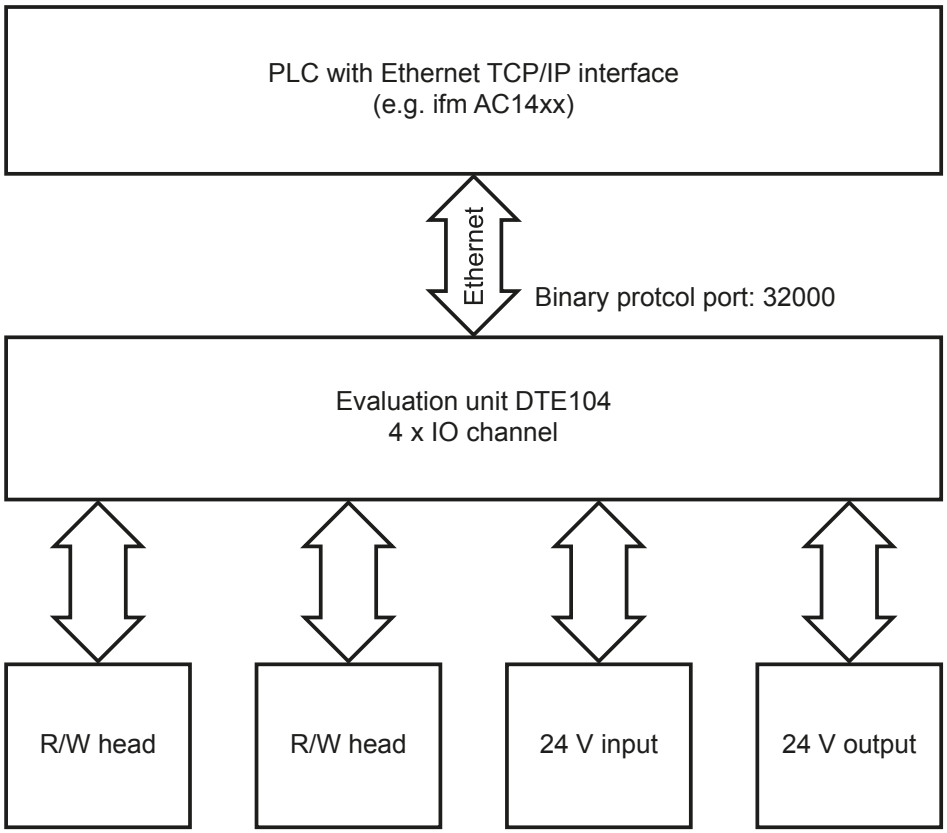
10.1 Set-up mode

To set up the evaluation unit it is recommended to use the integrated web server. This allows individual setting and activation of the 4 IO channels. The selected channel configuration is saved and allows immediate use of the device in the plant without any further actions.



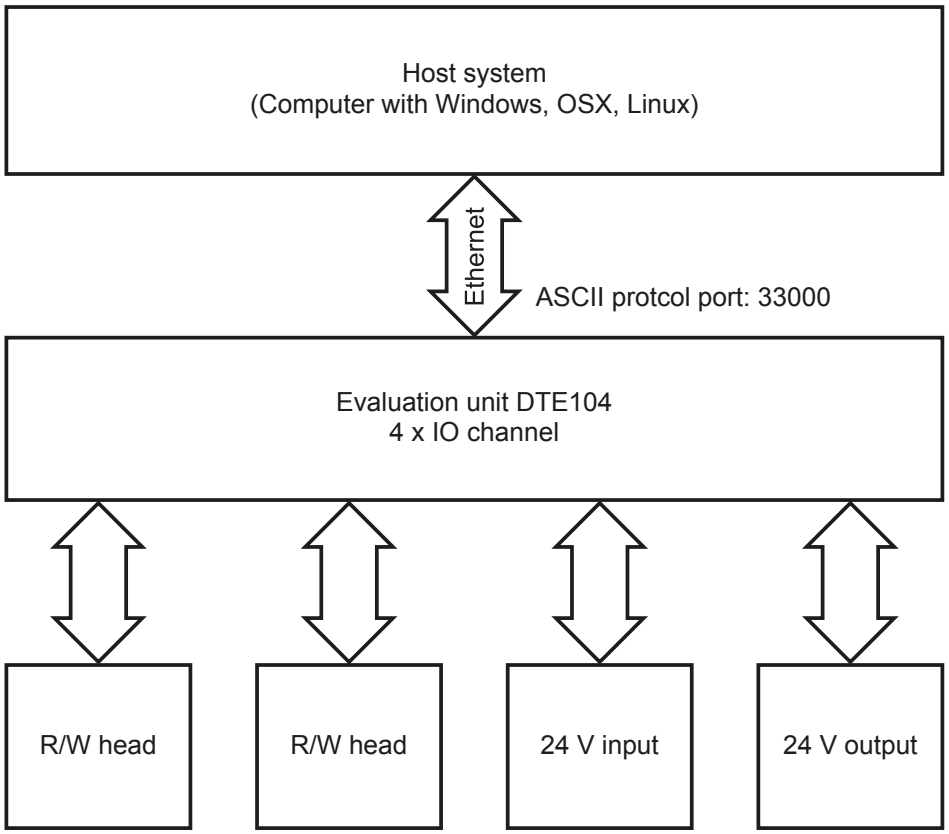
10.2 Controller mode

For the communication between a controller and the evaluation unit it is recommended to use the binary protocol. This protocol sends the information for all 4 IO channels in a telegram. The data content itself is coded in hexadecimal numbers and allows a fast and easy coding / decoding of the data content. The user data of the telegram for each IO channel is limited to 16 bytes.



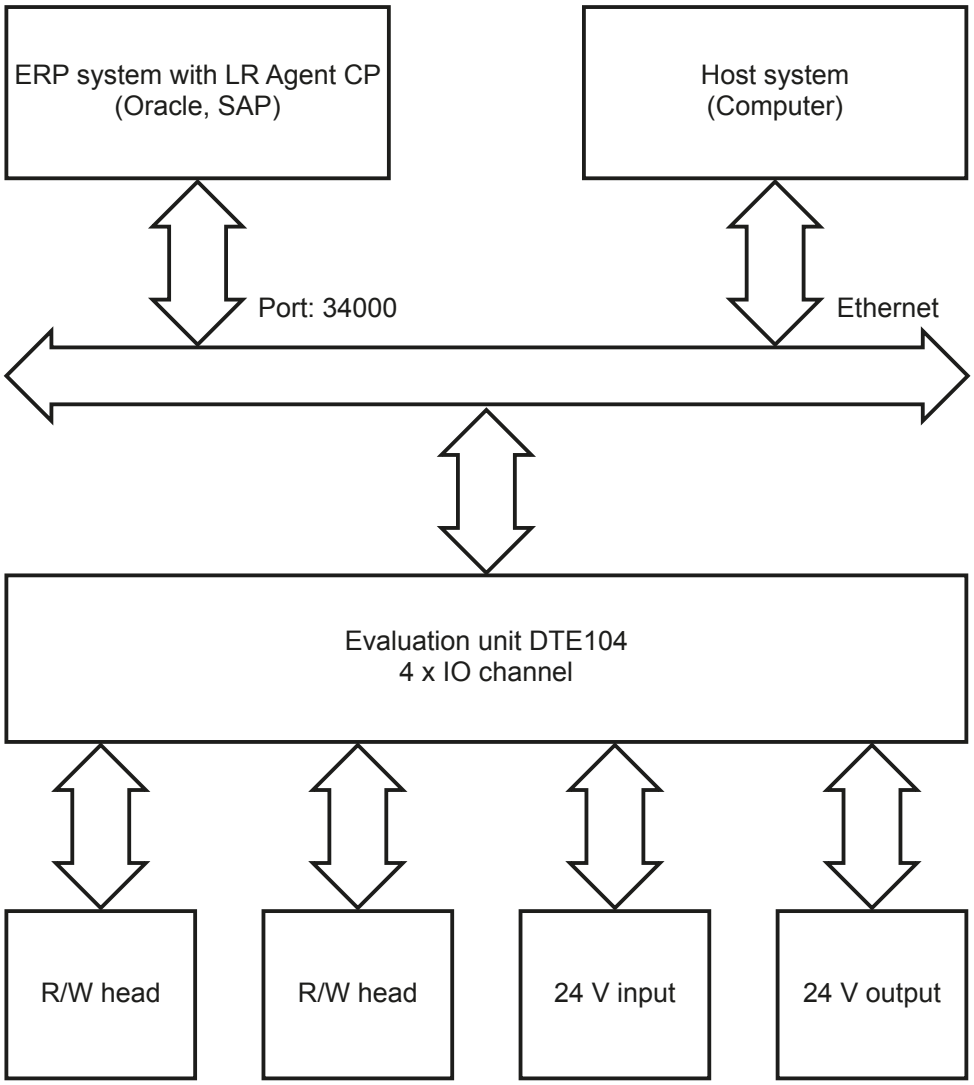
10.3 Host mode

For the communication between a host system and the evaluation unit it is recommended to use the ASCII protocol via the TCP port 33000. Each IO channel is transmitted in a separate TCP/IP frame. The length of the user data is variable. The data content itself is coded in a UTF-8 ASCII code with the code page 437.



10.4 ERP mode

For the communication with an ERP system, the evaluation unit offers a separate communication path via TCP. In this mode, the ERP system needs the software product LR Agent CP from ifm electronic gmbh. This software product allows easy connection of the evaluation unit to the ERP system. The evaluation unit is configured via the integrated web server of the evaluation unit or via the host system by means of the ASCII protocol. The data itself is sent to the ERP system by the LR Agent CP.



10.5 Set-up via the integrated web server

The evaluation unit and the IO channels are configured via the web server.

The following steps need to be carried out:

- Setting of the IP address and the port number of the ERP system.
- Configuration of the IO channels of the evaluation unit.
- Setting of the data which have to be sent to the ERP system by the evaluation unit.

The settings are saved and used with the next power on.

More information (→ 9.7.1 "Web" mode).

After these steps have been carried out, the evaluation unit tries to connect to the LINERECORDER or the SMARTOBERSERVER of the ERP server. When a connection could be established, the evaluation unit sends the preset command response to the ERP server by means of the LINERECORDER Agent protocol. The data is sent when the evaluation unit detects a change in the data contents.

10.5.1 Set-up via the host system

The evaluation unit and the IO channels are configured via a host system. The following steps need to be carried out:

- Setting of the IP address and the port number of the ERP system via the integrated web server of the evaluation unit. The settings are saved and used with the next power on.
- Setting of the evaluation unit with the commands "configure evaluation unit" and "configure IO channel".
- Request of the data content via the host system using the commands defined in the ASCII protocol of the evaluation unit.

More information (→ 9.7.2 "Fieldbus" mode).

10.5.2 Command types

There are two types of commands:

- Synchronous commands
  For each command request of the host, the evaluation unit returns exactly one response.
- Asynchronous commands:
  The command request of the host is done once. The evaluation unit immediately returns a response to the host. The next response of the evaluation unit is sent back when the data content of the response changes because new information is detected by the read/write head or by the evaluation unit itself. In addition, the response of the evaluation unit is sent to the ERP system via the LINERECORDER Agent protocol.

11 Configuration

11.1 Parameter setting of the Ethernet interface

The following settings can be configured via the web server:

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	
Automatic-negotiation	on	See (2)
Port speed	10MBit/s,	See (2)
Duplex mode	Half duplex	See (2)

(1) When the unit does not detect a DHCP server on the connected Ethernet network, the preset address 192.168.0.79 is set. After reboot of the device, the DHCP function is deactivated 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 (→ 7.1 Reset to factory settings).

(2) If the auto-negotiation of the data transfer between the evaluation unit and the connected Ethernet node fails, the device is set to 10 MBit/s, half duplex.

11.2 Determine the MAC address

There are several options to determine the MAC address of the device:

► Finding the MAC address on the type label.

> The type label is located on the upper side of the device above the AUX connector.

► Scan the MAC address with a data matrix code reader.

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

- Finding the MAC address via the integrated web server.

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

Web Interface DTE104

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

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

Submit

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

Hardware information

Article:	DTE104
Hardware version:	5
Firmware version:	V3.1.7
Serial number:	8023
Production date:	2015-09-15 08:26
MAC-address:	00:02:01:40:1F:57

11.3 Connection concept of the Ethernet interface

The device can be connected to two Ethernet lines via 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 which enables the host to address the evaluation unit with a single IP address.

Both Ethernet ports have the same functionality. However, a software update of the device is only possible via "port 1".

Connectors port 1 and port 2:

M12 Ethernet socket, D-coded

Signal	Name	Core colour	Pin
TD +	transmit data +	white/orange	1
TD -	transmit data -	orange	3
RD +	receive data +	white/green	2
RD -	receive data -	green	4
Screen	screen	-	housing

The colours refer to the standard T568B.

11.4 Overview of the communication methods via Ethernet TCP/IP

The evaluation unit has a standard 10/100Base-TX Ethernet TCP/IP interface. The TCP layer is used to transport the data of the evaluation unit to the counterpart, e.g. PC or controller.

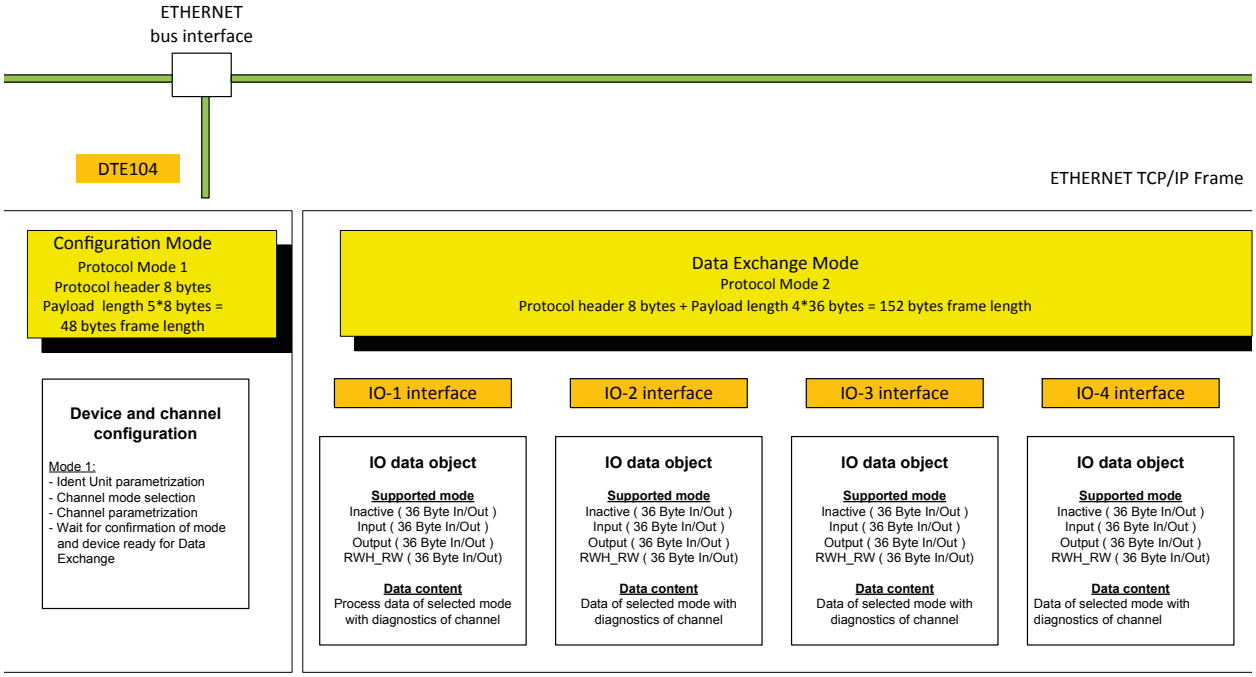
Only an exclusive owner can control the evaluation unit.

Each IO-1...IO-4 channel can be switched to the following modes:

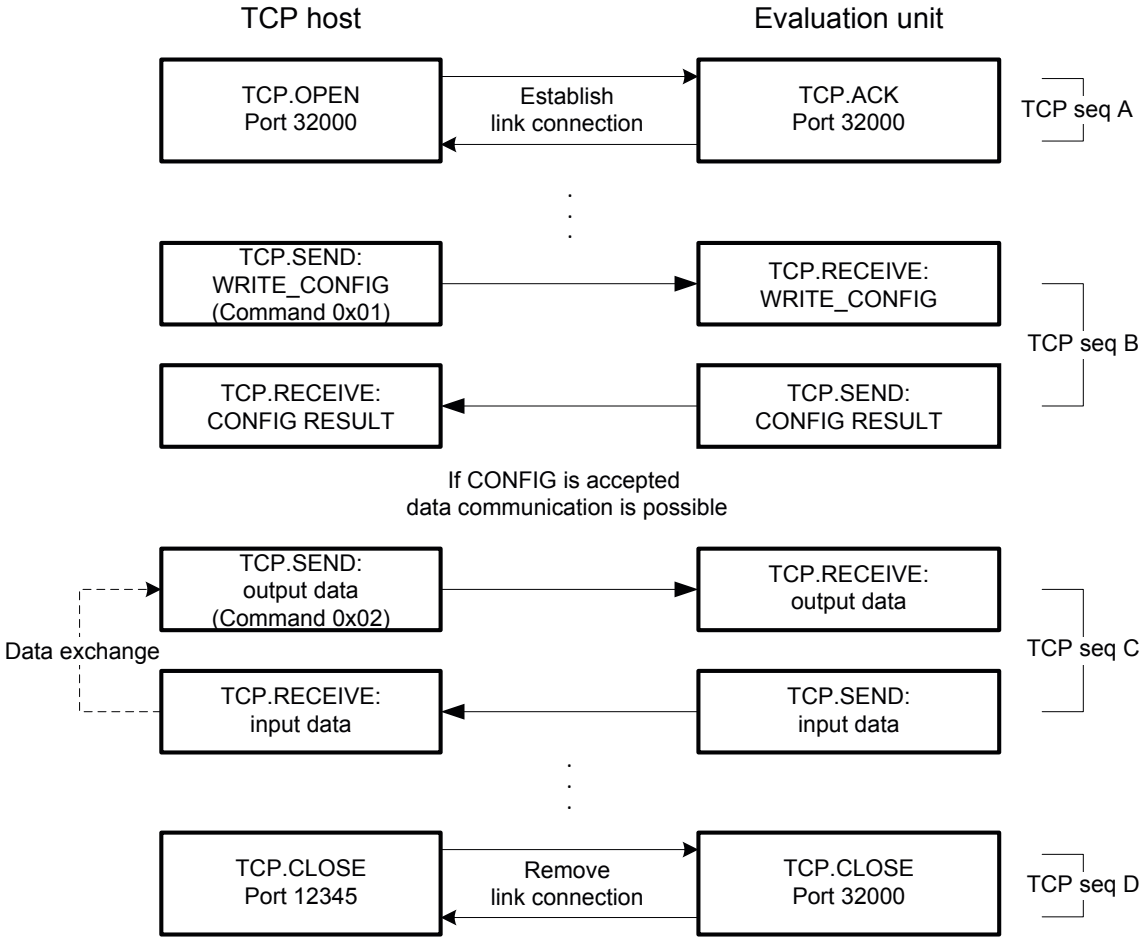
- inactive
- IEC61131 input
- IEC61131 output
- RWH_RW
  - to read the UID of an ID tag
  - to read data from an ID tag
  - to write data to an ID tag
  - to read the inputs from the IO channel
  - to set the output of the IO channel

11.5 Ethernet TCP/IP model of the RFID evaluation unit

11.5.1 Binary protocol communication via Ethernet TCP/IP



The configuration data and the process data of the evaluation unit is transferred to the evaluation unit by a TCP host via a TCP/IP connection. The host is the requestor, the evaluation unit the responder.



Sequence model of the connection establishment, configuration of the evaluation unit, data exchange and connection termination (→ 11.5.2 Binary protocol connection establishment between host and evaluation unit).

11.5.2 Binary protocol connection establishment between host and evaluation unit

TCP sequence	Host (PC)	Evaluation unit	Remark
A	Set IP address	Set IP address, i.e.192.168.0.79 and open TCP port 32000	Switch on
	Establish a communication with the evaluation unit via the IP address 192.168.0.79 and the TCP port 32000		TCP port 32000: binary protocol
B	Host writes configuration ->		
		<- Evaluation unit sends the result of the configuration request	If configuration not OK: > Evaluation unit sends NOT_READY, therefore data exchange is not possible. New configuration must be sent by the host. If configuration OK: > Evaluation unit sends READY, data exchange is possible.

