Ifm electronic

Device manual extension RFID evaluation unit module RWH_CMD

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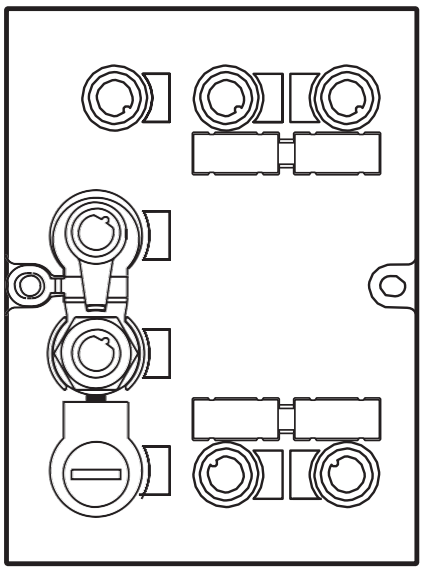
efector190

DTE100
DTE101
DTE102
DTE104



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1 Detailed description of module RWH_CMD

Following functions are available:

1. Detection if an ID tag is in front of the Read-/Write head.
2. Control of Read-/Write head to switch on or off the RFID antenna field.
3. Read of the Unique Identifier number (UID) of the ID tag.
4. Read of the User data of the ID tag.
   -> Reading started via control bit “RD”. Maximum read length with one command depends on the size of the selected module.
5. Write to the User data of the ID tag.
   -> Writing started via control bit “WR”. Maximum write length with one command depends on the size of the selected module.
6. Write verified to the User data of the ID tag.
   -> Writing verified started via control bit “WR” and "RD". Maximum write length with one command depends on the size of the selected module.
7. Simple diagnostics of the IO channels of the evaluation unit.
8. Simple notification of evaluation unit diagnostics.
9. Remote restart of the evaluation unit

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

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

Example:

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

Notes:

- If the number of bytes of all IO channels exceed the limits of the evaluation unit, the configuration is rejected and no data exchange with the PLC will be possible.
- It is in the PLC programmers responsibility to calculate the correct address offsets and the maximum possible data size of the IO channels within the PLC input/output data image, see chapter “Module RWH_CMD, general description”.

1.1 Module “RWH_CMD”, general description

This module allows the user to

- read the UID and the RSSI value of the ID tag over the Read-/Write head at process interface IO-1 … IO-4.
  Two different modes are available:
  Read UID once on request over the command channel (Synchronous mode).
  Read UID automatically whenever the evaluation unit detect a change of the UID data (Asynchronous mode).
- Accelerated read of the User data of the ID tag over the Read-/Write head at process interface IO-1 … IO-4.
  Two different modes are available:
  Read User data of the ID-tag once on request (Synchronous mode).
  Read User data of the ID-tag automatically whenever the evaluation unit detect a change of the UID data (Asynchronous mode).
- Accelerated write to the User data of the ID tag over the Read-/Write head at process interface IO-1 … IO-4.
  Two different modes are available:
  Write User data of the ID-tag once on request (Synchronous mode).
  Write User data of the ID-tag automatically whenever the evaluation unit detect a change of the UID data (Asynchronous mode).

- Accelerated write verified to the User data of the ID tag.
  Two different modes are available:
  Write verified User data of the ID-tag once on request (Synchronous mode).
  Write verified User data of the ID-tag automatically whenever the evaluation unit detect a change of the UID data (Asynchronous mode).

- Read the diagnostic information of the evaluation unit.
- Switch off and on the antenna field of the Read-/Write head.
- Execute commands to read or write different parameters of the evaluation unit and the Read-/Write heads.

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

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

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

(2) Additionally following limits of the different evaluation units must be noticed:

	DTE100	DTE101	DTE102	DTE104	
Maximum input or output data size [bytes]	144	1024	504	1454	

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	**CM**	Res	Res	Res	Res	Res	Res	**TR**
3	Data byte 1							
..	…							
N-1	Data byte (N-3)							
N	Data byte (N-2)							

Description Byte 1, “Control byte 1”:

Bit	Bit name	Description
0	Res	**Res**erved. Has to be set to default value 0.
1	**AO**	„**A**ntenna field **O**ff“ request
2	**WR**	Mode “**WR**ite data” to the evaluation unit
3	**RD**	Mode “**R**ea**D** data” from the evaluation unit
4	**UR**	Mode “**U**se**R** 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 evaluation unit 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” transfer the mode to the evaluation unit, but it does not activate a command request. This is done by the control bit TR in Control byte 2. Once these bits are set in the control bytes, the corresponding bits in the status bytes are acknowledged, regardless of the setting of the bit TR.

Description Byte 2, “Control byte 2”:

Bit	Bit name	Description
0	**TR** ([1])	**T**oggle **R**equest
1..6	Res	Reserved. Has to be set to default value 0.
7	**CM**	Mode **“C**ommand **M**ode” Activate the command channel of the evaluation unit. If this bit is set, all other modes must be deactivated.

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

Example:

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

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

Description Byte 3…n, ”Data byte 1…(N-2)”:

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

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-1	Data byte (N-3)							
N	Data byte (N-2)							

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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 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.
1	**AI** (1)	**A**ntenna field **I**nactive
2	**WA** (2)	Mode “**W**rite data” to the evaluation unit **A**ctive
3	**RA** (2)	Mode “**R**ead data” from the evaluation unit **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 evaluation unit detect the setting of the corresponding bits in the control bytes 1 and 2 of the PLC data output image. Any change in the settings of these bits to prior received states set the data bytes 1 … (n-2) to the default value 0x00. The bit TR does not influence this behavior.

