RFID-AS-HF-EIP

Device Manual (Supplement)

V 1.1

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2 List of Abbreviations

RFID-SA-HF-EIP: Read Write RFID antenna/head
RFID: Radio Frequency Identification
HF: High Frequency. RFID-SA-HF-EIP supports 13.56 MHz
UID: Unique ID of and High Frequency RFID tag
RSSI: Received Signal Strength Indicator
ID: Identification, Generally in reference to and ID RFID tag
RWH_CMD: Read Write Head Command
MSByte: Most Significant Byte
LSByte: Least Significant Byte
ms: millisecond

3 Ethernet/IP Configuration and Assembly Size settings

Install the EDS file to the controller and create an Ethernet/IP node as an Exclusive Owner in the controller. Three assemblies are created in the controller: Configuration, Input and Output

NOTE: The EDS file can be found in the webserver of the device

The configuration assembly is a structured data type and requires settings to configure when a connection is made from the controller to the RFID-SA-HF-EIP.
The user sets the sizes of the Input and Output assemblies based on the settings of the Module Identifiers in the Configuration Assembly.

3.1 Configuration Assembly:

3.1.1 Module names:

The configuration assembly requires the setting of three modules:
RWH Module: setting for reading and writing HF RFID ID tags
IO1: Auxiliary input or output used by Pin 4 of the RFID-SA-HF-EIP power connector.
IO2: Auxiliary input or output used by Pin 2 of the RFID-SA-HF-EIP power connector.

3.1.2 Module Identifiers

RWH_Module Identifier: Settings varies with application
IO_1_Module Identifier : Settings varies with application
IO_2_Module Identifier : Settings varies with application

See section 3.2 and Figure 1 for an explanation of the module identifiers settings .
The user selections create the IO mapping of the RFID-SA-HF-EIP's data in the PLC. See section 3.3 for mapping.

3.1.3 RWH Data Hold Time

Data hold time: Time in ms *10 RFID data is kept stable. This is helpful if the time interval, in which the RFID tag data are available, is shorter than the controller can read these from the RFID unit.

Data hold time calculation for asynchronous (continuous) commands
The setting of the IO-channel parameter Data hold time influences the time, how long the bits TP (tag present) and the response data are kept stable in the process data input image when executing asynchronous command.

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

Formula for data hold time calculation

Data hold time = 2 x PLC maximum cycle time

3.1.4 RWH Number of Blocks and Block Size

Number of blocks: Number of blocks available on the ID tag.
Block size: Number of bytes per block available on the ID tag.
See ID tag information for proper settings of the Number of blocks and Block size.
Range 0...127. A value=0 =256 bytes.

3.1.5 RWH Edge Controlled UID Reading

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

3.1.6 IO1 and IO2 Overload Detection

Not used. Set to default value=0/Off

3.1.7 IO2 Fail Safe Mode

0/Off (Default) or 1/On.
Failsafe mode = off: The IO-Channel is deactivated if no connection to the Ethernet/ IP scanner is established.
Failsafe mode = on: The IO-Channels remain activated and the outputs keep the last received state if no connection to the Ethernet/IP scanner is established.

3.2 Input and Output Assembly Sizes

The size of the input and output assembly for the Ethernet/IP module depends on the user selections of the RFID-SA-HF-EIP's Module Identifiers. The Module Identifiers are in the Configuration assembly.
Figure 1 shows the number of bytes produced or consumed by each Module Identifier.
RWH_CMD Module Identifier is for configuring RFID reading and writing. The user selects the Module ID value depending on application needs and controller capability.
Input and Output Module Identifiers are on-board discrete input and outputs available on the RFID-SA-HF-EIP.
See Figure 2 for examples for calculating the size of Input and Output assemblies for the controller.

Module ID	Module Identifier name	Description	Total bytes produced or consumed
0	Inactive	Module Inactive	0 Byte In/Out
2	Input [1]	Cyclic transmission	20 Byte In/Out
3	Output[1]	Cyclic transmission	20 Byte In/Out
12	RWH_CMD26	Cyclic command channel	26 Byte In/Out
13	RWH_CMD46	Cyclic command channel	46 Byte In/Out
14	RWH_CMD66	Cyclic command channel	66 Byte In/Out
15	RWH_CMD86	Cyclic command channel	86 Byte In/Out
16	RWH_CMD106	Cyclic command channel	106 Byte In/Out
17	RWH_CMD126	Cyclic command channel	126 Byte In/Out
18	RWH_CMD146	Cyclic command channel	146 Byte In/Out
19	RWH_CMD166	Cyclic command channel	166 Byte In/Out
20	Input_2B[2]	Cyclic transmission	2 Byte In/Out
21	Output_2B[2]	Cyclic transmission	2 Byte In/Out

Figure 1

[1]20 bytes are reserved for mapping of diagnostic information of the IO-1 and IO-2 Channel. See section 6.2 and/or 7.2

(2)2 bytes are reserved in the mapping. No diagnostic information of the IO-1 and IO-2 channel will be available.

Example: Calculating Input and Output assembly sizes

Number	RFID channel	Channel IO-1	Channel IO-2	PLC Input / Output data Assembly size [bytes]
1	RWH_CMD_26	Inactive (0 Byte In/Out)	Inactive (0 Byte In/Out)	26
2	RWH_CMD_46	INTPUT_2B	OUTPUT_2B	50
3	RWH_CMD _166	INTPUT (20 Byte In/Out)	OUTPUT (20 Byte In/Out)	206

Figure 2

3.3 Mapping of the Input and Output assemblies

RWH_CMD Module Identifier is configured according to Figure 1
IO1 and IO2 Module Identifiers are Inactive

Byte no.	Byte
1	RWH_CMD Module Control Byte 1
2	RWH_CMD Module Control Byte 2
3...n	RWH_CMD Module Data byte 1.n

Figure 3

n=number of In/Out bytes for RWH_CMD modules shown in Figure 1

RWH_CMD Module Identifier is configured according to Figure 1
IO1 Module Identifier is not set Inactive
IO2 Module Identifier is Inactive

Byte no.	Byte
1	RWH_CMD Module Control Byte 1
2	RWH_CMD Module Control Byte 2
3...n	RWH_CMD Module Data byte 1...n
n+1	IO1 Module Data byte 1
n+2	IO1 Module Data byte 2
n+m	Last IO1 Module Data byte

Figure 4

n=number of In/Out bytes for RWH_CMD modules shown in Figure 1
m=number of In/Out bytes for IO1 module shown in Figure 1
RWH_CMD Module Identifier is configured according to Figure 1
IO1 Module Identifier is not set Inactive
IO2 Module Identifier is not set Inactive

Byte no.	Byte
1	RWH_CMD Module Control Byte 1
2	RWH_CMD Module Control Byte 2
3...n	RWH_CMD Module Data byte 1...n
n+1	IO1 Module Data byte 1
n+2	IO1 Module Data byte 2
n+m	Last IO1 Module Data byte
n+m+1	IO2 Module Data byte 1
n+m+2	IO2 Module Data byte 2
n+m+p	Last IO2 Module Data byte

Figure 5

n=number of In/Out bytes for RWH_CMD module shown in Figure 1
m=number of In/Out bytes for IO1 module shown in Figure 1
p=number of In/Out bytes for IO2 module shown in Figure 1

RWH_CMD Module Identifier is configured according to Figure 1
IO1 Module Identifier is set Inactive
IO2 Module Identifier is not set active

Byte no.	Byte
1	RWH_CMD Module Control Byte 1
2	RWH_CMD Module Control Byte 2
3...n	RWH_CMD Module Data byte 1...n
n+1	IO2 Module Data byte 1
n+2	IO2 Module Data byte 2
n+p	Last IO2 Module Data byte

Figure 6

n=number of In/Out bytes for RWH_CMD modules shown in Figure 1
p=number of In/Out bytes for IO2 module shown in Figure 1

3.4 Mapping of the Input and Output assemblies examples

Example: Input and Output Mapping of RFID only Example (Reference Figure 3)
RWH_CMD26 Module Identifier is selected
IO1 and IO2 Module Identifiers are Inactive

Byte no.	Byte
1	RWH_CMD Module Control Byte 1
2	RWH_CMD Module Control Byte 2
3...26	RWH_CMD Module Data byte 3...26

Example: Input and Output Mapping of RFID and 2 byte Input Example
(Reference Figure 4)
RWH_CMD46 Module Identifier is selected
Input_2B Module Identifier is selected for IO1 and IO2 Module Identifier is inactive

Byte no.	Byte
1	RWH_CMD Module Control Byte 1
2	RWH_CMD Module Control Byte 2
3...46	RWH_CMD Module Data byte 3...46
47...48	IO1 Module Data byte 1...2

Example: Input and Output Mapping of RFID and 20 byte Input and Output Example
(Reference Figure 5)
RWH_CMD166 Module Identifier is selected
Input and Output Module Identifiers are selected for IO1 and IO2, respectively

Byte no.	Byte
1	RWH_CMD Module Control Byte 1
2	RWH_CMD Module Control Byte 2
3...166	RWH_CMD Module Data byte 3...166
167...186	IO1 Module Data byte 1...20
187...206	IO2 Module Data byte 1...20

Example: Input and Output Mapping of RFID, IO1 is inactive and 2 byte Output is configured for IO2 (Reference Figure 6)

RWH_CMD166 Module Identifier is configured according to Figure 1

IO1 Module Identifier is set Inactive

Input_2B Module Identifier is selected

Byte no.	Byte
1	RWH_CMD Module Control Byte 1
2	RWH_CMD Module Control Byte 2
3...166	RWH_CMD Module Data byte 3...166
167...168	IO2 Module Data byte 1...2

4 RWH_CMD Module Mode settings

4.1 Module "RWH_CMD," general description

This module allows the user to interface with an HF ID tag. The Control Bytes are used to set the following modes:

- Read the UID and RSSI data continuously
- Read the User Memory once on a command request (Synchronous mode).
- Read the User Memory data once when a change of UID data is detected (Asynchronous mode).
- Write to the User Memory data of the an ID tag on a command request
- Write to the User Memory data once when a change of UID data is detected
- Write to the User Memory and Verify Read on a command request.
- Write to the User Memory and Verify Read when a change of UID data is detected.