Data exchange with "request -> response" relationship (1)

C	Write output data ->		Data exchange mode
		<- Write input data	

Data exchange with automatic response of the evaluation unit (2)

C1	Write output data ->		Data exchange mode (2)
		<- Write input data	
...			
C2	-		Input data is sent by the host without writing
		<- Write input data	
...			
C3	-		Input data is sent by the host without writing
		<- Write input data	

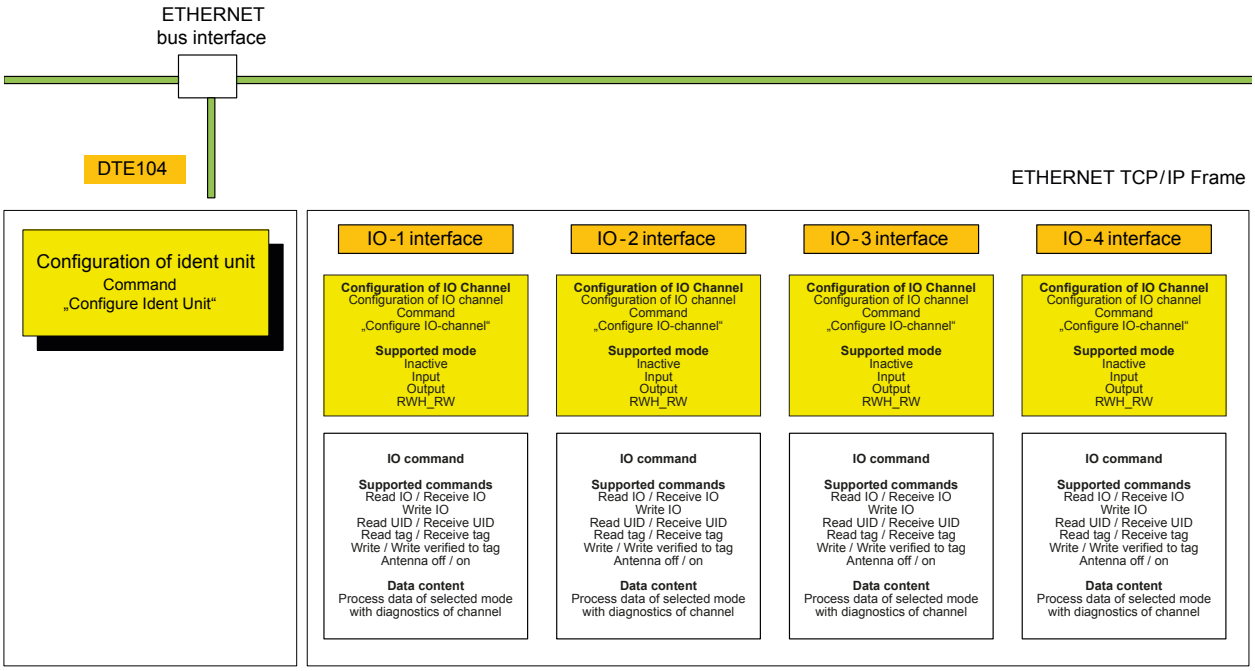
Port closed

D	Close connection		
		Close connection on request of the host	

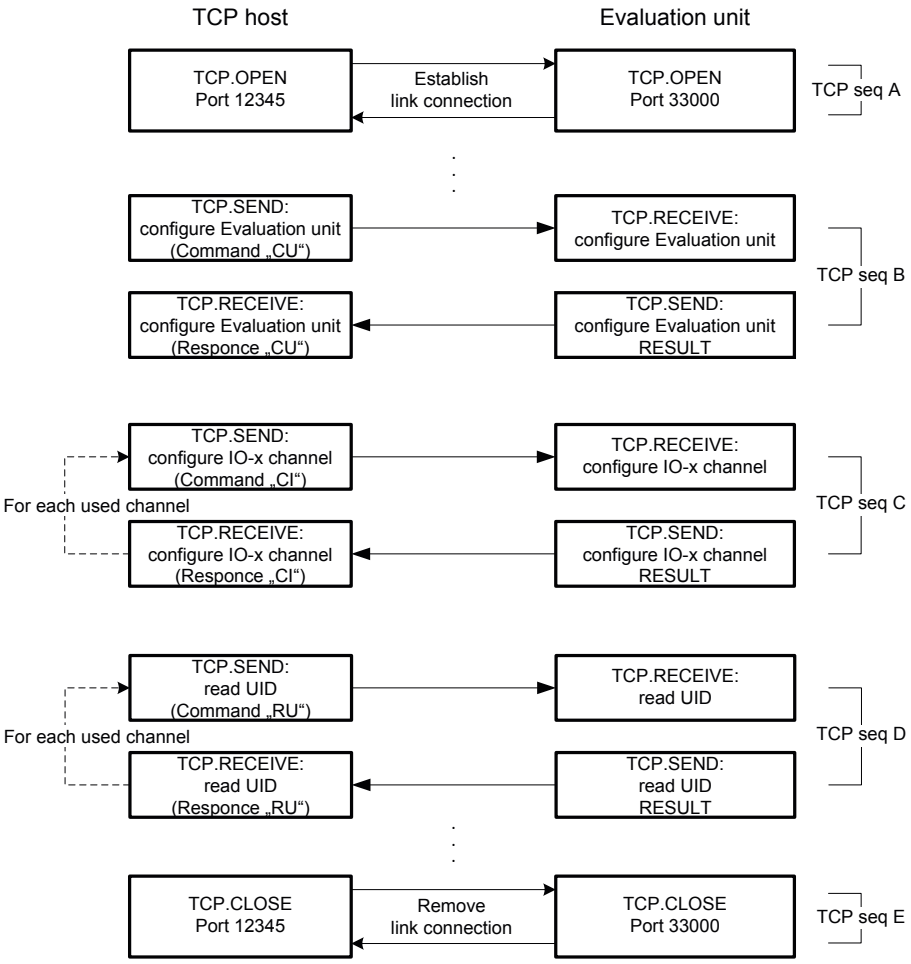
(1) Available for all channel modes

(2) Currently available only in channel mode RWH_RW with reading of the UID

11.5.3 ASCII protocol communication via Ethernet TCP/IP



The configuration data and the process data of the evaluation unit is transferred to the evaluation unit by a TCP host via a TCP/IP connection. The host is the requestor, the evaluation unit the responder.



Sequence model of the connection establishment, configuration of the evaluation unit, data exchange and connection termination (→ 11.5.4 ASCII protocol connection establishment between host and evaluation unit).

11.5.4 ASCII protocol connection establishment between host and evaluation unit

TCP sequence	Host (PC)	Evaluation unit	Remark
A	Set IP address	Set IP address, i.e. 192.168.0.79 and open TCP port 33000	Switch on
	Establish a communication with the evaluation unit via the IP address 192.168.0.79 and the TCP port 33000		TCP port 33000: ASCII protocol
B	Host writes configuration ->		
		<- Evaluation unit sends the result of the configuration request	If configuration not OK: > Evaluation unit sends "DIAG=01", therefore data exchange is not possible. New configuration must be sent by the host. If configuration OK: > Evaluation unit sends "DIAG=00", data exchange possible.
C	Host writes IO channel configuration ->		
		<- Evaluation unit sends the result of the configuration request	If configuration not OK: > Evaluation unit sends "DIAG=01", therefore data exchange is not possible. New configuration must be sent by the host.

Data exchange with "request -> response" relationship (1)

D	Read "UID" ->		Data exchange mode
		<- Read UID	

Data exchange with automatic response of the evaluation unit (2)

D1	Receive "UID" ->		Data exchange mode (2)
		<- Send UID data	
...			
D2	-		Input data is sent by the host without writing
		<- Send UID data	
...			
D3	-		Input data is sent by the host without writing
		<- Send UID data	

Port closed

E	Close connection		
		Close connection on request of the host	

(1) Available for all channel modes

(2) Available in the channel modes RWH_RW: "Read UID", "read user data of the ID tag", "receive inputs"

12 Binary protocol of the evaluation unit

The binary protocol of the evaluation unit is transferred within the user data field of the TCP/IP connection.

12.1 Telegram format of the evaluation unit

Request sent by the controller (controller -> evaluation unit):

Byte	Contents	Remark
0..7	Command header	→ 12.2.1 General description of the command request
8..47	Parameters of a telegram	→ 12.3 Parameters of a telegram
or		
8..151	Data exchange telegram	→ 12.4 Data exchange telegram

Response sent by the evaluation unit (evaluation unit -> controller):

Byte	Contents	Remark
0..7	Command header	→ 12.2.1 General description of the command request
8..151	Parameters of a telegram or Data exchange telegram	→ 12.3 Parameters of a telegram or → 12.4 Data exchange telegram

The telegram format for parameter and data exchange of the evaluation unit is identical.

12.2 Set-up of the data communication

After the controller has established the TCP/IP connection, the parameters of the evaluation unit are set first. The controller can then change the evaluation unit into the "data exchange" mode (→ 11.5 Ethernet TCP/IP model of the RFID evaluation unit).

12.2.1 General description of the command request

Controller -> evaluation unit:

Byte	Contents	Remark
0	Function code 0x1	"Write configuration" mode
	Function code 0x2	"Data exchange" mode
1..7	Reserved	Reserved for future use, should be set to 0x00

A reconfiguration is only allowed if the evaluation unit is in the "data exchange" mode and the TCP/IP connection was closed and opened again.

12.2.2 General description of the command response

Evaluation unit -> controller:

Byte	Contents	Remark
0	Mirroring of the function code	Mirroring of the function code of the request sent by the controller.
1..3	Reserved	For future use. Has to be set to 0x00.
4..7	Status (1)	Status of the "write configuration" mode. 0x0F000000 Application ready -> Change to “data exchange” mode possible 0x0F000001 Application not ready -> Change to "data exchange" mode requested, but configuration is not confirmed by the evaluation unit 0x0F000101 Mode not allowed -> A new "write configuration" request was done but the evaluation unit expects to change to the "data exchange" mode because a valid configuration is already set. Solution: First change to the "data exchange" mode and then send a new "write configuration" request. 0x0F000102 Mode invalid -> A mode other than "write configuration" and "data exchange" was requested by the user. Function code is not 0x1 or 0x2. 0x0F000200 Parameter of the evaluation unit invalid -> Please check the settings of the "global parameter of the evaluation unit" and the "channel parameter" 0x0F000201 Reconfiguration failed -> Reconfiguration not possible (internal error)

(1) The status is a DWORD. Depending on the controller system, it may be displayed in reverse order. Example: 0x0F000101 is transferred via TCP/IP with "01 01 00 0F".

12.3 Parameters of a telegram

Request "Write configuration" (controller -> evaluation unit):

Byte	Contents	Remark
0..7	Command header	→ 12.2.1 General description of the command request
8..15	Global parameters of the evaluation unit	→ 12.3.1 Coding of the global parameters of the evaluation unit
16..23	Channel parameter Ch1 of the evaluation unit	→ 12.3.2 Coding of the channel parameters of the evaluation unit
24..31	Channel parameter Ch2 of the evaluation unit	
32..39	Channel parameter Ch3 of the evaluation unit	
40..47	Channel parameter Ch4 of the evaluation unit	

Response in the "write configuration" mode (evaluation unit -> controller):

Byte	Contents	Remark
0..7	Command header	→ 12.2.2 General description of the command response
8..151	Set to 00h	not used

12.3.1 Coding of the global parameters of the evaluation unit

Byte offset	Contents	Remark
0..7	Command header	→ 12.2.1 General description of the command request
8	Failsafe mode (default: off)	Failsafe mode = off: If the connection to the controller is lost, all IO channels are deactivated. Failsafe mode = on: If the connection to the controller is lost, the IO channels hold the status set by the controller and the outputs C/Qo hold the last status set by the controller.
9	Reserved	Future use
10	Reserved	Future use
11	Control register 1 for all 4 output drivers	Default value: 0x00 This value forces the evaluation unit to use the default settings of the firmware (1)
12	Control register 2 for all 4 output drivers	Default value: 0x00 This value forces the evaluation unit to use the default settings of the firmware (1)
13..15	Reserved	-

(1) In standard applications the default values can be used.

12.3.2 Coding of the channel parameters of the evaluation unit

The four channels of the evaluation unit have the same data structure.

byte (name)	Contents	Remark
N+0 (CN)	Number channel IO-x [01h..04h]	Used for channel separation
N+1 (CC)	Channel configuration [01h,02h,03h,0Bh]	Used for settings of the channel mode 01h for the INACTIVE mode (32 bytes In/Out) 02h for the INPUT mode (32 bytes In/Out) 03h for the OUTPUT mode (32 bytes In/Out) 04h..0Ah reserved 0Bh for the RWH_RW mode (32 bytes In/Out)
N+2 (DH)	Data hold time [00h..FFh] in 10 x milliseconds Default setting: 0 ms	Hold time I/Q, UID, TP bits
N+3 (TL)	Block length of the ID tag [1,2,4,8,16,32,64,128,255] Default: 4 bytes	-
N+4.0 (OL)	Overload detection [01h=on / 00=off] Default setting: on	Overload at output L+ > 500 mA Only valid for the channel configuration "output" mode
N+4.1 (OC)	Overcurrent detection [on/off] Default setting: on	Overcurrent at output C/Qo > 500 mA
N+4.2	Reserved for future use	-
N+4.3 (TD)	TP bit delayed [01h=on / 00=off] Default setting: off	TP bit and UID data within the module RWH_RW are held for the time set in the DH byte. Note: Data hold time has no effect if data is read from the user area of the ID tag.
N+5.. N+7 (-)	Reserved for future use	-

Channel 1: N = 08 (end of data at byte 43)

Channel 2: N = 44 (end of data at byte 79)

Channel 3: N = 80 (end of data at byte 115)

Channel 4: N = 116 (end of data at byte 151)

Example → 14.1 Send configuration

12.4 Data exchange telegram

12.4.1 Contents of the data exchange telegram

The following modules can be transferred within the "data exchange" mode.

Module name	**Function**
Inactive	Switch the IO channel of the evaluation unit to the inactive mode.
Input	Switch the IO channel of the evaluation unit to the input mode. Two IEC61131 inputs C/Qi and I/Q can be read.
Output	Switch the IO channel of the evaluation unit to the output mode. One IEC61131 output C/Qo can be set and one IEC61131 input I/Q can be read.
RWH_RW	Switch the IO channel of the evaluation unit to the RFID communication mode. There are 3 modes to access the read/write head: - read UID of the ID tag - read the user data area of the ID tag - write the user data of the ID tag Note: The diagnostic information can be read via every module.

Command request of the controller in the "data exchange" mode (controller -> evaluation unit):

Byte	Contents	Remark
0..7	Command header	→ 12.2.1 General description of the command request
8..43	Data exchange request channel 1	→ 12.4.1 Contents of the data exchange telegram
44..79	Data exchange request channel 2	
80..115	Data exchange request channel 3	
116..151	Data exchange request channel 4	

Command response of the evaluation unit in the "data exchange" mode (evaluation unit -> controller):

Byte	Contents	Remark
0..7	Command header	→ 12.2.1 General description of the command request
8..43	Data exchange response channel 1	→ Command response of the evaluation unit in the "data exchange" mode (evaluation unit -> controller):
44..79	Data exchange response channel 2	
80..115	Data exchange response channel 3	
116..151	Data exchange response channel 4	

Examples → 14 Examples of the telegram of the binary protocol

13 Functional description of the binary protocol

13.1 Overview of the available modules

Module	Module identifier	IO-n hardware mode	Remark
Inactive (36 byte In/Out)	01h	Off (Hi-Z C/Qo, C/Qi and I/Q)	High impedance
Input (36 bytes In/Out)	02h	Input (input C/Qi and I/Q active)	IEC61131 input
Output (36 bytes In/Out)	03h	Output (output C/Qo and input I/Q active)	IEC61131 output
reserved	04h..0Ah	Reserved	-
RWH_RW (36 Byte In/Out)	0Bh	UART (communication mode ID-Link)	Command channel

The defined module length of the module identifiers 01h, 02h, 03h and 0Bh is 36 bytes.
36-byte In => length per module within the process input image of the controller.
36-byte Out => length per module within the process output image of the controller.

13.2 Detailed module description

13.2.1 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.

Process output image of the controller (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							
...	...							
35	0x00							
36	0x00							

Description byte 1 "control byte 1"

Bit	Value	Meaning	Remark
DR (1)	0	No read request	Data bytes 2..36 of the process input image of the controller are set to 0x00
	0 -> 1	Read diagnostics of the evaluation unit	-
	1	Read request of the diagnostics activated	DR must be held on 1 until the diagnostics response is available

(1) Diagnostics of the evaluation unit is only available if bit "Diag" is set within the command response.

Description bytes 2..36

Not used. Has to be set to 0x00 within the process output image of the controller.

Process input image of the controller (module "inactive")

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Diag	DR-RDY	0	0	0	0	0	0
2	0x00 / number of diagnostic messages							
3	0x00 / Function_Num							
4	0x00 / Error_Decode							
5	0x00 / Error_Code_1							
6	0x00 / Error_Code_2							
...	...							
36	not used							

Description byte 1 "status byte"

Bit	Value	Meaning	Remark
DR-RDY	0	Reading not started or evaluation unit diagnostic data not ready	-
	1	Read diagnostics ready	Diagnostics read response of the evaluation unit is ready and available in bytes 2..n.
Diag	0	No diagnostics available	-
	1	Diagnostics of the evaluation unit done	The command response is not influenced by setting the diagnostic bit.

Description byte 2 "number of diagnostic messages"

Number of diagnostic messages. A message contains Func_Num, Error_Decode, Error_Code_1, Error_Code_2. (0 = no diagnostics, 1..4 = 1..4 diagnostic message(s)).

Description bytes 3..n

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

If more than one diagnostic message is available, all will be transferred. Up to 4 diagnostic messages can be transferred (→ 14 Examples of the telegram of the binary protocol).

Description bytes (n+1)..36

Is set to the default value 0x00 by the evaluation unit.

13.2.2 Module "input"

This module allows the user to

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

Process output image of the controller (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							
...	...							
35	0x00							
36	0x00							

Description byte 1 "control byte 1"

Bit	Value	Meaning	Remark
DR (1)	0	No read request	Data bytes 2..36 of the process input image of the controller are set to 0x00
	0 -> 1	Read diagnostics of the evaluation unit	-
	1	Read request of diagnostics activated	DR must be held on 1 until the diagnostics response is available

(1) Diagnostics of the evaluation unit is only available if bit "Diag" is set within the command response.

Description bytes 2..36

Not used. Has to be set to 0x00 within the process output image of the controller.

Process input image of the controller (module "input")

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Diag	DR-RDY	0	0	OL	0	I/Q (1)	C/QI (1)
2	0x00 / number of diagnostic messages							
3	0x00 / Function_Num							
4	0x00 / Error_Decode							
5	0x00 / Error_Code_1							
6	0x00 / Error_Code_2							
...	...							
36	not used							

(1) Diagnostics of the evaluation unit is only available if bit "Diag" is set within the command response.

Description byte 1 "status byte"

Bit	Value	Meaning	Remark
C/Qi (1)	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
I/Q (1)	0	Input voltage at I/Q < 8 V	Level of I/Q is measured by hardware
	1	Input voltage at I/Q > 11 V	Level of I/Q is measured by hardware
OL	0	L+ OK	Set by hardware
	1	Overload on L+	Set by hardware
DR-RDY	0	Reading not started or evaluation unit diagnostic data not ready	-
	1	Read diagnostics ready	Diagnostics read response of the evaluation unit is ready and available in bytes 2..5
Diag	0	No diagnostics available	-
	1	Diagnostics of the evaluation unit done	The command response is not influenced by setting the diagnostic bit.

(1) Diagnostics of the evaluation unit is only available if bit "Diag" is set within the command response.

Description byte 2 "number of diagnostic messages"

Number of diagnostic messages. A message contains Func_Num, Error_Decode, Error_Code_1, Error_Code_2. (0 = no diagnostics, 1..4 = 1..4 diagnostic message(s)).

Description bytes 3..n

If bit “DR-RDY” within the status byte is set, the following data contains the error codes of the evaluation unit. Otherwise, the evaluation unit sets this data to the default value 0x00.

If more than one diagnostic message is available, up to 3 more diagnostic messages will also be transferred. (→ 14 Examples of the telegram of the binary protocol).

Description bytes (n+1)..36

Is set to the default value 0x00 by the evaluation unit.

13.2.3 Module "Output"

This module allows the user to

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

Process output image of the controller (module "output")

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	DR	0	0	0	HC	0	C
2	0x00							
3	0x00							
...	...							
35	0x00							
36	0x00							

Description byte 1 "control byte 1"

Bit	Value	Meaning	Remark
C	0	Output C/Qo set to 0	-
	1	Output C/Qo set to 1	-
HC	0	Allow high-side output current of max. 0.5 A at C/Qo	Bit HC only valid on channel IO-3 and channel IO-4
	1	Allow high-side output current of max. 1 A at C/Qo	Bit HC only valid on channel IO-3 and channel IO-4
DR (1)	0	No read request	Data bytes 2..36 of the process input image of the controller are set to 0x00
	0 -> 1	Read diagnostics of the evaluation unit	-
	1	Read request of diagnostics activated	DR must be held on 1 until the diagnostics response is available

(1) Diagnostics of the evaluation unit is only available if bit "Diag" is set within the command response.

Description bytes 2..36

Not used. Has to be set to 0x00 within the process output image of the controller.

Process input image of the controller (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 messages							
3	0x00 / Function_Num							
4	0x00 / Error_Decode							
5	0x00 / Error_Code_1							
6	0x00 / Error_Code_2							
...	...							
36	not used							

Description byte 1 "status byte"

Bit	Value	Meaning	Remark
C/Qi	0	Input voltage at C/Qo = L	The level at input C/Qi is not measured but taken from the output value at C/Qo.
	1	Input voltage at C/Qo = H	The level at input C/Qi is not measured but taken from the output value at C/Qo.
I/Q	0	Input voltage at I/Q < 8 V	The level at input I/Q is measured by the evaluation unit.
	1	Input voltage at I/Q > 11 V	The level at input I/Q is measured by the evaluation unit.
HC	0	Current of max 0.5 A activated at C/Qo	-
	1	Current of max 1 A activated at C/Qo	Only valid on channels IO-3 and IO-4
OL	0	L+ OK	Set by hardware
	1	Overload on L+	Set by hardware
DR-RDY	0	Reading not started or evaluation unit diagnostic data not ready	-
	1	Read diagnostics ready	Diagnostics read response of the evaluation unit is ready and available in bytes 2..5
Diag	0	No diagnostics available	-
	1	Diagnostics of the evaluation unit done	The command response is not influenced by setting the diagnostic bit.

Description byte 2 "number of diagnostic messages"

Number of diagnostic messages. A message contains Func_Num, Error_Decode, Error_Code_1, Error_Code_2. (0 = no diagnostics, 1..4 = 1..4 diagnostic message(s)).

Description bytes 3..n

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

If more than one diagnostic message is available, up to 3 more diagnostic messages will also be transferred. (→ 14 Examples of the telegram of the binary protocol).

Description bytes (n+1)..36

Is set to the default value 0x00 by the evaluation unit.

13.2.4 Module RWH_RW

This module allows the user to

- read the UID of the ID tag via the read/write head at the process interfaces IO-1 .. IO-4.
- read the user data area of the ID tag via the read/write head at the process interfaces IO-1..IO-4.
- write to the user data area of the ID tag via the read/write head at the process interfaces IO-1..IO-4.
- read the diagnostic information of the evaluation unit and of the process interfaces IO-1 .. IO-4.

