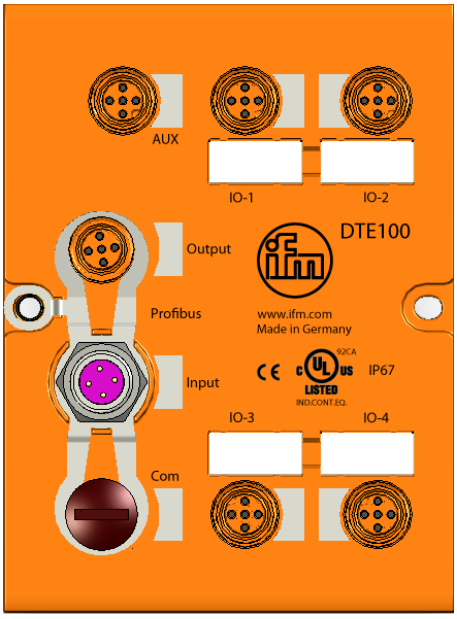
ifm electronic

Device Manual
RFID evaluation unit

UK

efector190®

DTE100



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Contents

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Licences and trademarks

1 Preliminary note

1.1 Symbols used

► Instruction

> Reaction, result

[…] Designation of pushbuttons, buttons or indications

→ Cross-reference

Important note
Non-compliance can result in malfunction or interference

Information
Supplementary note

2 Safety instructions

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

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

3 Functions and features

The RFID evaluation unit DTE100 integrates a Profibus DP interface and 4 channels for the connection of field devices. Each channel can be used either for the connection of an RFID antenna or as input/output to IEC 61131.

The device

- controls the data exchange to the RFID antennas or the sensor/actuator level.
- communicates with the higher-level control level via Profibus.
- allows device configuration via a web server.

Application examples:

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

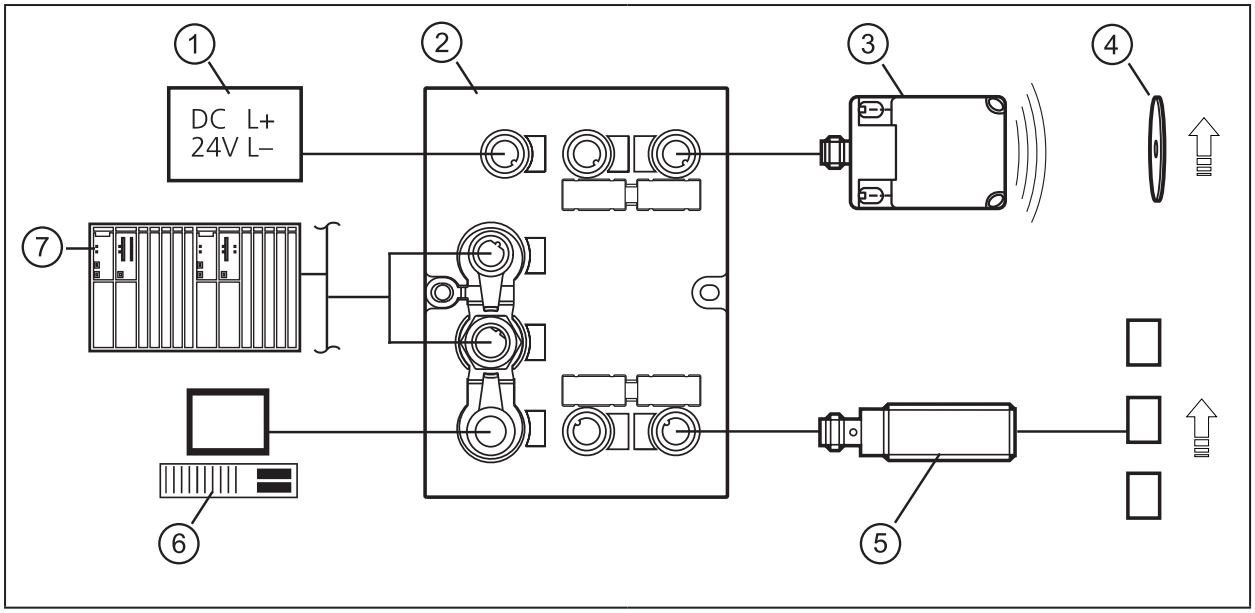
3.1 Requirements on the Profibus DP master

Profibus DP master of class 1 (DPM1) with DPV0 support or

Profibus DP master of class 1 (DPM1) with DPV1 support (recommended)

By using the DPV1 services the data size within the cyclically transferred input/output data of the Profibus DP master is considerably reduced.

4 Function



1: Voltage supply
2: DTE100 RFID evaluation unit
3: Read/write head type ANT51x
4: RFID tag
5: Sensor
6: PC (configuration interface)
7: Profibus DP master

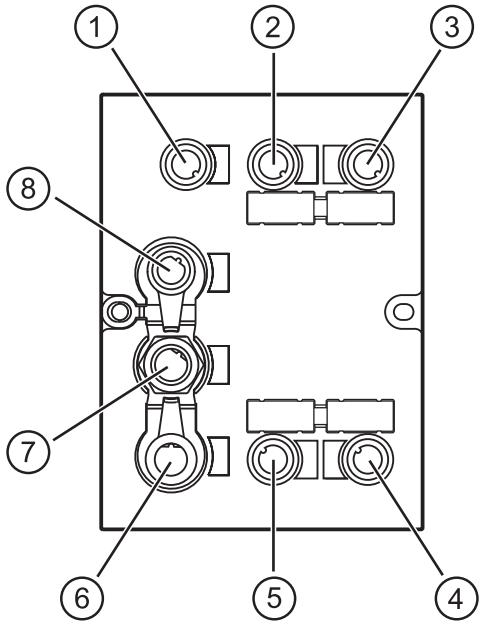
The evaluation unit DTE100 processes data from up to 4 RFID read/write heads (type ANT51x) or IEC 61131 inputs / outputs. It provides the following methods of communication with a Profibus DP master:

– Cyclic data transfer via MS0 connection

– Cyclic / acyclic mixed mode via a combined MS0 / MS1 connection

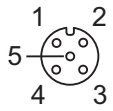
For further information about communication methods, see (→ chapter 8)

4.1 Connection



1: AUX voltage supply
2: Process connection IO-1
3: Process connection IO-2
4: Process connection IO-4
5: Process connection IO-3
6: COM configuration interface
7: PROFIBUS IN fieldbus interface
8: PROFIBUS OUT fieldbus interface

4.1.1 "AUX" voltage supply

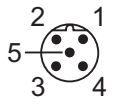


Pin	Connection
1	24 V DC
2	not used
3	0 V
4	not used
5	not used

4.1.2 "PROFIBUS IN" and "PROFIBUS OUT" fieldbus interface

- Profibus DP-V0 / DP-V1 interface isolated from potential
- Baud rate 9600 baud to 12 Mbaud
- Max. distance between gateway and host: depending on the baud rate
- Max. 127 participants, 32 per segment

PROFIBUS IN



Note: screened connection cable required

Pin	Connection
1	not used
2	RxD/TxD-N (bus A)
3	not used
4	RxD/TxD-P (bus B)
5	not used

PROFIBUS OUT

Note: screened connection cable required

Pin	Connection
1	P5V
2	RxD/TxD-N (bus A)
3	DGND
4	RxD/TxD-P (bus B)

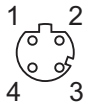
Profibus address

Profibus address on delivery:	126

The address can be adapted via the integrated web server (→ chapter 7.2) or a suitable Profibus DP master of class 1 or 2.

4.1.3 "COM" configuration interface

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



Note: screened connection cable required

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

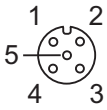
Factory setting of the Ethernet parameters

The following values are preset on delivery of the device:

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

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

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



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

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

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

You can find information about the matching read/write heads on our website at:

www.ifm.com → data sheet search → ANT51

5 Installation

You can find information about installation and electrical connection in the operating instructions for the unit at:

www.ifm.com → Data sheet search → DTE100 → Operating instructions

6 Operating and display elements

6.1 Reset to factory settings

Profibus address and Ethernet parameters can be reset to the factory settings. Take the following steps:

► Remove all cable connections from the device.

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

► Connect the device with the voltage supply and wait until the yellow LED indication on AUX and IO-3 flashes at approx. 8 Hz.

► Remove the conductive bridge from process connection IO-3.

► Disconnect the device from the voltage supply and connect it again.

> The settings are reset.