PLC process data output image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Res	**DR**	**ER**	**UR**	**RD**	**WR**	**AO**	Res
2	**CR**	Res	Res	Res	Res	Res	Res	**TR**
3	Data byte1							
...	...							
N [(1)]	Last byte of RWH_CMD module							

[(1)]N= Last byte of RWH_CMD module

Description Control byte 1:

Bit	Bit name	Description
0	Res	**Res**erved. Must be set to default value 0.
1	**AO**	**"A**ntenna field **O**ff" request
2	**WR**	Mode "**WR**ite data" to the RFID-SA-HF-EIP
3	**RD**	Mode "**R**ea**D** data" from the RFID-SA-HF-EIP
4	**UR**	Mode "**U**se**R** / UID / TID bank data access" to the ID tag
5	**ER**	Mode "**E**vent controlled **R**eading" of User memory of the ID tag
6	**DR**	Mode "**D**iagnostics **R**ead" Set by the controller to fetch the diagnostics, signaled by the RFID-SA-HF-EIP in the Diag-Status bit
7	Res	**Res**erved. Has to be set to default value 0.

Remark:

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

Description Control byte 2:

Bit	Bit name	Description
0	**TR**	"Toggle Request"
1...6	Res	Reserved. Has to be set to default value 0.
7	**CR**	Mode "Command Request" Activate the command channel of the RFID-SA-HF-EIP. If this bit is set, all other modes must be deactivated.

Toggle Request

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

Example:

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

Command Request

The bit CR is to be set when utilizing the Get/Set Commands. See section 5.

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

Description Byte 3…n, "Data byte 1…(N-2)":
Dependent on the selected mode, this data area contains the command data to send to the RFID-SA-HF-EIP.
Default value "Control byte 1 and 2": 0x00
Mode: Read UID automatically, antenna field on

PLC process data input image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	**DIAG**	**DA**	**EA**	**UA**	**RA**	**WA**	**AI**	**TP**
2	**CA**	Res	Res	Res	Res	Res	Res	**TA**
2	Data byte 1							
3	Data byte 2							
...	...							
N	Last byte of RWH_CMD module							

Description Byte1, "Status byte 1":

Bit	Bit name	Description
0	**TP** (1)	ID **T**ag **P**resent Bit is set to 1 as long as at least one ID tag is detected by the integrated Read/Write head. With the channel parameter "data hold time" the status of the bit can be extended.
1	**AI** (1)	**A**ntenna field **I**nactive
2	**WA** (2)	Mode "**W**rite data" to the RFID-SA-HF-EIP **A**ctive
3	**RA** (2)	Mode "**R**ead data" from the RFID-SA-HF-EIP **A**ctive
4	**UA** (2)	Mode "**U**ser data access" **A**ctive
5	**EA** (2)	Mode "Receive User data on **E**vent change" **A**ctive
6	**DA** (2)	Mode "**D**iagnostics read" **A**ctive
7	**DIAG** (1)	**DIAG**nostic data present, but not yet written in the response buffer. The response buffer contains still ID tag data. The diagnostics data will be copied in the response buffer after detecting that DR control bit is set and the bit TR has been toggled by the controller

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

(2)Bits WA, RA, UA, EA, DA are immediately set when the RFID-SA-HF-EIP detects the setting of the corresponding bits in the control bytes 1 and 2 of the PLC data output image. Any change in the settings of these bits to prior received states set the data bytes 1... (n-2) to the default value 0x00.

The bit TR does not influence this behavior.

Description Byte 2, "Status byte 2":

Bit	Bit name	Description
0	**TA**	**T**oggle request **A**cknowledge
1...6	Res	Reserved.
7	**CA**	Get/Set "**C**ommand Mode **A**ctive"

Toggle Acknowledge

Bit TA reflects the state of the command execution. When the RFID-SA-HF-EIP receives the bit TR from the controller at the state complimentary to the bit TA, a request to start the command is received from the controller. While the command execution is running, the bit TA will not change its state. When the command processing as completed the bit TA will be set to the state of the bit TR. The RFID-SA-HF-EIP is ready to process another command.

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

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

Dependent on the selected mode, this data area contains the response data read from the RFID-SA-HF-EIP or the diagnostics information.

4.2 Module "RWH_CMD," Read UID / RSSI data of the ID tag asynchronously

In this mode the UID data and the RSSI value of the ID tag can be read automatically without sending any read request. This mode is suitable if the user does not know when the ID tag is present in front of the Read/Write head. Additionally this mode allows the fastest detection of ID tag cause no command request need to be send to the RFID-SA-HF-EIP. The UID is transmitted in real time and the PLC cycle time need to be about factor 2 shorter as the ID tag is detected by the Read/Write head.
The setting of the IO-channel parameter "Data hold time" influence 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 (Module RWH_CMD)

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

(1)N= Last byte of RWH_CMD module

Description byte 1, "Control byte 1":

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

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

Description byte 2, "Control byte 2":

Bit	Bit name	Description
0	TR (2)	**T**oggle **R**equest. Controls the execution of the selected mode
1...7	-	Has to be set to default value 0

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

The initial state of the RFID-SA-HF-EIP after the controller establishes Ethernet/IP communication will have all PLC process data output image and PLC process data input image bytes set to 0x00. No command via the TR bit is required to read the UID. If the mode has been changed then the Read UID command must be executed using the TR bit to start the reading of the UID.

Description bytes 3...N:
Any set values are ignored

PLC process data input image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	0	0	0	0	0	AI	TP
2	0	0	0	0	0	0	0	TA
3	0x00							
4	RSSI + UID data length read							
5	0x00							
6	RSSI value							
7	UID data byte 1 (MSbyte)							
8	UID data byte 2							
…	…							
10/14/18/22	UID data byte 4/8/12/16 (LSByte)							
…	…							
N	0x00							

Description Byte 1, “Status byte 1”:

Bit	Value	Description	Remark
TP	0	No ID tag detected in front of the Read/Write head	-
	1	ID tag is detected in front of the Read/Write head	Bit is set to 1 as long as the ID tag is detected by the R/W head. With the channel parameter “data hold time” the status of the bit can be extended.
AI	0	“Antenna field on” active	-
Diag	0	No error detected	-
	1	RFID-SA-HF-EIP diagnostics available	Channel related or channel independent error occurred.

Description Byte 2, “Status byte 2”:

Bit	Bit name	Description
0	TA[1]	**T**oggle **R**equest. Controls the execution of the selected mode
1...7	-	Set to default value 0

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

Description Byte 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 read from ID tag [bytes].
Typical values: [6, 10, 14, 18] bytes
Remark: If no ID tag is detected by the Read/Write head these bytes are set to 0x00.

Description Byte 5...6, "RSSI value":
RSSI value of the ID tag. Reflect the received signal quality of the ID tag. Higher values mean a better reception of the ID tag signal.
Remark: If the Read/Write head has no RSSI value present, these bytes are set to 0x00.

Description Byte 7...10/14/18/22, "UID data byte":
Read UID of the ID tag with length of 32/64/96/128 bit. Unused bytes are set to 0x00. If no ID tag is detected by the Read/Write head this data field is set to 0x00.

Description Byte 11/15/19/23...N:
Always set to default value 0x00.

Note:
The setting of the IO-channel parameter "Data hold time" influence the time how long the RSSI value and the UID data bytes are kept stable in the process data input image.

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

4.3 Module "RWH_CMD," Read User data of the ID tag synchronously

In this mode the User data of the ID tag can be read by setting the bit TR in the PLC process data output image to the complement state of bit TA in the PLC process data input image. This mode is suitable if the user knows when the ID tag is present in front of the Read/Write head. The read User data are kept in the data bytes 3...N stable while bit TR is not changed.