Process output image of the controller (RWH RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Res	DR	ER	UR	RD	WR	AO	Res
2	Data byte 1							
3	Data byte 2							
...	...							
35	Data byte 31							
36	Data byte 32							

Description byte 1 "control byte 1"

Bit	Bit name	Bit = 1	Bit = 0
0	Res	Reserved	
1	AO	Request "Deactivate HF field of the read/ write head"	Request "Activate HF field of the read/ write head"
2	WR	Write data to the user data area of the ID tag	No command
3	RD (1)	Read data from the user data area of the ID tag or receive UID controlled by message	No command
4	UR (2)	"Access to the user data area of the ID tag" mode selected	"Read UID of the ID tag" mode selected
5	ER (3)	"Message-controlled reception of the UID" mode selected	"Receive UID on request" mode selected
6	DR	Reading the diagnostics of the evaluation unit set by the controller to fetch the diagnostics, indicated by the evaluation unit in the Diag status bit	No command
7	Res	reserved	

(1) Bit must be set depending on the mode of bits UR and ER

(2) If the mode is changed, the data is set to the default value 0x00 within the process data image. The successful mode change is evaluated with bit UD within byte 1 of the process data image.

(3) If bit ER and bit RD are set to 1, an automatic reading process of the UID starts when an ID tag is detected. The controller receives the UID if the status of the ID tag changes from "not present" to "present" and from "present" to "not present" without sending a request to the evaluation unit. This helps to reduce the requests sent by the controller, thus reducing Ethernet traffic.

Bits WR, RD, DR are edge-controlled bits. The change from status "0->1" activates the command request. The status "1" forces the evaluation unit to hold the command response. The status "0" forces the evaluation unit to set the data to the default value "0x00" within the process input image of bytes 2..36.

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

Description bytes 2..36 "data bytes 1..32"

Depending on the selected mode, this data area contains command data to be sent to the evaluation unit.

Process input image of the controller (RWH RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Diag	DR-RDY	EA	UD	RD-RDY	WR-RDY	AI	TP
2	Data byte 1							
3	Data byte 2							
...	...							
35	Data byte 31							
36	Data byte 32							

Description byte 1 "status byte"

Bit	Bit name	Bit = 1	Bit = 0
0	TP	No ID tag	No ID tag
1	AI	**The HF field of the read/write head is disabled.**	**The HF field of the read/write head is enabled.**
2	WR-RDY	Write data to the user data area of the ID tag ready	No command started or "Write data to user data area of the ID tag" not ready or error occurred.
3	RD-RDY (1)	Read data from the user data area of the ID tag ready or UID is sent by the evaluation unit if the ID tag status changes	No command started or "read data from the user data area of the ID tag" not ready or error occurred.
4	UD	"Access to the user data area of the tag" mode active	"Read UID of the tag" mode activated
5	EA	"Receive UID on change of message" mode active	"Read UID on request" mode activated
6	DR-RDY	Response to the reading of the diagnostic data of the evaluation unit is ready and available in the response buffer. Coding: Byte 2: number of diagnostic messages Byte 3: Function_Num, Byte 4: Error_Decode, Byte 5: Error_Code_1, Byte 6: Error_Code_2 (2) Byte 7: …	Reading not started or evaluation unit diagnostic data not ready
7	Diag	Diagnostics of the evaluation unit done but not yet written in the response buffer. The response buffer still contains ID tag data. The diagnostic data will be copied to the response buffer after detection that the DR control bit is set by the controller	No diagnostics available

(1) Bit set depending on the selected mode by setting UD or EA.

(2) For coding of the diagnostic message see tables 1..7.

Description bytes 2..36 "data bytes 1..32"

Depending on the selected mode, this data area contains the command response or diagnostic information read by the evaluation unit.

13.2.5 "Read UID of the tag" mode

In this mode, the controller can read the UID of the ID tag. Two different read modes are possible:

- Read UID on request
- Receive UID whenever the evaluation unit detects a change of the UID data

Process output image of the controller (RWH RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	DR (3)	ER	UR = 0 (1)	RD (2)	0	AO	0
2	not used							
...	...							
36	not used							

Description byte 1 "control byte 1"

Bit	Value	Meaning	Remark
AO	0	Request "Activate HF field of the read/ write head"	
	1	Request "Deactivate HF field of the read/ write head"	
RD (2)	0	No UID read request	UID length/data is deleted in the data bytes 2..36 of the process input image of the controller
	1	UID read request	RD must be held on 1 to read the UID. The UID length/data is transmitted in the data bytes 2..36 of the process input image of the controller
UR (1)	0	"Read UID" mode selected	Must be set to 0 for reading the UID of the ID tag (default value)
ER (2) (4)	0	"Read UID on request" mode selected	Read UID once after request is sent by the controller
	1	"Receive UID on change" mode selected	See (4)
DR (3)	0	No read request	Data bytes 2..36 of the process input image set to 0x00
	0 -> 1	Read diagnostics of the evaluation unit	-
	1	Diagnostics read request activated	DR must be held on 1 until the command response is available

(1) The mode can always be changed if the bits DR, RD and WR are set to 0 => no command active.

(2) The bit RD is only evaluated if bit UR is set to 0. Simultaneous activation of the bits DR and ER is not allowed!

(3) Reading of the diagnostics is only possible if ER and RD are set to 0. The evaluation diagnostics is only available if bit "Diag" is set within the command response. Otherwise, the command response returns the default data “0x00” within bytes 2..36 of the command response.

(4) If bits ER and RD are set to 1, a reading process of the UID is started when a change of bit TP is detected. So the user only receives a message from the evaluation unit if the status of the ID tag changes from “not present" to "present” and from "present" to "not present”. This helps to limit the read requests of the controller. In addition, the Ethernet data traffic is reduced.

Description byte 1 “control byte” is set to the default value 0x00. Mode: Read UID on request, enable HF field of the read/write head

PLC process input image of the controller (RWH RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Diag	DR-RDY	EA	UD=0	RD-RDY (1)	0	AI	TP
2	UID data length read							
3	UID data byte 1 (MSBy)							
4	UID data byte 2							
...	...							
18	UID data byte 16							
...	...							
35	0x00							
36	0x00							

Description byte 1 "status byte"

Bit	Value	Meaning	Remark
TP	0	No ID tag detected in front of the antenna	-
	1	ID tag detected in front of the antenna	The bit is set until the ID tag is detected by the read/write head irrespective of the setting of the channel parameter "data hold time".
AI	0	HF field of the read/write head is activated	-
	1	HF field of the read/write head is deactivated	-
RD-RDY (1)	0	UID reading stopped	UID length/data is deleted in data bytes 2..36 of the process input image of the controller.
	1	UID reading started	Every time the TP bit changes, the UID length/data is transmitted in data bytes 2..18 of the process input image of the controller.
DU	0	"Read UID" mode active	Feedback of the selected mode
EA (1)	0	"Read UID on request" mode active	
	1	"Receive UID on change" mode active	
DR-RDY	0	No diagnostics read request or diagnostic data not ready	-
	1	Diagnostics read request of the evaluation unit ready	Error code: Byte 2: number of diagnostic messages Byte 3: Function_Num, Byte 4: Error_Decode, Byte 5: Error_Code_1, Byte 6: Error_Code_2 Byte 7: …
Diag	0	No error detected	.
	1	Diagnostics of the evaluation unit available	

(1) Only valid if bit ER is set. The user can evaluate the detection of a new ID tag by evaluating bit TP or the byte "UID data length read".

Description byte 2 "UID data length read"

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

If the read/write head does not detect any ID tag, this data field is set to 0x00.

Description bytes 3..6/10/14/18 "UID data byte"

Read UID of the ID tag with a length of 32/64/96/128 bits. Unused bytes are set to 0x00.

If the read/write head does not detect any ID tag, this data field is set to 0x00.

Description bytes 19..36

Always set to 0x00.

13.2.6 Examples of the "read UID of the ID tag" mode

Read UID on request

Byte 1	Control byte	Comment
1	00h	Read UID of the ID tag.
		The current UID of the ID tag is received as response.
2	00h	Read UID of the ID tag.
		The current UID of the ID tag is received as response.
...	...	...

This mode is ideal if the controller knows when the ID tag is within the reading field of the antenna (→ 14.2 Read UID on request).

Receive UID automatically

Byte 1	Control byte	Comment
1	28h	Read UID of the ID tag.
		In the returned message, the default values or the current UID of the ID tag are received.
2	-	New UID data is sent as soon as the read /write head detects a change within the UID data field.
...	...	...

This mode is ideal if the controller does not know when the ID tag is within the reading field of the antenna. The evaluation unit only sends the UID data if the antenna detects a change of the ID tag status "ID tag in field"/"ID tag not in field" (→ 14.3 Read UID automatically).

13.2.7 "Read/write user data area of the ID tag" mode

In this mode, the user data area of the ID tag can be read or written to.

Process output image of the controller (RWH RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	DR (3)	0	UR (1)	RD (2)	WR (2)	AO	0
2	Read/write data length							
3	16-bit start address [D15..D8]							
4	16-bit start address [D7..D0]							
5	Not used / write data byte 1							
...	...							
36	Not used / write data byte 32							

Description byte 1 "control byte 1"

Bit	Value	Meaning	Remark
AO	0	Request "Activate HF field of the read/ write head"	
	1	Request "Deactivate HF field of the read/ write head"	
WR (2)	0	No write request	-
	0 -> 1	Request "Write user data to the ID tag"	Data bytes 5..36 are written to the ID tag
	1	Write request activated	WR must be held on 1 until the command response is available
RD (2)	0	No read request	Data bytes 2..36 of the process input image are set to 0x00
	0 -> 1	Request "Read user data of the ID tag"	-
	1	Read request activated	RD must be held on 1 until the command response is available
UR (1)	1	“Read/write user data of the ID tag” mode selected	Must be set to 1 for reading/writing the user data of the ID tag
DR (3)	0	No read request	Data bytes 2..36 of the process input image are set to 0x00
	0 -> 1	Read diagnostics of the evaluation unit	-
	1	Diagnostics read request activated	DR must be held on 1 until the command response is available

(1) Mode can always be changed if the bits DR, RD and WR are set to 0 => no command active.

(2) Simultaneous activation of the bits DR, WR and RD is not allowed! The read length and the 16-bit start address are set before bits RD or WR are activated.

(3) Diagnostics of the evaluation unit is only available if bit "Diag" is set within the command response. Otherwise, the evaluation unit will return the default data "0x00" within bytes 2..36 of the command response.

Description byte 2 "read / write data length"

Read data length or write data length, limited to a maximum number of 32 bytes.

Description bytes 3..4 "16-bit start address"

Start address of the user data area where the data is to be read or to be written to.

Description bytes 5..36 "not used / write data byte"

In the read mode, these bytes are ignored.

In the write mode, the data to be written must be copied to this data area (write data bytes 1..32).

PLC process input image of the controller (RWH RW)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Diag	DR-RDY	0	UD=1	RD-RDY	WR-RDY	AI	TP
2	Read/write data length							
3	Read data byte 1 / not used							
4	Read data byte 2 / not used							
...	...							
34	Read data byte 32 / not used							
...	...							
36	0x00							

Description byte 1 "status byte"

Bit	Value	Meaning	Remark
TP	0	No ID tag detected in front of the antenna	-
	1	ID tag detected in front of the antenna	The bit is set until the ID tag is detected by the read/write head irrespective of the setting of the channel parameter "data hold time".
AI	0	HF field of the read/write head is activated	-
	1	HF field of the read/write head is deactivated	-
WR-RDY	0	No command request detected or command execution active or error occurred	-
	1	Command execution is ready	-
RD-RDY	0	No command request detected or command execution active	The number of the read bytes and the data read in the bytes [2..17] are deleted within the process input image of the controller.
	1	Command execution is ready	**Diag bit is not set** Command execution OK. Read length / read data byte is set in the data bytes 2..17 of the process input image of the controller. **Diag bit is set** Command execution not OK. Bytes for read length / read data are set to zero.
UD	1	"Read/write user data of the ID tag" mode active	Feedback of the selected mode
DR-RDY	0	No diagnostics read request or diagnostic data not ready	-
	1	No diagnostics read request or diagnostic data not ready	Error code: Byte 2: number of diagnostic messages Byte 3: Function_Num, Byte 4: Error_Decode, Byte 5: Error_Code_1, Byte 6: Error_Code_2 Byte 7: …
Diag	0	No error detected	-
	1	Diagnostics of the evaluation unit available	Maybe a channel-dependent or channel-independent error occurred.

Description byte 2 "read / write data length"

Read data length or write data length.

Description bytes 3..36 "read data byte 1..32"

- In the write mode, these bytes are set to 0x00.
- In the read mode, this data area contains the data of the user data area of the ID tag. Unused bytes are set to 0x00.
- In the "read diagnostics" mode, this data area contains detailed error codes.

13.2.8 Examples of the "read/write to user data area of the ID tag" mode

Read "user data area of the ID tag" from the IO channel

Byte 1	Control byte	Comment
1	18h	Read "user data area"
2	10h	
3	01h	Address offset to be read from, here 102h = 514
4	02h	
5..36	00h	Reserved

As a response, the evaluation unit transmits the data of the user data area (→ 14.6 read the user data area of the ID tag).

Read "diagnostic information" from the IO channel

Byte 1	Control byte	Comment
1	40h	Read diagnostics
2..36	00h	Reserved

As a response, the evaluation unit transmits the diagnostic data (→ 14.4 Read diagnostic information).

Write data to the "user data area of the ID tag"

Byte 1	Control byte	Comment
1	14h	Control byte: read "user data area"
2	10h	As a response, the evaluation unit transfers the data of the user data area
3	01h	Address offset to be read from, here 102h = 514
4	02h	
5..36	00h	Reserved

As a response, the evaluation unit sends the diagnostic data (→ 14.7 Write the user data area to the ID tag).

Before changing to another mode, the active mode must be reset.

Example: 18h -> 10h -> 14h -> 10h -> 50h -> 18h

14 Examples of the telegram of the binary protocol

Example configuration for 2 read/write heads which are connected to the channels IO-1 and IO-2. Channel 3 and channel 4 are not connected.

To clearly distinguish the channels in the examples they are highlighted in different colours. The examples can be copied to other programs with the key combinations <CTRL>+<C> and <CTRL>+<V>.

DE

14.1 Send configuration

Command sent by the controller

010000000000000000000000000000000**010bc80403000000**020bc80403000000**030bc80403000000**
040bc80403000000

Controller: Set default parameters and select the module RWH_RW for channels IO-1...IO-4.

Response sent by the evaluation unit

010000000**0000000F**0000000000000000000000000000000

14.3 Read UID automatically

Command sent by the controller

02000000000000028000000000000000000000000000000000000000000000000000000000000000000000000000000028000000000000000000000000000000000000000000000000000000000000000000000000000000028000000000000000000000000000000000000000000000000000000000000000000000000000000028000000000000000000000000000000000000000000000000000000000000000000000000000000

Controller: UID of the ID tag automatically received on channels IO-1...IO-4.

Response sent by the evaluation unit

02000000000000f2908e00401004c5f494c000000000000000000000000000000000000000000000000000029 08e00801138ca1d7cb000000000000000000000000000000000000000000000000000080000000000000000000000000000000000000000000000000000000000000000000000000000000800000000000000000000000000000000000000000000000000000000000000000000000000000

Evaluation unit: Application ready, IO-1 and IO-2 detect a new ID tag and send UID with a length of 8 bytes; no read/write head available on IO-3 and IO-4.

...

Response sent by the evaluation unit

02000000000000f2800000000000000000000000000000000000000000000000000000000000000000000000000000 29 08e00801138ca1d7cb000000000000000000000000000000000000000000000000000000000000000000000000000000

Evaluation unit: Application ready, IO-1 detects no ID tag, IO-2 has the same data as before.

...

14.4 Read diagnostic information

Command sent by the controller

02000000000000004000000000000000000000000000000000000000000000000000000000000000000000000000000040000000000000000000000000000000000000000000000000000000000

14.6 read the user data area of the ID tag

Command sent by the controller

02000000000000001820000000000000000000000000000000000000000000000000000000000000000000000000000000
00001820000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000

Controller: Read 32-byte user data from channels IO-1 and IO-2.

Response sent by the evaluation unit

02000000000000001920000102030405060708090a0b0c0d0e0f101112131415161718191a1b1c1d1e1f00
00192000010203040506070809 0a0b0c0d0e0f101112131415161718191a1b1c1d1e1f0000800000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000

Evaluation unit: Send "read user data from channels IO-1 and IO-2", send "diagnostics available" to IO-3 and IO-4.

Command sent by the controller

02000000000000001000000000000000000000000000000000000000000000000000000000000000000000000000000000
00001000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000

Controller: Remove read request of the user data on channels IO-1 and IO-2.

Response sent by the evaluation unit

02000000000000001100000000000000000000000000000000000000000000000000000000000000000000000000000000
00001100000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000

Evaluation unit: Acknowledge removal of the read request of the user data, send "diagnostics available" to IO-3 and IO-4.

Use the following string to read the diagnostic data in the "read user data area of the ID tag" mode:

Command sent by the controller

02000000000000005000000000000000000000000000000000000000000000000000000000000000000000000000000000
00005000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000

Controller: Read diagnostic information on channels IO-1 and IO-2.

14.7 Write the user data area to the ID tag

Command sent by the controller

02000000000000001420004 0bbbbbbbb0000000000000000000000000000000000000000000000000000000000000
00001410000 0bbbbbbbb0000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000

Controller: Write 20h = 32 bytes at the address offset 40h = 64 to the user data area of the ID tag on channel IO-1, write 10h = 16 bytes at the address offset 00h to the user data area of the ID tag on channel IO-2, no command request on IO-3 and IO-4.

Response sent by the evaluation unit

02000000000000f11000000000000000000000000000000000000000000000000000000000000000000000000000011000000000000000000000000000000000000000000000000000000000

15 ASCII protocol of the evaluation unit

The ASCII protocol of the evaluation unit is transferred within the user data field of the TCP/IP connection.

15.1 ASCII commands

The following ASCII commands are available:

Command	Interface	Designation	Description
AN		Antenna On/Off	Deactivation of the transmitter of the read/write head
CI		Configure IO channel	Configuration of the IO channel of the unit
CU		Configure Ident unit	Configuration of the unit
DI		Read Diag	Reading of the diagnostic information of the unit
DR		Device Reset	Rebooting unit
GA	HF	Get AFI	Reading of the AFI information of the ID tag
GB	HF	Get Blocks Locked	Reading of the blocked data blocks of the ID tag
GD	HF	Get DSFID	Reading of the DSFID information of the ID tag
GG		Get BargraphState	Reading of the status of the bar graph display of the unit
GI		Read IO channel configuration (actual active configuration)	Reading of the IO channel configuration of the unit
GL	HF	Get ListHFPowerLevels	Reading of the adjustable HF transmission level of the read/write head
GM		Get MACAddress	Reading of the Ethernet MAC address of the unit
GP	HF	Get CurrentHFPowerLevel	Reading of the set HF transmission level of the read/write head
GU		Get IdentUnitconfiguration	Reading of the set configuration of the unit
IC		IDLINK_CMD	Sending of an IDLINK command
LA	HF	Set AFILocked	Protect AFI information of the ID tag against overwriting
LD	HF	Set DSFIDLocked	Protect DSFID information of the ID tag against overwriting
RA		Read all inputs	Reading of the IEC inputs of the unit
RD	HF	ReadUser	Reading of the user data of the ID tag
RE	HF	ReadIpERP	Reading of the IP address of the ERP server
RI		ReadIP	Reading of the IP address of the unit
RS	HF	ReadUID_RSSI	Reading of the RSSI value of the ID tag
RU	HF	ReadUID	Reading of the UID information of the ID tag
SA	HF	SetAFI	Setting of the AFI data information of the ID tag
SB	HF	SetBlocksLocked	Protection of the data blocks of the ID tag against overwriting
SD	HF	SetDSFID	Setting of the DSFID data information of the ID tag
SG		SetBargraphState	Setting of the bar graph display of the read/write head
SI	HF	SetI DTAG	Writing to the data blocks of the ID tag
SL		SET LED	Setting of the status LED of the unit
SP		Set HFPowerLevel	Setting of the HF transmission power of the read/write head
TU	HF	Transmit User	Dynamic description of the data blocks of the ID tag
WE	HF	Write Ip ERP	Setting of the IP address of the ERP server
WI v4a		Write IP	Setting of the IP address of the unit
WO		WRITE_OUTPUT	Setting of the IEC outputs of the IO channel
WR	HF	Write User	Writing to the user data of the ID tag
WV	HF	Write Verified	Writing to the user data of the ID tag and verifying
XA		Receive all inputs	Dynamic reading of the IEC inputs of the unit
XD	HF	ReceiveUser	Dynamic reading of the user data of the ID tag
XR	HF	Receive UID RSSI	Dynamic reading of the UID / RSSI information of the unit
XU	HF	Receive UID	Dynamic reading of the UID information of the unit

"HF" interface: The command is only available for the units with RFID HF interface.

15.2 ASCII data telegram format of the evaluation unit

15.2.1 Request sent by the host

Character no.	Contents	Remark
01..04	Ticket number [0001 .. 9999]	The ticket number is a unique identifier the host can send to the evaluation unit (1). It enables the host to check if the response of the evaluation unit refers to the command. "0000" is reserved and cannot be used.
05	Separator [_]	Default setting: "_" = 0x5F (2)
06..09	Frame length [0003..nnnn]	The frame length describes the total telegram length, including the end-of-line characters. Indication in decimal coding. (1)
10	Separator [_]	Default setting: "_" = 0x5F (2)
11..12	Command code [CU,CI,RU,RI ...]	Command code with 2 characters (→ 15.1 ASCII commands)
13	Separator [_]	Default setting: "_" = 0x5F (2)
14..nn	Command data [XX..XX]	Command data (→ 15.3 Set-up of the data communication)
nn+1..nn+2	End-of-line characters <CR/LF>	The end-of-line characters 0xD, 0xA must be sent with each command.

(1) Ticket number and telegram length must be sent together in the command request. It is allowed to omit these and send the command request beginning with the "command code".