6.2 LED indicators

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

6.2.1 LED AUX

LED green	LED yellow	Status	Note
off	off	no voltage supply	U_{AUX} < 5 V
on	flashes at 2 Hz	voltage supply too low	5 V ≤ U_{AUX} ≤ 18 V
on	off	voltage supply OK	18 V ≤ U_{AUX} ≤ 36 V
on	flashes at 8 Hz	voltage supply too high	U_{AUX} > 36 V

6.2.2 LED PROFIBUS

LED red	LED green	Status	Note
on	off	no connection to the Profibus DP master	Profibus DP protocol stack in the device does not run or no connection to the DP master
on	flashes at 2 Hz	connection to Profibus DP master exists, no cyclical data exchange	device is in the "WAIT_PRM" or "WAIT_ CFG" state
off	on	connection to the Profibus DP master exists, cyclical data exchange running	device is in the "DATA_EXCH" state"

6.2.3 LED COM

LED green	LED yellow	Status	Note
off	off	no connection to another Ethernet counterpart	link status "no link"“
on	off	connection to Ethernet counterpart exits, no data exchange	link status "link", "no traffic"
on	flashes sporadically	connection to Ethernet counterpart exists, data exchange running	link status "link", "traffic"

6.2.4 LEDs IO1 ... IO4

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

Use as input to IEC 61131

LED green	LED yellow	Status	Note
off	off	interface deactivated	interface in DP master not configured
on	off	interface activated, input on L level (0 V)	-
on	on	interface activated, input on H level (24 V)	-
flashes at 8 Hz	flashes at 8 Hz	overload or short circuit	-

Use as output to IEC 61131

LED green	LED yellow	Status	Note
off	off	interface deactivated	interface in DP master not configured
on	off	interface activated, output L-active (0 V)	-
on	on	interface activated, output H-active (24 V)	-
flashes at 8 Hz	flashes at 8 Hz	overload or short circuit	-

Use with RFID read/write heads

LED green	LED yellow	Status	Note
off	off	interface deactivated	interface in DP master not configured
flashes at 2 Hz	off	interface activated, antenna off	-
on	off	interface activated, tag not in the field	-
on	on	interface activated, tag in the field	-
flashes at 8 Hz	flashes at 8 Hz	overload, short circuit or communication error	-

6.2.5 Special device-LED indications

LED	Status	Note
green AUX LED on yellow AUX LED flashes at 8 Hz yellow IO1...IO4 LEDs flash at 8 Hz	Device is in the service mode "emergency system started".	A firmware update is necessary and can be executed via the web server.
green AUX LED on yellow AUX LED flashes at 8 Hz green IO1...IO4 LEDs flash at 8 Hz yellow IO1...IO4 LEDs flash at 8 Hz	Major error, device has to be returned.	Hardware fault or permanent data in the device is corrupt.
green AUX LED on yellow AUX LED flashes at 8 Hz yellow IO3 LED flashes at 8 Hz	Reset to factory settings	-

7 Putting into operation

► Connect the device according to the operating instructions.

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

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

7.1 Parameterisation

The parameters of the unit are set via the hardware configuration of the Profibus DP master.

The 4 channels of the DTE100 can be configured depending on the application:

Anwendung	Modulname	Beschreibung	Hinweis
Unused channel	Channel deactivated	Deactivation of the channel	If the channel is not used this module must be assigned to the slot.
Switching outputs of sensors, reading of IEC61131 outputs	Input (1 Byte In)	Cyclic reading of the inputs C/Qi and I/Q	Data is stored within the periphery input of the PLC. No library access required.
Switching inputs of controller, valves or actuators with 24V power supply	Output (1 Byte In/Out)	Cyclic writing of the output C/Qo	Data is read from the periphery output of the PLC and written to the output of the device. No library access required.
RFID antennas type ANT51x	PIB State (2 Byte In/Out)	Acyclic command channel MS0= Control/State MS1= Command channel	Data accessable only over library DTE100_L.
RFID antennas type ANT51x	RWH UID (11 Byte In/Out)	Cyclic reading of the UID with 32/64 Bit length	Data is stored within the periphery input of the PLC. No library access required.
	RWH UID (15 Byte In/Out)	Cyclic reading of the UID with 32/64/96 Bit length	Data is stored within the periphery input of the PLC. No library access required.
	RWH UID (19 Byte In/Out)	Cyclic reading of the UID with 32/64/96/128 Bit length	Data is stored within the periphery input of the PLC. No library access required.
RFID antennas type ANT51x	RWH STRG (26 Byte In/Out)	Cyclic command channel (MS0)	Data accessable only via library DTE100_L.
	RWH STRG (34 Byte In/Out)	Cyclic command channel (MS0)	Data accessable only via library DTE100_L.
	RWH STRG (42 Byte In/Out)	Cyclic command channel (MS0)	Data accessable only via library DTE100_L.

You can find detailed information in the supplement to the device manual at:

www.ifm.com → Data sheet search → DTE100 → Operating instructions

7.2 Web server

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

- configure the IP settings of the unit
- change the Profibus Address of the unit
- cpdate the firmware

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

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

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Please note that the evaluation unit and the PC must be set to the same IP-address range.
Default = 192.168.0.x

► Open the web browser on the PC and enter the IP-adress of the evaluation unit (Default:192.168.0.79)

> The web interface opens.

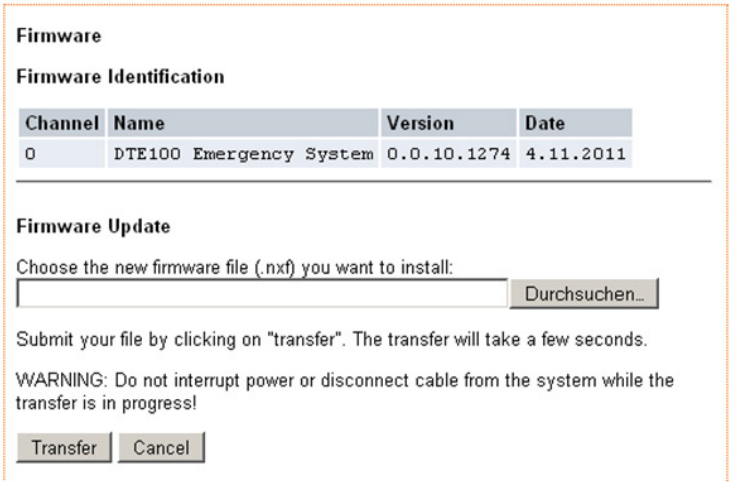
► To change IP settings or the profibus address, go to the respective tab and follow the on-screen instructions.

7.2.1 Firmware update

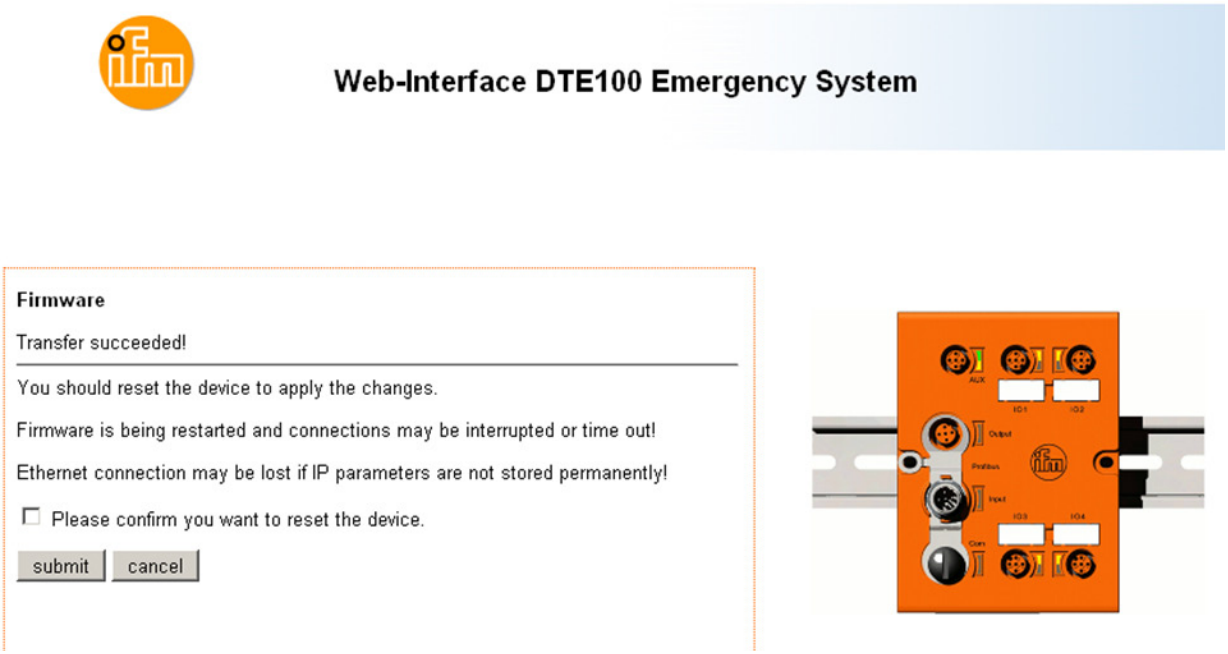
Do not interrupt power or disconnect cables from the system while the firmware transfer is in progress.

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

► Choose firmware file DTE100.nxf and commit via button [Transfer].