PLC process data output image (Module RWH_CMD)

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

(1)N= Last byte of RWH_CMD module

Description byte 1, "Control byte 1":

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

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

Description byte 2, "Control byte 2":

Bit	Bit name	Description
0	TR (2)	**T**oggle **R**equest. Controls the execution of the selected mode
1...7	-	Has to be set to default value 0

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

Description Byte 3...4, "16 bit read data length":
Read data length, limited to a maximum number of (N-6) bytes.

Description Byte 5...6, "16 bit start address":
Start address of the ID tag User data where the data has to be read from.

Description Byte 7...N, "Not used":

Any set values are ignored

PLC process data input image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	0	0	UR=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 bits start address [D15...D8]							
6	16 bits start address [D7...D0]							
7... (7+X)	Read data byte 1...X							
(8+X)...N	0x00							

Description Byte 1, "Status byte 1":

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

Description Byte 2, "Status byte 2":

Bit	Bit name	Description
0	TA[(1)]	**T**oggle **R**equest. Controls the execution of the selected mode
1...7	-	Set to default value 0

[(1)]Bit TR = NOT (TA): Command execution is started.
Bit TA = TR: Command has been processed by the RFID-SA-HF-EIP.

Description Byte 3...4, "16 bit read data length X":
Number of bytes which could be read successfully from the ID tag. If an error occur, the read data length is set to 0x0000 and the bit DIAG is set to 1.

Description Byte 5...6, "16 bit start address":
Start address of the ID tag User data where the data is read from.

Description Byte 7...(7+X), "Read data byte 1...X":
This data area contains the data of the User data of the ID tag. Unused bytes are set to 0x00.

Description Byte (8+X)...N:
Will be set to default value 0x00.

4.4 Module “RWH_CMD,” Read User data of the ID tag asynchronously

In this mode the memory bank of the ID tag can be read automatically. This mode is suitable if the user does not know when the ID tag is present in front of the Read/Write head.

After activation of the mode with bit TR = NOT (TA) the RFID-SA-HF-EIP start the reading of the User data of the ID tag immediately, regardless if an ID tag is detected or not by setting TA = TR. When the RFID-SA-HF-EIP detects a change of the status of the ID tag with TP=0->1 a reading process is started. If the status of the ID tag change with TP=1->0, the data length, the address value and the read data of the PLC data input image is set to default value = 0x0. The setting of the IO-channel parameter “Data hold time” influence the time, how long the TP bit and the read data from the ID tag is kept stable in the process data input image.

PLC process data output image (Module RWH_CMD)

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

(1)N= Last byte of RWH_CMD module

Description byte 1, “Control byte 1”:

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

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

Description byte 2, "Control byte 2":

Bit	Bit name	Description
0	TR [2]	**T**oggle **R**equest. Controls the execution of the selected mode
1...7	-	Has to be set to default value 0

[1]Bit TR = NOT (TA): Command execution is started. This has to be done only once. Further commands are executed automatically when the RFID-SA-HF-EIP detects a state change of the ID tag
from "not present" to "present."

Description Byte 3...4, "16 bit read data length":
Read data length, limited to a maximum number of (N-6) bytes.

Description Byte 5...6, "16 bit start address":
Start address of the ID tag User data where the data has to be read from.

Description Byte 7...N, "Not used":
Any set values are ignored

Note:
The command is executed continuously until it is finished by another command request with setting of TR=NOT (TA). If the command parameter "16 bit read length" and "16 bit start address" shall be changed, the bit TR need to be set to NOT (TA) to restart the command with the changed command parameter.

PLC Process data input image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	0	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 bits start address [D15...D8]							
6	16 bits start address [D7...D0]							
7... (7+X)	Read data byte 1 ... X							
(8+X) ... N	0x00							

Description Byte 1, "Status byte 1":

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

Description Byte 2, "Status byte 2":

Bit	Bit name	Description
0	TA[(1)]	**T**oggle request **A**cknowledge.
1...7	-	Will be set to default value 0 by the RFID-SA-HF-EIP

[(1)]Bit TR = NOT (TA): Command execution is started.
Bit TA = TR: Command has been processed by the RFID-SA-HF-EIP.

Description Byte 3...4, "16 bit read data length X":
Number of bytes which could be read successfully from the ID tag. If an error occurs, the read data length is set to 0x0000 and the bit DIAG is set to 1.

Description Byte 5...6, "16 bit start address":
Start address of the ID tag User data where the data has to be read from.

Description Byte 7...(7+X), "Read data byte 1...X":
This data area contains the data of the User data of the ID tag. Unused bytes are set to 0x00.

Description Byte (8+X)...N:
Will be set to default value 0x00.

Note:
-The command is executed continuously until it is finished by another command request with setting of TR=NOT (TA).
-If the command parameter "16 bit read length" and "16 bit start address" is changed, the bit TR needs to be set to NOT (TA) to restart the command with the changed command parameter.

-When no ID tag is detected or an error occur while the command is executed, bytes (3..N) are set to default value 0x00.
-The setting of the IO-channel parameter “Data hold time” influence the time, how long the TP bit and the read data from the ID tag are kept stable in the process data input image.

4.5 Module “RWH_CMD,” Write User data to the ID tag synchronously

In this mode the User data of the ID tag can be written by setting the bit TR in the PLC process data output image to the complement state of bit TA in the PLC process data input image. This mode is suitable if the user knows when the ID tag is present in front of the Read-/Write head.

PLC process data output image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	0	UR=1	0	WR=1	AO=0	0
2	0	0	0	0	0	0	0	TR
3	16 bits write data length [D15…D7]							
4	16 bits write data length [D7…D0]							
5	16 bits start address [D15…D8]							
6	16 bits start address [D7…D0]							
7…(7+X-1)(1)	Write data byte 1 … X							
(7+X)…N(2)	Not Used							

(1)X= Length of write data length in bytes 3…4.
(2)N= Last byte of RWH_CMD module

Description byte 1, “Control byte 1”:

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

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

Description byte 2, “Control byte 2”:

Bit	Bit name	Description
0	TR (2)	**T**oggle **R**equest. Controls the execution of the selected mode
1…7	-	Has to be set to default value 0

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

Description Byte 3…4, “16 bit write data length X”:
Write data length, limited to a maximum number of (N-6) bytes.

Description Byte 5…6, “16 bit start address”:
Start address of the ID tag User data where the data is to be written.

Description Byte 7...(7+X-1), "Write data byte 1...X":
This data area contains the data to write into the User data of the ID tag.

Description Byte (7+X)...N:
Any set values are ignored

PLC process data input image (Module RWH_CMD)

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

Description Byte 1, "Status byte 1":

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

Description Byte 2, “Status byte 2”:

Bit	Bit name	Description
0	TA[1]	**T**oggle request **A**cknowledge.
1...7	-	Will be set to default value 0 by the RFID-SA-HF-EIP

[1]Bit TR = NOT (TA): Command execution is started.
Bit TA = TR: Command has been processed by the RFID-SA-HF-EIP.

Description Byte 3...4, “16 bit write data length”:
Number of bytes which could be successfully written to the ID tag. If an error occurs, the write data length is set to 0x0000 and the bit DIAG is set to 1.

Description Byte 5...6, “16 bit start address”:
Start address of the ID tag User data where the data is written to.

Description Byte 7...N:
Will be set to default value 0x00.

4.6 Module “RWH_CMD,” Write User data to the ID tag asynchronously

In this mode the User data of the ID tag can be written automatically. This mode is suitable if the user does not know when the ID tag is present in front of the Read/Write head.

After activation of the mode with bit TR = NOT (TA) the RFID-SA-HF-EIP starts the writing of the User data of the ID tag immediately, regardless if an ID tag is detected or not by setting TA = TR. When the evaluation 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 change with 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 (Module RWH_CMD)

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 bits write data length [D15...D7]							
4	16 bits write data length [D7...D0]							
5	16 bits start address [D15...D8]							
6	16 bits start address [D7...D0]							
7...(7+X-1)(1)	Write data byte 1 ... X							
(7+X)...N(2)	Not Used							

(1)X= Length of write data length in bytes 3...4.
(2)N= Last byte of RWH_CMD module

Description byte 1, “Control byte 1”:

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

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

Description byte 2, “Control byte 2”:

Bit	Bit name	Description
0	TR (2)	**T**oggle **R**equest. Controls the execution of the selected mode
1...7	-	Has to be set to default value 0

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

Description Byte 3...4, "16 bit write data length X":
Write data length, limited to a maximum number of (N-6) bytes.

Description Byte 5...6, "16 bit start address":
Start address of the ID tag User data where the data is to be written.

Description Byte 7...(7+X-1), "Write data byte 1...X":
This data area contains the data to write into the User data of the ID tag.

Description Byte (7+X)...N:
Any set values are ignored

Note:
The command is executed continuously until it is finished by another command request with setting of TR=NOT (TA). If the command parameter "16 bit read length" and "16 bit start address" is changed, the bit TR need to be set to NOT (TA) to restart the command with the changed command parameter.