(2) The separator can be set by the command CU.

15.2.2 Response sent by evaluation unit

Character no.	Contents	Remark
01..04	Ticket number [0001 .. 9999]	The ticket number sent by the host is mirrored by the evaluation unit (1).
05	Separator [_]	Default setting: "_" = 0x5F (2)
06..09	Frame length [XXXX]	The frame length describes the total telegram length of the response, including the end-of-line characters. Indication in decimal coding. (1)
10	Separator [_]	Default setting: "_" = 0x5F (2)
11..12	Response code [XX]	The command code sent by the host is mirrored in the response code (→ 15.3 Set-up of the data communication).
13	Separator [_]	Default setting: "_" = 0x5F (2)
14..nn	Command response [XX..XX]	Command response (→ 15.3 Set-up of the data communication)
nn+1..nn+2	End-of-line characters <CR/LF>	End-of-line characters 0xD, 0xA

(1) The ticket number and frame length are only sent by the evaluation unit if the host sent the ticket number in the command request.

(2) The evaluation unit sends the separator defined by the command "CU".

15.3 Set-up of the data communication

After the host has established the TCP/IP connection, the parameters of the evaluation unit are set.

15.3.1 Configuration of the evaluation unit

Host command:

Character no.	Contents	Remark
01..02	CU	Command code "configure evaluation unit"
03	_	Separator (underscore = 0x5F)
04..05	00	Failsafe mode [00] = If the TCP connection is closed, the IO outputs are switched off. [01] = If the TCP connection is closed, the IO outputs hold the last status before the connection was closed.
06	_	Separator (underscore = 0x5F)
07..08	00	Control register 1 of the IO output driver [00] = default value
09	_	Separator (underscore = 0x5F)
10..11	00	Control register 2 of the IO output driver [00] = default value
12	_	Separator (underscore = 0x5F)
13..14	00	Ticket number [00] = No ticket number is sent by the host. [01] = A ticket number is sent by the host.
15	_	Separator (underscore = 0x5F)
16..17	00	reserved
18	_	"Set-up of the separator". This character is used for the following communication between the host and evaluation unit. Each character of the UNICODE UTF-8 code can be set. Exception: If the character '#' = 0x23 is set, the host sends the next telegrams without any separators. The evaluation unit will then also send the response without separators.
19..20	AS	Data format [AS] = ASCII UNICODE UTF-8 code page 437 format
21..22	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

CU_01_00_00_**00**_00_AS<CR/LF>	Command without ticket number and with separators
1107_0032_CU_00_00_00_**01**_00_AS<CR/LF>	Command with ticket number and separators
CU_00_00_00_00_00.AS<CR/LF>	Command with separators set to "."
CU_00_00_00_00_00**#**AS<CR/LF>	Command with separators set to "#" -> no separator for the following data communication

- A reconfiguration of the unit is only possible after the TCP connection is closed and opened again.
- The telegram format for this command is static. The separator of the command is "_" = 0x5F.
- The configuration of the evaluation unit is read with the command "GU<CR/LF>". The response corresponds to the response of the command "CU".

Response of the evaluation unit:

Character no.	Contents	Remark
01..02	CU	Response code of the command "configure evaluation unit"
03	_	In this response, all separators are "_" = 0x5F irrespective of the setting in the field "separators".
04..05	00	Diagnostic information [00] = no diagnostic information [01] = diagnostic information available. The diagnostic information is read with the command "DI".
06	_	Separator
07..08	00	Failsafe mode [00] = If the TCP connection is closed, the IO outputs are switched off. [01] = If the TCP connection is closed, the IO outputs hold the last status before the connection was closed.
09	_	Separator
10..11	00	Control register 1 of the IO output driver [00] = default value
12	_	Separator
13..14	00	Control register 2 of the IO output driver [00] = default value
15	_	Separator
16..17	00	Acknowledge the "ticket number" mode [00] = No ticket number is sent by the host. [01] = A ticket number is sent by the host. From this moment the mode is set.
18	_	Separator
19..20	00	Reserved
21	_	Acknowledge the setting "separator set-up". From this moment this character must be sent by the host.
22..23	AS	Data format [AS] = ASCII UNICODE UTF-8 Code page 437 format
24..25	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

CU_00_00_00_00_**00**_00_AS<CR/LF>	Response without ticket number and with separators
1107_0035_CU_00_00_00_00_**01**_00_AS<CR/LF>	Response with ticket number and separators
CU_00_00_00_00_00_00.AS<CR/LF>	Response with separators set to "."
CU_00_00_00_00_00_00**#**AS<CR/LF>	Response with separators set to "**#**" -> no separators in following data communication

The separator in this response is defined in the field "definition of the separator" within the command.

15.3.2 IO channel configuration

Each channel is configured separately. Unused channels are not configured.

Host command:

Character no.	Contents	Remark
01..02	CI	Command code "configure IO channels"
03	_	The separator must be identical to the character defined in the command CU, field “separator set-up”
04..05	01	IO channel number to be configured [01..04]
06	_	Separator
07..08	11	Channel mode [01] = inactive [02] = input [03] = output [11] = RFID channel
09	_	Separator
10..13	0000	Data hold time, [milliseconds] [0000..2550]
14	_	Separator
15..17	004	Length of the ID tag block in bytes [004,008,016,032,064,128,256]
18	_	Separator
19..21	256	Number of the blocks on the ID tag -> see documentation of the ID tags [001..256]
22	_	Separator
23..24	01	Overload protection at output L+ [00] = off [01] = on (default)
25	_	Separator
26..27	01	Overcurrent protection at output C/Q0 [00] = off [01] = on (default)
28	_	Separator
29..30	00	TP bit and UID data are held for the time set in the data hold time [00] = no data hold time [01] = TP bit and UID data are held stable
31..32	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

CI_01_11_0000_004_256_01_01_00<CR/LF>	Command without ticket number and with separators
CI011100000004256010100<CR/LF>	Command without ticket number and separators
1107_0042_CI_01_11_0000_004_256_01_01_00<CR/LF>	Command with ticket number and separators
11070032CI011100000004256010100<CR/LF>	Command with ticket number and without separators

- A reconfiguration is only possible if the TCP connection is closed and opened again.
- The configuration of the IO channels can be read from the evaluation unit with the command "GI_XX<CR/LF>"; XX stands for the IO channel number. The response corresponds to the response of the command "CI".
- The possible commands which can be sent by the host depend on the preset channel mode. For more information see description of the commands (→ 15.3 Set-up of the data communication).

Response of the evaluation unit:

Character no.	Contents	Remark
01..02	CI	Response code of the command "configure IO channels"
03	_	The separator must be identical to the character defined in the command CU, field “separator set-up”
04..05	01	IO channel number to be configured [01. .04]
06	_	Separator
07..08	01	Diagnostic information [00] = no diagnostic information [01] = diagnostic information available. It can be read with the command "DI"
09	_	Separator
10..11	11	Channel mode [01] = inactive [02] = input [03] = output [11] = RFID channel
12	_	Separator
13..16	0000	Data hold time, [milliseconds] [0000..2550]
17	_	Separator
18..20	004	Length of the ID tag block in bytes [004,008,016,032,064,128,256]
21	_	Separator
22..24	256	Number of the blocks on the ID tag -> see documentation of the ID tags [001..256 [001..256]
25	_	Separator
26..27	01	Overload protection at output L+ [00] = off [01] = on (default)
28	_	Separator
29..30	01	Overcurrent protection at output C/Q0 [00] = off [01] = on (default)
31	_	Separator
32..33	00	TP bit and UID data are held for the time set in data hold time [00] = no data hold time [01] = TP bit and UID data are held stable
34..35	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

CI_01_00_11_0000_004_256_01_01_00<CR/LF>	Response without ticket number and with separators
CI0100110000004256010100<CR/LF>	Response without ticket number and separators
1107_0045_CI_01_00_11_0000_004_256_01_01_00<CR/LF>	Response with ticket number and separators
11070034CI0100110000004256010100<CR/LF>	Response with ticket number and without separators

15.3.3 Read IO channel inputs

This command is supported in the channel modes "input" and "output".

Host command:

Character no.	Contents	Remark
01..02	RA	Command code “read all inputs”
03	_	The separator must be identical to the character defined in the command CU, field “separator set-up”
04..05	01	Number of the IO channel to be read from [01..04]
06..07	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

RA_01<CR/LF>	Command without ticket number and with separators
RA01<CR/LF>	Command without ticket number and separators
1107_0017_RA_01<CR/LF>	Command with ticket number and separators
11070014RA01<CR/LF>	Command with ticket number and without separators

Response of the evaluation unit:

Character no.	Contents	Remark
01..02	RA	Response code of command “read all inputs”
03	_	The separator is identical to the character defined in the command CU in the field "separator set-up".
04..05	01	Number of the IO-channel which was read from [01..04]
06	_	Separator
07..08	00	Diagnostic information [00] = no diagnostic information [01] = diagnostic information available. It can be read with the command "DI"
09	_	Separator
10..11	00	Status of the channel input C/Qi [00] = off [01] = on
12	_	Separator
13..14	00	Status of the channel input IQ [00] = off [01] = on
15..16	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

RA_01_00_00_00<CR/LF>	Response without ticket number and with separators
RA01000000<CR/LF>	Response without ticket number and separators
1107_0026_RA_01_00_00_00<CR/LF>	Response with ticket number and separators
11070020RA01000000<CR/LF>	Response with ticket number and without separators

15.3.4 Write outputs to IO channel

This command is supported in the channel mode "output".

Host command:

Character no.	Contents	Remark
01..02	WO	Command code "write output"
03	_	The separator must be identical to the character defined in the command CU, field “separator set-up”
04..05	01	Number of the IO channel to be written to [01..04]
06	_	Separator
07..08	00	Status of channel output C/Q0 [00] = off [01] = on
09	_	Separator
10..11	00	High current active (only for channels IO-3 and IO-4 valid) [00] = off [01] = on
12..13	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

WO_01_00_00<CR/LF>	Command without ticket number and with separators
WO010000<CR/LF>	Command without ticket number and separators
1107_0023_WO_01_00_00<CR/LF>	Command with ticket number and separators
11070023WO010000<CR/LF>	Command with ticket number and without separators

Response of the evaluation unit:

Character no.	Contents	Remark
01..02	WO	Response code of the command "write output"
03	_	The separator is identical to the character defined in the command CU in the field "separator set-up".
04..05	01	Number of the IO channel [01..04]
06	_	Separator
07..08	00	Diagnostic information [00] = no diagnostic information [01] = diagnostic information available. It can be read with the command "DI"
09	_	Separator
10..11	00	Status of the channel input C/Qi [00] = off [01] = on
12	_	Separator
13..14	00	Status of the channel input IQ [00] = off [01] = on
15	_	Separator
16..17	00	Status "high current enabled" (only valid for channels IO-3 and IO-4) [00] = off [01] = on
18..19	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

WO_01_00_00_00_00<CR/LF>	Response without ticket number and with separators
WO0100000000<CR/LF>	Response without ticket number and separators
1107_0029_WO_01_00_00_00_00<CR/LF>	Response with ticket number and separators
11070022WO0100000000<CR/LF>	Response with ticket number and without separators

15.3.5 Read data from ID tag

This command is supported in the channel mode "RWH".

Host command:

Character no.	Contents	Remark
01..02	RU	Command code "read UID"
03	_	The separator must be identical to the character defined in the command CU, field “separator set-up”
04..05	01	Number of the IO channel from which is to be written [01..04]
06..07	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

RU_01<CR/LF>	Command without ticket number and with separators
RU01<CR/LF>	Command without ticket number and separators
1107_0040_RU_01<CR/LF>	Command with ticket number and separators
RU01<CR/LF>	Command with ticket number and without separators

Response of the evaluation unit:

Character no.	Contents	Remark
01..02	RU	Response code of the command "read UID"
03	_	The separator is identical to the character defined in the command CU in the field "separator set-up".
04..05	01	Number of the IO channel from which is to be written [01..04]
06	_	Separator
07..08	00	Diagnostic information [00] = no diagnostic information [01] = diagnostic information available. It can be read with the command "DI"
09	_	Separator
10..11	08	Length of the UID read from the ID tag (example) [Bytes]
12	_	Separator
13..28	0FE0A23C4A5612CE	UID read from the ID tag (example). In case of a fault, the value is set to "0000".
nn+1..nn+2	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

RU_01_00_08_0FE0A23C4A5612CE<CR/LF>	Response without ticket number and with separators
RU0100080FE0A23C4A5612CE<CR/LF>	Response without ticket number and separators
1107_0040_RU_01_00_08_0FE0A23C4A5612CE<CR/LF>	Response with ticket number and separators
11070034RU0100080FE0A23C4A5612CE<CR/LF>	Response with ticket number and without separators

15.3.6 Receive UID from the ID tag automatically

This command is supported in the channel mode "RWH".

Host command:

Character no.	Contents	Remark
01..02	XU	Command code "receive UID automatically"
03	_	The separator must be identical to the character defined in the command CU, field “separator set-up”
04..05	01	Number of the IO channel to be written to [01..04]
06..07	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

XU_01<CR/LF>	Command without ticket number and with separators
XU01<CR/LF>	Command without ticket number and separators
1107_0017_XU_01<CR/LF>	Command with ticket number and separators
11070014XU01<CR/LF>	Command with ticket number and without separators

Response of the evaluation unit:

Character no.	Contents	Remark
01..02	XU	Response code of the command "receive UID automatically"
03	_	The separator is identical to the character defined in the command CU in the field "separator set-up".
04..05	01	Number of the IO channel from which is to be written [01..04]
06	_	Separator
07..08	00	Diagnostic information [00] = no diagnostic information [01] = diagnostic information available. It can be read with the command "DI"
09	_	Separator
10..11	08	Length of the UID read from the ID tag (example) [Bytes]
12	_	Separator
13..nn	0F..CE	UID read from the ID tag (example)
nn+1..nn+2	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

XU_01_00_08_0FE0A23C4A5612CE<CR/LF>	Response without ticket number and with separators
XU0100080FE0A23C4A5612CE<CR/LF>	Response without ticket number and separators
1107_0040_XU_01_00_08_0FE0A23C4A5612CE<CR/LF>	Response with ticket number and separators
11070034XU0100080FE0A23C4A5612CE<CR/LF>	Response with ticket number and without separators

With this command, a host can see when there is an ID tag within the reading field of the read/write head. The evaluation unit only sends the UID data if the read/write head detects a change of the ID tag status "ID tag in field"/ "ID tag not in field".

Examples

Host request	Command response of the evaluation unit	IO channel status
XU_01<CR/LF>	XU_01_00_00<CR/LF>	no ID tag detected
<none>	XU_01_00_04_023A324E<CR/LF>	ID tag detected
<none>	XU_01_00_00<CR/LF>	no ID tag detected
<none>	XU_01_00_08_0FE0A23C4A5612CE<CR/LF>	new ID tag detected

15.3.7 Read user data of the ID tag

This command is supported in the channel mode "RWH".

Host command:

Character no.	Contents	Remark
01..02	RD	Command code "read user data"
03	_	The separator must be identical to the character defined in the command CU, field “separator set-up”
04..05	01	Number of the IO channel to be read from [01..04]
06	_	Separator
07..11	00100	Start address from which the ID tag is read (example). The possible length is indicated in the data sheet of the ID tag.
12	_	Separator
13..16	0008	Number of characters read from the ID tag (example). The possible length is indicated in the data sheet of the ID tag.
17..18	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

RD_01_00100_0012<CR/LF>	Command without ticket number and with separators
RD010010000012<CR/LF>	Command without ticket number and separators
1107_0028_RD_01_00100_0012<CR/LF>	Command with ticket number and separators
11070023RD01001000012<CR/LF>	Command with ticket number and without separators

Response of the evaluation unit:

Character no.	Contents	Remark
01..02	RD	Response code of the command "read user data"
03	_	The separator is identical to the character defined in the command CU in the field "separator set-up".
04..05	01	Number of the IO channel to be written to [01..04]
06	_	Separator
07..08	00	Diagnostic information [00] = no diagnostic information [01] = diagnostic information available. It can be read with the command "DI"
09	_	Separator
10..14	00100	Start address where data was read (example)
15	_	Separator
16..19	0008	Number of characters read
20..27	_	Separator
28..nn	Plant A12B	Characters read from the ID tag (example)
nn+1..nn+2	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

RD_01_00_08_PLANT A12B<CR/LF>	Response without ticket number and with separators
RD010008PLANT A12B<CR/LF>	Response without ticket number and separators
1107_0032_RD_01_00_08_PLANT A12B<CR/LF>	Response with ticket number and separators
11070028RD010008PLANT A12B<CR/LF>	Response with ticket number and without separators

15.3.8 Receive user data of the ID tag

This command is supported in the channel mode "RWH".

Host command:

Character no.	Contents	Remark
01..02	XD	Command code "receive user data"
03	_	The separator must be identical to the character defined in the command CU, field “separator set-up”
04..05	01	Number of the IO channel to be read from [01..04]
06	_	Separator
07..11	00100	Start address from which the ID tag is read (example). The possible length is indicated in the data sheet of the ID tag.
12	_	Separator
13..16	0008	Number of characters read from the ID tag (example). The possible length is indicated in the data sheet of the ID tag.
17..18	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

XD_01_00100_0008<CR/LF>	Command without ticket number and with separators
XD010010000008<CR/LF>	Command without ticket number and separators
1107_0028_XD_01_00100_0008<CR/LF>	Command with ticket number and separators
11070023XD01001000008<CR/LF>	Command with ticket number and without separators

Response of the evaluation unit:

Character no.	Contents	Remark
01..02	XD	Response code of the command "receive user data"
03	_	The separator is identical to the character defined in the command CU in the field "separator set-up".
04..05	01	Number of the IO channel to be written to [01..04]
06	_	Separator
07..08	00	Diagnostic information [00] = no diagnostic information [01] = diagnostic information available. It can be read with the command "DI".
09	_	Separator
10..14	00100	Start address where data was read (example)
15	_	Separator
16..19	0008	Number of characters read (example)
20	_	Separator
21..nn	PLANT A12B	Characters read from the ID tag (example)
nn+1..nn+2	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

XD_01_00_08_PLANT A12B<CR/LF>	Response without ticket number and with separators
XD010008PLANT A12B<CR/LF>	Response without ticket number and separators
1107_0032_XD_01_00_08_PLANT A12B<CR/LF>	Response with ticket number and separators
11070028XD010008PLANT A12B<CR/LF>	Response with ticket number and without separators

With this command, a host can see when there is an ID tag within the reading field of the read/write head. The evaluation unit only sends the user data if the read/write head detects a change of the ID tag status "ID tag in field"/ "ID tag not in field".

Examples

Host request	Command response of the evaluation unit	IO channel status
XD_01_00100_0008<CR/LF>	XD_01_00_00100_0000_00000000<CR/LF>	no ID tag detected
<none>	XD_01_00_00100_0008_PLANT A1<CR/LF>	ID tag detected
<none>	XD_01_00_00100_0000_00000000<CR/LF>	no ID tag detected
<none>	XD_01_00_00100_0008_MATERIAL<CR/LF>	new ID tag detected

15.3.9 Write user data of the ID tag

This command is supported in the channel mode "RWH".

Host command:

Character no.	Contents	Remark
01..02	WR	Command code "write user data"
03	_	The separator must be identical to the character defined in the command CU, field “separator set-up”
04..05	01	Number of the IO channel [01..04]
06	_	Separator
07..11	00100	Start address (example). The possible address range is indicated in the data sheet of the ID tag. [000..65535]
12	_	Separator
13..16	0008	Number of characters to be written to the ID tag (example). The possible length is indicated in the data sheet of the ID tag. [0001..1400]
17	_	Separator
18..24	Prod.015	Characters to be written to the ID tag
25..26	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

WR_01_00100_0008_Prod.015<CR/LF><CR/LF>	Command without ticket number and with separators
WR01001000008Prod.015<CR/LF><CR/LF>	Command without ticket number and separators
1107_0037_WR_01_00100_0008_Prod.015<CR/LF>	Command with ticket number and separators
11070031WR01001000008Prod.015<CR/LF>	Command with ticket number and without separators

Response of the evaluation unit:

Character no.	Contents	Remark
01..02	WR	Response code of the command "read user data"
03	_	The separator is identical to the character defined in the command CU in the field "separator set-up".
04..05	01	Number of the IO channel [01..04]
06	_	Separator
07..08	00	Diagnostic information [00] = no diagnostic information [01] = diagnostic information available. It can be read with the command "DI"
09	_	Separator
10..14	00100	Start address to which data was written (example) (1)
15	_	Separator
16..19	0008	Number of characters written to the ID tag (example) (1)
20..27	_	Separator
28..nn	Prod.015	Characters written to the ID tag (example) (1)
nn+1..nn+2	<CR/LF>	End-of-line characters 0xD, 0xA

(1) If the command was executed without any error, the start address, the number of characters and the data are returned by the evaluation unit with the values set by the host.

Examples:

WR_01_00_00100_0008_Prod.015<CR/LF>	Response without ticket number and with separators
WR0100001000008Prod.015<CR/LF>	Response without ticket number and separators
1107_0040_WR_01_00_00100_0008_Prod.015<CR/LF>	Response with ticket number and separators
11070033WR0100001000008Prod.015<CR/LF>	Response with ticket number and without separators

The characters sent by the evaluation unit are not read back by the ID tag but only mirrored back by the command.

15.3.10 Write and verify the user data of the ID tag

This command is supported in the channel mode "RWH".