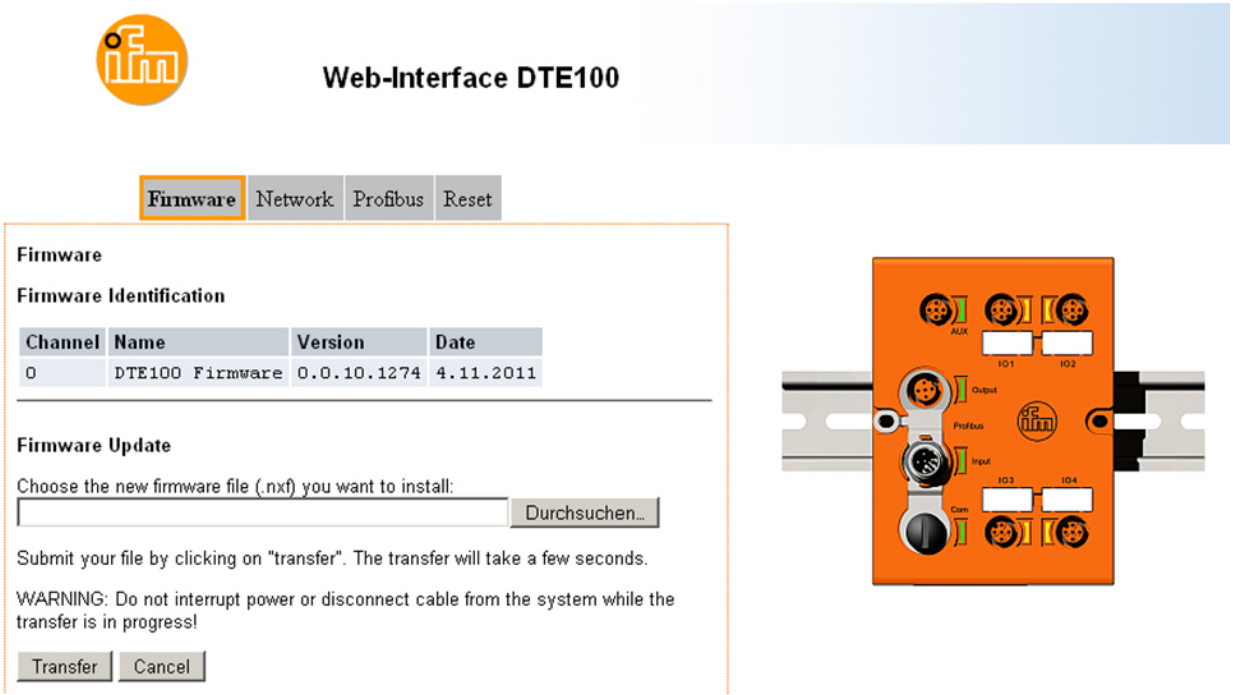
> After approx. 60 seconds the following message appears:



► Disconnect the device from the power supply.
Alternative:
Activate checkbox "Please confirm you want to reset the device" and press the "submit" button.

► Reconnect the device to the power supply

> The DTE100 starts up with the new firmware.



8 Profibus communication methods

The following chapters describe how the evaluation unit DTE100 communicates with higher level systems (e.g. PLCs) via a standard Profibus DP bus system.

8.1 Legend

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	1	1	0	0	1	D0
2	1	0	D5	1	1	0	Res.	

Byte no.	Byte order
Bit	Bit number
0 / 1	Static signal state: 0 = low level, 1 = high level
Res.	Reserved, can be low or high level
Yellow	Mandatory for PIB implementation
Green	ifm specific definition

Data formats:

0001b	Binary 0 0 0 1 (MSB to LSB)
21h	Hex 0x21
31	Decimal 31

8.2 Abbreviation

PDU	Protocol data unit (frame)
IDU	Ident unit (here the DTE100 evaluation unit)
PIB	Proxy Ident Block according to the Technical specification for Profibus and Profinet version 1.9 (PNO order 3.142)
IO-1	Process interface of the evaluation unit, channel 1
IO-2	Process interface of the evaluation unit, channel 2
IO-3	Process interface of the evaluation unit, channel 3
IO-4	Process interface of the evaluation unit, channel 4

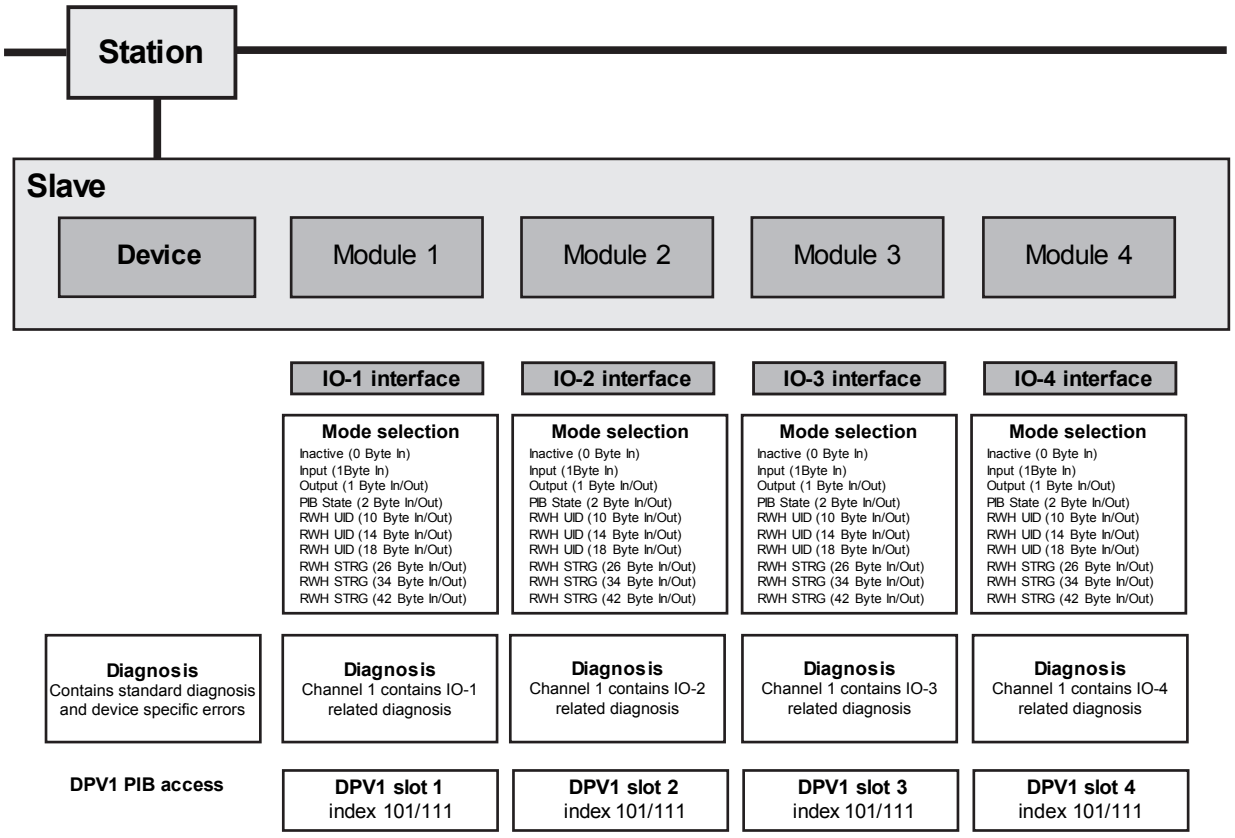
8.3 General information

The data of the evaluation unit is accessable via four independent channels.

Each channel can be switched into the following modes:

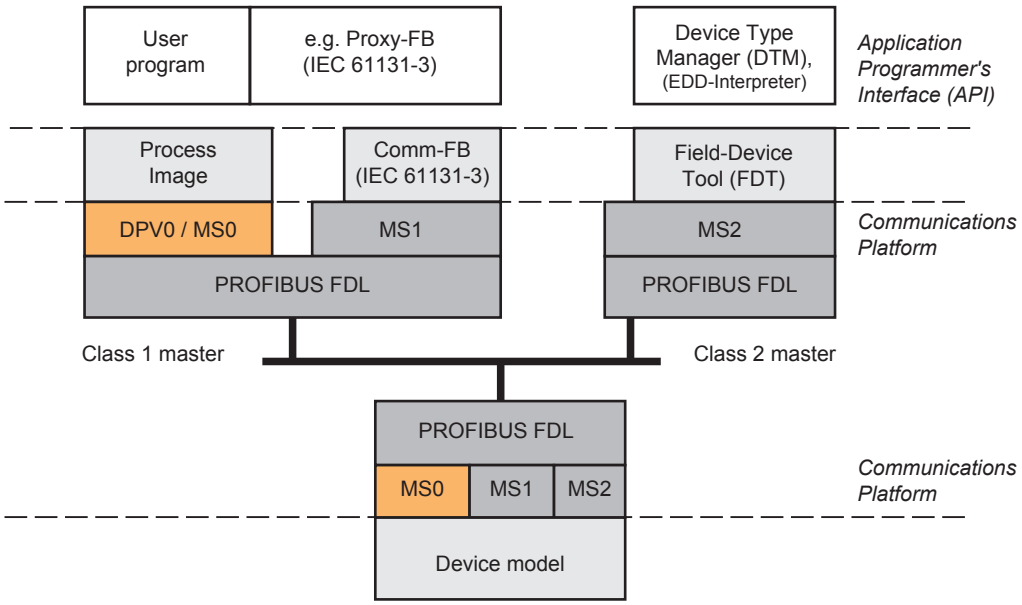
- Inactive
- IEC61131 input
- IEC61131 output
- Communication mode to read/write the UID of a tag via an RFID reader.
- Communication mode to read/write data from/to a tag via an RFID reader.