PLC process data input image (Module RWH_CMD)

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

Description Byte 1, "Status byte 1":

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

Description Byte 2, "Status byte 2":

Bit	Bit name	Description
0	TA[1]	**T**oggle request **A**cknowledge.
1...7	-	Will be set to default value 0 by the RFID-SA-HF-EIP

[1]Bit TR = NOT (TA): Command execution is started.
Bit TA = TR: Command has been processed by the RFID-SA-HF-EIP.

Description Byte 3...4, "16 bit write data length":
Number of bytes which could be successfully written to the ID tag. If an error occurs, the write data length is set to 0x0000 and the bit DIAG is set to 1.

Description Byte 5...6, "16 bit start address":
Start address of the ID tag User data where the data is written to.

Description Byte 7...(N-6):
Will be set to default value 0x00.

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

4.7 Module “RWH_CMD,” Write verified User data to the ID tag synchronously

In this mode the User data of the ID tag can be written and read back with one command request. In the first step the command data is written to the ID tag, in the second step it is read back from the ID tag. In the third step the RFID-SA-HF-EIP 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 input data image is set to the write data length of the PLC process data output image, otherwise a diagnostic message is generated.

PLC process data output image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	0	UR=1	RD=1	WR=1	AO=0	0
2	0	0	0	0	0	0	0	TR
3	16 bits write data length [D15...D7]							
4	16 bits write data length [D7...D0]							
5	16 bits start address [D15...D8]							
6	16 bits start address [D7...D0]							
7	Write data byte 1							
7+(X-1)(1)	Write data byte 2...X							
(7+X)...N(2)	Not Used							

(1)X= Length of write data length in bytes 3...4.
(2)N= Last byte of RWH_CMD module

Description byte 1, “Control byte 1”:

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

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

Description byte 2, “Control byte 2”:

Bit	Bit name	Description
0	TR (2)	**T**oggle **R**equest. Controls the execution of the selected mode
1...7	-	Has to be set to default value 0

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

Description Byte 3...4, “16 bit write data length X”:

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

Description Byte 5...6, "16 bit start address":
Start address of the ID tag User data where the data is to be written.

Description Byte 7...(7+X-1), "Write data byte 1...X":
This data area contains the data to write to the User data of the ID tag.

Description Byte (7+X)...N:
Any set values are ignored

PLC process data input image (Module RWH_CMD)

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

(1)X= Length of write data length in bytes 3...4.
(2)N= Last byte of RWH_CMD module

Description Byte 1, "Status byte1":

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

Description Byte 2, “Status byte 2”:

Bit	Bit name	Description
0	**TA** (1)	**T**oggle request **A**cknowledge
1...7	-	Will be set to default value 0 by the RFID-SA-HF-EIP

(1)Bit TA = NOT (TR): Command execution is running.
Bit TA = TR :Command has been processed by the RFID-SA-HF-EIP.

Description Byte 3...4, “16 bit read data length X”:
Number of bytes which could be written and read successfully from the ID tag. If an error occurs, the read data length is set to 0x0000 and the bit DIAG is set to 1.

Description Byte 5...6, “16 bit start address”:
Start address of the ID tag User data where the data is written to and read back from.

Description Byte 7...(7+X-1), “Read data byte 1...X”:
This data area contains the data of the User data of the ID tag.

Description Byte (7+X)...N:
Will be set to default value 0x00.

4.8 Module “RWH_CMD,” Write verified User data to the ID tag asynchronously

In this mode the User data of the ID tag can be written and read back automatically. This mode is suitable if the user does not know when the ID tag is present in front of the Read/Write head.

In the first step the command data is written to the ID tag, in the second step it is read back from the ID tag. In the third step the RFID-SA-HF-EIP 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 input data image is set to the write data length of the PLC process data output image, otherwise a diagnostic message is generated.

After activation of the mode with bit TR = NOT (TA) the RFID-SA-HF-EIP start the writing of the User data of the ID tag immediately, regardless if an ID tag is detected or not by setting TA = TR. When the RFID-SA-HF-EIP 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 change with TP=1->0 the data length, the address value and the read data of the PLC data input image are set to default value = 0x0.

PLC process data output image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	ER=1	UR=1	RD=1	WR=1	AO=0	0
2	0	0	0	0	0	0	0	TR
3	16 bits write data length [D15...D7]							
4	16 bits write data length [D7...D0]							
5	16 bits start address [D15...D8]							
6	16 bits start address [D7...D0]							
7	Write data byte 1							
7... (7+X-1)(1)	Write Data byte 2...X							
(7+X) ... N(2)	Not used							

(1)X= Length of write data length in bytes 3...4.
(2)N= Last byte of RWH_CMD module

Description byte 1, “Control byte 1”:

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

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

Description byte 2, "Control byte 2":

Bit	Bit name	Description
0	TR [2]	**T**oggle **R**equest. Controls the execution of the selected mode
1...7	-	Has to be set to default value 0

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

Description Byte 3...4, "16 bit write data length X":
Write data length, limited to a maximum number of (N-6) bytes.

Description Byte 5...6, "16 bit start address":
Start address of the ID tag User data where the data is to be written.

Description Byte 7...(7+X-1), "Write data byte 1...X":
This data area contains the data to write to the User data of the ID tag.

Description Byte (7+X)...N:
Any set values are ignored

PLC process data input image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	0	ER=1	UA=1	RA=1	WA=1	AI	TP
2	0	0	0	0	0	0	0	TA
3	16 bits write data length [D15...D7]							
4	16 bits write data length [D7...D0]							
5	16 bits start address [D15...D8]							
6	16 bits start address [D7...D0]							
7...(7+X-1)	Read Data byte 1...X							
(7+X)...N	0x00							

[1]X= Length of write data length in bytes 3...4.
[2]N= Last byte of RWH_CMD module

Description Byte 1, "Status byte1":

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

Description Byte 2, "Status byte 2":

Bit	Bit name	Description
0	**TA** (1)	**T**oggle request **A**cknowledge
1...7	-	Will be set to default value 0 by the RFID-SA-HF-EIP

(1)Bit TA = NOT (TR): Command execution is running.
Bit TA = TR :Command has been processed by the RFID-SA-HF-EIP.

Description Byte 3...4, "16 bit read data length X":
Number of bytes which could be written and read successfully from the ID tag. If an error occurs, the read data length is set to 0x0000 and the bit DIAG is set to 1.

Description Byte 5...6, "16 bit start address":
Start address of the ID tag User data where the data is written to and read back from.

Description Byte 7...(7+X), "Read data byte 1...X":
This data area contains the data of the User data of the ID tag. Unused bytes are set to 0x00.

Description Byte (7+X)...N:
Will be set to default value 0x00.

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

The command is executed continuously until it is finished by another command request with setting of TR=NOT (TA). If the command parameter "16 bit read length" and "16 bit start address" shall be changed, the bit TR need to be set to NOT (TA) to restart the command with the changed command parameter.

4.9 Module “RWH_CMD,” Diagnostic Read

In this mode the diagnostic information of the compact device can be read.

PLC process data output image (Module RWH_CMD)

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

Description byte 1, “Control byte 1”:

Bit	Value	Description	Remark
AO	0/1	“Antenna field on” request	Can be left unchanged while mode Diagnostic Read is active
UR	0/1	Mode “User data” access to the ID tag	Can be left unchanged while mode Diagnostic Read is active
ER	0/1	Activate mode “Read data”	Can be left unchanged while mode Diagnostic Read is active
DR [1]	1	Mode “Diagnostic read” active	Diagnostic read is started after bit TR is set to NOT (TA) in status bytes 2 of the PLC data input image

[1]Diagnostic is only available, if bit “Diag” within the response data is set. Otherwise the response data will return default data “0x00” within byte 3...n.

Description byte 2, “Control byte 2”:

Bit	Bit name	Description
0	TR [2]	**T**oggle **R**equest. Controls the execution of the selected mode
1...7	-	Has to be set to default value 0

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

Description Byte 3...N:

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

PLC process data input image (Module RWH_CMD)

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

Description Byte 1, "Status byte 1":

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

Description Byte 2, "Status byte 2":

Bit	Bit name	Description
0	TA (1)	**T**oggle **R**equest Acknowledge
1...7	-	Will be set to default value 0 by the RFID-SA-HF-EIP

(1)Bit TA = NOT (TR): Command execution is running.
Bit TA = TR: Command has been processed by the RFID-SA-HF-EIP.

Description Byte 3:
Always set to the default value 0x00.

Description Byte 4, "Number of error codes":
Number of error codes present in the RFID-SA-HF-EIP. Maximum number of error codes to read with one diagnostic read request is 4.

Description Byte 5...6:
Always set to the default value 0x00.