Host command:

Character no.	Contents	Remark
01..02	WV	Command code "write and verify the user data"
03	_	The separator must be identical to the character defined in the command CU, field “separator set-up”
04..05	01	Number of the IO channel [01..04]
06	_	Separator
07..11	00100	Start address (example). The address range is indicated in the data sheet of the ID tag. [000..65535]
12	_	Separator
13..16	0008	Number of characters to be written to the ID tag (example). The possible length is indicated in the data sheet of the ID tag. [00..1400]
17	_	Separator
18..25	Prod.015	Characters to be written to the ID tag
26..27	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

WV_01_00100_0008_Prod.015<CR/LF><CR/LF>	Command without ticket number and with separators
WV01001000008Prod.015<CR/LF><CR/LF>	Command without ticket number and separators
1107_0037_WV_01_00100_0008_Prod.015<CR/LF>	Command with ticket number and separators
11070031WV01001000008Prod.015<CR/LF>	Command with ticket number and without separators

Response of the evaluation unit:

Character no.	Contents	Remark
01..02	WV	Response code of the command "read user data"
03	_	The separator is identical to the character defined in the command CU in the field "separator set-up".
04..05	01	Number of the IO channel [01..04]
06	_	Separator
07..08	00	Diagnostic information [00] = no diagnostic information [01] = diagnostic information available. It can be read with the command "DI"
09	_	Separator
10..14	00100	Start address to which data was written (example) (1)
15	_	Separator
16..19	0008	Number of characters written to the ID tag (example) (1)
20..27	_	Separator
28..nn	Prod.015	Characters written and read back by the ID tag (example) (2)
nn+1..nn+2	<CR/LF>	End-of-line characters 0xD, 0xA

(1) If the command could be correctly executed, the following data is sent back:

- Start address of the user memory area of the ID tag
- Number of characters written to the ID tag
- Characters which were read back from the user data of the ID tag

(2) In case of an error, the start address is set to "00000" and the number of characters is set to "0000". No characters are sent by the evaluation unit.

Examples:

WV_01_00_00100_0008_Prod.015<CR/LF>	Response without ticket number and with separators
WV0100001000008Prod.015<CR/LF>	Response without ticket number and separators
1107_0040_WV_01_00_00100_0008_Prod.015<CR/LF>	Response with ticket number and separators
11070033WV0100001000008Prod.015<CR/LF>	Response with ticket number and without separators

15.3.11 Deactivate the HF field of the read/write head

This command is supported in the channel mode "RWH".

Host command:

Character no.	Contents	Remark
01..02	AN	Command code "deactivate HF field of the read/write head"
03	_	The separator must be identical to the character defined in the command CU, field “separator set-up”
04..05	01	Number of the IO channel to be written to [01..04]
06	_	Separator
07..08	00	Activate/deactivate the HF field of the read/write head [00] = HF field off [01] = HF field on
09..10	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

AN_01_01<CR/LF>	Command without ticket number and with separators
AN0101CR/LF>	Command without ticket number and separators
1107_0020_AN_01_01<CR/LF>	Command with ticket number and separators
11070016AN0101<CR/LF>	Command with ticket number and without separators

Response of the evaluation unit:

Character no.	Contents	Remark
01..02	AN	Reply code of the command "deactivate the HF field of the read/write head"
03	_	The separator is identical to the character defined in the command CU in the field "separator set-up".
04..05	01	Number of the IO channel to be written to [01..04]
06	_	Separator
07..08	00	Diagnostic information [00] = no diagnostic information [01] = diagnostic information available. It can be read with the command "DI"
09	_	Separator
10..11	03	Number of diagnostic codes. Each code has 4 characters. [00..04]
12..13	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

AN_01_00_00<CR/LF>	Response without ticket number and with separators
AN010000<CR/LF>	Response without ticket number and separators
1107_0023_AN_01_00_00<CR/LF>	Response with ticket number and separators
11070010AN010000<CR/LF>	Response with ticket number and without separators

15.3.12 Read diagnostic information from the evaluation unit

This command is supported in the channel modes "input", "output" and "RWH".

Host command:

Character no.	Contents	Remark
01..02	DI	Command code "read diagnostics"
03	_	The separator must be identical to the character defined in the command CU, field “separator set-up”
04..05	01	Number of the IO channel to be written to [01..04]
06..07	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

DI_01<CR/LF>	Command without ticket number and with separators
DI01<CR/LF>	Command without ticket number and separators
1107_0017_DI_01<CR/LF>	Command with ticket number and separators
11070014DI01<CR/LF>	Command with ticket number and without separators

Response of the evaluation unit:

Character no.	Contents	Remark
01..02	DI	Response code of the command "read diagnostics"
03	_	The separator is identical to the character defined in the command CU in the field "separator set-up".
04..05	01	Number of the IO channel to be written to [01..04]
06	_	Separator
07..08	00	Diagnostic information [00] = no diagnostic information [01] = diagnostic information available. It can be read with the command "DI".
09	_	Separator
10..11	03	Number of diagnostic codes. Each code has 4 characters. [00..04]
12	_	Separator
13..nn	F4..00	Diagnostic code (example)
nn+1..nn+2	<CR/LF>	End-of-line characters 0xD, 0xA

Examples:

DI_01_00_03_F4FE0100F4FE0300F4FE8900<CR/LF>	Response without ticket number and with separators
DI010003F4FE0100F4FE0300F4FE8900<CR/LF>	Response without ticket number and separators
1107_0048_DI_01_00_03_F4FE0100F4FE0300F4FE8900<CR/LF>	Response with ticket number and separators
11070042DI010003F4FE0100F4FE0300F4FE8900<CR/LF>	Response with ticket number and without separators

16 Telegram examples of ASCII protocol

16.1 Send configuration for the evaluation unit and the IO channels

Command "configure evaluation unit" sent by the host

CU_01_00_00_00_00_AS<CR/LF>

Host: Set default parameters for the evaluation unit.

Response sent by the evaluation unit

CU_00_00_00_00_00_00_AS<CR/LF>

Evaluation unit: Evaluation unit ready

Command "configure channel IO-1 as RFID channel" sent by the host

CI_01_11_0000_004_256_01_01_00<CR/LF>

Host: Set channel IO-1 as RFID channel with default parameters for the ID tag

Response sent by the evaluation unit

CI_01_00_11_0000_004_256_01_01_00<CR/LF>

Evaluation unit: Writing data on channel IO-1 finished

Command "configure channel IO-2 as RFID channel" sent by the host

CI_01_11_0000_004_256_01_01_00<CR/LF>

Host: Set channel IO-2 as RFID channel with default parameters for the ID tag

Response sent by the evaluation unit

CI_01_00_11_0000_004_256_01_01_00<CR/LF>

Evaluation unit: Writing data on channel IO-2 finished

Command "configure channel IO-3 as input" sent by the host

CI_03_02_0000_000_000_01_01_00<CR/LF>

Host: Set channel IO-3 as input

Response sent by the evaluation unit

CI_03_00_02_0000_000_000_01_01_00<CR/LF>

Evaluation unit: Writing data on channel IO-3 finished

Command "configure channel IO-4 as output" sent by the host

CI_01_03_0000_000_000_01_01_00<CR/LF>

Host: Set channel IO-4 as output with default parameters

Response sent by the evaluation unit

CI_04_00_03_0000_000_000_01_01_00<CR/LF>

Evaluation unit: Writing data on channel IO-4 finished

16.2 Read UID from the ID tag

Command sent by the host

RU_01<CR/LF>

Response sent by the evaluation unit

RU_01_00_00_0000000000000000<CR/LF>

16.3 Receive UID from the ID tag

Command sent by the host

XU_01<CR/LF>

Response sent by the evaluation unit

XU_01_00_00_0000000000000000<CR/LF>

…

Response sent by the evaluation unit

XU_01_00_08_0FE0A23C4A5612CE<CR/LF>

…

Response sent by the evaluation unit

XU_01_00_00_0000000000000000<CR/LF>

16.4 Read diagnostic information from the evaluation unit

Command sent by the host

DI_01<CR/LF>

Response sent by the evaluation unit

DI_01_00_03_F4FE0100F4FE0300F4FE8900<CR/LF>

16.5 Read user data of the ID tag

Command sent by the host

RD_01_0005_0019<CR/LF>

Response sent by the evaluation unit

RD_01_00_0005_0019_ifm electronic gmbh<CR/LF>

16.6 Receive user data of the ID tag

Command sent by the host

XD_01_0005_0019<CR/LF>

Response sent by the evaluation unit

XD_01_00_00100_0000<CR/LF>

> no ID tag detected

…

Response sent by the evaluation unit

XD_01_00_0005_0019_ifm electronic gmbh<CR/LF>

> ID tag detected

…

Response sent by the evaluation unit

XD_01_00_00100_0000<CR/LF>

> no ID tag detected

16.7 Write user data of the ID tag

Command sent by the host

WR_01_0008_00034_Plant 203, Engine 3203142475, pass<CR/LF>

Response sent by the evaluation unit

WR_01_00_0008_00034_Plant 203, Engine 3203142475, pass<CR/LF>

> User data sent by the evaluation unit is mirrored by the command request.

16.8 Write and verify the user data of the ID tag

Command sent by the host

WV_01_0012_00034_Plant 203, Engine 3203142475, pass<CR/LF>

Response sent by the evaluation unit

WV_01_00_0012_00034_Plant 203, Engine 3203142475, pass<CR/LF>

> User data sent by the evaluation unit is read from the ID tag.

16.9 Read IO channel inputs

Command sent by the host

RA_03<CR/LF>

Response sent by the evaluation unit

RA_03_00_00_00<CR/LF>

16.10 Write outputs to IO channel

Command sent by the host

WO_04_00_00<CR/LF>

Response sent by the evaluation unit

WO_04_00_00_00_00<CR/LF>

16.11 Deactivate the HF field of the read/write head

Command sent by the host

AN_01_00<CR/LF>

Response sent by the evaluation unit

AN_01_00_00<CR/LF>

17 Description of the module RWH_CMD

The following functions are available:

- Detection of an ID tag in front of the read/write head.
- Control of the read/write head to activate and deactivate the HF field of the read/write head.
- Reading of the unique identifier number (UID) of the ID tag.
- Reading of the user data of the ID tag. The reading process is 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. The writing process is started via control bit “WR”. Maximum write length with one command depends on the size of the selected module.
- Write to and verify the user data of the ID tag. The verified writing process is started via the control bits “WR” and "RD". The maximum write length per command depends on the size of the selected module.
- Simple diagnostics of the IO channels of the evaluation unit.
- Simple notification of evaluation unit diagnostics.
- Remote restart of the evaluation unit

Module ID	Module name	Description	Note
0	Off (0 byte In/Out)	Spare module	There is no data
1	Inactive (20 bytes In/Out)	Cyclic transmission	High impedance
2	Input (20 bytes In/Out)	Cyclic transmission	IEC61131 input
3	Output (20 bytes In/Out)	Cyclic transmission	IEC61131 output
11	RWH_RW (20 Bytes In/Out)	Cyclic command channel	User data size 16 bytes
12	RWH_CMD (26 bytes In/Out)	Cyclic command channel	User data size 20 bytes
13	RWH_CMD (46 bytes In/Out)	Cyclic command channel	User data size 40 bytes
14	RWH_CMD (66 bytes In/Out)	Cyclic command channel	User data size 60 bytes
15	RWH_CMD (86 bytes In/Out)	Cyclic command channel	User data size 80 bytes
16	RWH_CMD (106 bytes In/Out)	Cyclic command channel	User data size 100 bytes
17	RWH_CMD (126 bytes In/Out)	Cyclic command channel	User data size 120 bytes
18	RWH_CMD (146 bytes In/Out)	Cyclic command channel	User data size 140 bytes
19	RWH_CMD (166 bytes In/Out)	Cyclic command channel	User data size 160 bytes
20	Input (2 bytes In/Out)	Cyclic command channel	User data size 2 bytes
21	Output (2 bytes In/Out)	Cyclic command channel	User data size 2 bytes

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 is set individually to one of the available modules.

Example:

Channel IO-1	Channel IO-2	Channel IO-3	Channel IO-4	Size of the PLC input/output data image [bytes]
RWH_RW (20 bytes In/Out)	RWH_RW (20 bytes In/Out)	OFF (0 bytes In/Out)	OFF (0 bytes In/Out)	40
RWH_RW (20 bytes In/Out)	RWH_RW (20 bytes In/Out)	Input (20 bytes In/Out)	Output (20 bytes In/Out)	80
RWH_CMD (126 bytes In/Out)	RWH_CMD (126 bytes In/Out)	OFF (0 bytes In/Out)	OFF (0 bytes In/Out)	252
RWH_CMD (166 bytes In/Out)	RWH_CMD (166 bytes In/Out)	OFF (0 bytes In/Out)	OFF (0 bytes In/Out)	332
RWH_CMD (146 bytes In/Out)	RWH_CMD (146 bytes In/Out)	RWH_CMD (146 bytes In/Out)	RWH_CMD (146 bytes In/Out)	504

- If the number of bytes of all IO channels exceeds the limits of the evaluation unit, the configuration is rejected and no data exchange with the PLC is possible.
- The PLC programmer has to calculate the correct address offset and the maximum possible data size of the IO channels within the PLC input/output data image (→ 17.1 General description).

17.1 General description

The module RWH_CMD can read the UID and RSSI value of the ID tag.

- Two modes are available:
  - Read UID once on request via the command channel (synchronous mode).
  - Read UID automatically whenever the evaluation unit detects a change of the UID data (asynchronous mode).
- Read the user data of the ID tag. Two modes are available:
  - Read user data of the ID tag once on request (synchronous mode).
  - Read the user data of the ID tag automatically whenever the evaluation unit detects a change of the UID data (asynchronous mode).
- Write the user data of the ID tag. Two modes are available:
  - Write user data of the ID tag once on request (synchronous mode).
  - Write user data of the ID tag automatically whenever the evaluation unit detects a change of the UID data (asynchronous mode).
- Write and verify the user data of the ID tag. Two modes are available:
  - Write and verify user data of the ID tag once on request (synchronous mode).
  - Write and verify user data of the ID tag automatically whenever the evaluation unit detects a change of the UID data (asynchronous mode).
- Read diagnostic information of the evaluation unit.
- Activate and deactivate the HF field of the read/write head.
- Execute commands to read or write different parameters of the evaluation unit, the read/write head and the ID tag.

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

Available module sizes N per IO-channel (1) [bytes]	Transferable number of the blocks with ID tag block size 4 bytes [blocks]	Transferable number of the blocks with ID tag block size 8 bytes [blocks]	Transferable number of the blocks with ID tag block size 32 bytes [blocks]
26	6	2	-
46	10	5	1
66	15	7	1
86	20	10	2
106	25	12	3
126	30	15	3
146	35	17	4
166	40	20	5

(1) The number of bytes transferred by the active IO channels has to be below the limits of the PLC data input and output image.

The following limits of the different evaluation units have to be complied with:

	DTE100	DTE101	DTE102	DTE103	DTE104
Maximum allowed size of the process data of the evaluation unit [bytes]	144	1024	504	80	1454

PLC process data output image

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Res	DR	ER	UR	RD	WR	AO	Res
2	CM	Res	Res	Res	Res	Res	Res	TR
3	data byte 1							
...	...							
N-1	data byte (N3)							
N	data byte (N2)							

Description byte 1 "control byte 1"

Bit	Bit name	Remark
0	Res	Reserved. Is set to the default value 0.
1	AO	Request "HF field of the read/write head off"
2	WR	“WRite data” mode to the evaluation unit
3	RD	"ReaD data" mode of the evaluation unit
4	UR	“UseR data access” mode of the ID tag
5	ER	"Event-controlled Reading" mode of the working memory of the ID tag
6	DR	"Diagnostics Read" mode set by the controller to request diagnostic data, displayed by the evaluation unit in the Diag status bit
7	Res	Reserved. Is set to the default value 0.

The control bits WR, RD, DR and ER are level-controlled bits to activate the corresponding modes. As soon as the bits in control byte 1 are set to "1", bits WA, RA, DA and EA in the status byte 1 are acknowledged, irrespective of the setting of bit TR in control byte 2. The status "1" of the control bits selects the corresponding mode in the evaluation unit, does not activate it, however. The selected mode is activated by setting the control bit TR (NOT) TA in control byte 2.

Control bit AO controls the HF field of the read/write head. By setting the control bit to status "1", the HF field is deactivated. By setting the control bit to status "0", the HF field is activated. The control bit activates the selected status at once, irrespective of the control bit TR. Deactivation of the HF field of the read/write head takes approx. 5..10 ms.

Description byte 2 "control byte 2"

Bit	Bit name	Remark
0	TR (1)	Toggle request
1..6	Res	Reserved. Is set to the default value 0.
7	CM	"Command" mode Activates the command channel of the evaluation unit. When the bit is set, all other modes are deactivated.

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

Example:

Bit TA	Bit TR	Remark
0	0	Command execution terminated
0	1	Command execution started
1	1	Command execution terminated
1	0	Command execution started

The control bit CR activates the command channel mode of the evaluation unit. With the commands, the parameters of the unit, the read /write head or the ID tag are read or set. The execution of the command is also controlled by control bit TR in control byte 2.

Description bytes 3..n, ”data bytes 1..(N-2)"

Depending on the selected mode, the data bytes contain the command parameters required for the execution of the command.

Default value control bytes 1 and 2:

0x00. This corresponds to the "read UID automatically", "HF field of the read/write head on" mode.

PLC process data input image

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	Res	Res	TA
3	data byte 1							
4	data byte 2							
...	...							
N-1	data byte (N3)							
N	data byte (N2)							

Description byte 1 "control byte 1"

Bit	Bit name	Remark
0	TP (1)	No ID tag Bit is set to 1 as long as the ID tag is detected by the read/write head. With the channel parameter “data hold time”, the status of the bit is extended.
1	AI (1)	Status "HF field of the read/write head off"
2	WA (2)	“Write data” mode to the evaluation unit active
3	RA (2)	“Read data” mode to the evaluation unit active
4	UA (2)	“User data access” mode active
5	EA (2)	"Receive user data on event change" mode active
6	DA (2)	“Diagnostics read” mode active
7	DIAG (1)	Diagnostic data available but not yet written to the response buffer. The response buffer still contains ID tag data. The diagnostic data is copied in the response buffer after control bit DR is set and bit TR has been toggled by the controller.

(1) Bits TP and AI indicate the current status of the ID tag or of the HF field of the read/write head. Bit DIAG signals if a diagnostic message is in the unit.

(2) Status bits WA, RA, UA, EA and DA are automatically set when the evaluation unit has detected the setting of the corresponding bits in control bytes 1 and 2 of the PLC data output image. Any change in the settings of these bits to previously received states resets the data bytes 1 .. (n-2) to the default value 0x00. Bit TR does not influence this behaviour.

Description byte 2 "control byte 2"

Bit	Bit name	Remark
0	TA (1)	Toggle Acknowledge (status of the command request)
1..6	Res	Reserved. Is set to the default value 0.
7	CA	Status of the command mode

(1) Bit TA indicates the status of the command execution of the evaluation unit. When the evaluation unit receives bit TR from the controller with an inverted status of bit TA, the command of the selected mode is started. While the command execution is running, bit TA does not change its status. When the command has been processed by the evaluation unit, bit TA is set to the same status as bit TR.

Example:

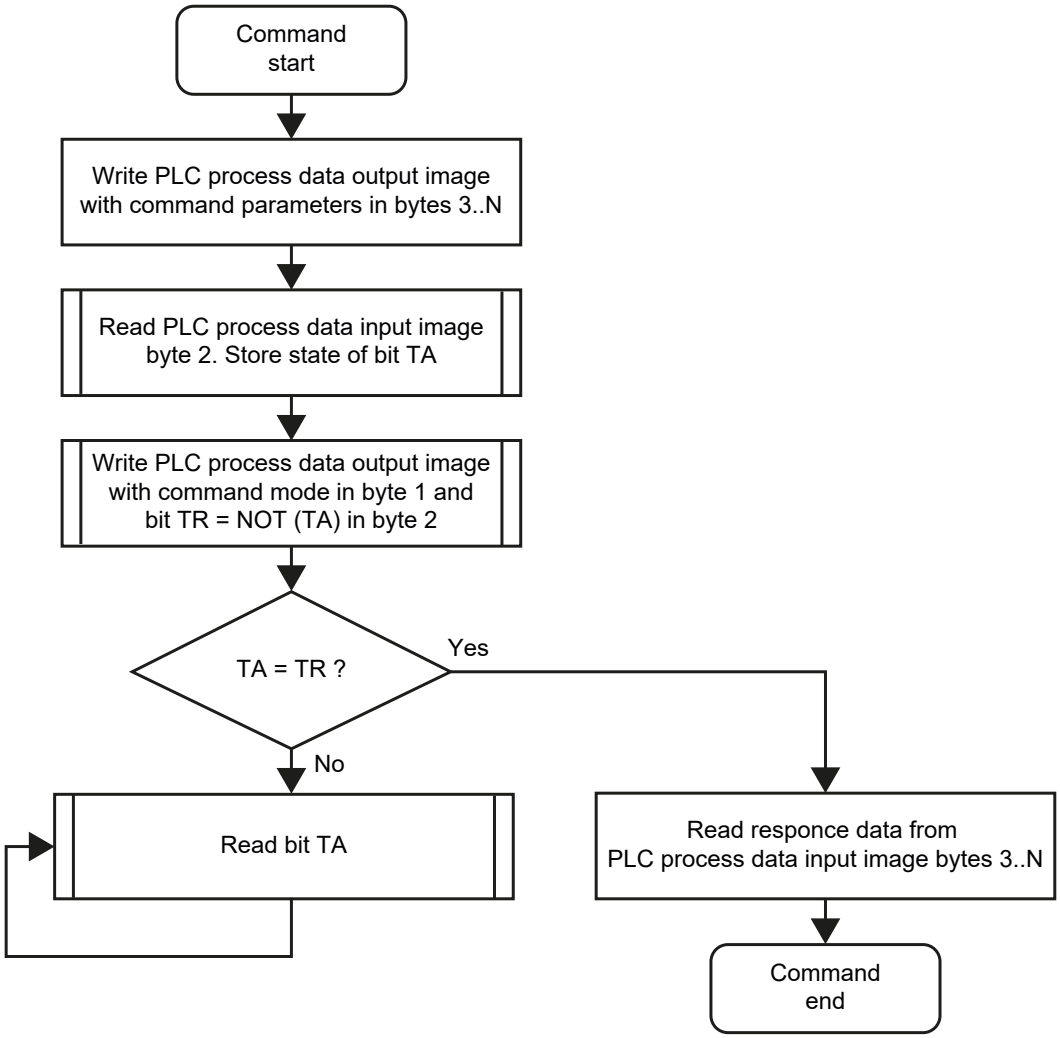
Bit TA	Bit TR	Remark
0	0	Command execution has not yet been started or command execution is finished
1	0	Command execution started
1	1	Command execution has not yet been started or command execution is finished
1	0	Command execution started

Status byte CA reflects the command channel mode of the evaluation unit.