8.4 Profibus DP model of the RFID evaluation unit (MS0/MS1)

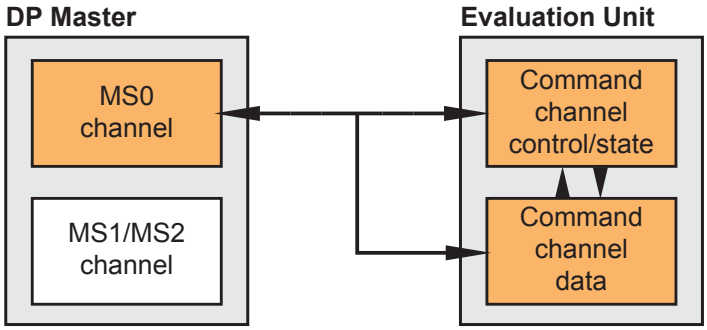


8.5 Communication via MS0 connection (Method 1)

The data of the evaluation unit is transferred cyclically from and to the DP slave via a MS0 connection.



This method is selected by setting the appropriate module configuration.



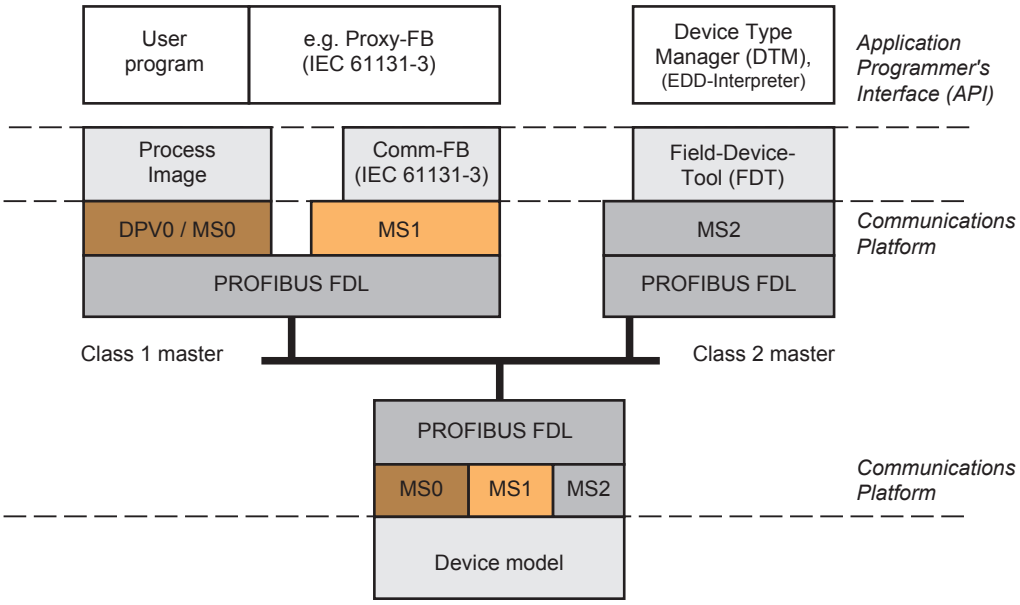
8.6 Communication via MS0 / MS1 connection (Method 2)

The data of the evaluation unit is transferred via a combined MS0 / MS1 connection.

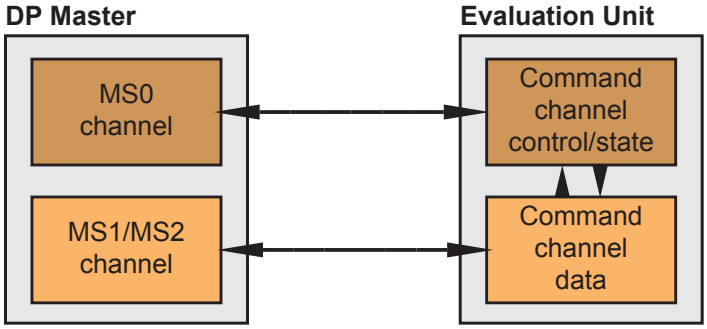
The control and status information of the command is transferred cyclically via an MS0 connection, the command data is transferred acyclically from and to the DP slave via a MS1 connection.

This connection method is compliant with the PNO Profile for Identification Systems, Proxy Ident Function Block. [1]

The advantage of this method is that the MS0 connection uses fewer data bytes, because the command channel needs only 2 bytes for the control word in the process data output and 2 bytes for the status word in the process data input.



This method is selected by setting the appropriate module configuration.



8.7 Communication mechanism for the command channel

For the synchronisation of the command request with the command response data, a cyclic control word and a cyclic status word is used. The command request data and the command response data can be sent via the MS0 channel cyclically or the MS0/MS1 channel acyclically. Additional parameters can be read out via an MS2 connection.

8.7.1 Setting the communication channel MS0 or MS0/MS1

The communication mode MS0 or MS0/MS1 is set via the module configuration.

8.7.2 Cyclic control word (MS0 request)

The cyclic control word is used to synchronise telegram communication between the DP Master / IO controller (PLC executing the PIB) and slave / IO device (evaluation unit). The transfer of non–cyclic command and acknowledgement telegrams via an MS1 connection shall not be started until this is indicated by the cyclic status word of the evaluation unit in the acknowledgement counter.

Profibus DP Output (CCW):

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	IAR	Res	Res	Res	Res	Res.	Res	Res
2	SRR	RCR (2)	Res	Res	Res./ RD (1)	Res./ WR (1)	AO	Res

Description Byte 1:

Bit	Bit name	Bit = 1	Bit = 0
0	Res.	Reserved for manufacturer	
1	Res.	Reserved for future PIB functionality	
2	Res.	Reserved for future PIB functionality	
3	Res.	Reserved for future PIB functionality	
4	Res.	Reserved for future PIB functionality	
5	Res.	Reserved for future PIB functionality	
6	Res.	Reserved for future PIB functionality	
7	IAR	Startup procedure with initialisation request	No startup procedure request

Description Byte 2:

Bit	Bit name	Bit = 1	Bit = 0
0	Res	Reserved for manufacturer	
1	AO	Antenna off request	Antenna on request
2	Res. / WR	Reserved for manufacturer **or** Ident command write request (0->1 edge) (1)	
3	Res. / RD	Reserved for manufacturer **or** Ident command read request (0->1 edge) (1)	
4	Res.	Reserved for future PIB functionality	
5	Res.	Reserved for future PIB functionality	
6	RCR (2)	Command repetition request	No command repetition requested
7	SRR	Command cancelling request	No command cancelling

(1) = These bits are only used for the command execution via an MS0 connection.

(2) = Function currently not supported.

8.7.3 Cyclic status word (MS0 response)

The cyclic status word is used to synchronize the execution of commands. The modification of the command counter (done by the evaluation unit) indicates to the PIB that it is allowed to send the next command. Modifying the acknowledge counter indicates that a command has been finished (within the evaluation unit) and the PIB can read the acknowledgement from the evaluation unit. The order to change the counters (done within the evaluation unit and monitored by the PIB) is identical for both counters (AC and CC).

Profibus DP Input (CSW):

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	IA	AC_H	AC_L	CC_H	CC_L	Res.	TPC	TP
2	SRA	RCA (2)	BSY	EF	ILL	BRY (1)	AI	ACP

Description Byte1:

Bit	Bit name	Bit = 1	Bit = 0
0	TP	Tag present	Tag not present
1	TPC	Tag state changed	Tag state steady
2	Res.	Reserved for manufacturer	Reserved for manufacturer
3	CC_L.	Command counter low (cyclic/acyclic sync.)	
4	CC_H	Command counter high (cyclic/acyclic sync.)	
5	AC_L	Acknowledge counter low (acyclic. sync.)	
6	AC_H	Acknowledge counter high (acyclic. sync.)	
7	IA	Startup procedure runs	Startup procedure finished

Description Byte2:

Bit	Bit name	Bit = 1	Bit = 0
0	ACP	Acyclic command processing	Cyclic command processing
1	AI	Antenna inactive	Antenna active
2	BRY	Block transfer ready (1)	Block transfer not ready (1)
3	ILL	Illegal command access. Exp: Acyclic command request while cyclic command runs or vice versa	Command access ok
4	EF	Fatal hardware error of the evaluation unit	Evaluation unit ok
5	BSY	Command in progress	Command processing finished
6	RCA (2)	Command repetition active	No command repetition active
7	SRA	Command cancelled by User	Command not cancelled

The modification of the command counter CC done by the evaluation unit indicates to the PIB that it is allowed to send the next block. Modifying the acknowledge counter AC indicates that a command has been finished within the evaluation unit and the PIB can read the acknowledgement or the response from the evaluation unit.

(1) = These bits are only used for the command execution via a MS0 connection.