Description Byte 7...x, "Error code 1...4":
Up to 4 error codes can be present.
1 Error code will be present in bytes 7...10.
2 Error codes will be present in bytes 7...14.
3 Error codes will be present in bytes 7...18
4 Error codes will be present in bytes 7...22
All remaining bytes after the last byte of the error code in RWD_CMD module will be set 0x00.
Error codes are 4 bytes in Length. See section 9 for error codes descriptions

5 RWH_CMD Module Get/Set Commands

5.1 Module "RWH_CMD," Execute command synchronously

In this mode various read or write commands can be sent to the RFID-SA-HF-EIP.

PLC process data output image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	0	0	RD [2]	WR [1]	0	0
2	CM=1	0	0	0	0	0	0	TR
3	16 bit command length, MSbyte							
4	16 bit command length, LSbyte							
5	16 bit command code, MSbyte							
6	16 bit command code, LSbyte							
7	Command parameter 1, MSbyte							
8	Command parameter 1, LSbyte							
9	Command parameter 2, MSbyte							
10	Command parameter 2, LSbyte							
…	…							
N	0x00							

Description byte 1, "Control byte 1":

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

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

Description byte 2, "Control byte 2":

Bit	Bit name	Description
0	**TR** [2]	**T**oggle **R**equest. Controls the execution of the selected mode
1…6	-	Has to be set to default value 0
7	**CM**	**C**ommand **M**ode active Has to be set to 1 to activate "command mode"

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

Description Byte 3…4, "16 bit command length X":

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

Description Byte 5…6, "16 bit command code":

Command code of "Get/Set Commands."

Description Byte 7…N, "16 bit command parameter 1…X":
Command parameter. Unused bytes are set to 0x00.

PLC process data input image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	0	0	0	RA	WA	AI	TP
2	CA	0	0	0	0	0	0	TA
3	16 bit response data length, MSbyte							
4	16 bit response data length, LSbyte							
5	16 bit response code, MSbyte							
6	16 bit response code, LSbyte							
7	16 bit response data 1, MSbyte							
8	16 bit response data 1, LSbyte							
9	16 bit response data 2, MSbyte							
10	16 bit response data 2, LSbyte							
…	…							
N	0x00							

Description Byte 1, "Status byte1":

Bit	Value	Description	Remark
TP (1)	0	No ID tag detected in front of the Read/Write head	-
	1	ID tag is detected in front of the Read/Write head	Bit is set to 1 as long as the ID tag is detected by the R/W head. With the channel parameter "data hold time" the status of the bit can be extended.
AI (1)	0	"Antenna field on" active	Reflect the current state of the antenna field setting.
WA (2)	1	Mode "PUT" command to the RFID-SA-HF-EIP active	Reflect the state of bit WR.
RA (2)	1	Mode "GET" data from the RFID-SA-HF-EIP active	Reflect the state of bit RD.
DIAG (1)	0	No error detected	-
	1	RFID-SA-HF-EIP diagnostics available	Diagnostic information can be read out with mode "Diagnostics read"

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

(2)Bits WA, RA are immediately set when the RFID-SA-HF-EIP detects the setting of the corresponding bits WR and RD in the control byte 1 of the PLC data output image.
Any change in the settings of these bits to prior received states set the data bytes 3 … (N) to the default value 0x00. The bit TR does not influence this behavior.

Description Byte 2, "Status byte 2":

Bit	Bit name	Description
0	**TA** (1)	**T**oggle request **A**cknowledge
1...6	-	Will be set to default value 0 by the RFID-SA-HF-EIP
7	**CA** (2)	**C**ommand mode **A**ctive

(1)Bit TA = NOT (TR): Command execution is running
Bit TA = TR : Command has been processed by the RFID-SA-HF-EIP

(2)Bit CA is immediately set when the RFID-SA-HF-EIP detects the setting of bit CR in the control byte 2 of the PLC data output image. Any change of bit CR to prior received state set the data bytes 3 ... (N) to the default value 0x00. The bit TR does not influence this behavior.

Description Byte 3...4, "16 bit response data length X":
Response data length include response code. Limited to a maximum number of (N-4) bytes.

Description Byte 5...6, "16 bit response code": Response code of the command request.

Description Byte 7...(N), "16 bit response data 1...X":
This data area contains the response data of the command. Unused bytes are set to 0x00.

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

5.2 Overview Get/Set

Use the Get/Set commands to read or write parameter specific commands to the RFID-SA-HF-EIP.
Control Byte 1:
Set =0x08 to read or Set =0x04 to write
Control Byte 2:
Bit 7 in Control Byte 2 is set TRUE to set the RFID-SA-HF-EIP into Get/Set Command mode and bit 0 executes the command.
Binary Control Byte 2 = 1000_000 or 1000_0001
Hex Control Byte 2 = 0x80 or 0x81

Command	Control word [1]	Command length	Cmd Code	Param1	Param2	Param3... (N)
GET IDENT DIAGNOSIS	0x088x	0x0002	0x62C8	0x0000	0x0000	0x0000
GET MAC ADDRESS	0x088x	0x0002	0x62C9	0x0000	0x0000	0x0000
GET HF POWER LIST	0x088x	0x0002	0x62CE	0x0000	0x0000	0x0000
GET HF POWER SETTING	0x088x	0x0002	0x62CF	0x0000	0x0000	0x0000
GET BARGRAPH STATE	0x088x	0x0002	0x62D0	0x0000	0x0000	0x0000
GET BLOCKS LOCKED	0x088x	0x0006	0x62D1	STB	NOB	0x0000
GET DSFID	0x088x	0x0002	0x62D2	0x0000	0x0000	0x0000
GET AFI	0x088x	0x0002	0x62D3	0x0000	0x0000	0x0000
GET UID-RSSI	0x088x	0x0002	0x62CD	0x0000	0x0000	0x0000
SET HF POWER LEVEL	0x048x	0x0004	0x65D6	PWR	0x0000	0x0000
SET BARGRAPH STATE	0x048x	0x0004	0x65D7	State	0x0000	0x0000
SET BLOCKS LOCKED	0x048x	0x0006	0x65D8	STB	NOB	0x0000
SET DEVICE RESET	0x048x	0x0004	0x65D9	RDT	0x0000	0x0000
SET DSFID	0x048x	0x0004	0x65DA	DSFID	0x0000	0x00000
SET AFI	0x048x	0x0004	0x65DB	AFI	0x0000	0x0000
SET DSFID LOCKED	0x048x	0x0002	0x65DC	0x0000	0x0000	0x0000
SET AFI LOCKED	0x048x	0x0002	0x65DD	0x0000	0x0000	0x0000
SET ID tag	0x048x	0x0008	0x65DE	LEN	ADDR	DEF
Reboot device	0x048x	0x0004	0x65D9	Count-down value	0x0000	0x0000

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

5.3 Get Diagnostics

With this command the diagnostic data of the RFID-SA-HF-EIP can be read by the controller.

PLC process data output image (Module RWH_CMD)

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

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

PLC process data input image (Module RWH_CMD)

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

(1)Bit TA = NOT (TR): Command execution is running.
Bit TA = TR : Command has been processed by the RFID-SA-HF-EIP.

5.4 Get MAC Address

With this command the media access control (MAC) address of the RFID-SA-HF-EIP can be read by the controller.

PLC process data output image (Module RWH_CMD)

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

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

PLC process data input image (Module RWH_CMD)

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

(1)Bit TA = NOT (TR): Command execution is running.
Bit TA = TR: Command has been processed by the RFID-SA-HF-EIP

5.5 Get HF Power List

With this command the controller can read out the available HF power levels of the Read/Head.

PLC process data output image (Module RWH_CMD)

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

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSbyte)
4	0x02 + (n)	Response length (LSbyte)
5	0x62	Response code (MSbyte)
6	**0xCE**	Response code (LSbyte)
7	0x00	Not used
8	0x00 ... X	Number of power levels. X =[0...5] 0x0 = No entry in HF power list 0x1 = one level (e.g. 100%)n 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.
Bit TA = TR :Command has been processed by the RFID-SA-HF-EIP

Note:
If the command is not successful the DIAG bit is set in status byte 2. The error code can be read out with the command “GET IDENT DIAGNOSIS.” .”

5.6 Get HF Power Setting

With this command the controller can read out the current HF power level setting of the Read/Head.

PLC process data output image (Module RWH_CMD)

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

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSbyte)
4	0x04	Response length (LSbyte)
5	0x62	Response code (MSbyte)
6	**0xCF**	Response code (LSbyte)
7	0x00	Not used
8	PWR1	Current HF power level active in the Read/Write head [%] e.g. 0x32 = 50%
9…N	0x00	Not used

(1)Bit TA = NOT (TR): Command execution is running.
Bit TA = TR : Command has been processed by the RFID-SA-HF-EIP

Note:
If the command is not successful the DIAG bit is set in status byte 2. The error code can be read out with the command “GET IDENT DIAGNOSIS.” .”

5.7 Get Bargraph State

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

PLC process data output image (Module RWH_CMD)

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

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

PLC process data input image (Module RWH_CMD)

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

(1)Bit TA = NOT (TR):Command execution is running.
Bit TA = TR : Command has been processed by the RFID-SA-HF-EIP.
(2)State = Binary: When an ID tag is present all LED's 1...4 are switched on
State = RSSI mode: The RSSI value range. 1 LED weakest signal...4 LED strongest signal

Note:
If the command is not supported by the Read/Write head, the RFID-SA-HF-EIP set the flag DIAG in status byte 2. The error code can be read out with command "GET IDENT DIAGNOSIS."