Description bytes 3..n, ”data bytes 1..(N-2)"

Depending on the selected mode, this data area contains the response data read from the evaluation unit.

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



To activate the command, the command mode is set together with the command parameter with bit TR = NOT (TA) within one PLC cycle.

17.2 Read UID/RSSI value of the ID tag asynchronously

In this mode, the UID and the RSSI values of the ID tag are read automatically without sending any read request. The mode is in particular suited if you do not know when the ID tag is in front of the read/write head. Additionally, this mode allows the fastest detection of the ID tag because no additional command request needs to be sent to the evaluation unit.

The UID value is transferred in real time. Therefore, the PLC cycle time has to be shorter by approx. the factor 2 than the time necessary to detect the ID tag by the read/write head.

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

PLC process data output image

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	0	0	0	0	AO = 0	0
2	0	0	0	0	0	0	0	0
3	not used							
...	...							
N-1	not used							
N	not used							

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
AO	0	Request "HF field of the read/write head on"	The activation of the HF field of the read/write head is necessary for the communication with the ID tag.

Description byte 2 "control byte 2"

Not used.

Description bytes 3..N

Has to be set to default value 0x00.

PLC process data input image

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	0	0	0
3	0x00							
4	RSSI + UID data length read							
5	0x00							
6	RSSI value							
7	UID data byte 1 (MSBy)							
8	UID data byte 2							
...	...							
10/14/18/22	UID data byte 4/8/12/16 (LSBy)							
...	…							
N	0x00							

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
TP	0	No ID tag detected in front of the read/write head.	-
	1	ID tag detected in front of the read/write head	Bit is set to 1 as long as the ID tag is detected by the read/write head. With the channel parameter “data hold time” the status of the bit is extended.
AI	0	HF field of the read/write head active	-
Diag	0	No error detected.	-
	1	Diagnostic information of the evaluation unit available	Channel-related or channel-independent error occurred.

Description byte 2 "control byte 2"

Not used.

Description bytes 3..4, ”UID + RSSI data length read"

RSSI and UID data length read. Total data length of the RSSI value plus data length of the UID [bytes] read from ID tag.

Typical values: [6, 10, 14, 18] bytes

If the read/write head does not detect any ID tag, these bytes are set to 0x00.

Description bytes 5..6, ”RSSI value"

RSSI value of the ID tag. Indicates the received signal quality of the ID tag. Higher values mean a better reception of the ID tag signal.

If the read/write head does not detect any RSSI value, these bytes are set to 0x00.

Description bytes 7..10/14/18/22, ”UID data byte"

UID data of the ID tag with a length of 32/64/96/128 bits read. Unused bytes are set to 0x00.

If the read/write head does not detect any ID tag, this data field is set to 0x00.

Description bytes 11/15/19/23..N

Always set to default value 0x00.

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

17.3 Read user data of the ID tag synchronously

In this mode, the user data of the ID tag is read when bit TR in the PLC process data output image corresponds to the inverted status of bit TA in the PLC process data input image.

The mode is in particular suited if you know when the ID tag is in front of the read/write head. The read user data is maintained stable in the data bytes 3..N until bit TR is set to (NOT) TA.

PLC process data output image

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	16-bit read data length [D15..D7]							
4	16-bit read data length [D7..D0]							
5	16-bit start address [D15..D8]							
6	16-bit start address [D7..D0]							
7..N	0x00							

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
AO	0	Request "HF field of the read/write head on"	The activation of the HF field of the read/write head is necessary for the communication with the ID tag.
RD (1)	1	Activate “read data” mode	The 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 “user data access” mode	

(1) Bits RD and UR must have been set to level 1 when bit TR changes its status. Bits RD, UR and TR are set simultaneously in the same PLC cycle.

Description byte 2 "control byte 2"

Bit name	Bit	Description
TR (2)	0	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 bytes 3..4, ”16-bit read data length"

Read data length, limited to a maximum number of (N-6) bytes.

Description bytes 5..6, ”16-bit start address"

Start address of the ID tag user data area the data is read from.

Description bytes 7..N, ”not used"

Has to be set to default value 0x00.

PLC process data input image

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	16-bit read data length [D15..D7]							
4	16-bit read data length [D7..D0]							
5	16-bit start address [D15..D8]							
6	16-bit start address [D7..D0]							
7..(7+X)	Read data bytes 1..X							
(8+X)..N	0x00							

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
TP	0	No ID tag detected in front of the read/write head.	-
	1	ID tag detected in front of the read/write head	Bit is set to 1 as long as the ID tag is detected by the read/write head. With the channel parameter “data hold time” the status of the bit is extended.
AI	0	HF field of the read/write head active	-
RA	1	“Read data” mode of the evaluation unit active	Indicates the status of bit RD.
UA	1	“User data” mode active	Indicates the status of bit UR.
Diag	0	No error detected.	-
	1	Diagnostic information of the evaluation unit available	Diagnostic information is read in the "diagnostics read" mode.

Description byte 2 "control byte 2"

Bit name	Bit	Description
0	TA (2)	Toggle request acknowledge
1..7	-	Is set to the default value 0 by the evaluation unit

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

Bit TA = TR: The command has been processed by the evaluation unit. Bytes 3..N contain the command response data.

Description bytes 3..4, ”16-bit read data length X"

Number of bytes read successfully by the ID tag. If an error occurs, the read data length and bit DIAG are set to 1.

Description bytes 5..6, ”16-bit start address"

Start address of the ID tag user data area the data is read from.

Description bytes 7..(7+X), ”read data bytes 1..X"

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

Description bytes (8+X)..N

Is set to the default value 0x00.

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

17.4 Read user data of the ID tag asynchronously

In this mode, the user data of the ID tag is read automatically. The mode is in particular suited if you know when the ID tag is in front of the read/write head. This mode allows the fastest detection of the ID tag because no additional command request needs to be sent to the evaluation unit.

When the mode has been activated via bit TR = NOT (TA), the evaluation unit tries to read the user data of the ID tag. When an ID tag has been detected, the reading process starts automatically. This is signalled by the status transition of bit TP=0→1. When the reading field is left, the status bit TP=0→1changes. The data length, the address value and the read data of the PLC data input image are set to the default value 0x0.

The setting of the IO-channel parameter “data hold time” influences the time, how long bit TP and the read data of the ID tag are kept stable in the process data input image.

PLC process data output image

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	16-bit data length [D15..D7]							
4	16-bit data length [D7..D0]							
5	16-bit start address [D15..D8]							
6	16-bit start address [D7..D0]							
7..N	0x00							

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
AO	0	Request "HF field of the read/write head on"	The activation of the HF field of the read/write head is necessary for the communication with the ID tag.
RD (1)	1	Activate “read data” mode	The 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 “user data access” mode	Access to the user data of the ID tag
ER (1)	1	Activate “receive user data automatically” mode	

(1) Bits RD, UR and ER must have been set to level 1 when bit TR changes its status. Bits RD, UR, ER and TR are set simultaneously in the same PLC cycle.

Description byte 2 "control byte 2"

Bit name	Bit	Description
TR (2)	0	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. Command execution is started only once. More commands are executed automatically when the evaluation unit detects a change of status of the ID tag.

Description bytes 3..4, ”16-bit read data length X"

Number of bytes read successfully by the ID tag. If an error occurs, the read data length and bit DIAG are set to 1.

Description bytes 5..6, ”16-bit start address"

Start address of the ID tag user data area the data is read from.

Description bytes 7..(7+X), ”read data byte 1X“

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

Description bytes (8+X)..N

Has to be set to default value 0x00.

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

The setting of the IO-channel parameter “data hold time” influences the time, how long bit TP and the read data of the ID tag are kept stable in the process data input image.

PLC process data input image

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	0	EA = 1	UA = 1	RA = 1	0	AI	TP
2	0	0	0	0	0	0	0	TA
3	16-bit read data length [D15..D7]							
4	16-bit read data length [D7..D0]							
5	16-bit start address [D15..D8]							
6	16-bit start address [D7..D0]							
7..(7+X)	Read data bytes 1..X							
(8+X)..N	0x00							

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
TP	0	No ID tag detected in front of the read/write head.	-
	1	ID tag detected in front of the read/write head	Bit is set to 1 as long as the ID tag is detected by the read/write head. With the channel parameter “data hold time” the status of the bit is extended.
AI	0	HF field of the read/write head active	-
RA	1	“Read data” mode of the evaluation unit active	Indicates the status of bit RD.
UA	1	“User data” mode active	Indicates the status of bit UR.
EA	1	“Receive user data automatically” mode active	Indicates the status of bit ER.
Diag	0	No error detected.	-
	1	Diagnostic information of the evaluation unit available	Diagnostic information is read in the “diagnostics read" mode.

Description byte 2 "control byte 2"

Bit name	Bit	Description
0	TA (2)	Toggle request acknowledge
1..7	-	Is set to the default value 0 by the evaluation unit.

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

Bit TA = TR: The command has been processed by the evaluation unit. Bytes 3..N contain the command response data.

Description bytes 3..4, ”16-bit read data length X"

Number of bytes read successfully by the ID tag. If an error occurs, the read data length and bit DIAG are set to 1.

Description bytes 5..6, ”16-bit start address"

Start address of the ID tag user data area the data is read from.

Description bytes 7..(7+X), ”read data bytes 1..X"

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

Description bytes (8+X)..N

Is set to the default value 0x00.

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

The setting of the IO-channel parameter “data hold time” influences the time, how long bit TP and the read data of the ID tag are kept stable in the process data input image.

17.5 Write user data to the ID tag synchronously

In this mode, the user data of the ID tag is written when bit TR in the PLC process data output image corresponds to the inverted status of bit TA in the PLC process data input image.

The mode is in particular suited if you know when the ID tag is in front of the read/write head.

PLC process data output image

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	0	UR = 1	0	WR = 1	AO = 0	0
2	0	0	0	0	0	0	0	TR
3	16-bit data length [D15..D7]							
4	16-bit data length [D7..D0]							
5	16-bit start address [D15..D8]							
6	16-bit start address [D7..D0]							
7..(7+X)	Write data bytes 1..X							
(8+X)..N	0x00							

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
AO	0	Request "HF field of the read/write head on"	The activation of the HF field of the read/write head is necessary for the communication with the ID tag.
WR (1)	1	Activate “write data” mode	The 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 “user data access” mode	

(1) Bits WR and UR must have been set to 1 when bit TR changes its status. Bits WR, UR and TR can be set simultaneously in the same PLC cycle.

Description byte 2 "control byte 2"

Bit name	Bit	Description
TR (2)	0	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 bytes 3..4, ”16-bit written data length X"

Write data length, limited to a maximum number of (N-6) bytes.

Description bytes 5..6, ”16-bit start address"

Start address of the ID tag user data area to which the data is to be written.

Description bytes 7..(7+X), ”writing of data bytes 1..X"

This data area contains the user data which is to be written to the ID tag.

Description bytes (8+X)..N

Has to be set to default value 0x00.

PLC process data input image

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	16-bit written data length [D15..D7]							
4	16-bit written data length [D7..D0]							
5	16-bit start address [D15..D8]							
6	16-bit start address [D7..D0]							
7..N	0x00							

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
TP	0	No ID tag detected in front of the read/write head.	-
	1	ID tag detected in front of the read/write head	Bit is set to 1 as long as the ID tag is detected by the read/write head. With the channel parameter “data hold time” the status of the bit is extended.
AI	0	HF field of the read/write head active	-
WA	1	“Write data” mode of the evaluation unit active	Indicates the status of bit WR.
UA	1	“User data” mode active	Indicates the status of bit UR.
Diag	0	No error detected.	-
	1	Diagnostic information of the evaluation unit available	Diagnostic information is read in the “diagnostics read" mode.

Description byte 2 "control byte 2"

Bit name	Bit	Description
0	TA (2)	Toggle request acknowledge
1..7	-	Is set to the default value 0 by the evaluation unit

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

Bit TA = TR: The command has been processed by the evaluation unit. Bytes 3..N contain the command response data.

Description bytes 3..4, ”16-bit written data length X"

Number of bytes successfully written to the ID tag. If an error occurs, the written data length is set to 0x0000 and bit DIAG is set to 1.

Description bytes 5..6, ”16-bit start address"

Start address of the ID tag user data area to which the data is written.

Description bytes 7..(N)

Is set to the default value 0x00.

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

17.6 Write user data to the ID tag asynchronously

In this mode, the user data of the ID tag is written automatically. The mode is in particular suited if you know when the ID tag is in front of the read/write head.

When the mode has been activated via bit TR = NOT (TA), the evaluation unit starts to write the user data of the ID tag at once by setting TA = TR. This happens if an ID tag is detected or not. When the evaluation unit detects a change of the status of the ID tag with TP=0->1, a writing process is started. If the status of the ID tag changes from TP=1->0, the data length and the address value of the PLC data input image are set to default value 0x0.

PLC process data output image

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	ER = 1	UR = 1	0	WR = 1	AO = 0	0
2	0	0	0	0	0	0	0	TR
3	16-bit data length [D15..D7]							
4	16-bit data length [D7..D0]							
5	16-bit start address [D15..D8]							
6	16-bit start address [D7..D0]							
7..(7+X)	Write data bytes 1..X							
(8+X)..N	0x00							

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
AO	0	Request "HF field of the read/write head on"	The activation of the HF field of the read/write head is necessary for the communication with the ID tag.
WR (1)	1	Activate “write data” mode	The 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 “user data access” mode	
ER (1)	1	Activate “receive user data automatically” mode	

(1) Bits WR, UR and ER must have been set to 1 when bit TR changes its status. Bits WR, UR, ER and TR can be set simultaneously in the same PLC cycle.

Description byte 2 "control byte 2"

Bit name	Bit	Description
TR (2)	0	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. Command execution has to be started only once. More commands are executed automatically when the evaluation unit detects a change of status of the ID tag.

Description bytes 3..4, ”16-bit written data length X"

Write data length, limited to a maximum number of (N-6) bytes.

Description bytes 5..6, ”16-bit start address"

Start address of the ID tag user data area to which the data is to be written.

Description bytes 7..(7+X), ”writing of data bytes 1..X"

This data area contains the user data which is to be written to the ID tag.

Description bytes (8+X)..N

Has to be set to default value 0x00.

PLC process data input image

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	0	EA = 1	UA = 1	RA = 1	0	AI	TP
2	0	0	0	0	0	0	0	TA
3	16-bit written data length [D15..D7]							
4	16-bit written data length [D7..D0]							
5	16-bit start address [D15..D8]							
6	16-bit start address [D7..D0]							
7..N	0x00							

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
TP	0	No ID tag detected in front of the read/write head.	-
	1	ID tag detected in front of the read/write head	Bit is set to 1 as long as the ID tag is detected by the read/write head. With the channel parameter “data hold time” the status of the bit is extended.
AI	0	HF field of the read/write head active	-
WA	1	“Write data” mode of the evaluation unit active	Indicates the status of bit WR.
UA	1	“User data” mode active	Indicates the status of bit UR.
EA	1	“Receive user data automatically” mode active	Indicates the status of bit ER.
Diag	0	No error detected.	-
	1	Diagnostic information of the evaluation unit available	Diagnostic information is read in the “diagnostics read" mode.

Description byte 2 "control byte 2"

Bit name	Bit	Description
0	TA (2)	Toggle request acknowledge
1..7	-	Is set to the default value 0 by the evaluation unit

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

Bit TA = TR: The command has been processed by the evaluation unit. Bytes 3..N contain the command response data.

Description bytes 3..4, ”16-bit written data length X"

Number of bytes successfully written to the ID tag. If an error occurs, the written data length is set to 0x0000 and bit DIAG is set to 1.

Description bytes 5..6, ”16-bit start address"

Start address of the ID tag user data area to which the data is written.

Description bytes 7..(N)

Is set to the default value 0x00.

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

17.7 Write user data to the ID tag synchronously and verify

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

In a first step, the command data is written to the ID tag and in a second step it is read back. In a third step, the evaluation unit compares the written data with the read data and sends back the result to the PLC. If the written data is identical to the data read back, the read data length in the PLC process data input image is set to the written data length of the PLC process data output image. If the written data is not identical to the data read back, a diagnostic message is generated.

PLC process data output image

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	0	UR = 1	RD = 1	WR = 1	AO = 0	0
2	0	0	0	0	0	0	0	TR
3	16-bit data length [D15..D7]							
4	16-bit data length [D7..D0]							
5	16-bit start address [D15..D8]							
6	16-bit start address [D7..D0]							
7..(7+X)	Write data bytes 1..X							
(8+X)..N	0x00							

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
AO	0	Request "HF field of the read/write head on"	The activation of the HF field of the read/write head is necessary for the communication with the ID tag.
WR (1)	1	Activate “write data” mode	The command is started after bit TR is set to NOT (TA) in status byte 2 of the PLC data input image.
RD (1)	1	Activate “read data” mode	
UR (1)	1	Activate “user data access” mode	

(1) Bits WR, RD and UR must have been set to 1 when bit TR changes its status. Bits WR, RD, UR and TR can be set simultaneously in the same PLC cycle.

Description byte 2 "control byte 2"

Bit name	Bit	Description
TR (2)	0	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 bytes 3..4, ”16-bit written data length X"

Write data length, limited to a maximum number of (N-6) bytes.

Description bytes 5..6, ”16-bit start address"

Start address of the ID tag user data area to which the data is to be written.

Description bytes 7..(7+X), ”writing of data bytes 1..X"

This data area contains the user data which is to be written to the ID tag.

Description bytes (8+X)..N

Has to be set to default value 0x00.

PLC process data input image

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	0	0	UA = 1	RA = 1	WA = 1	AI	TP
2	0	0	0	0	0	0	0	TA
3	16-bit written data length [D15..D7]							
4	16-bit written data length [D7..D0]							
5	16-bit start address [D15..D8]							
6	16-bit start address [D7..D0]							
7..N	0x00							

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
TP	0	No ID tag detected in front of the read/write head	-
	1	ID tag detected in front of the read/write head	Bit is set to 1 as long as the ID tag is detected by the read/write head. With the channel parameter “data hold time” the status of the bit is extended.
AI	0	HF field of the read/write head active	-
WA	1	“Write data” mode of the evaluation unit active	Indicates the status of bit WR.
RA	1	“Read data” mode of the evaluation unit active	Indicates the status of bit RD.
UA	1	“User data” mode active	Indicates the status of bit UR.
Diag	0	No error detected.	-
	1	Diagnostic information of the evaluation unit available	Diagnostic information is read in the “diagnostics read" mode.

Description byte 2 "control byte 2"

Bit name	Bit	Description
0	TA (2)	Toggle request acknowledge
1..7	-	Is set to the default value 0 by the evaluation unit

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

Bit TA = TR: The command has been processed by the evaluation unit. Bytes 3..N contain the command response data.

Description bytes 3..4, ”16-bit written data length X"

Number of bytes written successfully to the ID tag and then read by the ID tag. If an error occurs, the read data length and bit DIAG are set to 1.

Description bytes 5..6, ”16-bit start address"

Start address of the ID tag user data area to which the data is written and from which the data is read.

Description bytes 7..(7+X), ”read data bytes 1..X"

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

Description bytes (8+X)..N

Is set to the default value 0x00.

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

17.8 Write user data to the ID tag asynchronously and verify

In this mode, the user data of the ID tag is written and read back automatically. The mode is in particular suited if you do not know when the ID tag is in front of the read/write head.

In a first step, the command data is written to the ID tag and in a second step it is read back. In a third step, the evaluation unit compares the written data with the read data and sends back the result to the PLC. If the written data is identical to the data read back, the read data length in the PLC data input image is set to the written data length of the PLC process data output image, otherwise a diagnostic message is generated.

When the mode has been activated via TR = NOT (TA), the evaluation unit starts to write the user data of the ID tag by setting TA = TR. This is independent of whether an ID tag is detected or not. When the evaluation unit detects a change of the status of the ID tag with TP=0->1, a writing process is started. If the status of the ID tag changes from TP=1->0, the data length, the address value and the read data of the PLC data input image are set to the default value 0x0.

PLC process data output image

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	ER = 1	UR = 1	RD = 1	WR = 1	AO = 0	0
2	0	0	0	0	0	0	0	TR
3	16-bit data length [D15..D7]							
4	16-bit data length [D7..D0]							
5	16-bit start address [D15..D8]							
6	16-bit start address [D7..D0]							
7..(7+X)	Writing of data bytes 1..X							
(8+X)..N	0x00							

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
AO	0	Request "HF field of the read/write head on"	The activation of the HF field of the read/write head is necessary for the communication with the ID tag.
WR (1)	1	Activate “write data” mode	The command is started after bit TR is set to NOT (TA) in status byte 2 of the PLC data input image.
RD (1)	1	Activate “read data” mode	
UR (1)	1	Activate “user data access” mode	
ER (1)	1	Activate “receive user data automatically” mode	

(1) Bits WR, RD, UR and ER must have been set to 1 when bit TR changes its status. Bits WR, RD, UR, ER and TR can be set simultaneously in the same PLC cycle.

Description byte 2 "control byte 2"

Bit name	Bit	Description
TR (2)	0	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 bytes 3..4, ”16-bit written data length X"

Write data length, limited to a maximum number of (N-6) bytes.

Description bytes 5..6, ”16-bit start address"

Start address of the ID tag user data area to which the data is to be written.

Description bytes 7..(7+X), ”writing of data bytes 1..X"

This data area contains the user data which is to be written to the ID tag.

Description bytes (8+X)..N

Has to be set to default value 0x00.

Command execution has to be started only once. A command with the setting TR = NOT (TA) ends the command execution.

If the command parameters “16 bit read length” and “16 bit start address” are to be changed, bit TR is set to NOT (TA) to restart the command with the changed command parameter.