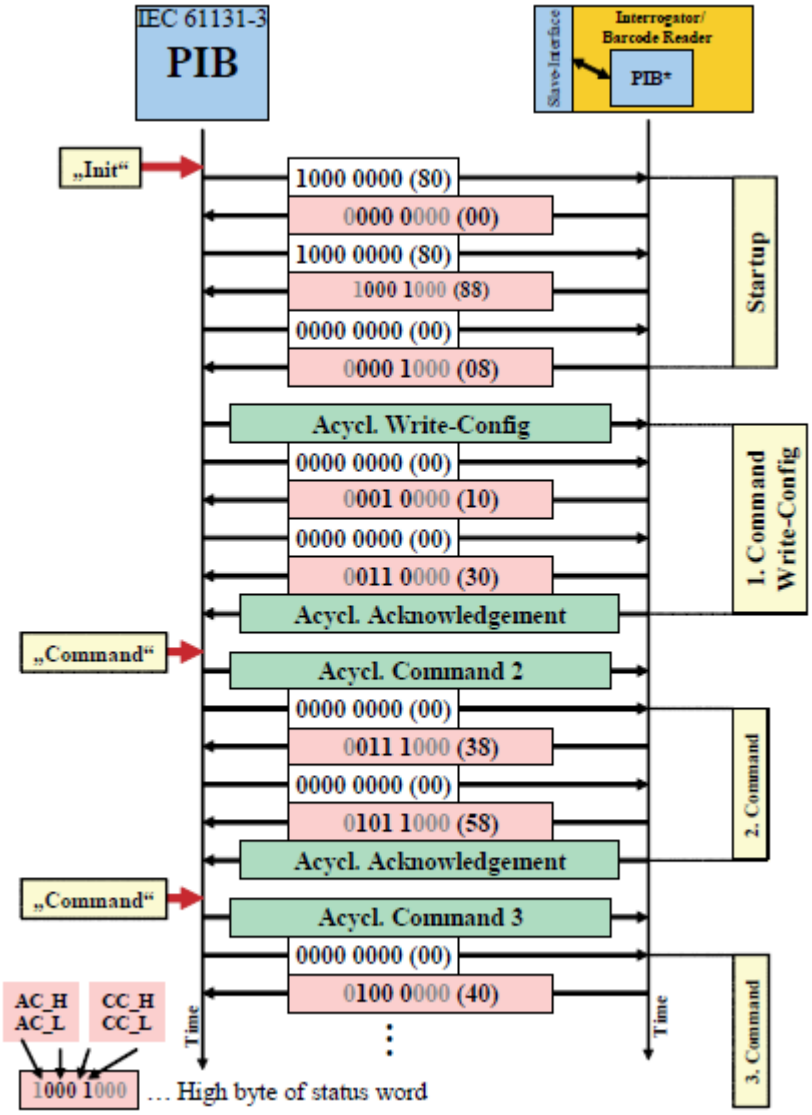
(2) = Function currently not supported.

8.7.4 Command synchronisation mechanism for MS0 connection

The initiation of commands using only an MS0 connection is done via bit WR or bit RD within the cyclic control status word. The state of the command is read by the CC / AC counter within the cyclic status word.

8.7.5 Command synchronisation mechanism for combined MS0 / MS1 connection

The initiation of commands using a combined MS0 / MS1 connection is done as described in [01].
See (→ 13 Referenced Documents)



from: “Profile Identification Systems”, PNO order 3.142, V1.9, 05/2010

8.7.6 Command request header (acyclic data transmission)

Byte No	Name	Description	Remark
1	Res.	Reserved	For future use.
2	Res.	Reserved	For future use.
3	SN	Sequence number high	Sequence Number is used as a command counter. The counter is incremented each time a new command is issued by the user. After “INIT” succeeded the sequence number is set to “0”. The “SN” takes the value of “1”
4	SN	Sequence number low	
5	CC	Command codex	Command codex is used as an individual identifier for a command to be transmitted from the user to the evaluation unit and the corresponding acknowledgement.
6	CI	Command index	Command Index is set to “A=0x41” in case of a command telegram sent to the evaluation unit. Remark: CI = 0x42…0x48 (“B”...”H”) reserved CI = 0x49…0x56 (“I”…”U”) user specific CI = 0x57…0x5B (“V”…“Z”) reserved
7	TDB high	Total number of data blocks, high byte	Total Number of Data Blocks indicates the total number of individual data blocks to be transmitted in association with a single command. It is used for flow control of data split into several data packages.
8	TDB low	Total number of data blocks, low byte	
9	DBN high	Current data block , high byte	Data Block Number is used to identify an individual data package within a sequence of data packages associated with a single command.
10	DBN low	Current data block , low byte	
11	DBL	Data block length	DBL is used to indicate the number of bytes following within the user data area of the telegram. The max. DBL depends on the capabilities of the slave device (evaluation unit). The user must check the PDU length supported by the evaluation unit dynamically within the initialisation phase (INIT). The evaluation unit sends the supported PDU length within the acknowledgement to the “Write-Config” command through the parameter “MaxPacketSize” (header + data). The user must adapt the internal algorithm for packaging data and align the PDU size.
12 … XX	Data 01 … nn	Command request data	User data area

8.7.7 Command response header with positive acknowledge

Byte No	Name	Description	Remark
1	Res.	Reserved	For future use.
2	Res.	Reserved	For future use.
3	SN high	Sequence number high	Sequence Number is incremented with every new acknowledgement telegram (except the first). In case a command contains a sequence of acknowledgements, all individual acknowledgements carry the same SN value. After “INIT” succeeded the sequence number is set to “0”. The “SN” takes the value of “1”
4	SN low	Sequence number low	
5	CC	Command codex	Command Codex is used as an individual identifier for acknowledgement of the command
6	Status	Status information XXXX XXX0	In the Acknowledgement telegram Status is used to transfer the status information. Bit D0 = 0 No Error Bit D2 = 0 RAM battery o.k. Bit D2 = 1 RAM battery poor or exhausted Bit D1, D3…D7 vendor specific
7	TDB high	Total number of data blocks, high byte	Total Number of Data Blocks indicates the total number of individual data blocks to be transmitted in association with a single command. It is used for the flow control of data split into several data packages.
8	TDB low	Total number of data blocks, low byte	
9	DBN high	Current data block , high byte	Data Block Number is used to identify an individual data package within a sequence of data packages associated with a single command.
10	DBN low	Current data block , low byte	
11	DBL	Data block length	DBL is used to indicate the number of bytes following within the user data area of the telegram. The max. DBL depends on the capabilities of the slave device (evaluation unit). The User must check the PDU length supported by the evaluation unit dynamically within the initialization phase (INIT). The evaluation unit sends the supported PDU length within the acknowledgement to the “Write-Config” command through the parameter “MaxPacketSize” (header + data). The User must adapt the internal algorithm for packaging data and align the PDU size.
12 … XX	Data 01 …nn	Command response data	User data area

8.7.8 Command response header with negative acknowledge

Byte No	Name	Value [hex]	Description	Remark
1	Res.		Reserved	Response header
2	Res.		Reserved	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	XXh	Command codex	
6	Status	XXXX 0001b	Status information Bit D0 = 1: Command terminated with error. Data byte 12 .. .15 contains error Information.	
7	TDB [D15...D8]	**00h**	Total number of data blocks, high byte. Fix set to 00h	
8	TDB [D7…D0]	**01h**	Total number of data blocks, low byte. Fix set to 01h	
9	DBN [D15...D8]	**00h**	Current data block, high byte. Fix set to 00h.	
10	DBN [D7…D0]	**01h**	Current data block, low byte. Fix set to 01h.	
11	DBL	**04h**	Response data length [bytes] Fix set to 04h.	
12	Function_Num	XXh	The Function_Num byte definition is used for grouping of failures and warnings.	Response data
13	Error_Decode	FEh	The Error_Decode byte is used to define the meaning of Function_Num, Error_ Code_1 and Error_Code_2.	
14	Error_Code_1	XXh	The Error_Code_1 provides a number detailing the error or warning. Within the following table Error_Decode is fixed to 0xFE.	
15	Error_Code_2	Status	The Error_Code_2 provides either warning information (if bit 4 of Function_Num is set “1”) or optional vendor specific numbers detailing the error (if bit 4 of Function_Num is reset “0”). The warnings are mapped from the acyclic acknowledge telegram byte 6 (Status).	

Status Information

Status **[Bit 7654 3210]**	**Source**	**Meaning**	**mandatory / optional**
XXXX XXX**n**	Evaluation unit	0 = Command terminated with no error 1 = Command terminated with error, user data bytes 12..15 contains error information	M
XXXX XX**n**X	Evaluation unit	Vendor specific	O
XXXX X**n**XX	Evaluation unit	0 = Battery o.k. 1 = The RAM battery is poor or exhausted.	M
XXXX **n**XXX	Evaluation unit	Vendor specific	O
XXX**n** XXXX	Evaluation unit	Vendor specific	O
XX**n**X XXXX	Evaluation unit	Vendor specific	O
X**n**XX XXXX	Evaluation unit	Vendor specific	O
nXXX XXXX	Evaluation unit	Vendor specific	O