5.8 Get Blocks Locked

With this command the controller can check which memory areas of the ID tag have a write protection.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSbyte)
4	0x06	Command length (LSbyte)
5	0x62	Command code (MSbyte)
6	**0xD1**	Command code (LSbyte)
7	0x00	Not used
8	STB	Block number of the first block which shall be checked for state "Blocked locked." X = [0x0... n] n shall not exceed the module size – 8 and the number of blocks of the ID tag – 1.
9	0x00	Not used
10	NOB	Number of blocks which shall be checked [0x1... 0xFF] Number of blocks shall not exceed (N-8) bytes. STB + NOB shall not exceed number of 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 (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSbyte)
4	0x04 + X	Response length (LSbyte)
5	0x62	Response code (MSbyte)
6	**0xD1**	Response code (LSbyte)
7	0x00	Not used
8	NOB	Number of blocks which were checked for state "Block locked." X = [0x1... nn]
9	BS1	Status of block with number STB: 0x0 = Block is unlocked 0x1 = Block is locked
...	...	...
9+(X-1)	BSX	Status of block with number 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.
Bit TA = TR : Command has been processed by the RFID-SA-HF-EIP

Note:
If the command is not successful the DIAG bit is set in status byte 2. The error code can be read out with the command “GET IDENT DIAGNOSIS.” .”

5.9 Get DSFID

With this command the controller can read out the data structure format identifier (DSFID) of the ID tag.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSbyte)
4	0x02	Command length (LSbyte)
5	0x62	Command code (MSbyte)
6	**0xD2**	Command code (LSbyte)
7...N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSbyte)
4	0x04	Response length (LSbyte)
5	0x62	Response code (MSbyte)
6	**0xD2**	Response code (LSbyte)
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.
Bit TA = TR :Command has been processed by the RFID-SA-HF-EIP.

5.10 Get AFI

With this command the controller can read out the application family identifier (AFI) of the ID tag.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSbyte)
4	0x02	Command length (LSbyte)
5	0x62	Command code (MSbyte)
6	**0xD3**	Command code (LSbyte)
7...N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSbyte)
4	0x04	Response length (LSbyte)
5	0x62	Response code (MSbyte)
6	**0xD3**	Response code (LSbyte)
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.
Bit TA = TR : Command has been processed by the RFID-SA-HF-EIP.

5.11 Get UID-RSSI

With this command the controller can read out the UID of ID tag and the RSSI value from the Read/Write head.

PLC process data output image (Module RWH_CMD)

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

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSbyte)
4	0x0E	Response length (LSB). Fixed to 14 bytes, regardless of UID length.
5	0x62	Response code (MSbyte)
6	**0xCD**	Response code (LSbyte)
7	0x00	Not used
8	0x06 / 0x0A	RSSI and UID data length [6,10]
9	0x00	Not used
10	RSSI	RSSI value of the ID tag. Reflect the received signal quality of the ID tag. Higher values mean a better reception of the ID tag signal. If no ID tag is detected by the Read/Write head this data field is set to 0x00.
11...X	UID	Read UID of the ID tag with length of 4/8/16/32 bytes. Unused bytes are set to 0x00. If no ID tag is detected by the Read/Write head this data field is set to 0x00.
11...X	...	...
(X+1)...N	0x00	Not used

(1)Bit TA = NOT (TR):Command execution is running.
Bit TA = TR :Command has been processed by the RFID-SA-HF-EIP

Note:
If the command is not successful the DIAG bit is set in status byte 2. The error code can be read out with the command “GET IDENT DIAGNOSIS.” .”

5.12 Set HF Power Level

With this command the controller can set the HF power level of the Read/Write head.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSbyte)
4	0x04	Command length (LSbyte)
5	0x65	Command code (MSbyte)
6	**0xD6**	Command code (LSbyte)
7	0x00	Not used
8	PWR	HF power level to activate in the Read/Write head [%] e.g. 0x32 = 50%
8…N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSbyte)
4	0x04	Response length (LSbyte)
5	0x65	Response code (MSbyte)
6	**0xD6**	Response code (LSbyte)
7	0x00	Not used
8	PWR	Current HF power level active in the Read/Write head [%] e.g. 0x32 = 50%
9…N	0x00	Not used

(1)Bit TA = NOT (TR):Command execution is running.
Bit TA = TR :Command has been processed by the RFID-SA-HF-EIP

Note:
If the command is not successful the DIAG bit is set in status byte 2. The error code can be read out with the command “GET IDENT DIAGNOSIS.” .”

5.13 Set Bargraph State

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

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSbyte)
4	0x04	Command length (LSbyte)
5	0x65	Command code (MSbyte)
6	**0xD7**	Command code (LSbyte)
7	0x00	Not used
8	State	Setting of the LED bar graph of the Read/Write head 0x00 = Binary Mode 0x01 = RSSI mode
9…N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSbyte)
4	0x04	Response length (LSbyte)
5	0x65	Response code (MSbyte)
6	**0xD7**	Response code (LSbyte)
7	0x00	Not used
8	State	Current setting of the LED bar graph of the Read/Write head 0x00 = Off 0x01 = On
9…N	0x00	Not used

(1)Bit TA = NOT (TR):Command execution is running.
Bit TA = TR :Command has been processed by the RFID-SA-HF-EIP

Note:
If the command is not successful the DIAG bit is set in status byte 2. The error code can be read out with the command “GET IDENT DIAGNOSIS.” .”

5.14 Set Blocks Locked

With this command the controller can set a write protection on a specific user memory area of the ID tag.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSbyte)
4	0x06	Command length (LSbyte)
5	0x65	Command code (MSbyte)
6	**0xD8**	Command code (LSbyte)
7	0x00	Not used
8	STB	Block number of the first block which shall be set into state "Blocked locked." [0x0...n] Note: n shall not exceed number of blocks of the ID tag - 1
9	0x00	Not used
10	NOB	Number of blocks which shall be set into state "Blocked locked." [0x1...0xFF] Note: STB + NOB shall not exceed number of 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 (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSbyte)
4	0x04	Response length (LSbyte)
5	0x65	Response code (MSbyte)
6	**0xD8**	Response code (LSbyte)
7	0x00	Not used
8	State	0x0 = Blocks locked failed 0x1 = Blocks locked ok
9...N	0x00	Not used

(1)Bit TA = NOT (TR):Command execution is running.
Bit TA = TR :Command has been processed by the RFID-SA-HF-EIP

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

5.15 Set Device Reset

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

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSbyte)
4	0x04	Command length (LSbyte)
5	0x65	Command code (MSbyte)
6	**0xD9**	Command code (LSbyte)
7	0x00	Not used
8	**RDT**	**R**estart **D**elay **T**ime [ms*10] 0x00 = Restart of the RFID-SA-HF-EIP without delay 0x01… 0xN = Restart of the RFID-SA-HF-EIP within N * 10 ms
9…N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

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

(1)Bit TA = NOT (TR):Command execution is running.
Bit TA = TR :Command has been processed by the RFID-SA-HF-EIP

Triggering the reset command with Control Byte 2= 0x81:
If the reset command is executed at Control Byte 2= 0x81, then once the command is executed (TA is not equal to TR) set the TR bit=0. When the reset is complete and the controller reestablishes the Ethernet/IP connection all PLC process data input image bytes are set =0x00. If the reset command values are set and the Control Byte 2 is left at 0x81, then the RFID-SA-HF-EIP will be commanded to reset again.

5.16 Set DSFID

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

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSbyte)
4	0x04	Command length (LSbyte)
5	0x65	Command code (MSbyte)
6	**0xDA**	Command code (LSbyte)
7	0x00	Not used
8	DSFID	Data structure format identifier to write 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 (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSbyte)
4	0x04	Response length (LSbyte)
5	0x65	Response code (MSbyte)
6	**0xDA**	Response code (LSbyte)
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.
Bit TA = TR :Command has been processed by the RFID-SA-HF-EIP.

5.17 Set AFI

With this command the controller can write the application family identifier (AFI) of the ID tag.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSbyte)
4	0x04	Command length (LSbyte)
5	0x65	Command code (MSbyte)
6	**0xDB**	Command code (LSbyte)
7	0x00	Not used
8	AFI	Application family identifier to write to the ID tag [0x0...0xFF]
7...N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSbyte)
4	0x04	Response length (LSbyte)
5	0x65	Response code (MSbyte)
6	**0xDB**	Response code (LSbyte)
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.
Bit TA = TR :Command has been processed by the RFID-SA-HF-EIP.