PLC process data input image

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	0	EA = 1	UA = 1	RA = 1	WA = 1	AI	TP
2	0	0	0	0	0	0	0	TA
3	16-bit written data length [D15..D7]							
4	16-bit written data length [D7..D0]							
5	16-bit start address [D15..D8]							
6	16-bit start address [D7..D0]							
7..(7+X)	Read data bytes 1..X							
(8+X)..N	0x00							

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
TP	0	No ID tag detected in front of the read/write head.	-
	1	ID tag detected in front of the read/write head	Bit is set to 1 as long as the ID tag is detected by the read/write head. With the channel parameter “data hold time” the status of the bit is extended.
AI	0	HF field of the read/write head active	-
WA	1	“Write data” mode of the evaluation unit active	Indicates the status of bit WR.
RA	1	“Read data” mode of the evaluation unit active	Indicates the status of bit RD.
UA	1	“User data” mode active	Indicates the status of bit UR.
EA	1	“Receive user data automatically” mode active	Indicates the status of bit ER.
Diag	0	No error detected	-
	1	Diagnostic information of the evaluation unit available	Diagnostic information is read in the “diagnostics read" mode.

Description byte 2 "control byte 2"

Bit name	Bit	Description
0	TA (2)	Toggle request acknowledge
1..7	-	Is set to the default value 0 by the evaluation unit

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

Bit TA = TR: The command has been processed by the evaluation unit. Bytes 3..N contain the command response data.

Description bytes 3..4, ”16-bit written data length X"

Number of bytes written successfully to the ID tag and then read by the ID tag. If an error occurs, the read data length and bit DIAG are set to 1.

Description bytes 5..6, ”16-bit start address"

Start address of the ID tag user data area to which the data is written and from which the data is read.

Description bytes 7..(7+X), ”read data bytes 1..X"

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

Description bytes (8+X)..N

Is set to the default value 0x00.

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

17.9 Read diagnostic information

In this mode, the diagnostic information of the evaluation unit is read.

PLC process data output image

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

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
AO	0/1	Request "HF field of the read/write head on"	Can remain unchanged as long as the "diagnostics read" mode is active.
UR	0/1	Activate “user data access” mode	Can remain unchanged as long as the "diagnostics read" mode is active.
ER	0/1	Activate “receive user data automatically” mode	Can remain unchanged as long as the "diagnostics read" mode is active.
DR (1)	1	“Diagnostics read” mode active	Diagnostic read is started after bit TR is set to NOT (TA) in status byte 2 of the PLC data input image.

(1) Diagnostic information is only available if bit “Diag” is set within the response data. Otherwise the response data returns the default data “0x00” within bytes 3..n.

Description byte 2 "control byte 2"

Bit name	Bit	Description
TR (2)	0	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 bytes 3..N

Not used. The data area remains unchanged to quickly return to the previously executed mode.

PLC process data input image

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
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 "control byte 1"

Bit name	Bit	Remark	Note
TP	0	No ID tag detected in front of the read/write head.	-
	1	ID tag detected in front of the read/write head	Bit is set to 1 as long as the ID tag is detected by the read/write head. With the channel parameter “data hold time” the status of the bit is extended.
AI	0/1	HF field of the read/write head active	-
UA	0/1	“User data” mode active	Indicates the status of bit UR.
EA	0/1	“Receive user data automatically” mode active	Indicates the status of bit ER.
DA	0	“Diagnostics read” mode inactive	-
	1	“Diagnostics read” mode active	-
Diag	0	No error detected.	-
	1	Diagnostic information of the evaluation unit available	Diagnostic information is read in the “diagnostics read" mode.

Description byte 2 "control byte 2"

Bit name	Bit	Description
0	TA (2)	Toggle request acknowledge
1..7	-	Is set to the default value 0 by the evaluation unit

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

Bit TA = TR: The command has been processed by the evaluation unit. Bytes 3..N contain the command response data.

Description bytes 3..4, ”number of error codes"

Number of error codes in the evaluation unit. Maximum 4 error codes are read per diagnostic read request.

Description bytes 5..6

Is set to the default value 0x00.

Description bytes 7..x, ”error codes 1..4"

The length of an error code of the evaluation unit is always 4 bytes (→ 18 Error codes of the evaluation unit).

If there are fewer than 4 error codes, the unused bytes are set to the default value "0x00".

Description bytes (x+1)..N

Is set to the default value 0x00.

17.10 Execute synchronous command channel

In this mode, different commands can be sent to the evaluation unit to read data from the evaluation unit or to write data to the evaluation unit.

PLC process data output image

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	0	0	RD	WR	0	0
2	CM	0	0	0	0	0	0	TR
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 name	Bit	Remark	Note
WR (1)	1	Activate "PUT" mode (send command)	The command is started after bit TR is set to NOT (TA) in status byte 2 of the PLC data input image.
RD (1)	1	Activate "GET" mode (receive response)	The command is started after bit TR is set to NOT (TA) in status byte 2 of the PLC data input image.

(1) Bit WR or RD has to be set to 1 when bit TR changes its status. Bits WR and TR or RD and TR can be set simultaneously in the same PLC cycle.

Description byte 2 "control byte 2"

Bit name	Bit	Description
TR (2)	0	Toggle request. Controls the execution of the selected mode.
-	1..6	Has to be set to default value 0.
CM	7	Command mode active. Is set to 1 to activate the “command" mode.

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

Description bytes 3..4, ”16-bit command length X"

Data length of the command, including the length of the command code, limited to maximum (n-6) bytes.

Description bytes 5..6, ”16-bit command code"

Command code (→ 17.11 Commands - overview).

Description bytes 7..N, ”16-bit command parameter 1..X"

Command parameter. Unused bytes are set to 0x00.

PLC process data input image

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	0	0	0	RA	WA	AI	TP
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							
...	. . .							
N	0x00							

Description byte 1 "control byte 1"

Bit name	Bit	Remark	Note
TP (1)	0	No ID tag detected in front of the read/write head.	-
	1	ID tag detected in front of the read/write head	Bit is set to 1 as long as the ID tag is detected by the read/write head. With the channel parameter “data hold time” the status of the bit is extended.
AI (1)	0	HF field of the read/write head active	-
WA (2)	1	"PUT" mode active (send command)	Indicates the status of bit WR.
RA (2)	1	"GET" mode active (receive response)	Indicates the status of bit RD.
Diag (1)	0	No error detected.	-
	1	Diagnostic information of the evaluation unit available	Diagnostic information is read in the “diagnostics read" mode.

(1) Bits TP, AI and DIAG show the current status of the ID tag, the HF field and the diagnostic data. Bit TR does not influence this behaviour.

(2) Bits WA and RA are immediately set when the evaluation unit detects the setting of the corresponding bits WR and RD in control byte 1 of the PLC data output image. Any change in the settings of these bits to previously received states sets the data bytes 3 .. (N) to the default value 0x00. Bit TR does not influence this behaviour.

Description byte 2 "control byte 2"

Bit name	Bit	Description
TA (1)	0	Toggle request. Controls the execution of the selected mode.
-	1..6	Has to be set to default value 0.
CA (2)	7	Command mode active. Is set to 1 to activate the “command" mode.

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

Bit TA = TR: The command has been processed by the evaluation unit.

(2) Bit CA is set automatically as soon as the evaluation unit detects the setting of bit CR in the control bytes 2 of the PLC data output image. Any change of bit CR to a previously received status sets the data bytes 3 .. (N) to the default value 0x00. Bit TR does not influence this behaviour.

Description bytes 3..4, ”16-bit response data length X"

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

Description bytes 5..6, ”16-bit response code"

Response code of the command request

Description bytes 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, bytes (7..N) are set to 0x0000 and bit DIAG is set to 1.

17.11 Commands - overview

Command	Control word (1)	Command length	Command code	Parameter 1	Parameter 2	Parameters 3..(N-6)
GET IDET DIAGNOSIS	0x0880	0x0002	0x62C8	0x0000	0x0000	0x0000
GET MAC ADDRESS	0x0880	0x0002	0x62C9	0x0000	0x0000	0x0000
GET HF POWER LIST	0x0880	0x0002	0x62CE	0x0000	0x0000	0x0000
GET HF POWER SETTING	0x0880	0x0002	0x62CF	0x0000	0x0000	0x0000
GET BARGRAPH STATE	0x0880	0x0002	0x62D0	0x0000	0x0000	0x0000
GET BLOCKS LOCKED	0x0880	0x0006	0x62D1	Start block	Number of blocks	0x0000
GET DSFID	0x0880	0x0006	0x62D2	0x0000	0x0000	0x0000
GET AFI	0x0880	0x0006	0x62D3	0x0000	0x0000	0x0000

Command	Control word (1)	Command length	Command code	Parameter 1	Parameter 2	Parameters 3..(N-6)
SET HF POWER LEVEL	0x0480	0x0004	0x65D6	Power level	0x0000	0x0000
SET BARGRAPH STATE	0x0480	0x0004	0x65D7	Status	0x0000	0x0000
SET BLOCKS LOCKED	0x0480	0x0006	0x65D8	Start block	Number of blocks	0x0000
SET DEVICE RESET	0x0480	0x0004	0x65D9	Countdown value	0x0000	0x0000
SET DSFID	0x0480	0x0004	0x65DA	DSFID value	0x0000	0x0000
SET AFI	0x0480	0x0004	0x65DB	AFI value	0x0000	0x0000
SET DSFID LOCKED	0x0480	0x0002	0x65DC	0x0000	0x0000	0x0000
SET AFI LOCKED	0x0480	0x0002	0x65DD	0x0000	0x0000	0x0000
SET ID-TAG	0x0480	0x0008	0x65DE	Start block	Number of blocks	Default data

(1) Bit TR in the control byte has to be set to NOT (TA) to activate the command.

17.12 Command "GET IDENT DIAGNOSIS"

With this command, the controller reads the diagnostic data of the evaluation unit.

PLC process data output image

Byte no.	Contents	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

Byte no.	Contents	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 (→ 18 Error codes of the evaluation unit)
13..X	…	…
(X+1)..N	0x00	Not used

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

Bit TA = TR: The command has been processed by the evaluation unit.

17.13 Command "GET MAC ADDRESS"

With this command, the controller reads the MAC address of the evaluation unit.

PLC process data output image

Byte no.	Contents	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

Byte no.	Contents	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	MAC address, octet 1
8	Octet 2	MAC address, octet 2
9	Octet 3	MAC address, octet 3
10	Octet 4	MAC address, octet 4
11	Octet 5	MAC address, octet 5
12	Octet 6	MAC address, octet 6
13..N	0x00	Not used

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

Bit TA = TR: The command has been processed by the evaluation unit.

17.14 Command "GET HF POWER LIST"

With this command, the controller reads the available HF power levels of the read/write head.

PLC process data output image

Byte no.	Contents	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	0xCE	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

Byte no.	Contents	Remark
1	0x08	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x02 + (n)	Response length (LSBy)
5	0x62	Response code (MSBy)
6	0xCE	Response code (LSBy)
7	0x00	Not used
8	0x00..X	Number of power levels (X = [0..5]): 0x0 = no entry in the HF power list 0x1 = one level (e.g. 100%) 0x2 = two levels (e.g. 0% and 100%) ...
9	PWR1	First available power level [%] (e.g. 0x0 = 0% => HF field off)
10	PWR2	Second available power level [%] (e.g. 0x64 = 100% => HF field on)
11..X	…	…
(X+1)..N	0x00	Not used

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

Bit TA = TR: The command has been processed by the evaluation unit.

If the command is not supported by the read/write head, the evaluation unit sets the flag DIAG in status byte 2. The error code is read with the command “GET IDENT DIAGNOSIS”.

17.15 Command "GET HF POWER SETTING"

With this command, the controller reads the current HF power level setting of the read/write head.

PLC process data output image

Byte no.	Contents	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	0xCF	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

Byte no.	Contents	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	0xCF	Response code (LSBy)
7	0x00	Not used
8	PWR1	Current HF power level in the read/write head [%] (e.g. 0x32 = 50%)
9..N	0x00	Not used

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

Bit TA = TR: The command has been processed by the evaluation unit.

If the command is not supported by the read/write head, the evaluation unit sets the flag DIAG in status byte 2. The error code is read with the command “GET IDENT DIAGNOSIS”.

17.16 Command "GET BARGRAPH STATE"

With this command, the controller reads the status of the LED level indication of the read/write head.

PLC process data output image

Byte no.	Contents	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

Byte no.	Contents	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	Status	Status of the LED level indication of the read/write head: 0x00 = off 0x01 = on
9..N	0x00	Not used

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

Bit TA = TR: The command has been processed by the evaluation unit.

If the command is not supported by the read/write head, the evaluation unit sets the flag DIAG in status byte 2. The error code is read with the command “GET IDENT DIAGNOSIS”.

17.17 Command "GET BLOCKS LOCKED"

With this command, the controller verifies the write protection of certain memory areas of the ID tag.

PLC process data output image

Byte no.	Contents	Remark
1	0x08	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSBy)
4	0x06	Command length (LSBy)
5	0x62	Command code (MSBy)
6	0xD1	Command code (LSBy)
7	0x00	Not used
8	STB	Block number of the first block which is to be verified for the status "block locked" (X = [0x0..nn]). "nn" must be smaller than ● the "module size - 8" and ● the "number of the blocks of the ID tag - 1".
9	0x00	Not used
10	NOB	Number of the blocks to be verified [0x1..0xFF]. The number of the blocks must be smaller than (N-8) bytes. STB + NOB must be smaller than the number of the blocks of the ID tag.
11..N	0x00	Not used

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

PLC process data input image

Byte no.	Contents	Remark
1	0x08	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x04 + X	Response length (LSBy)
5	0x62	Response code (MSBy)
6	0xD1	Response code (LSBy)
7	0x00	Not used
8	NOB	Number of the blocks verified for the status "block locked“ (X = [0x1..nn]).
9	BS1	Status of the block STB: 0x0 = block is unlocked 0x1 = block is locked
…	…	...
9 + (X-1)	BSX	Status of block STB+(X-1): 0x0 = block is unlocked 0x1 = block is locked
(9+X)..N	0x00	Not used

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

Bit TA = TR: The command has been processed by the evaluation unit.

If the command is not supported by the read/write head, the evaluation unit sets the flag DIAG in status byte 2. The error code is read with the command “GET IDENT DIAGNOSIS”.

17.18 Command "GET DSFID"

With this command, the controller reads the data structure format identifier (DSFID) of the ID tag.

PLC process data output image

Byte no.	Contents	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	0xD2	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

Byte no.	Contents	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	0xD2	Response code (LSBy)
7	0x00	Not used
8	DSFID	Data structure format identifier of the ID tag [0x0..0xFF].
9..N	0x00	Not used

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

Bit TA = TR: The command has been processed by the evaluation unit.

17.19 Command “GET AFI”

With this command, the controller reads the application family identifier (AFI) of the ID tag.

PLC process data output image

Byte no.	Contents	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	0xD3	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

Byte no.	Contents	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	0xD3	Response code (LSBy)
7	0x00	Not used
8	AFI	Application family identifier of the ID tag [0x0..0xFF].
9..N	0x00	Not used

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

Bit TA = TR:The command has been processed by the evaluation unit.

17.20 Command "GET UID-RSSI"

With this command, the controller reads the UID of the ID tag and the RSSI value from the read/write head.

PLC process data output image

Byte no.	Contents	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	0xCD	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

Byte no.	Contents	Remark
1	0x08	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x0E	Response length (LSB) The response length is fixed to 14 bytes, regardless of the UID length.
5	0x62	Response code (MSBy)
6	0xCD	Response code (LSBy)
7	0x00	Not used
8	0x06 / 0x0A	RSSI and UID data length [6,10]
9	0x00	Not used
10	RSSI	The RSSI value indicates the quality of the received ID tag signal. The higher the value, the better the reception of the ID tag signal. If the read/write head does not detect any ID tag, this data field is set to 0x00.
11..X	UID	Read the UID of the ID tag of a length of 4/8/16/32 bytes. Unused bytes are set to 0x00. If the read/write head does not detect any ID tag, this data field is set to 0x00.
11..X	…	...
(X+1)..N	0x00	Not used

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

Bit TA = TR: The command has been processed by the evaluation unit.

If the command is not supported by the read/write head, the evaluation unit sets the flag DIAG in status byte 2. The error code is read with the command “GET IDENT DIAGNOSIS”.

17.21 Command "SET HF POWER LEVEL"

With this command, the controller sets the HF power level of the read/write head.

PLC process data output image

Byte no.	Contents	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	0xD6	Command code (LSBy)
7	0x00	Not used
8	PWR	HF power level [%] (e.g. 0x32 = 50%) to be activated in the read/write head.
9..N	0x00	Not used

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

PLC process data input image

Byte no.	Contents	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSB)
5	0x65	Response code (MSBy)
6	0xD6	Response code (LSBy)
7	0x00	Not used
8	PWR	Current HF power level in the read/write head [%] (e.g. 0x32 = 50%).
9..N	0x00	Not used

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

Bit TA = TR: The command has been processed by the evaluation unit.

If the command is not supported by the read/write head, the evaluation unit sets the flag DIAG in status byte 2. The error code is read with the command “GET IDENT DIAGNOSIS”.

17.22 Command "SET BARGRAPH STATE"

With this command, the controller sets the LED level indication status of the read/write head.

PLC process data output image

Byte no.	Contents	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	Status	Status of the LED level indication of the read/write head: 0x00 = off 0x01 = on
9..N	0x00	Not used

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

PLC process data input image

Byte no.	Contents	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSB)
5	0x65	Response code (MSBy)
6	0xD7	Response code (LSBy)
7	0x00	Not used
8	Status	Current status of the LED level indication of the read/write head: 0x00 = off 0x01 = on
9..N	0x00	Not used

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

Bit TA = TR: The command has been processed by the evaluation unit.

If the command is not supported by the read/write head, the evaluation unit sets the flag DIAG in status byte 2. The error code is read with the command “GET IDENT DIAGNOSIS”.

17.23 Command "SET BLOCKS LOCKED"

With this command, the controller verifies the write protection of certain memory areas of the ID tag.

If the write protection is activated on the corresponding data blocks, it cannot be undone any more.

PLC process data output image

Byte no.	Contents	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	0xD8	Command code (LSBy)
7	0x00	Not used
8	STB	Block number of the first block to be set to status "block locked" [0x0..nn]. "nn" must be smaller than the "number of the blocks of the ID tag - 1".
9	0x00	Not used
10	NOB	Number of the blocks to be set to the status "block locked" [0x1..0xFF]. STB + NOB must be smaller than the number of the blocks of the ID tag.
11..N	0x00	Not used

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

PLC process data input image

Byte no.	Contents	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSB)
5	0x65	Response code (MSBy)
6	0xD8	Response code (LSBy)
7	0x00	Not used
8	Status	0x0 = locking failed 0x1 = locking successful
9..N	0x00	Not used

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

Bit TA = TR: The command has been processed by the evaluation unit.

If the command is not supported by the read/write head, the evaluation unit sets the flag DIAG in status byte 2. The error code is read with the command “GET IDENT DIAGNOSIS”.

17.24 Command "SET DEVICE RESET"

With this command, the controller restarts the evaluation unit.

PLC process data output image

Byte no.	Contents	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	Time until the evaluation unit is restarted (restart delay time) [ms*10]: 0x00 = restart of the evaluation unit without delay 0x01..0xXX = restart of the evaluation unit 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

Byte no.	Contents	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSB)
5	0x65	Response code (MSBy)
6	0xD9	Response code (LSBy)
7	0x00	Not used
8	CRT	Countdown until the evaluation unit is restarted (countdown restart delay time) [ms*10]. The value is counted down to 0x0 from the time set in byte RTD. After that, a restart sequence is executed.
9..N	0x00	Not used

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

Bit TA = TR: The command has been processed by the evaluation unit.

When the command is executed on an IO channel, other active IO channels are not updated in the process data input image.

17.25 Command "SET DSFID"

With this command, the controller writes the data structure format identifier (DSFID) of the ID tag.

PLC process data output image

Byte no.	Contents	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	0xDA	Command code (LSBy)
7	0x00	Not used
8	DSFID	The data structure format identifier to be written to the ID tag [0x0..0xFF].
9..N	0x00	Not used

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

PLC process data input image

Byte no.	Contents	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSB)
5	0x65	Response code (MSBy)
6	0xDA	Response code (LSBy)
7	0x00	Not used
8	DSFID	Data structure format identifier of the ID tag (echo of the command) [0x0..0xFF].
9..N	0x00	Not used

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

17.26 Command "SET AFI"

With this command, the controller writes the application family identifier (AFI) of the ID tag.

PLC process data output image

Byte no.	Contents	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	0xDB	Command code (LSBy)
7	0x00	Not used
8	AFI	The application family identifier to be written to the ID tag [0x0..0xFF].
9..N	0x00	Not used

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

PLC process data input image

Byte no.	Contents	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSB)
5	0x65	Response code (MSBy)
6	0xDB	Response code (LSBy)
7	0x00	Not used
8	AFI	Application family identifier of the ID tag (echo of the command) [0x0..0xFF].
9..N	0x00	Not used

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

17.27 Command "SET DSFID LOCKED"

With this command, the controller protects the data structure format identifier (DSFID) of the ID tag against tampering.

The set tampering protection cannot be deactivated!

PLC process data output image

Byte no.	Contents	Remark
1	0x04	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSBy)
4	0x02	Command length (LSBy)
5	0x65	Command code (MSBy)
6	0xDC	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

Byte no.	Contents	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x02	Response length (LSB)
5	0x65	Response code (MSBy)
6	0xDC	Response code (LSBy)
7..N	0x00	Not used

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

Bit TA = TR: The command has been processed by the evaluation unit.

17.28 Command "SET AFI LOCKED"

With this command, the controller protects the application family identifier (AFI) of the ID tag against modification.

The set tampering protection cannot be deactivated!

PLC process data output image

Byte no.	Contents	Remark
1	0x04	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSBy)
4	0x02	Command length (LSBy)
5	0x65	Command code (MSBy)
6	0xDD	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

Byte no.	Contents	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x02	Response length (LSB)
5	0x65	Response code (MSBy)
6	0xDD	Response code (LSBy)
7..N	0x00	Not used

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

17.29 Command "SET ID-tag"

With this command, the controller overwrites the working memory of the ID tag with an adjustable value.