Command Error Codes

Error group	Function_ Num	Error Decode	Error Code 1	Error Code 2	Description	Triggered by Profibus command
Tag/Transponder	F1h	FEh	01h	00h	Tag memory error (e.g. CRC error)	Physical-Read, Physical-Write
	F1h	FEh	02h	00h	Presence error (indicated by evaluation unit), tag has left the transmission window.	Physical-Read, Physical-Write
	F1h	FEh	03h	00h	Address or command does not fit the tag characteristics (memory size), (indicated by evaluation unit).	Physical-Write
	F1h	FEh	04h	00h	Tag is defective. Replace tag or battery.	Physical-Read, Physical-Write
	F1h	FEh	05h	00h	Tag memory overflow.	Physical-Read, Physical-Write
	F1h	FEh	06h	00h	Unformatted tag.	Physical-Read, Physical-Write
	F1h	FEh	07h	00h	Inconsistent tag data structure. Reformat tag.	Physical-Read, Physical-Write
	F1h	FEh	0Ah	00h	Access violation (e.g. block locked) refer to ISO18000-x.	Physical-Write
Air interface	F2h	FEh	01h	00h	Communication timeout on air interface (indicated by evaluation unit)	Physical-Read, Physical-Write
	F4h	FEh	03h	00h	Antenna not operating; e.g. switched off or disconnected.	Physical-Read, Physical-Write
	F4h	FEh	04h	00h	Command buffer overflow.	All commands
	F4h	FEh	05h	00h	Data buffer overflow.	All commands
	F4h	FEh	06h	00h	Command in this mode not supported.	All commands
	F4h	FEh	07h	00h	Unspecific error. Indicated by the cyclic status word (e.g. antenna does not work.) This error is not related to a specific command.	All commands
	F4h	FEh	81h	00h	Channel mode not set (ifm code).	All commands
	F4h	FEh	82h	00h	Channel mode setting not allowed (ifm code).	Put -> Set_Channel_Mode
Communication User - Evaluation unit	F5h	FEh	01h	00h	Wrong sequence number (SN) indicated by evaluation unit.	All commands
	F5h	FEh	04h	00h	Invalid data block number DBN indicated by evaluation unit.	All commands
	F5h	FEh	06h	00h	Invalid data block length DBL indicated by evaluation unit.	All commands
	F5h	FEh	08h	00h	Command from another user being processed (indicated by evaluation unit).	All commands
Command error	F6h	FEh	01h	00h	Invalid CMD.	All unkown commands
	F6h	FEh	02h	00h	Invalid command index CI.	All commands
	F6h	FEh	03h	00h	Invalid command parameter (e.g. data range).	All commands
	F6h	FEh	04h	00h	Invalid command parameter (e.g. data range).	All commands
	F6h	FEh	05h	00h	Only Write-Config command permissible in this state.	All commands, when PIB* is in INIT state

9 Profibus DP communication (MS0)

The DPV0 mode of the evaluation unit DTE100 allows the configuration of the 4 process interfaces (IO-1 ... IO-4). Each channel can be configured individually to fulfill the requirements of different applications.

For each channel the following modes are available:

1. Channel inactive
2. Channel used as IEC61131 input
3. Channel used as IEC61131 output
4. Channel to execute commands via PIB as described in [01]
5. Channel to read and write the UID to the transponder
6. Channel to execute commands

9.1 Overview module configuration

Mode	Module Name	Description	Remark
1	Inactive	No data transmission	**High impedance**
2	Input (1 Byte In)	Cyclic transmission	**IEC61131 Input**
3	Output (1 Byte In/Out)	Cyclic transmission	**IEC61131 Output**
4	PIB State (2 Byte In/Out)	Acyclic command channel	**PIB control/state**
5	RWH UID (11 Byte In/Out)	Cyclic command channel/ Cyclic UID	**UID for 64 bit UID**
	RWH UID (15 Byte In/Out)	Cyclic command channel/ Cyclic UID	**UID for 96 bit UID**
	RWH UID (19 Byte In/Out)	Cyclic command channel/ Cyclic UID	**UID for 128 bit UID**
6	RWH STRG (26 Byte In/Out)	Cyclic command channel	**Command channel**
	RWH STRG (34 Byte In/Out)	Cyclic command channel	**Command channel**
	RWH STRG (42 Byte In/Out)	Cyclic command channel	**Command channel**

Remark:

XX Byte In: Length per module within the process data input of the PLC

XX Byte Out: Length per module within the process data output of the PLC

9.1.1 Module identifier string (SAP62)

Module identifier	Module Name	Chk_Cfg telegramm string
0	Inactive	0x00
1	Input (1 Byte In)	0x41 0x80 0x01
2	Output (1 Byte In/Out)	0xC1 0x80 0x80 0x02
3	PIB State (2 Byte In/Out)	0xC1 0x81 0x81 0x03
4	RWH UID (11 Byte In/Out)	0xC1 0x8A 0x8A 0x04
5	RWH UID (15 Byte In/Out)	0xC1 0x8E 0x8E 0x05
6	RWH UID (19 Byte In/Out)	0xC1 0x92 0x92 0x06
7	RWH STRG (26 Byte In/Out)	0xC1 0x99 0x99 0x07
8	RWH STRG (34 Byte In/Out)	0xC1 0xA1 0xA1 0x08
9	RWH STRG (42 Byte In/Out)	0xC1 0xA9 0xA9 0x09

9.1.2 Module “Input”

This module allows the User to

– read the binary inputs of the process interfaces IO-1 … IO-4.

Profibus DP Output:

Not used

Profibus DP Input:

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	OL	0	0	0	0	0	I/Q (1)	C/Qi (1)

Bit meaning:

Bit name	**Bit = 1**	**Bit = 0**
I/Q (1)	Input I/Q > 11V	Input I/Q < 8V
OL	Overload on L+	L+ o.k.
C/Qi (1)	Input at C/Qi > 11V	Input at C/Qi < 8V

(1) The level of C/Qi and I/Q is measured by hardware.

9.1.3 Module “Output”

This module allows the user to

– read the binary inputs of the process interfaces IO-1…IO-4.

– write to binary outputs of the process interfaces IO-1…IO-4.

Profibus DP Output:

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	HC ([1])	0	0	0	0	0	C/Qo

Description Byte 1:

Bit name	Bit = 1	Bit = 0
C/Qo	Drive output at C/Qo high	Drive output at C/Qo low
HC ([1])	Allow highside output current of max. 1A at C/Qo	Allow highside output current of max. 0.5A at C/Qo

([1]) Bit HC only valid on channel IO-3 and channel IO-4.

Profibus DP Input:

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	OL	HC	0	0	0	0	I/Q	C/Qi ([1])

Description Byte 1:

Bit name	Bit = 1	Bit = 0
C/Qi ([1])	Level at C/Qo = H	Level at C/Qo = L
OL	Overload at L+	L+ o.k.
I/Q	Input at I/Q > 11V	Input at I/Q < 8V
HC	Current of max. 1A enabled at C/Qo	Current of max. 0.5A enabled at C/Qo

([1]) The level of C/Qi is not measured but taken from the output value C/Qo.

9.1.4 Module “PIB_STATE”

This module allows the user to

– write the control word and to read the status word of the the evaluation unit.

The command data, which has to be sent, must be transferred with a DPV1 READ_REQ or WR_REQ call.

Remark:

This module allows the execution of commands via PIB as described in [01].

It requires the smallest resources within the PLC cyclic input / ouput area.

Profibus DP Output (PIB_STATE):

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	IAR	Res	Res	Res	Res	Res	Res	Res
2	SRR	RCR	Res	Res	Res	Res	AO	Res

Description Byte 1…2 ”Cyclic control word“:

See Module “PIB State (2 Byte In/Out)”, Profibus DP output. (→ chapter 8.7.2)

Profibus DP Input (PIB_STATE):

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	IA	AC_H	AC_L	CC_H	CC_L	Res	TPC	TP
2	SRA	RCA	BSY	EF	ILL	Res	AI	ACP

Description byte 1, byte 2 “Cyclic status word”:

See Module “PIB State (2 Byte In/Out)”, Profibus DP Input (→ chapter 8.7.3).

9.1.5 Module “RWH UID”

This module allows the user to

– read the UID from the transponder or write once the UID to the Transponder via MS0 connection.

Profibus DP Output (RWH UID):

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Res	Res	Res	Res	Res	Res	Res	Res
2	Res	RCR	Res	Res	RD	WR	AO	Res
3	UID data length write							
4	UID byte 1 (MSBy)							
5	UID byte 2							
6	UID byte 3							
7	UID byte 4							
8	UID byte 5							
9	UID byte 6							
10	UID byte 7							
11	UID byte 8							
...	...							
15/19	UID byte 12/16							

Description byte 1, byte 2:

Bit AO see Module “PIB State (2 Byte In/Out)”, Profibus DP output. (→ chapter 8.7.2)

Bit WR and RD:

RD = 0: UID no read request.

RD = 1: UID read request (rising edge 0->1)

The bit RD is only evaluated if the parameter “Read of UID edge controlled” is set. Otherwise the UID will be refreshed continuously regardless of the setting of the bit RD.

WR = 0: UID no write request.

WR = 1: UID write request (rising edge 0->1)

Remark:

RD and WR must not be set simultaneously.

Description UID Byte 3:

UID data length write: Number of UID bytes to write to transponder. Only valid if bit WR is set.

Description UID bytes 4 ...11,15,19:

For WR **=1 :**

UID byte 1...nn: UID to write to the transponder.

For WR **=0 :**

UID byte 1...nn: Data is ignored.

Profibus DP Input (RWH UID):

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	Res	Res	Res	Res	Res	Res.	TPC	TP
2	Res	Res	Res	Res	RD-RDY	WR-RDY	AI	Res
3	UID data length read							
4	UID Byte 1 (MSBy)							
5	UID byte 2							
6	UID byte 3							
7	UID byte 4							
8	UID byte 5							
9	UID byte 6							
10	UID byte 7							
11	UID byte 8							
...	...							
15/19	UID byte 13/17							

Description byte 1, byte 2:

Bits TP, TPC, AI see module “PIB State (2 Byte In/Out)”, Profibus DP Input. (→ chapter 8.7.3)

Bit RD-RDY and WR-RDY

Bit RD-RDY:

0 = Bit RD in DP output is reset or UID not read yet.