5.18 Set DSFID Locked

With this command the controller can protect the data structure format identifier (DSFID) of the ID tag against modification.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSbyte)
4	0x02	Command length (LSbyte)
5	0x65	Command code (MSbyte)
6	**0xDC**	Command code (LSbyte)
7...N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSbyte)
4	0x02	Response length (LSbyte)
5	0x65	Response code (MSbyte)
6	**0xDC**	Response code (LSbyte)
7...N	0x00	Not used

(1)Bit TA = NOT (TR): Command execution is running.
Bit TA = TR :Command has been processed by the RFID-SA-HF-EIP.

5.19 Set AFI Locked

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

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSbyte)
4	0x02	Command length (LSbyte)
5	0x65	Command code (MSbyte)
6	**0xDD**	Command code (LSbyte)
7...N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSbyte)
4	0x02	Response length (LSbyte)
5	0x65	Response code (MSbyte)
6	**0xDD**	Response code (LSbyte)
7...N	0x00	Not used

(1)Bit TA = NOT (TR): Command execution is running.
Bit TA = TR :Command has been processed by the RFID-SA-HF-EIP.

5.20 Set ID tag

With this command the controller can setup the User data memory of the ID tag with a predefined value.

PLC process data output image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Control byte 1
2	0x80 (1)	Control byte 2
3	0x00	Command length (MSbyte)
4	0x08	Command length (LSbyte)
5	0x65	Command code (MSbyte)
6	**0xDE**	Command code (LSbyte)
7..8	LEN (2)	Write data **LEN**gth in bytes which shall be set to [DEF] value. [0x0] = Auto detect the number of blocks of the ID tag. [0x1…n] = Number of blocks which shall be set with the value of byte DEF. Note: ADDR + LEN shall not exceed the number of bytes of the ID tag.
9…10	ADDR	User memory start address of the ID tag to be set to [DEF] value. [0x0…n] Note: n shall not exceed the number of bytes of the ID tag - 1
11	0x00	Not used
12	DEF	**DEF**ault 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)Please refer to data sheet of the ID tag if the number of blocks of the ID tag can be evaluated Automatically

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSbyte)
4	0x08	Response length (LSbyte)
5	0x65	Response code (MSbyte)
6	**0xDE**	Response code (LSbyte)
7…8	LEN	Write data **LEN**gth in bytes which were set to [DEF] value.
9…10	ADDR	User memory start **ADDR**ess of the ID tag which was set to [DEF] value
11	0x00	Not used
12	DEF	**DEF**ault data value of the ID tag [0x00 … 0xFF]
13…N	0x00	Not used

(1)Bit TA = NOT (TR):Command execution is running.
Bit TA = TR :Command has been processed by the RFID-SA-HF-EIP

6 Input Modules

6.1 Module “Input_2B” – Module ID 20

The module allows the user to

- Read the binary inputs of the process interface IO-1 and/or IO-2

PLC process data input image (Module Output)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	0	0	0	0	0	0
2	Reserved							

PLC process data input image (Module Input)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	0	0	OL	0	0	C/Qi
2	Reserved							

Description Byte 1, “Status byte”:

Bit	Value	Description
C/Qi	0	Input at C/Qi < 8 V
	1	Input at C/Qi > 11 V
OL	0	L+ OK
	1	Overload on L+

6.2 Module “Input” - Module ID 2

The module allows the user to

- Read the binary inputs of the process interface IO-1 and IO-2
- Read the diagnostic information of the RFID-SA-HF-EIP

PLC process data output image (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							
...	...							
19	0x00							
20	0x00							

Description byte 1, “Control byte 1”:

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

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

Description Byte 2...20:
Not used. Should be set to 0x00 within the PLC process data output image.

PLC process data input image (Module Input)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	DR-RDY	0	0	OL	0	0	C/Qi
2	Number of diagnostic Events							
3	Error code 1 byte 1							
4	Error code 1 byte 2							
5	Error code 1 byte 3							
6	Error code 1 byte 4							
7...10	Error code 2 byte 1...4							
11...14	Error code 3 byte 1...4							
15...18	Error code 4 byte 1...4							
19...20	Reserved							

Description Byte 1, "Status byte":

Bit	Value	Description
C/Qi	0	Input at C/Qi < 8 V
	1	Input at C/Qi > 11 V
OL	0	L+ OK
	1	Overload on L+
DR-RDY	0	Diagnostic data is not ready
	1	Diagnostic read ready
Diag	0	No diagnostic available
	1	Diagnostic data is available

Description Byte 2, "Number of diagnostic events":
Number of diagnostic events. (0 = No diagnostics, 1…4 = 1…4 diagnostics event(s))

Description Byte 3 …20
If bit "DR-RDY" within the Status byte is set these bytes contain the error codes of the RFID-SA-HF-EIP. Otherwise these bytes are set to default value 0x00 by the RFID-SA-HF-EIP. If more than one diagnostics event is available this is appended. Up to 4 diagnostics messages could be transferred. Error codes see section 9.

Description Byte 19…20:
Reserved: Set to default 0x00.

7 Output Modules

7.1 Module “Output_2B” – Module ID 21

This module allows the user to

- write to binary outputs of the process interface IO-1 and IO-2.
- read the binary feedback inputs of the process interface IO-1 and IO-2.

PLC process data output image (Module Output)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	0	0	0	0	0	C/Qo
2	0x00							

Description byte 1, “Control byte 1”:

Bit	Value	Description	Remark
C/Qo	0	Drive output at C/Qo low	
	1	Drive output at C/Qo high	

PLC process data input image (Module Output)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	0	0	OL	0	0	C/Qo Feedback
2	Reserved							

Description Byte 1, “Status byte”:

Bit	Value	Description
C/Qo Feedback	0	C/Qo is at 0VDC.
	1	C/Qo is at 24 VDC (100mA max)
OL	0	L+ OK
	1	Overload on L+

7.2 Module “Output” – Module ID 3

This module allows the user to

- write to binary outputs of the process interface IO-1 and IO-2.
- read the binary feedback inputs of the process interface IO-1 and IO-2.
- read the diagnostic information of the RFID-SA-HF-EIP.

PLC process data output image (Module Output)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	DR	0	0	0	0	0	C/Qo
2	0x00							
3	0x00							
...	...							
19	0x00							
20	0x00							

Description byte 1, “Control byte 1”:

Bit	Value	Description	Remark
C/Qo	0	Drive output at C/Qo low	
	1	Drive output at C/Qo high	
DR (1)	0	No read request	Data byte 2 ... 20 of the PLC process data input image is set to 0x00.
	0 ->1	Read diagnostics of the RFID-SA-HF-EIP	
	1	Diagnostic read request active	DR must be kept on 1 until the diagnostics response is available.

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

Description Byte 2...20: Not used. Should be set to 0x00 within the PLC process data output image.

PLC process data input image (Module Output)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	DR-RDY	0	0	OL	0	0	C/Qo Feedback
2	Number of diagnostic Events							
3	Error code 1 byte 1							
4	Error code 1 byte 2							
5	Error code 1 byte 3							
6	Error code 1 byte 4							
7...10	Error code 2 byte 1...4							
11...14	Error code 3 byte 1...4							
15...18	Error code 4 byte 1...4							
19...20	Reserved							

Description Byte 1, "Status byte":

Bit	Value	Description
C/Qo Feedback	0	C/Qo is at 0VDC.
	1	C/Qo is at 24 VDC (100mA max)
OL	0	L+ OK
	1	Overload on L+
DR-RDY	0	Diagnostic data is not ready
	1	Diagnostic read ready
Diag	0	No diagnostic available
	1	Diagnostic data is available

Description Byte 2, "Number of diagnostic events":
Number of diagnostic events. (0 = No diagnostics, 1...4 = 1...4 diagnostics event(s))

Description Byte 3...18:
If bit "DR-RDY" within the Status byte is set these bytes contain the error codes of the RFID-SA-HF-EIP. Otherwise these bytes are set to default value 0x00 by the RFID-SA-HF-EIP. If more than one diagnostics event is available this is appended. Up to 4 diagnostics messages could be transferred. Error codes see section 9.

Description Byte 19...20:
Reserved: Set to default 0x00.

8 Inactive Module

8.1 Module “Inactive” – Module ID 0

The inactive module can only be configured for IO1 and IO2.
The RWH CMD module must be configured with a RWH_CMD Module ID.