Description Byte 2, “Status byte 2”:

Bit	Bit name	Description
0	**TA** (1)	**T**oggle request **A**cknowledge
1..6	Res	Reserved. Will be set to default value 0
7	**CA**	Mode “**C**ommand mode **A**ctive”

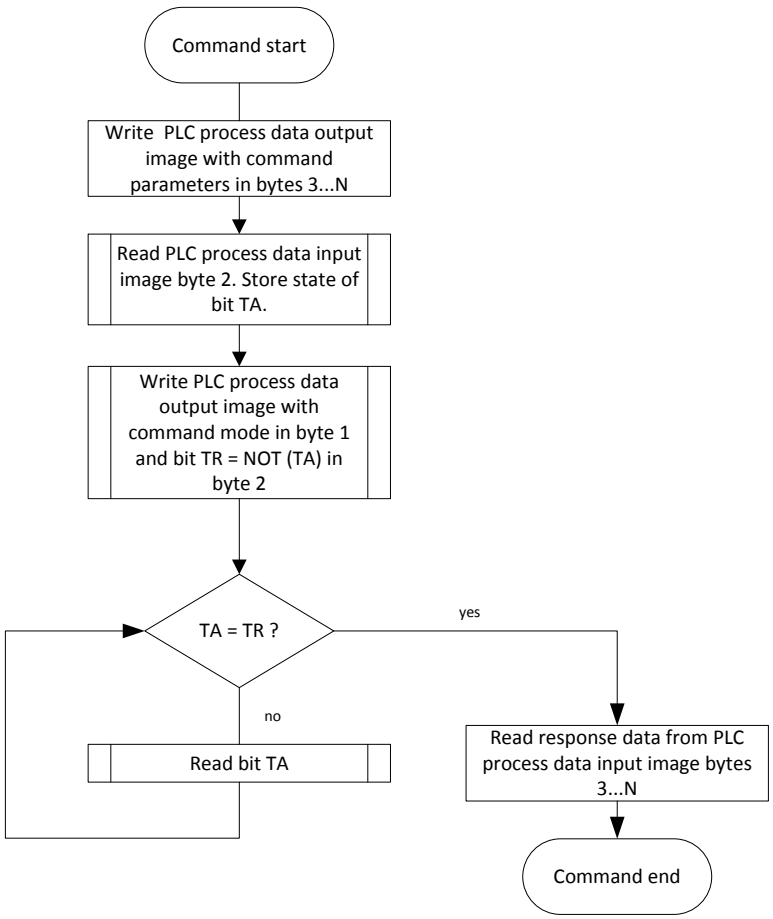
(1) Bit TA reflect the state of the command execution of the evaluation unit. When the evaluation unit receives the bit TR from the controller with a complement state of the bit TA, a request to start the command of the selected mode is received from the controller. While the command execution is running,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

Example:

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

Description Byte 3…N, ”Data byte 1…(N-2)”:
Dependent on the selected mode, this data area contains the response data read from the evaluation unit or the diagnostics information.

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



Note: 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.

1.2 Module “RWH_CMD”, Read UID / RSSI value of the ID tag asynchronously

In this mode the UID and the RSSI value of the ID tag can be read automatically without sending any read request. This mode is suitable if the user do not know when the ID tag is present in front of the Read-/Write head. Additionally this mode allow the fastest detection of ID tag cause no command request need to be send to the evaluation unit. Please note that the UID is transmitted in real time and the PLC cycle time need to be about factor 2 shorter as the ID tag is detected by the Read-/Write head.
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	0	0	0	0	0	AO=0	0
2	0	0	0	0	0	0	0	0
3	Not used							
..	…							
N-1	Not used							
N	Not used							

Description byte 1, “Control byte 1”:

Bit	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” within the response data is set. Otherwise the response data will return default data “0x00” within byte 3...n. The setting of bit DR to 1 is only allowed when bit RD is set to 0.

Description byte 2, “Control byte 2”:
Not used.

Description bytes 3..N:
Has to be set to default value 0x00.

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

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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	Evaluation unit diagnostics available	Channel related or channel independent error occurred.

Description Byte 2, “Status byte 2”:
Not used.

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.

1.3 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 know 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 bit start address [D15…D8]							
6	16 bit start address [D7…D0]							
7..N	0x00							

Description byte 1, “Control byte 1”:

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

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

(2) 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”:
Has to be set to default value 0x00.

PLC process data input image (Module RWH_CMD)

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

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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 evaluation unit 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	Evaluation unit 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 evaluation unit

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

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.

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.

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

In this mode the User data 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 evaluation unit 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 evaluation unit 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 bit start address [D15…D8]							
6	16 bit start address [D7…D0]							
7…N	0x00							

Description byte 1, “Control byte 1”:

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

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

Description byte 2, “Control byte 2”:

Bit	Bit name	Description
0	TR (1)	**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 evaluation unit 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”:
Has to 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” 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 bit start address [D15…D8]							
6	16 bit start address [D7…D0]							
7… (7+X)	Read data byte 1 … X							
(8+X) … N	0x00							

UK

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.
RA	1	Mode “Read data” from the evaluation unit active	Reflect the state of bit RD.
UA	1	Mode “User data” active	Reflect the state of bit UR.
EA	1	Mode “Receive User data automatically” active	Reflect the state of bit ER.
Diag	0	No error detected	-
	1	Evaluation unit 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 evaluation unit

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

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.

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

1.5 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 know 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 bit write data length [D15…D7]							
4	16 bit write data length [D7…D0]							
5	16 bit start address [D15…D8]							
6	16 bit start address [D7…D0]							
7… (7+X)	Write data byte 1 … X							
(8+X) … N	0x00							

Description byte 1, “Control byte 1”:

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

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

Description byte 2, “Control byte 2”:

Bit	Bit name	Description
0	TR (1)	**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 has to be written to.

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

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

PLC process data input image (Module RWH_CMD)

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

Description Byte 1, “Status byte1”:

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

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

Description Byte 3...4, ”16 bit write data length”:
Number of bytes which could be successfully written to the ID tag. If an error occur, 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 occur while the command is executed, bytes (3..N) are set to default value 0x00.

1.6 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 evaluation unit 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 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 bit write data length [D15…D7]							
4	16 bit write data length [D7…D0]							
5	16 bit start address [D15…D8]							
6	16 bit start address [D7…D0]							
7… (7+X)	Write data byte 1 … X							
(8+X) … N	0x00							

Description byte 1, “Control byte 1”:

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

Description byte 2, “Control byte 2”:

Bit	Bit name	Description
0	TR (1)	**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 evaluation unit 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 has to be written to.