1 = Reading of UID ready.

Bit WR-RDY:

0 = Bit WR in DP output is reset or UID not written yet.

1 = Writing of UID ready

Description UID byte 3:

UID data length read: Number of UID bytes to be read from transponder. Only valid if Bit RD is set.

Description bytes 4 ..10/18:

64 bit or 96 bit or 128 bit UID of transponder which is detected by the antenna.

Unused bits are set to 0b.

UID bytes 1...nn = 0: No tag detected by the antenna or antenna not active.

9.1.6 Module “RWH STRG”

This module allows the user to

– write and read commands to the evaluation unit via MS0 connection.

Profibus DP Output (RWH STRG):

Byte no.	Byte name	Bit							
		7	6	5	4	3	2	1	0
1	CCW high	IAR	Res	Res	Res	Res	Res.	Res	Res
2	CCW low	SRR	RCR	Res	Res	RD	WR	AO	Res
3	SN high	SN_D15	SN_D14	SN_D13	SN_D12	SN_D11	SN_D10	SN_D9	SN_D8
4	SN low	SN_D7	SN_D6	SN_D5	SN_D4	SN_D3	SN_D2	SN_D1	SN_D0
5	CC	CC_D7	CC_D6	CC_D5	CC_D4	CC_D3	CC_D2	CC_D1	CC_D0
6	CI	CI_D7	CI_D6	CI_D5	CI_D4	CI_D3	CI_D2	CI_D1	CI_D0
7	TDB high	D15	D14	D13	D12	D11	D10	D09	D08
8	TDB low	D07	D06	D05	D04	D03	D02	D01	D00
9	DBN high	D15	D14	D13	D12	D11	D10	D09	D08
10	DBN low	D07	D06	D05	D04	D03	D02	D01	D00
11	DBL	D07	D06	D05	D04	D03	D02	D01	D00
12 … 26/ 34/ 42	U_BY 1 … U_BY 15 / U_BY 23 / U_BY 31	Command request data							

Description bytes 1 … 2 ”Cyclic control word“:

See Module “PIB State (2 Byte In/Out)”, Profibus DP output. (→ chapter 8.7.2).

Description bytes 3 ... 11 “Command header request”:

See description of “command header request” (→ chapter 8.7.6).

Description bytes 12...nn “Command request data”:

Command to transfer to the evaluation unit. Data content depends on the command request.

Data size can be selected by selection of the module.

(See overview module configuration → chapter 9.1).

Profibus DP Input (RWH STRG):

Byte Nr.	Byte name	Bit							
		7	6	5	4	3	2	1	0
1	CSW high	IA	AC_H	AC_L	CC_H	CC_L	Res.	TPC	TP
2	CSW low	SRA	RCA	BSY	EF	ILL	Res.	AI	ACP
3	SN high	SN_D15	SN_D14	SN_D13	SN_D12	SN_D11	SN_D10	SN_D9	SN_D8
4	SN low	SN_D7	SN_D6	SN_D5	SN_D4	SN_D3	SN_D2	SN_D1	SN_D0
5	RC	RC_D7	RC_D6	RC_D5	RC_D4	RC_D3	RC_D2	RC_D1	RC_D0
6	RS	RS_D7	RS_D6	RS_D5	RS_D4	RS_D3	RS_D2	RS_D1	RS_D0
7	TDB high	D15	D14	D13	D12	D11	D10	D09	D08
8	TDB low	D07	D06	D05	D04	D03	D02	D01	D00
9	DBN high	D15	D14	D13	D12	D11	D10	D09	D08
10	DBN low	D07	D06	D05	D04	D03	D02	D01	D00
11	DBL	D07	D06	D05	D04	D03	D02	D01	D00
12 … 26/ 34/ 42	U_BY 1 … U_BY 15 / U_BY 23 / U_BY 31	Command response data							

Description byte 1, byte 2 „Cyclic status word“:

See Module “PIB State (2 Byte In/Out)”, Profibus DP Input (→ chapter 8.7.3).

Description byte 3…byte 11 „Command header response“:

In case of a positive command response, see description of “command header response with positive acknowledge” (→ chapter 8.7.7).

In case of a negative command response, see description of “command header response with negative acknowledge” (→ chapter 8.7.8).

Description bytes 12…nn “Command response data”:

Command response received from the evaluation unit. Data content depends on the command response. Data size can be selected by selection of the module.

(See overview module configuration → chapter 9.1)

9.2 Command overview (MS0 connection)

Command codex [char]	Command codex [hex]	Name	Description
‘p’	70h	**Physical-Read**	Command to read data from a transponder using a physical start address and the length of data to be read.
‘b’	62h	**Get**	Command to read manufacturer-specific data from the evaluation unit.
‘q’	71h	**Physical-Write**	Command to write data to a transponder using a physical start address and the length of data to be written.
‘e’	65h	**Put**	Command to write manufacturer-specific data to the evaluation unit.
‘x’	78h	**Write-Config**	This service is used to modify operation of the evaluation unit except interruption of the communication. It is possible to send new parameters to the evaluation unit (ConfigData). Also a reset can be initiated requesting the evaluation unit to restart operation.
‘a’	61h	**Read-Config**	This service is used to read config data from the evaluation unit. The config data is manufacturer specific.
‘t’	74h	**Dev-Status**	This service is used to read the status of an evaluation unit. The RXBUF is used as a manufacturer-specific area for status data. The status data is manufacturer specific. With this command the channel related I&M information is read out.

Remark:

The cyclic commands are transferred via MS0 communication.

The commands “Mem_Status” and “Inventory” are currently not supported.

9.2.1 Command Physical-Read (cyclic data transmission)

Command header request (Physical Read):

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**70h**	Command codex	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	0Eh	User data block length. Always fixed to 14 bytes (bytes 12...nn).	
12	UID 1 [D63...D56]	XXh	This parameter identifies a single transponder to be read. If UID = 0000h, the tag(s) currently present is (are) read.	Command prefix (14 bytes)
13	UID 2 [D55...D48]	XXh		
14	UID 3 [D47...D40]	XXh		
15	UID 4 [D39...D32]	XXh		
16	UID 5 [D31...D24]	XXh		
17	UID 6 [D23...D16]	XXh		
18	UID 7 [D15…D08]	XXh		
19	UID 8 [D07…D00]	XXh		
20	Read data length [D15...D8]	XXh	This parameter specifies the number of bytes to be read from the transponder starting at the address indicated by the parameter start address.	
21	Read data length [D7…D0]	XXh		
22	32 bit start address [D31...D24]	XXh	This parameter specifies a physical address within the transponder memory. [0x00000000 … 0xFFFFFFFF]	
23	32 bit start address [D23…D16]	XXh		
24	32 bit start address [D15...D8]	XXh		
25	32 bit start address [D7…D0]	XXh		
26 … nn	Unused data	00h	Only sent from the evaluation unit, if the selected MS0 module size is greater than 25 bytes. (*)	Unused data

(*) If the selected MS0 module size is greater than the “command header + Command prefix”, the unused bytes are ignored by the evaluation unit.

Command acknowledge response (Physical Read):

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**70h**	Command codex	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	XXh	Current response data block length. (Byte 12...nn) [bytes] (*)	
12…nn	Data Byte 1..nn	XXh	Response data. Unused bytes are set to 00h by the evaluation unit.	Response data

(*) The evaluation unit sets the data block length to the length of the valid data within the Response data field.

9.2.2 Command Physical-Write (cyclic data transmission)

Command header request (Physical Write):

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**71h**	Command codex	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	XXh	Total number of data blocks, high byte	
8	TDB [D7…D0]	XXh	Total number of data blocks, low byte	
9	DBN [D15...D8]	XXh	Current data block, high byte	
10	DBN [D7…D0]	XXh	Current data block, low byte	
11	DBL	XXh	Current user data block length. (bytes 12...nn)	
12	UID 1 [D63...D56]	XXh	This parameter identifies a single transponder to be written. If UID = 0000h, the tag currently present is written.	Command prefix (14 bytes)
13	UID 2 [D55...D48]	XXh		
14	UID 3 [D47...D40]	XXh		
15	UID 4 [D39...D32]	XXh		
16	UID 5 [D31...D24]	XXh		
17	UID 6 [D23...D16]	XXh		
18	UID 7 [D15…D08]	XXh		
19	UID 8 [D07…D00]	XXh		
20	Write data length [D15...D8]	XXh	This parameter specifies the total number of user data bytes to be sent to the transponder starting at the address indicated by the parameter StartAddress.	
21	Write data length [D7…D0]	XXh		
22	32 bit start address [D31...D24]	XXh	This parameter specifies a physical address within the transponder memory. [0x00000000 … 0xFFFFFFFF]	
23	32 bit start address [D23…D16]	XXh		
24	32 bit start address [D15...D8]	XXh		
25	32 bit start address [D7…D0]	XXh		
26…nn	Data bytes 1…nn	XXh	User data block to write to the transponder. (*)	Command data

(*) If the current data block length is smaller than the "MS0 module configuration – 26 bytes", the unused bytes are ignored by the evaluation unit.

Command acknowledge response (Physical Write):

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**71h**	Command codex	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	00h	Response data length, always 0 bytes.	
12 … nn	Unused data	00h	Unused data is filled with 0 (*)	Unused data

(*) The size of the unused data depends on the selected MS0 module configuration.