Module “Inactive” Reserves zero bytes in the Input and Output Process image

9 Error codes

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

- Command response of the RFID-SA-HF-EIP for diagnostic read over bit “DR”:
  5101 0001 0000 **F4FE9000**

- Command response of the RFID-SA-HF-EIP for command “GET IDENT DIAGNOSIS” 0880 0008 62C8 0001 **F4FE9000**

9.1 Error group ID tag (0xF1FE)

Error group	Error Code	Description
ID Tag	F1FE0200	ID tag presence error or R/W head communication error with the ID tag
ID Tag	F1FE0300	Address or command does not fit the ID tag characteristics, memory size invalid
ID Tag	F1FE0400	ID tag is defective, replace ID tag or battery
ID Tag	F1FE0500	ID tag memory overflow. UID > 16 bytes
ID Tag	F1FE0900	Command not supported by the ID tag
ID Tag	F1FE0A00	Access violation, e.g. block locked. Refer to ISO15693
ID Tag	F1FE0B00	General ID tag error which is not specified in detail
ID Tag	F1FE0C00	Unknown internal error

9.2 Error group RFID-SA-HF-EIP (0xF4FE)

Error group	Error Code	Description
RFID-SA-HF-EIP	F4FE0100	Power supply failure
RFID-SA-HF-EIP	F4FE0200	Hardware failure , short circuit and overload
RFID-SA-HF-EIP	F4FE0201	Allowed temperature exceeded
RFID-SA-HF-EIP	F4FE0300	Read/Write head not operating cause time out occurred
RFID-SA-HF-EIP	F4FE0400	Command buffer overflow IO-Server Queue (Internal error)
RFID-SA-HF-EIP	F4FE0500	Data buffer overflow, memory allocation (Internal error)
RFID-SA-HF-EIP	F4FE0600	Command in this mode not supported (Internal error)
RFID-SA-HF-EIP	F4FE8100	ID-Link Master inactive. e.g. after power (Internal error)
RFID-SA-HF-EIP	F4FE8200	Internal IO-Port server error (Internal error)
RFID-SA-HF-EIP	F4FE8300	IO-Port invalid parameter Internal error, e.g. channel (Internal error)
RFID-SA-HF-EIP	F4FE8400	Vendor specific error on PUT
RFID-SA-HF-EIP	F4FE8500	IO-Port server resets channel
RFID-SA-HF-EIP	F4FE8600	Data not available for delayed C/Q inputs or delayed UID (Internal error)

Error Group	Error Code	Description
RFID-SA-HF-EIP	F4FE8700	IO-Port channel reconfiguration not allowed yet (internal error)
RFID-SA-HF-EIP	F4FE8800	IO-Port parameter selector flag not set (internal error)
RFID-SA-HF-EIP	F4FE8900	General error detected from ID-Link Master
RFID-SA-HF-EIP	F4FE8A00	CRC error detected from ID-Link Master
RFID-SA-HF-EIP	F4FE8B00	Object not found detected from ID-Link Master
RFID-SA-HF-EIP	F4FE8C00	Data read/write size within command not valid
RFID-SA-HF-EIP	F4FE8D00	IO-Port channel is reconfigured
RFID-SA-HF-EIP	F4FE8E00	Read/Write head could not process command e.g. Read/write length exceeded, ID tag memory error, write to locked block
RFID-SA-HF-EIP	F4FE8F00	ID tag data length exceed (Block size * Block number)
RFID-SA-HF-EIP	F4FE9001	Short circuit at output driver detected
RFID-SA-HF-EIP	F4FE9002	Under voltage at output driver detected
RFID-SA-HF-EIP	F4FE9003	Overload at output driver detected
RFID-SA-HF-EIP	F4FE9004	Over temperature at output driver detected
RFID-SA-HF-EIP	F4FE9005	Line break to Read/Write head
RFID-SA-HF-EIP	F4FE9006	Upper limit reached at output driver
RFID-SA-HF-EIP	F4FE9007	Under voltage at C/Qo detected
RFID-SA-HF-EIP	F4FE9008	Read/Write head failure detected
RFID-SA-HF-EIP	F4FE9009	Read/Write head communication error
RFID-SA-HF-EIP	F4FE900A	Communication error (Internal error)
RFID-SA-HF-EIP	F4FE900B	Communication parity error (Internal error)
RFID-SA-HF-EIP	F4FE900C	Command rejected cause antenna field switched off
RFID-SA-HF-EIP	F4FE900D	Internal data of PROFNET stack corrupt (Internal error)
RFID-SA-HF-EIP	F4FE900E	R/W head do not support this object
RFID-SA-HF-EIP	F4FE9401	Frontend Error detected by Read/Write head
RFID-SA-HF-EIP	F4FE9402	General error detected by Read/Write head
RFID-SA-HF-EIP	F4FE9403	ID-Link Error detected by Read/Write head
RFID-SA-HF-EIP	F4FE9404	Buffer overrun Error detected by Read/Write head
RFID-SA-HF-EIP	F4FE9405	Over temperature at front end detected
RFID-SA-HF-EIP	F4FE9406	R/W head error detect reverse power to high
RFID-SA-HF-EIP	F4FE9407	Reset of R/W head detected
RFID-SA-HF-EIP	F4FE9408	R/W head HAL error detected
RFID-SA-HF-EIP	F4FEA000	Invalid command code detected
RFID-SA-HF-EIP	F4FEA001	Invalid command parameter detected
RFID-SA-HF-EIP	F4FEA002	Invalid command data detected
RFID-SA-HF-EIP	F4FEA003	Ticket number or ticket length detected
RFID-SA-HF-EIP	F4FEA100	Configuration of RFID-SA-HF-EIP failed (CR1 / CR2)
RFID-SA-HF-EIP	F4FEA200	Configuration of IO-channel failed (Internal error)
RFID-SA-HF-EIP	F4FEA300	Reading of Inputs C/Qi (Internal error)
RFID-SA-HF-EIP	F4FEA400	Write of output C/Qo failed (Internal error)
RFID-SA-HF-EIP	F4FEA500	Setting of high current failed (Internal error)
RFID-SA-HF-EIP	F4FEA600	Read of UID failed (Internal error)
RFID-SA-HF-EIP	F4FEA700	Read of User data memory of the ID tag failed (Internal error)
RFID-SA-HF-EIP	F4FEA800	Write to user memory of the ID tag failed, command WU (Internal error)

Error Group	Error Code	Error Description
RFID-SA-HF-EIP	F4FEA900	Write to user memory of the ID tag failed, command WV (Internal error)
RFID-SA-HF-EIP	F4FEAA00	Verification of the user memory of the ID tag failed, commands “WV” (Internal error)
RFID-SA-HF-EIP	F4FEAB00	Setting of Antenna field on/off failed, command “AN”
RFID-SA-HF-EIP	F4FEAC00	ID-Link master could not read the ID tag blocks (Internal error)
RFID-SA-HF-EIP	F4FEAD00	Block size/number of blocks could not be read from the ID tag

9.3 Error group communication user – RFID-SA-HF-EIP (0xF5FE)

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

9.4 Error group command error – RFID-SA-HF-EIP (0xF6FE)

Error group	Error Code	Description
Communication User - RFID-SA-HF-EIP	F6FE0300	Invalid command parameter (e.g. data range) (indicated by RFID-SA-HF-EIP)

10 Glossary

Definition	Remark
Adaptor	Bus device of an EtherNet/IP network.
Antenna	RFID antenna built in a Read/Write head.
Asynchronously	Data of the command response is updated after the device detects a state change of the ID tag from “not present” to “present” or vice versa.
Block size	Size of one block of the ID tag, for HF ID tags 4 …. 128 bytes.
Connection	Describes the logical connection between two objects, e.g. Controller and slave.
Controller	See definition PLC.
Event	Events can occur in several ways: **COM**ing event: An ID tag or a signal change from L-> H level on the I/O is newly detected. **UPD**ate event: An event that has already been signaled is repeated. **GOI**ng event: An ID tag is no longer recognized within a period of time or a signal change from H-> L level is detected.
EDS	**E**lectronic **D**ata **S**heet. Device description file for EtherNet/IP.
EtherNet/IP	EtherNet Industrial Protocol from ODVA.
ETSI	**E**uropean **T**elecommunications **S**tandards **I**nstitute.
FCC	**F**ederal **C**ommunications **C**ommission. Responsible for standardization of Information and Communication in North America.
Hexadecimal	Numeral format, which use 16 values to represent a numeric value. 0…9, A, B, C, D, E, F
ID tag, transponder	RFID ID tag, e.g. E80360, E80370, …
ODVA	**O**pen **D**eviceNet **V**endors **A**ssociation Incorporated.
PC	**P**ersonal **c**omputer, e.g. desktop computer, notebook.
PermData	**Perm**anent **Data** Nonvolatile data area of the device for storage of user specific settings, like fieldbus parameter, address settings and so on.
PLC	**P**rogrammable **L**ogic **C**ontroller.

	e.g. Allen Bradley Compact Logix, Beckhoff CX5020, Siemens CPU 315-2 DP/PN.
Process data input image	Data area where the PLC can read the outputs of the external periphery devices.
Process data output image	Data area where the PLC can write to the inputs of the external periphery devices.
Read/Write head	RFID Read/Write head. In compact devices already integrated.
RSSI	**R**eceive **S**ignal **S**trength **I**ndicator. Reflect the received signal quality of the ID tag. Higher values mean a better reception of the ID tag signal.
Scanner	Bus master of a EtherNet/IP network.
Synchronously	Data of the command response is updated immediately with the currently detected state of the ID tag.
UID	Unique, only readable numeric value of an ID tag (**U**nique **Id**entifier)
User data	Data area of the ID tag which can be read and written randomly.