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

Description Byte (8+X)...N:
Has to 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” 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 write data length [D15…D7]							
4	16 bit write data length [D7…D0]							
5	16 bit start address [D15…D8]							
6	16 bit start address [D7…D0]							
7…N	0x00							

Description Byte 1, “Status byte1”:

Bit	Value	Description	Remark
TP	0	No ID tag detected in front of the Read-/Write head	-
	1	ID tag is detected in front of the Read-/Write head	Bit is set to 1 as long as the ID tag is detected by the R/W head. With the channel parameter “data hold time” the status of the bit can be extended.
AI	0	“Antenna field on” active	Reflect the current state of the antenna field setting.
WA	1	Mode “Write data” to the evaluation unit active	Reflect the state of bit WR.
UA	1	Mode “User data” active	Reflect the state of bit UR.
EA	1	Mode “Receive User data automatically” active	Reflect the state of bit ER.
Diag	0	No error detected	-
	1	Evaluation unit 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 evaluation unit

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

Description Byte 3...4, ”16 bit write data length”:
Number of bytes which could be successfully written to the ID tag. If an error occur, 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.

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.

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1.7 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 evaluation unit compares the written data with the read data and sends back the result to the PLC. If the written data is identical to the data read back, the read data length in the PLC 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 bit write data length [D15…D7]							
4	16 bit write data length [D7…D0]							
5	16 bit start address [D15…D8]							
6	16 bit start address [D7…D0]							
7	Write data byte 1							
..	…							
7+(X-1)	Write data byte X							
…	…							
N	0x00							

Description byte 1, “Control byte 1”:

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

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

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

PLC process data input image (Module RWH_CMD)

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

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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 evaluation unit active	Reflect the state of bit WR.
RA	1	Mode “Read data” to the evaluation unit 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	Evaluation unit 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 evaluation unit

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

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 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 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 (8+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.

1.8 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 evaluation unit compares the written data with the read data and sends back the result to the PLC. If the written data is identical to the data read back, the read data length in the PLC 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 evaluation unit 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 evaluation unit detects a change of the status of the ID tag with TP=0->1 a writing process is started. If the status of the ID tag 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 bit write data length [D15…D7]							
4	16 bit write data length [D7…D0]							
5	16 bit start address [D15…D8]							
6	16 bit start address [D7…D0]							
7… (7+X)	Write data byte 1 … X							
(8+X) … N	0x00							

Description byte 1, “Control byte 1”:

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

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

Description Byte (8+X)...N:
Has to 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” shall be changed, the bit TR need to be set to NOT (TA) to restart the command with the changed command parameter.

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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	WA=1	AI	TP
2	0	0	0	0	0	0	0	TA
3	16 bit read data length [D15…D7]							
4	16 bit read data length [D7…D0]							
5	16 bit start address [D15…D8]							
6	16 bit start address [D7…D0]							
7… (7+X)	Read data byte 1 … X							
(8+X) … N	0x00							

Description Byte 1, “Status byte1”:

Bit	Value	Description	Remark
TP	0	No ID tag detected in front of the Read-/Write head	-
	1	ID tag is detected in front of the Read-/Write head	Bit is set to 1 as long as the ID tag is detected by the R/W head. With the channel parameter “data hold time” the status of the bit can be extended.
AI	0	“Antenna field on” active	Reflect the current state of the antenna field setting.
WA	1	Mode “Write data” to the evaluation unit active	Reflect the state of bit WR.
RA	1	Mode “Read data” from the evaluation unit active	Reflect the state of bit RD.
UA	1	Mode “User data” active	Reflect the state of bit UR.
EA	1	Mode “Receive User data automatically” active	Reflect the state of bit ER.
Diag	0	No error detected	-
	1	Evaluation unit 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 evaluation unit

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

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 written to and read back from.

Description Byte 7…(7+X), ”Read data byte 1…X”:
This data area contains the data read back from 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:
When no ID tag is detected or an error occur while the command is executed, bytes (3..N) are set to default value 0x00.

1.9 Module “RWH_CMD”, Diagnostics read

In this mode the diagnostic information of the evaluation unit 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	ER	UR	0	0	AO	0
2	0	0	0	0	0	0	0	TR
3	Not used							
..	…							
N-1	Not used							
N	Not used							

Description byte 1, “Control byte 1”:

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

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

Description byte 2, “Control byte 2”:

Bit	Bit name	Description
0	TR (1)	**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..N:

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

PLC process data input image (Module RWH_CMD)

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	DIAG	DA	EA	UA	0	0	AI	TP
2	0	0	0	0	0	0	0	TA
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							

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Description Byte 1, “Status byte”:

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

Description Byte 2, “Status byte 2”:

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

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

Description Byte 3..4, ”Number of error codes”:
Number of error codes present in the evaluation unit. Maximum number of error codes to read with one diagnostic read request is 4.

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

Description Byte 7..x, ”Error code 1..4”:
Error codes of the evaluation unit. Details see chapter “Error codes of the evaluation unit”. One error code has always a length of 4 bytes
Remark: If less than 4 error codes are present, the unused bytes are set to default value 0x00.

Description Byte (x+1) … N:
Always set to default value 0x00.

1.10 Module “RWH_CMD”, Execute command synchronously

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

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	WR	0	0
2	CM	0	0	0	0	0	0	TR
3	16 bit command length, MSBy							
4	16 bit command length, LSBy							
5	16 bit command code, MSBy							
6	16 bit command code, LSBy							
7	Command parameter 1, MSBy							
8	Command parameter 1, LSBy							
9	Command parameter 2, MSBy							
10	Command parameter 2, LSBy							
…	…							
N	0x00							

Description byte 1, “Control byte 1”:

Bit	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** (1)	**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”

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

Description Byte 3...4, ”16 bit command length X”:
Command data length, including length of command code. Limited to a maximum number of (N-6) bytes.

Description Byte 5...6, ”16 bit command code”:
Command code. Available commands see section “Overview of the available commands”.

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

PLC process data input image (Module RWH_CMD)

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

UK

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	1	Mode ”PUT” command to the evaluation unit active	Reflect the state of bit WR.
RA	1	Mode “GET” data from the evaluation unit active	Reflect the state of bit RD.
DIAG (1)	0	No error detected	-
	1	Evaluation unit 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 evaluation unit detect the setting of the corresponding bits WR and RD in the control byte 1 of the PLC data output image.
Any change in the settings of these bits to prior received states set the data bytes 3 … (N) to the default value 0x00. The bit TR does not influence this behavior.

Description Byte 2, “Status byte 2”:

Bit	Bit name	Description
0	**TA** (1)	**T**oggle request **A**cknowledge
1..6	-	Will be set to default value 0 by the evaluation unit
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 evaluation unit

(2) Bit CA is immediately set when the evaluation unit detect the setting of bit CR in the control bytes 2 of the PLC data output image. Any change of bit CR to prior received state set the data bytes 3 … (N) to the default value 0x00. The bit TR does not influence this behavior.