PLC process data output image

Byte no.	Contents	Remark
1	0x04	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSBy)
4	0x08	Command length (LSBy)
5	0x65	Command code (MSBy)
6	0xDE	Command code (LSBy)
7..8	LEN (2)	Data length in bytes to be overwritten with the [DEF] value: [0x0] = automatic detection of the number of the blocks of the ID tag. [0x1.. nn] = number of the blocks to be set to the [DEF] value. ADDR + LEN must be smaller than the number of the blocks of the ID tag.
9..10	ADDR	Start address of the working memory to be overwritten with the [DEF] value [0x0..nn]. "nn" must be smaller than the "number of the blocks of the ID tag - 1".
11	0x00	Not used
12	DEF	DEFault data value of the ID tag [0x00..0xFF]
13..N	0x00	Not used

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

(2) Note the data sheet for the ID tag for automatic evaluation of the number of blocks.

PLC process data input image

Byte no.	Contents	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x08	Response length (LSB)
5	0x65	Response code (MSBy)
6	0xDE	Response code (LSBy)
7..8	LEN	Data length in bytes overwritten with the [DEF] value.
9..10	ADDR	Start address of the working memory overwritten with the [DEF] value.
11	0x00	Not used
12	DEF	DEFault data value of the ID tag [0x00..0xFF]
13..N	0x00	Not used

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

Bit TA = TR: The command has been processed by the evaluation unit.

17.30 Telegram examples of the RWH_CMD module

The telegram examples base on the following device configuration:

- 2 read/write heads connected to channels IO-1 and IO-2. ID tag detected on both channels.
- Set channel mode on channels IO-1 and IO-2: RWH_CMD_26.
- Set channel mode on channels IO-3 and IO-4: OFF.

The representation of the values in the examples is hexadecimal:

30 = 0x30 (hexadecimal) = 48 (decimal)

17.30.1 Read UID and RSSI values asynchronously

Display of the user data traffic

Command sent by the controller:

000000000000000000000000000000000000000000000000000000**0000**00000000000000000000000000000000000000000000000000

Controller: Read UID and RSSI values of the ID tags on channel IO-1 and channel IO-2. The TR bits of both channels remain unchanged.

Response sent by evaluation unit:

0100000A0003e00401004c5f494c00000000000000000000000000**0100**000A0002e00801138ca1d7cb00000000000000000000000000

Evaluation unit: Read UID and RSSI values of channels IO-1 and IO-2.

Display of the user data traffic, read diagnostics

Command sent by the controller:

400100000000000000000000000000000000000000000000000000**4000**00000000000000000000000000000000000000000000000000

Controller: Read diagnostic information of channels IO-1 and IO-2. Activate read request by sending bit TR = NOT (TA).

Response sent by the evaluation unit after processing of the command:

400100010000F4FE03000000000000000000000000000000000000**4100**00000000000000000000000000000000000000000000000000

Evaluation unit: Diagnostic information with one element is available on channel IO-1. Diagnostics: Read/write head does not function (timeout). Channel IO-1 detects an ID tag and has no diagnostic information.

The UID can be read again by resetting bit DR within the control byte. Example of "reset bit DR on both channels":

Command sent by the controller:

000000000000000000000000000000000000000000000000000000**0001**00000000000000000000000000000000000000000000000000

Controller: Read and remove diagnostics on channels IO-1 and IO-2. Activate mode by sending bit TR = NOT (TA).

17.30.2 Read user data of the ID tag synchronously

Display of the user data traffic

Last response from the evaluation unit:

0100000A0003e00401004c5f494c0000000000000000000000000000**0101**000A0002e00801138ca1d7cb0000
0000000000000000000000

With the last response of the evaluation unit, the status can be shown in the PLC process data input image.

- Byte 2 (bit TA) for channel IO-1
- Byte 28 for channel IO-2

Command sent by the controller:

1801000A0004000000000000000000000000000000000000000000**1800**0008000200000000000000000000
0000000000000000000000

Controller: “Read user data of the ID tag” on channels IO-1 and IO-2.

Response sent by the evaluation unit during processing of the command:

19000000000000000000000000000000000000000000000000000000**1901**0000000000000000000000000000
0000000000000000000000

Evaluation unit: ID tag detected, response data in channels IO-1 and IO-2 set to default setting.

Response sent by the evaluation unit after processing of the command:

1901000A000411223344556677889 9AA00000000000000000000**1900**000800023344556677889 9
AA00000000000000000000000

Evaluation unit: ID tag detected, user data read on channels IO-1 and IO-2.

Display of the user data traffic, read diagnostics

Last response from the evaluation unit:

1901000A000411223344556677889 9AA00000000000000000000**1900**000800023344556677889 9
AA00000000000000000000000

With the response, the status byte of the evaluation unit can be determined:

- Byte 2 (bit TA) for channel IO-1
- Byte 28 for channel IO-2

Command sent by the controller:

50000000000000000000000000000000000000000000000000000000**5001**0000000000000000000000000000

0000000000000000000000

Controller: Read diagnostic information of channel IO-1 and channel IO-2. Activate mode by sending bit TR = NOT (TA).

Response sent by the evaluation unit after processing of the command:

500100010000F4FE0300000000000000000000000000000000000000**5100**0000000000000000000000000000
0000000000000000000000

Evaluation unit: Diagnostic information with one element is available on channel IO-1.

Diagnostics: Read/write head does not function (timeout). Channel IO-1 detects an ID tag and has no diagnostic information.

The user data can be read back again by resetting bit DR within the control byte. Example of "reset bit DR on both channels“:

Command sent by the controller:

1800000A0004000000000000000000000000000000000000000000**1801**000800020000000000000000000000000000000000000000000000000000

Controller: Read and remove diagnostics on channels IO-1 and IO-2. Activate mode by sending bit TR = NOT (TA).

17.30.3 Read user data of the ID tag asynchronously

Display of the user data traffic

Last response from the evaluation unit:

0100000A0003e00401004c5f494c0000000000000000000000000**0101**000A0002e00801138ca1d7cb0000000000000000000000000

With the response, the status byte of the evaluation unit can be determined:

- Byte 2 (bit TA) for channel IO-1
- Byte 28 for channel IO-2

Command sent by the controller:

3801000A0004000000000000000000000000000000000000000000**3800**000800020000000000000000000000000000000000000000000000000000

Controller: Read user data of the ID tag on channels IO-1 and IO-2 asynchronously.

Response sent by evaluation unit when an ID tag is detected on channel IO-2:

3800000000000000000000000000000000000000000000000000**3900**000800023344556677889 9AA0000000000000000000000000

Evaluation unit: No ID tag detected on channel IO-1. ID tag detected on channel IO-2, user data read.

Response sent by evaluation unit when an ID tag is detected on channel IO-1:

3901000A000411223344556677889 9AA0000000000000000000**3900**000800023344556677889 9AA0000000000000000000000000

Evaluation unit: ID tag detected on channel IO-1, user data read. ID tag on channel IO-2 still detected, the data on channel IO-2 remains unchanged.

The command is finished by sending a new command.

Display of the user data traffic, read diagnostics

Command sent by the controller:

7000000000000000000000000000000000000000000000000000**7001**000000000000000000000000000000000000000000000000000000

Controller: Read diagnostic information of channel IO-1 and channel IO-2. Activate mode by sending bit TR = NOT (TA).

Response sent by the evaluation unit after processing of the command:

700100010000F4FE0300000000000000000000000000000000000**7100**000000000000000000000000000000000000000000000000

Evaluation unit: Diagnostic information with one element is available on channel IO-1.

Diagnostics: Read/write head does not function (timeout). Channel IO-2 has no diagnostic information.

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The user data can be read back again by resetting bit DR within the control byte. Example of "reset bit DR on both channels“:

Command sent by the controller:

3800000A0004000000000000000000000000000000000000000**3801**0008000200000000000000000000000000000000000000000

Controller: Read user data of the ID tag on channels IO-1 and IO-2 asynchronously. Activate mode by sending bit TR = NOT (TA).

17.30.4 Write user data of the ID tag synchronously

Display of the user data traffic

Last response from the evaluation unit:

0100000A0003e00401004c5f494c0000000000000000000000000**0101**000A0002e00801138ca1d7cb000000000000000000000

With the last response of the evaluation unit, the status can be shown in the PLC process data input image.

- Byte 2 (bit TA) for channel IO-1
- Byte 28 for channel IO-2

Command sent by the controller:

140100040008C1C2C3C4000000000000000000000000000000000**1400**000A0020B1B2B3B4B5B6B7B8B9BA00000000000000000000

Controller: Writing of 4 bytes of user data of the ID tag starting with address 0x0008 to channel IO-1, writing 10 bytes of user data starting with address 0x0020 to channel IO-2.

Response sent by the evaluation unit during processing of the command:

1500000000000000000000000000000000000000000000000000**1501**000A0020000000000000000000000000000000000000000

Evaluation unit: Send “ID tag is in field”, response data in channels IO-1 and IO-2 set to default values.

Response sent by the evaluation unit after processing of the command

1501000400080000000000000000000000000000000000000000**1500**000A0020000000000000000000000000000000000000000

Evaluation unit: ID tag detected, response data on channels IO-1 and IO-2 reset to default values.

Response sent by the evaluation unit after processing of the command:

1501000400080000000000000000000000000000000000000000**1500**000A0020000000000000000000000000000000000000000

Evaluation unit: ID tag detected, user data read on channels IO-1 and IO-2.

Display of the user data traffic, read diagnostics

Command sent by the controller**:**

500000000000000000000000000000000000000000000000000000**5001**00000000000000000000000000000000000000000000000000

Controller: Read diagnostic information of channel IO-1 and channel IO-2. Activate mode by sending bit TR = NOT (TA).

Response sent by the evaluation unit after processing of the command:

500100010000F4FE03000000000000000000000000000000000000**5100**00000000000000000000000000000000000000000000000000

Evaluation unit: Diagnostic information with one element is available on channel IO-1.

Diagnostics: Read/write head does not function (timeout). Channel IO-2 detects an ID tag and has no diagnostic information.

The user data can be read back again by resetting bit DR within the control byte. Example of "reset bit DR on both channels“:

Command sent by the controller:

1400000A0004000000000000000000000000000000000000000000**1401**00080002000000000000000000000000000000000000000000

Controller: Read and remove diagnostics on channels IO-1 and IO-2. Activate mode by sending bit TR = NOT (TA).

17.30.5 Write user data of the ID tag asynchronously

Example configuration of 2 IO channels of a length of 26 bytes per channel.

Display of the user data traffic

Last response from the evaluation unit:

0100000A0003e00401004c5f494c0000000000000000000000000000**0001**000A0002e00801138ca1d7c
b00000000000000000000000000

With the response, the status byte of the evaluation unit can be determined:

- Byte 2 (bit TA) for channel IO-1
- Byte 28 for channel IO-2

Command sent by the controller:

340100040008C1C2C3C4000000000000000000000000000000000000**3400**000A0020B1B2B3B4B5B6B7B
8B9BA00000000000000000000

Controller: Writing of 4 bytes of user data of the ID tag starting with address 0x0008 to channel IO-1, writing of 10 bytes of user data starting with address 0x0020 to channel IO-2.

Response sent by the evaluation unit during processing of the command:

350000000000000000000000000000000000000000000000000000000000**3401**0000000000000000000000000000000
0000000000000000000

Evaluation unit: ID tag detected on channel IO-1; no ID tag detected on channel IO-2. Response data on channels IO-1 and IO-2 reset to default values.

Response sent by the evaluation unit after processing of the command:

350100040008000000000000000000000000000000000000000000000000**3501**0000000000000000000000000000000
0000000000000000000

Evaluation unit: Command on channel IO-1 processed; ID tag on channel IO-1 detected.

Response sent by the evaluation unit after processing of the command:

350100040008000000000000000000000000000000000000000000000000**3500**000A0020000000000000000000
0000000000000000000

Evaluation unit: Data on channel IO-1 unchanged; command on channel IO-2 processed.

Display of the user data traffic, read diagnostics

Command sent by the controller:

700000000000000000000000000000000000000000000000000000000000**7001**0000000000000000000000000000000
0000000000000000000

Controller: Read diagnostic information of channel IO-1 and channel IO-2. Activate mode by sending bit TR = NOT (TA).

Response sent by the evaluation unit after processing of the command:

700100010000F4FE0300000000000000000000000000000000000000**7100**0000000000000000000000000000000
0000000000000000000000000

Evaluation unit: Diagnostic information with one element is available on channel IO-1. Diagnostics: Read/write head does not function (timeout). Channel IO-2 detects an ID tag and has no diagnostic information.

17.30.6 User data on the ID tag verified and write synchronously

Example configuration of 2 IO channels of a length of 26 bytes per channel.

Display of the user data traffic

Last response from the evaluation unit:

0100000A0003e00401004c5f494c0000000000000000000000000000**0101**000A0002e00801138ca1d7c
b00000000000000000000000000

With the response, the status byte of the evaluation unit can be determined:

- Byte 2 (bit TA) for channel IO-1
- Byte 28 for channel IO-2

Command sent by the controller:

1C0100040008C1C2C3C400000000000000000000000000000000**1C00**000A0020B1B2B3B4B5B6B7B
8B9BA00000000000000000000

Controller: Write and verify 4 bytes of user data of the ID tag starting with address 0x0008 on channel IO-1, write and verify 10 bytes of user data starting with address 0x0020 on channel IO-2.

Response sent by the evaluation unit during processing of the command:

1D0000000000000000000000000000000000000000000000000000**1D01**000000000000000000000000
000000000000000000000000

Evaluation unit: ID detected on channels IO-1 and IO-2. Response data on channels IO-1 and IO-2 reset to default values.

Response sent by the evaluation unit after processing of the command:

1D0100040008C1C2C3C400000000000000000000000000000000**1D00**000A0020B1B2B3B4B5B6B7B
8B9BA00000000000000000000

Evaluation unit: Read back user data of the ID tag on channels IO-1 and IO-2.

Display of the user data traffic, read diagnostics

Command sent by the controller:

500000000000000000000000000000000000000000000000000000**5001**000000000000000000000000000000
00000000000000000000

Controller: Read diagnostic information of channel IO-1 and channel IO-2. Activate mode by sending bit TR = NOT (TA).

Response sent by the evaluation unit after processing of the command:

500100010000F4FE0300000000000000000000000000000000**5100**000000000000000000000000
000000000000000000000000

Evaluation unit: Diagnostic information with one element is available on channel IO-1.

Diagnostics: Read/write head does not function (timeout). Channel IO-1 detects an ID tag and has no diagnostic information.

The user data can be read back again by resetting bit DR within the control byte. Example of "reset bit DR on both channels“:

Command sent by the controller:

1C0000040008C1C2C3C4000000000000000000000000000000000**1C01**000A0020B1B2B3 B4B5B6B7B8B9BA00000000000000000000

Controller: Read and remove diagnostics on channels IO-1 and IO-2. Activate mode by sending bit TR = NOT (TA).

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17.30.7 Execute synchronous command channel

Example configuration of 2 IO channels of a length of 26 bytes per channel.

Display of the user data traffic

Last response from the evaluation unit:

0100000A0003e00401004c5f494c000000000000000000000000**0001**000A0002e00801138ca1d7c b000000000000000000000000

With the response, the status byte of the evaluation unit can be determined:

- Byte 2 (bit TA) for channel IO-1
- Byte 28 for channel IO-2

Command sent by the controller:

0881000662D10006000A000000000000000000000000000000000**0001**000000000000000000000000 000000000000000000000000

Controller: Locking the data blocks of the ID tag from block number 6 to block number 15 on channel IO-1. No command execution on channel IO-2.

Response sent by evaluation unit:

0981000000000000000000000000000000000000000000000000**0001**000000000000000000000000 000000000000000000000000

Evaluation unit: ID tag detected on channel IO-1. While the command is being processed, the response data in channel IO-1 is set to default setting. No ID tag detected on channel IO-2.

Display of the user data traffic, read diagnostics

Command sent by the controller:

0880000262C8000000000000000000000000000000000000000000**0001**000000000000000000000000 000000000000000000000000

Controller: Reading of the diagnostic information on channel IO-1. No command execution on channel IO-2.

Response sent by evaluation unit:

0980000862C80001F4FE03000000000000000000000000000000000**0001**000000000000000000000000 000000000000000000000000

Evaluation unit: Diagnostic information with one element is available on channel IO-1.

Diagnostics: Read/write head does not function (timeout). Channel IO-1 detects an ID tag and has no diagnostic information.

The user data can be read back again by resetting bit DR within the control byte. Example of "reset bit DR on both channels":

Command sent by the controller:

3801000A0004000000000000000000000000000000000000000000**3800**0008000200000000000000000000000000000000000000000000

Controller: Read and remove diagnostics on channels IO-1 and IO-2. Activate mode by sending bit TR = NOT (TA).

18 Error codes of the evaluation unit

18.1 Error messaging of the binary protocol

Errors are indicated with bit "Diag" = "1" within the status byte of the command response of the evaluation unit. Up to 4 diagnostic messages can be transferred simultaneously per channel. After all diagnostic messages have been read, bit "Diag" = "0" is set by the evaluation unit.

Device-relevant hardware diagnostic messages are displayed on all active channels by setting bit "Diag" = "1".

An inactive channel can only transfer hardware diagnostic messages.

Example:

Request for diagnostics: control byte = 0x40

Response of the evaluation unit to the diagnostic request: 0xC001**F4FE9000**

18.2 Error messaging of the ASCII protocol

Errors are displayed within the command response of the evaluation unit with byte Diag = 0x01. The error code itself is read with the command "DI". After all diagnostic messages have been read, byte Diag is set to 0x00 by the evaluation unit.

Example:

Command request of the host: DI_01<CR/LF>

Command response of the evaluation unit: DI_01_01_01_**F4FE9000**<CR/LF>

18.3 Error codes

The error codes of the binary and the ASCII protocols are identical.

Error group F1	Error code	Meaning
ID tag	F1FE0200	No ID tag. ID tag has left the transfer window
ID tag	F1FE0300	Address or command does not match the ID tag characteristics, memory size invalid
ID tag	F1FE0400	ID tag is defective, replace ID tag or battery
ID tag	F1FE0500	Overflow of the ID tag memory UID > 16 bytes
ID tag	F1FE0900	Command not supported by the ID tag
ID tag	F1FE0A00	Access error, e.g. block locked (→ ISO18000-x)
ID tag	F1FE0B00	General ID tag error not specified in detail
ID tag	F1FE0C00	Unknown internal error

Error group F4	Error code	Meaning
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 in this mode not supported (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 UID (internal error)
Evaluation unit	F4FE8700	Reconfiguration of the IO port channel not yet allowed (internal error)
Evaluation unit	F4FE8800	Parameter flag of the IO port parameter not set (internal error)

Error group F4	Error code	Meaning
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 is reconfigured
Evaluation unit	F4FE8E00	Read/write head could not process the command, e.g. read/write length exceeded, ID tag memory error, write to locked block
Evaluation unit	F4FE8F00	ID 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	Overtemperature 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	I²C communication error (internal error)
Evaluation unit	F4FE900B	I²C communication parity error (internal error)
Evaluation unit	F4FE900C	Command rejected because the HF field is switched off
Evaluation unit	F4FE900D	Internal data of PROFINET stack corrupt (internal error)
Evaluation unit	F4FE900E	Read/write head does not support this object
Evaluation unit	F4FE9401	Front-end error detected by read/write head
Evaluation unit	F4FE9402	General error detected by read/write head
Evaluation unit	F4FE9403	ID link error detected by read/write head
Evaluation unit	F4FE9404	Buffer overrun error detected by 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	Writing 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 ID tag failed (internal error)
Evaluation unit	F4FEA800	Writing to the user data of the ID tag failed, command WU (internal error)
Evaluation unit	F4FEA900	Writing to the user data of the ID tag failed, command WV (internal error)
Evaluation unit	F4FEAA00	Verification of the ID tag user data 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 ID tag blocks (internal error)
Evaluation unit	F4FEAD00	Reading of the block size or number of the blocks of the ID failed

Error group F5	Error code	Meaning
Communication user - evaluation unit	F5FE0800	Command is processed by another user (displayed 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
Communication user - evaluation unit	F5FE8400	Invalid command request in module RWH_CMD detected

Error group F6	Error code	Meaning
Command error	F6FE0300	Invalid command parameter (e.g. data range)

19 Glossary

Term	Description
Antenna	RFID antenna built into a read/write head.
Asynchronous	The data of the command response is updated after the evaluation unit detects a status change of the ID tag from “not present” to “present” or vice versa.
Evaluation unit	RFID evaluation units DTE100, DTE101, DT102, DTE103, DTE104.
Block size	Size of one block of the ID tag, e.g. 4/8/32 bytes.
Hexadecimal	Number format with 16 values to represent a numerical value (0..9, A, B, C, D, E, F).
ID tag	RFID ID tag, e.g. E80360, E80370.
Read/write head	RFID read/write head (e.g. ANT411, ANT513).
N	Selected module size of the IO-channel.
Emergency system	Web server with reduced functionality to download the firmware of the evaluation unit.
User data	Data area of the ID tag which can be read and written at will.
PermData	Non-volatile data area of the evaluation unit for storage of user-specific settings (e.g. fieldbus parameter, address settings etc.).
Process data output image	Data area in which the PLC can write to the inputs of the external peripherals (%QBx).
Process data input image	Data area in which the PLC can read the outputs of the external peripherals (%IBx).
RSSI	The receive signal strength indicator indicates the quality of the received ID tag signal. The higher the value, the better the reception of the ID tag signal.
PLC, controller	Programmable logic controller (e.g. Allen Bradley Compact Logix, Beckhoff CX5020, Siemens CPU 315-2 DP/PN).
Synchronous	Data of the command response is updated immediately with the currently detected status of the ID tag.
Connection	Describes the logical connection between two objects, e.g. controller and slave.
Web client	PC program to send “http protocol” requests, e.g. Firefox, Internet Explorer.
Web server	Built-in “http protocol” server to process http requests from a PC.