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

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

Description Byte 5...6, ”16 bit response code”:

Response code of the command request.

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

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

1.10.1 Overview GET / SET commands

Command	Control word [1]	Command length	Command code	Parameter 1	Parameter 2	Parameter 3 .. (N-6)
GET IDENT DIAGNOSIS	0x0880	0x0002	0x62C8	0x0000	0x0000	0x0000
GET MAC ADDRESS	0x0880	0x0002	0x62C9	0x0000	0x0000	0x0000
GET UID-RSSI	0x0880	0x0002	0x62CD	0x0000	0x0000	0x0000
GET HF POWER LIST	0x0880	0x0002	0x62CE	0x0000	0x0000	0x0000
GET HF POWER SETTING	0x0880	0x0002	0x62CF	0x0000	0x0000	0x0000
GET BARGRAPH STATE	0x0880	0x0002	0x62D0	0x0000	0x0000	0x0000
GET BLOCKS LOCKED	0x0880	0x0006	0x62D1	Start block	Number of blocks	0x0000
GET DSFID	0x0880	0x0006	0x62D2	0x0000	0x0000	0x0000
GET AFI	0x0880	0x0006	0x62D3	0x0000	0x0000	0x0000
SET HF POWER LEVEL	0x0480	0x0004	0x65D6	Power Level	0x0000	0x0000
SET BARGRAPH STATE	0x0480	0x0004	0x65D7	State	0x0000	0x0000
SET BLOCKS LOCKED	0x0480	0x0006	0x65D8	Start block	Number of blocks	0x0000
SET DEVICE RESET	0x0480	0x0004	0x65D9	Countdown value	0x0000	0x0000
SET DSFID	0x0480	0x0004	0x65DA	DSFID value	0x0000	0x0000
SET AFI	0x0480	0x0004	0x65DB	AFI value	0x0000	0x0000
SET DSFID LOCKED	0x0480	0x0002	0x65DC	0x0000	0x0000	0x0000
SET AFI LOCKED	0x0480	0x0002	0x65DD	0x0000	0x0000	0x0000

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

1.10.2 Command “GET IDENT DIAGNOSIS”

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

PLC process data output image (Module RWH_CMD)

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

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

PLC process data input image (Module RWH_CMD)

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

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

1.10.3 Command “GET MAC ADDRESS”

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

PLC process data output image (Module RWH_CMD)

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

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

PLC process data input image (Module RWH_CMD)

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

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

1.10.4 Command “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 (MSBy)
4	0x02	Command length (LSBy)
5	0x62	Command code (MSBy)
6	**0xCE**	Command code (LSBy)
7…N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x02 + (n)	Response length (LSBy)
5	0x62	Response code (MSBy)
6	**0xCE**	Response code (LSBy)
7	0x00	Not used
8	0x00 … X	Number of power levels. X =[0...5] 0x0 = No entry in 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. Bytes 3..N are set to default value 0x00.
Bit TA = TR : Command has been processed by the evaluation unit

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

1.10.5 Command “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 (MSBy)
4	0x02	Command length (LSBy)
5	0x62	Command code (MSBy)
6	**0xCF**	Command code (LSBy)
7…N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSBy)
5	0x62	Response code (MSBy)
6	**0xCF**	Response code (LSBy)
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. Bytes 3..N are set to default value 0x00.
Bit TA = TR : Command has been processed by the evaluation unit

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

1.10.6 Command “GET BARGRAPH STATE”

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

PLC process data output image (Module RWH_CMD)

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

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSBy)
5	0x62	Response code (MSBy)
6	**0xD0**	Response code (LSBy)
7	0x00	Not used
8	State	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. Bytes 3..N are set to default value 0x00.
Bit TA = TR : Command has been processed by the evaluation unit.

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

1.10.7 Command “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 (MSBy)
4	0x06	Command length (LSBy)
5	0x62	Command code (MSBy)
6	**0xD1**	Command code (LSBy)
7	0x00	Not used
8	STB	Block number of the first block which shall be checked for state "Blocked locked". X = [0x0.. nn] Notes: nn 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] Notes: 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 (MSBy)
4	0x04 + X	Response length (LSBy)
5	0x62	Response code (MSBy)
6	**0xD1**	Response code (LSBy)
7	0x00	Not used
8	NOB	Number of 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. Bytes 3..N are set to default value 0x00.
Bit TA = TR : Command has been processed by the evaluation unit

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

1.10.8 Command “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 (MSBy)
4	0x02	Command length (LSBy)
5	0x62	Command code (MSBy)
6	**0xD2**	Command code (LSBy)
7…N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSBy)
5	0x62	Response code (MSBy)
6	**0xD2**	Response code (LSBy)
7	0x00	Not used
8	DSFID	Data structure format identifier of the ID tag [0x0 .. 0xFF]
(9…N)	0x00	Not used

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

1.10.9 Command “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 (MSBy)
4	0x02	Command length (LSBy)
5	0x62	Command code (MSBy)
6	**0xD3**	Command code (LSBy)
7…N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSBy)
5	0x62	Response code (MSBy)
6	**0xD3**	Response code (LSBy)
7	0x00	Not used
8	AFI	Application family identifier of the ID tag [0x0 .. 0xFF]
(9…N)	0x00	Not used

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

1.10.10 Command “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 (MSBy)
4	0x02	Command length (LSBy)
5	0x62	Command code (MSBy)
6	**0xCD**	Command code (LSBy)
7…N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x08	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x0E	Response length (LSB). Fixed to 14 bytes, regardless of UID length.
5	0x62	Response code (MSBy)
6	**0xCD**	Response code (LSBy)
7	0x00	Not used
8	0x06 / 0x0A	RSSI and UID data length [6,10]
9	0x00	Not used
10	RSSI	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

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

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

1.10.11 Command “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 (MSBy)
4	0x04	Command length (LSBy)
5	0x65	Command code (MSBy)
6	**0xD6**	Command code (LSBy)
7	0x00	Not used
8	PWR	HF power level 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 (MSBy)
4	0x04	Response length (LSBy)
5	0x65	Response code (MSBy)
6	**0xD6**	Response code (LSBy)
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. Bytes 3..N are set to default value 0x00.
Bit TA = TR : Command has been processed by the evaluation unit

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

1.10.12 Command “SET BARGRAPH STATE”

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

PLC process data output image (Module RWH_CMD)

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

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSBy)
5	0x65	Response code (MSBy)
6	**0xD7**	Response code (LSBy)
7	0x00	Not used
8	State	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. Bytes 3..N are set to default value 0x00.
Bit TA = TR : Command has been processed by the evaluation unit

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

1.10.13 Command “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 (MSBy)
4	0x06	Command length (LSBy)
5	0x65	Command code (MSBy)
6	**0xD8**	Command code (LSBy)
7	0x00	Not used
8	STB	Block number of the first block which shall be set into state "Blocked locked". [0x0.. nn] Note: nn 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 (MSBy)
4	0x04	Response length (LSBy)
5	0x65	Response code (MSBy)
6	**0xD8**	Response code (LSBy)
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. Bytes 3..N are set to default value 0x00.
Bit TA = TR : Command has been processed by the evaluation unit.

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

1.10.14 Command “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 (MSBy)
4	0x04	Command length (LSBy)
5	0x65	Command code (MSBy)
6	**0xD9**	Command code (LSBy)
7	0x00	Not used
8	**RDT**	**R**estart **D**elay **T**ime [ms*10] 0x00 = Restart of the evaluation unit without delay 0x01… 0xXX = Restart of the evaluation unit within XX * 10 ms
9…N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x04	Response length (LSBy)
5	0x65	Response code (MSBy)
6	**0xD9**	Response code (LSBy)
7	0x00	Not used
8	**CRT**	**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. Bytes 3..N are set to default value 0x00.
Bit TA = TR : Command has been processed by the evaluation unit.

Notes:
It is sufficient to execute this command at one IO channel.
Once the command is started, the other active IO channels will not be actualized in the process data input image.

1.10.15 Command “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 (MSBy)
4	0x04	Command length (LSBy)
5	0x62	Command code (MSBy)
6	**0xDA**	Command code (LSBy)
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 (MSBy)
4	0x04	Response length (LSBy)
5	0x62	Response code (MSBy)
6	**0xDA**	Response code (LSBy)
7	0x00	Not used
8	DSFID	Data structure format identifier of the ID tag (echo of the command) [0x0 .. 0xFF]
9…N	0x00	Not used

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

1.10.16 Command “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 (MSBy)
4	0x04	Command length (LSBy)
5	0x62	Command code (MSBy)
6	**0xDB**	Command code (LSBy)
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 (MSBy)
4	0x04	Response length (LSBy)
5	0x62	Response code (MSBy)
6	**0xDB**	Response code (LSBy)
7	0x00	Not used
8	AFI	Application family identifier of the ID tag (echo of the command) [0x0 .. 0xFF]
9…N	0x00	Not used

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

1.10.17 Command “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 (MSBy)
4	0x02	Command length (LSBy)
5	0x62	Command code (MSBy)
6	**0xDC**	Command code (LSBy)
7…N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x02	Response length (LSBy)
5	0x62	Response code (MSBy)
6	**0xDC**	Response code (LSBy)
7…N	0x00	Not used

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

1.10.18 Command “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 (MSBy)
4	0x02	Command length (LSBy)
5	0x62	Command code (MSBy)
6	**0xDD**	Command code (LSBy)
7…N	0x00	Not used

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

PLC process data input image (Module RWH_CMD)

Byte No.	Content	Remark
1	0x04	Status byte 1
2	0x80 (1)	Status byte 2
3	0x00	Response length (MSBy)
4	0x02	Response length (LSBy)
5	0x62	Response code (MSBy)
6	**0xDD**	Response code (LSBy)
7…N	0x00	Not used

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

2 Data frame examples

In the following examples the evaluation unit is configured for 2 Read-/Write heads at channel IO-1 and channel IO-2. The Read/write heads are connected on both channels. Channel 3 and channel 4 are unconnected.

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

2.1 Module “RWH_CMD”, Read UID and RSSI value asynchronously

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

2.1.1 Payload traffic view

Last response from the evaluation unit:
00000000000000000000000000000000000000000000000000000**0001**0000000000000000000000000000000000
00000000000000000

Note: The evaluation of the response of the evaluation unit is necessary to get the state of the bit TA in byte 2 for channel IO-1 and byte 28 for channel IO-2 in the PLC process data input image.

Command request send by Controller:
00000000000000000000000000000000000000000000000000000**0001**0000000000000000000000000000000000
00000000000000000

Controller: “Read UID of the ID tag” on channel IO-1 and IO-2. Bits TR of both channels are not changed.

Response send by evaluation unit:
0100000A0003e00401004c5f494c0000000000000000000000000**0101**000A0002e00801138ca1d7cb0000000
00000000000000000

Evaluation unit: Send “Tag is in field” with RSSI value and UID data with length of 8 bytes from channel IO-1 and IO-2.

2.1.2 Payload traffic view, read diagnostics

Command request send by Controller:
40010000000000000000000000000000000000000000000000000**4000**0000000000000000000000000000000000
00000000000000000

Controller: Read diagnostics information from channel IO-1, “Read UID of the ID tag” from channel IO-2. Activate mode by sending bit TR = NOT (TA).

Response send by evaluation unit when command has been processed:
400100010000F4FE0300000000000000000000000000000000000**4100**0000000000000000000000000000000000
00000000000000000

Evaluation unit: Channel IO-1 had diagnostics information with 1 element. Diagnostics " Read-/Write head not operating cause time out occurred ". Channel IO-1 detect ID tag and has no diagnostics information.

Note:
Before the UID can be read again, the DR bit within the Control byte must be reset.
Here an example how to reset the DR bit on both channels

00000000000000000000000000000000000000000000000000000**0001**0000000000000000000000000000000000
00000000000000000

Controller: Remove diagnostics read request on channel IO-1 and IO-2. Activate mode by sending bit TR = NOT (TA).

2.2 Module “RWH_CMD”, Read User data of the ID tag synchronously

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

2.2.1 Payload traffic view

Last response from the evaluation unit:
0100000A0003e00401004c5f494c00000000000000000000000000**0101**000A0002e00801138ca1d7cb0000000
00000000000000000

Note: The evaluation of the response of the evaluation unit is necessary to get the state of the bit TA in byte 2 for channel IO-1 and byte 28 for channel IO-2 in the PLC process data input image.

Command request send by Controller:
1801000A0004000000000000000000000000000000000000000000**1800**00080002000000000000000000000000
00000000000000000
Controller: “Read User data of the ID tag” on channel IO-1 and IO-2.

Response send by evaluation unit while command is processed:
190000000000000000000000000000000000000000000000000000**1901**00000000000000000000000000000000
00000000000000000
Evaluation unit: Send “Tag is in field”, response data set to default values in channel IO-1 and IO-2.

Response send by evaluation unit when command has been processed:
1901000A00041122334455667788 99AA00000000000000000000**1900**00080002334455667788 99AA0000000
00000000000000000
Evaluation unit: Send “Tag is in field” with User data read from from channel IO-1 and IO-2.

2.2.2 Payload traffic view, read diagnostics

Command request send by Controller:
500000000000000000000000000000000000000000000000000000**5001**00000000000000000000000000000000
00000000000000000
Controller: Read diagnostics information from channel IO-1, “Read UID of the ID tag” from channel IO-2. Activate mode by sending bit TR = NOT (TA).

Response send by evaluation unit when command has been processed:
500100010000F4FE03000000000000000000000000000000000000**5100**00000000000000000000000000000000
00000000000000000
Evaluation unit: Channel IO-1 had diagnostics information with 1 element. Diagnostics " Read-/Write head not operating cause time out occurred ". Channel IO-1 detect ID tag and has no diagnostics information.

Note:
Before the User data can be read again, the DR bit within the Control byte must be reset.
Here an example how to reset the DR bit on both channels:

Command request send by Controller:
1800000A0004000000000000000000000000000000000000000000**1801**00080002000000000000000000000000
00000000000000000
Controller: Remove diagnostics read request on channel IO-1 and IO-2. Reactivate mode “Read User data of the ID tag synchronously” by sending bit TR = NOT (TA).

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

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

2.3.1 Payload traffic view

Last response from the evaluation unit:
0100000A0003e00401004c5f494c00000000000000000000000000**0101**000A0002e00801138ca1d7cb0000000
00000000000000000

Note: The last response of the evaluation unit is necessary to get the state of the bit TA in byte 2 for channel IO-1 and byte 28 for channel IO-2 in the PLC process data input image to set the bits TR correctly.

Command request send by Controller:
3801000A0004000000000000000000000000000000000000000000**3800**00080002000000000000000000000000
00000000000000000
Controller: “Read User data of the ID tag asynchronously” on channel IO-1 and IO-2.

Response send by evaluation unit when ID-tag is detected on channel IO-2:
380000000000000000000000000000000000000000000000000000**3900**00080002334455667788 99AA0000000
00000000000000000
Evaluation unit: No ID tag detected on channel IO-1. New ID tag detected on channel IO-2, User data read.
…
Response send by evaluation unit when ID-tag is detected on channel IO-1:
3901000A00041122334455667788 99AA00000000000000000000**3900**00080002334455667788 99AA0000000
00000000000000000
Evaluation unit: New ID tag detected on channel IO-1, User data read. Data on channel IO-2 not changed.

Note: While the command is not finished, no other commands can be started.

2.3.2 Payload traffic view, read diagnostics

Command request send by Controller:
700000000000000000000000000000000000000000000000000000**7001**00000000000000000000000000000000
00000000000000000
Controller: Read diagnostics information from channel IO-1, “Read UID of the ID tag” from channel IO-2. Activate mode by sending bit TR = NOT (TA).

Response send by evaluation unit when command has been processed:
700100010000F4FE03000000000000000000000000000000000000**7100**00000000000000000000000000000000
00000000000000000
Evaluation unit: Channel IO-1 had diagnostics information with 1 element. Diagnostics " Read-/Write head not operating cause time out occurred ". Channel IO-1 detect ID tag and has no diagnostics information.

Note:
Before the User data can be read again, the DR bit within the Control byte must be reset.
Here an example how to reset the DR bit on both channels:

Command request send by Controller:
3800000A0004000000000000000000000000000000000000000000**3801**00080002000000000000000000000000
00000000000000000
Controller: Remove diagnostics read request on channel IO-1 and IO-2. Reactivate mode “Read User data of the ID tag asynchronously ” by sending bit TR = NOT (TA).

2.4 Module “RWH_CMD”, Write User data of the ID tag synchronously

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

2.4.1 Payload traffic view

Last response from the evaluation unit:
0100000A0003e00401004c5f494c00000000000000000000000000**0101**000A0002e00801138ca1d7cb0000000
00000000000000000

Note: The evaluation of the response of the evaluation unit is necessary to get the state of the bit TA in byte 2 for channel IO-1 and byte 28 for channel IO-2 in the PLC process data input image.

Command request send by Controller:
140100040008C1C2C3C400000000000000000000000000000000**1400**000A0020B1B2B3B4B5B6B7B8B9BA000
00000000000000000
Controller: Write 4 bytes at address 0x0008 to User data of ID tag at channel IO-1 and 10 bytes at address 0x0020 to ID tag at channel IO-2

Response send by evaluation unit while command is processed:
150000000000000000000000000000000000000000000000000000**1501**00**0A**0**02**000000000000000000000000000
00000000000000000
Evaluation unit: Send “Tag is in field”, response data set to default values in channel IO-1 and IO-2.

Response send by evaluation unit when command has been processed:
150100040008000000000000000000000000000000000000000000**1500**000A002000000000000000000000000000
00000000000000000
Evaluation unit: Send “Tag is in field” with User data read from channel IO-1 and IO-2.

2.4.2 Payload traffic view, read diagnostics

Command request send by Controller:
500000000000000000000000000000000000000000000000000000**5001**00000000000000000000000000000000000
00000000000000000
Controller: Read diagnostics information from channel IO-1, “Read UID of the ID tag” from channel IO-2. Activate mode by sending bit TR = NOT (TA).

Response send by evaluation unit when command has been processed:
500100010000F4FE03000000000000000000000000000000000000**5100**00000000000000000000000000000000000
00000000000000000
Evaluation unit: Channel IO-1 had diagnostics information with 1 element. Diagnostics " Read-/Write head not operating cause time out occurred ". Channel IO-1 detect ID tag and has no diagnostics information.

Note:
Before the User data can be read again, the DR bit within the Control byte must be reset.
Here an example how to reset the DR bit on both channels:

Command request send by Controller:
140000**0A**00**04**00000000000000000000000000000000000000000000**1401**00**08**00**02**000000000000000000000000000
00000000000000000
Controller: Remove diagnostics read request on channel IO-1 and IO-2. Reactivate mode “Write User data to the ID tag” by sending bit TR = NOT (TA).

2.5 Module “RWH_CMD”, Write User data of the ID tag asynchronously

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

2.5.1 Payload traffic view

Last response from the evaluation unit:
0100000A0003e00401004c5f494c00000000000000000000000000**0001**000A0002e00801138ca1d7cb0000000
00000000000000000

Note: The last response of the evaluation unit is necessary to get the state of the bit TA in byte 2 for channel IO-1 and byte 28 for channel IO-2 in the PLC process data input image to set the bits TR correctly.

Command request send by Controller:
340100040008C1C2C3C4000000000000000000000000000000000**3400**000A0020B1B2B3B4B5B6B7B8B9BA000
00000000000000000
Controller: Write 4 bytes at address 0x0008 to User data of ID tag at channel IO-1 and 10 bytes at address 0x0020 to ID tag at channel IO-2

Response send by evaluation unit:
350000000000000000000000000000000000000000000000000000**3401**000000000000000000000000000000000
00000000000000000
Evaluation unit: Send “ID tag detected” at channel IO-1, “No ID tag detected” at channel IO-2. Response data set to default values in channel IO-1 and IO-2.
…
Response send by evaluation unit:
350100040008000000000000000000000000000000000000000000**3501**000000000000000000000000000000000
00000000000000000
Evaluation unit: Send command processed at channel IO-1, “ID tag detected” at channel IO-2.
…
Response send by evaluation unit:
350100040008000000000000000000000000000000000000000000**3500**000A002000000000000000000000000000
00000000000000000
Evaluation unit: Send command processed at channel IO-2.

2.5.2 Payload traffic view, read diagnostics

Command request send by Controller:
700000000000000000000000000000000000000000000000000000**7001**000000000000000000000000000000000
00000000000000000
Controller: Read diagnostics information from channel IO-1, “Read UID of the ID tag” from channel IO-2. Activate mode by sending bit TR = NOT (TA).

Response send by evaluation unit when command has been processed:
700100010000F4FE03000000000000000000000000000000000000**7100**000000000000000000000000000000000
00000000000000000
Evaluation unit: Channel IO-1 had diagnostics information with 1 element. Diagnostics " Read-/Write head not operating cause time out occurred ". Channel IO-1 detect ID tag and has no diagnostics information.

Note:
Before the User data can be read again, the DR bit within the Control byte must be reset.
Here an example how to reset the DR bit on both channels:

Command request send by Controller:
3400000A000400000000000000000000000000000000000000**3401**000800020000000000000000000000000
00000000000000000
Controller: Remove diagnostics read request on channel IO-1 and IO-2. Reactivate mode “Write User data to the ID tag asynchronously ” by sending bit TR = NOT (TA).

2.6 Module “RWH_CMD”, Write verified User data of the ID tag synchronously

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

2.6.1 Payload traffic view

Last response from the evaluation unit:
0100000A0003e00401004c5f494c00000000000000000000000000**0101**000A0002e00801138ca1d7cb0000000000000000000000000

Note: The evaluation of the response of the evaluation unit is necessary to get the state of the bit TA in byte 2 for channel IO-1 and byte 28 for channel IO-2 in the PLC process data input image.

Command request send by Controller:
1C0100040008C1C2C3C4000000000000000000000000000000000**1C00**000A0020B1B2B3B4B5B6B7B8B9BA0000000000000000000000
Controller: Write verified 4 bytes at address 0x0008 to User data of ID tag at channel IO-1 and 10 bytes at address 0x0020 to ID tag at channel IO-2

Response send by evaluation unit while command is processed:
1D0000000000000000000000000000000000000000000000000000**1D01**0000000000000000000000000000000000000000000000000
Evaluation unit: Send “Tag is in field”, response data set to default values in channel IO-1 and IO-2.

Response send by evaluation unit when command has been processed:
1D0100040008C1C2C3C4000000000000000000000000000000000**1D00**000A0020B1B2B3B4B5B6B7B8B9BA0000000000000000000000
Evaluation unit: Send “Tag is in field” with User data read from from channel IO-1 and IO-2.

2.6.2 Payload traffic view, read diagnostics

Command request send by Controller:
500000000000000000000000000000000000000000000000000000**5001**0000000000000000000000000000000000000000000000000
Controller: Read diagnostics information from channel IO-1, “Read UID of the ID tag” from channel IO-2. Activate mode by sending bit TR = NOT (TA).

Response send by evaluation unit when command has been processed:
500100010000F4FE0300000000000000000000000000000000000**5100**0000000000000000000000000000000000000000000000000
Evaluation unit: Channel IO-1 had diagnostics information with 1 element. Diagnostics " Read-/Write head not operating cause time out occurred ". Channel IO-1 detect ID tag and has no diagnostics information.

Note:
Before the User data can be read again, the DR bit within the Control byte must be reset.
Here an example how to reset the DR bit on both channels:

Command request send by Controller:
1C0000040008C1C2C3C4000000000000000000000000000000000**1C01**000A0020B1B2B3B4B5B6B7B8B9BA0000000000000000000000
Controller: Remove diagnostics read request on channel IO-1 and IO-2. Reactivate mode “Write verified User data to the ID tag” by sending bit TR = NOT (TA).

2.7 Module “RWH_CMD”, Execute command synchronously

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

2.7.1 Payload traffic view

Last response from the evaluation unit:
0100000A0003e00401004c5f494c00000000000000000000000000**0001**000A0002e00801138ca1d7cb0000000
00000000000000000

Note: The last response of the evaluation unit is necessary to get the state of the bit TA in byte 2 for channel IO-1 and byte 28 for channel IO-2 in the PLC process data input image to set the bits TR correctly.

Command request send by Controller:
08810006**62D1**00**06**00**0A**0000000000000000000000000000000000**0001**0000000000000000000000000000000000
00000000000000000
Controller: Send command “Get Blocks locked” of ID tag from block number 6 up to block number 15 at channel IO-1. No command execution on channel IO-2.

Response send by evaluation unit:
09810000000000000000000000000000000000000000000000000000**0001**0000000000000000000000000000000000
00000000000000000
Evaluation unit: Send “ID tag detected” at channel IO-1, response data set to default values in channel IO-1 while command is processed. “No ID tag detected” at channel IO-2.

2.7.2 Payload traffic view, read diagnostics

Command request send by Controller:
08800002**62C8**0000000000000000000000000000000000000000000000**0001**0000000000000000000000000000000000
00000000000000000
Controller: Send command “Get Ident diagnosis” from channel IO-1. No command execution on channel IO-2.

Response send by evaluation unit:
09800008**62C8**0001F4FE03000000000000000000000000000000**0001**0000000000000000000000000000000000
00000000000000000
Evaluation unit: Channel IO-1 had diagnostics information with 1 element. Diagnostics " Read-/Write head not operating cause time out occurred ". “No ID tag detected” at channel IO-2.

Note:
Before the User data can be read again, the DR bit within the Control byte must be reset.
Here an example how to reset the DR bit on both channels:

Command request send by Controller:
3801000A000400000000000000000000000000000000000000000000**3800**0008000200000000000000000000000000
00000000000000000
Controller: Remove diagnostics read request on channel IO-1 and IO-2. Reactivate mode “Read User data of the ID tag asynchronously” by sending bit TR = NOT (TA).

3 Error codes of the evaluation unit

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

Example:
Command response of the evaluation unit for command “DR”
C001**F4FE9000**

3.1 Error group ID tag (F1FE)

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

3.2 Error group evaluation unit (F4FE)

Error group	Error Code	Description
Evaluation unit	F4FE0100	Power supply failure
Ident Unit	F4FE0200	Hardware failure , short circuit and overload
Evaluation unit	F4FE0201	Allowed temperature exceeded
Evaluation unit	F4FE0300	Read-/Write head not operating cause time out occurred
Evaluation unit	F4FE0400	Command buffer overflow IO-Server Queue (Internal error)
Evaluation unit	F4FE0500	Data buffer overflow, memory allocation (Internal error)
Evaluation unit	F4FE0600	Command in this mode not supported (Internal error)
Evaluation unit	F4FE8100	ID-Link Master inactive. e.g. after power (Internal error)
Evaluation unit	F4FE8200	Internal IO-Port server error (Internal error)
Evaluation unit	F4FE8300	IO-Port invalid parameter Internal error, e.g. channel (Internal error)
Evaluation unit	F4FE8400	Vendor specific error on PUT
Evaluation unit	F4FE8500	IO-Port server resets channel
Evaluation unit	F4FE8600	Data not available for delayed C/Q inputs or delayed UID (Internal error)
Evaluation unit	F4FE8700	IO-Port channel reconfiguration not allowed yet (internal error)
Evaluation unit	F4FE8800	IO-Port parameter selector flag not set (internal error)
Evaluation unit	F4FE8900	General error detected from ID-Link Master
Evaluation unit	F4FE8A00	CRC error detected from ID-Link Master
Evaluation unit	F4FE8B00	Object not found detected from ID-Link Master
Evaluation unit	F4FE8C00	Data read/write size within command not valid
Evaluation unit	F4FE8D00	IO-Port channel is reconfigured
Evaluation unit	F4FE8E00	Read-/Write head could not process command e.g. Read/write length exceeded, ID tag memory error, write to locked block
Evaluation unit	F4FE8F00	ID tag data length exceed (Block size * Block number)
Evaluation unit	F4FE9001	Short circuit at output driver detected
Evaluation unit	F4FE9002	Under voltage at output driver detected
Evaluation unit	F4FE9003	Overload at output driver detected
Evaluation unit	F4FE9004	Over temperature at output driver detected
Evaluation unit	F4FE9005	Line break to Read/Write head
Evaluation unit	F4FE9006	Upper limit reached at output driver
Evaluation unit	F4FE9007	Under voltage at C/Qo detected
Evaluation unit	F4FE9008	Read-/Write head failure detected
Evaluation unit	F4FE9009	Read-/Write head communication error
Evaluation unit	F4FE900A	I²C communication error (Internal error)
Evaluation unit	F4FE900B	I²C communication parity error (Internal error)
Evaluation unit	F4FE900C	Command rejected cause antenna field switched off
Evaluation unit	F4FE900D	Internal data of PROFNET stack corrupt (Internal error)
Evaluation unit	F4FE900E	R/W head do not support this object
Evaluation unit	F4FE9401	Frontend Error detected by Read-/Write head
Evaluation unit	F4FE9402	General error detected by Read-/Write head
Evaluation unit	F4FE9403	ID-Link Error detected by Read-/Write head
Evaluation unit	F4FE9404	Buffer overrun Error detected by Read-/Write head
Evaluation unit	F4FEA000	Invalid command code detected
Evaluation unit	F4FEA001	Invalid command parameter detected
Evaluation unit	F4FEA002	Invalid command data detected
Evaluation unit	F4FEA003	Ticket number or ticket length detected

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

3.3 Error group Communication User – evaluation unit (F5FE)

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

4 Glossary

Definition	Remark
Antenna	RFID antenna built in a Read-/Write head
Asynchronously	Data of the command response is updated after the evaluation unit 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, e.g. 4/8/32 bytes
Connection	Describes the logical connection between two objects, e.g. Controller and slave
Controller	See definition PLC
Emergency system	Web server with reduced functionality to download the firmware of the evaluation unit
Evaluation unit	RFID Identification unit DTE100, DTE101, DT102, DTE104
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
N	Selected module size of the IO-channel
PC	Personal computer, e.g. desktop computer, notebook
PermData	Nonvolatile data area of the evaluation unit for storage of user specific settings, like fieldbus parameter, address settings and so on.
PLC	Programmable Logic Controller, e.g. Allen Bradley Compact Logix, Beckhoff CX5020, Siemens CPU 315-2 DP/PN
Process data input image	Data area where the PLC can read the outputs of the external periphery devices. (%IBx)
Process data output image	Data area where the PLC can write to the inputs of the external periphery devices. (%QBx)
Read-/Write head	RFID Read-/Write head, e.g. ANT411, ANT513
RSSI	Receive Signal Strength Indicator. Reflect the received signal quality of the ID tag. Higher values mean a better reception of the ID tag signal.
Synchronously	Data of the command response is updated immediately with the currently detected state of the ID tag.
User data	Data area of the ID tag which can be read and written randomly
Web client	PC program to send “http protocol” requests, e.g. Firefox, Internet Explorer
Web server	Built in “http protocol” server to service request from a PC