9.2.3 Command Write-Config (cyclic data transmission)

Command header request (Write-Config):

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**78h**	Command codex “Write-Config”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	**00h**	Current data block, high byte	
10	DBN [D7…D0]	**01h**	Current data block, low byte	
11	DBL	**03h**	Current user data block length. (bytes 12 ..14)	
12	Config in	**00h**	00h = Config in request	Command data
13	Config data length, [D15...D8]	**00h**	This parameter specifies the number of optional data bytes to write to the evaluation unit. (Set to 0 bytes, if no optional data has to be written to the evaluation unit.)	
14	Config data length, [D7…D0]	**00h**		

Command acknowledge response (Write-Config with Config in = 00h):

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte ([1])	Response header
2	CSW low	XXh	Cyclic status word, low byte ([1])	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**78h**	Command codex	
6	Status	XXh	Status information	
7	TDB [D15...D8]	**00h**	Total number of data blocks, high byte	
8	TDB [D7…D0]	**01h**	Total number of data blocks, low byte	
9	DBN [D15...D8]	**00h**	Current data block, high byte	
10	DBN [D7…D0]	**01h**	Current data block, low byte	
11	DBL	**01h**	Response data length [bytes]	
12	MaxPacketSize [D7… D0]	**XXh**	Max. length of the Ident PDU (Ident header + data) the slave device is able to receive or send [bytes]. ([2]) (The value is set to the selected length of the MS0 module configuration.)	Response data
13 … nn	Unused data	00h	Unused data is filled with 0 (*)	Unused data

(*) The size of the unused data depends on the selected MS0 module configuration.

([1]) In deviation to the acyclic Write-Config command, the data block length is not transferred in byte 1 and byte 2.

([2]) The value is set to the selected length of the MS0 module configuration.

9.2.4 Command Read-Config (cyclic data transmission)

Command header request (Read-Config):

Byte no.	Name	Value [hex]	Description	Remark
1	Data block length [D15...D8]	00h	Data block length high ([1])	Command header
2	Data block length [D7…D0]	23h	Data block length low ([1])	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**61h**	Command codex	
6	CI	41h	Command index	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	**01h**	Total number of data blocks, low byte	
9	DBN [D15...D8]	**00h**	Current data block, high byte	
10	DBN [D7…D0]	**01h**	Current data block, low byte	
11	DBL	**00h**	Data block length, 35 bytes fix.	

Command acknowledge response (Read Config):

Byte no.	Name	Value [hex]	Description	Remark
1	Data block length [D15...D8]	00h	Data block length high ([1])	Response header
2	Data block length [D7…D0]	01h	Data block length low ([1])	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**61h**	Command codex	
6	Status	XXh	Status information	
7	TDB [D15...D8]	**00h**	Total number of data blocks, high byte	
8	TDB [D7…D0]	**01h**	Total number of data blocks, low byte	
9	DBN [D15...D8]	**00h**	Current data block, high byte	
10	DBN [D7…D0]	**01h**	Current data block, low byte	
11	DBL	**01h**	Fix response data length [bytes]	
12	MaxPacketSize [D7…D0]	XXh	Max. length of the Ident PDU (Ident header + data) the slave device is able to receive or send 00h = (240 bytes) 01h … 3Fh = reserved 40h … F0h = max. permitted PDU size F1H … FFh = reserved	Response data
13 … nn	Unused data	00h	Unused data is filled with 0 (*)	Unused data

(*) The size of the unused data depends on the selected MS0 module configuration.

([1]) Differing from the acyclic Read-Config command, the data block length is not transferred in byte 1 and byte 2

9.2.5 Command Dev-Status (cyclic data transmission)

Command Dev-Status header request:

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**74h**	Command codex	
6	CI	41h	Command index	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	23h	Data block length, 35 bytes fix.	
12	Cmd attribute	XXh	0x04: channel-related I&M information (data record I&M0) 0x05: channel-related I&M information (data record I&M1) 0x0…0x3, 0x6…0xFF: not supported	Command data

Command Dev-Status acknowledge response:

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**74h**	Command codex	
6	Status	XXh	Status information	
7	TDB [D15...D8]	XXh	Total number of data blocks, high byte	
8	TDB [D7…D0]	XXh	Total number of data blocks, low byte	
9	DBN [D15...D8]	XXh	Current data block, high byte	
10	DBN [D7…D0]	XXh	Current data block, low byte	
11	DBL	XXh	Response data length (Byte 12 .. nn) [bytes]	
12	Response attribute	XXh	0x04: channel-related I&M information (data record I&M0) 0x05: channel-related I&M information (data record I&M1)	Response attribute
13…nn	I&M Record	XXh	I&M0 or I&M1 data record	Response data

9.2.6 Command Get (cyclic data transmission)

Command request data structure (GET)

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command codex “Get”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	XXh	Total number of data blocks, high byte	
8	TDB [D7…D0]	XXh	Total number of data blocks, low byte	
9	DBN [D15...D8]	XXh	Current data block, high byte	
10	DBN [D7…D0]	XXh	Current data block, low byte	
11	DBL	**XXh**	User data block length (bytes 12 .. nn)	
12	SubCmd	**XXh**	SubCmd code	SubCmd request data
13 … nn	SubCmd data	**XXh**	SubCmd request data	structure

Command response data structure (GET) with positive acknowledge:

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command response “Get”	
6	Status	XXh	Status information	
7	TDB [D15...D8]	XXh	Total number of data blocks, high byte	
8	TDB [D7…D0]	XXh	Total number of data blocks, low byte	
9	DBN [D15...D8]	XXh	Current data block, high byte	
10	DBN [D7…D0]	XXh	Current data block, low byte	
11	DBL	**XXh**	Response data length (bytes 12...nn)	
12	SubCmd	**XXh**	Echo of the SubCmd code	SubCmd response data
13 … nn	SubCmd data	**XXh**	SubCmd response data	structure

Command response data structure (Get) with negative acknowledge:

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command response “Get”	
6	Status	01h	Status information Bit D0 = 1: Command terminated with error. Data bytes 12...15 contain error Information.	
7	TDB [D15...D8]	**00h**	Total number of data blocks, high byte. Fix set to 00h	
8	TDB [D7…D0]	**01h**	Total number of data blocks, low byte. Fix set to 01h	
9	DBN [D15...D8]	**00h**	Current data block, high byte. Fix set to 00h.	
10	DBN [D7…D0]	**01h**	Current data block, low byte. Fix set to 01h.	
11	DBL	**04h**	Response data length [bytes] Fix set to 04h.	
12	Function_Num	XXh	Error_ Code _1 provides error information related to **evaluation unit.**	Response data
13	Error_Decode	FEh	Profile-specific error	
14	Error_Code_1	XXh	Command-specific error	
15	Error_Code_2	00h	Copy of Status	

9.2.7 SubCmd overview over Get (cyclic)

SubCmd	Name	Description
C1h	Get_Ethernet_Parameter	Read Ethernet parameter of the evaluation unit
C2h	Get_Ident_Unit_Parameter	Read settings of the evaluation unit
C3h	Get _Clock	Read the clock settings of the evaluation unit
C4h	reserved	-
C5h	Get_Ant_Type	Read out the properties of the antenna
C6h	Get_Block_Parameter	Read out the block parameter of the antenna
C7h	Get_Transponder_Type	Read out the data of the Tag
C8h	Get_Ident_Diagnosis	Read out diagnosis of the evaluation unit
C9h	Get_MAC_Address	Read out Ethernet MAC address
CAh	Get_Ant_Diagnosis	Read out diagnosis of the antenna
CBh	Get_Channel_Mode	Read out the operation mode of the channels IO-1…IO-4
CCh	reserved	-
CDh	Get_UID	Read out UID of transponder

Subcommand Get_Ethernet_Parameter (cyclic data transmission)

Command request (Get_Ethernet_Parameter)

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command codex “Get”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**01h**	Current user data block length 4 bytes (Byte 12)	
12	SubCmd	**C1h**	Subcmd Get_Ethernet_Parameter	Subcmd code

Command acknowledge response (Get_Ethernet_Parameter)

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command response “Get”	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**15h**	Response data length 21 bytes	
12	SubCmd	**C1h**	Sub Cmd echo	Subcmd echo

13	DHCP	0000 00XXh	DHCP off = 00h DHCP on = 01h	Subcmd data
14	ANEG	0000 00XXh	Autonegotiation on: FFh Autonegotiation off: 100MB/Duplex: 00h 100MB/Simplex: 01h (Default) 10MB/Duplex: 02h 10MB/Simplex: 03h	
15	IP [Octet 1]	XXh	IP address of evaluation unit Exp: 192.168.0.10	
16	IP [Octet 2]	XXh		
17	IP [Octet 3]	XXh		
18	IP [Octet 4]	XXh		
19	GW [Octet 1]	XXh	Gateway address Exp: 192.168.0.100	
20	GW [Octet 2]	XXh		
21	GW [Octet 3]	XXh		
22	GW [Octet 4]	XXh		
23	SN [Octet 1]	XXh	Subnet mask Exp: 255.255.255.0	
24	SN [Octet 2]	XXh		
25	SN [Octet 3]	XXh		
26	SN [Octet 4]	XXh		

Remark: This command can be sent over all 4 channels.

Subcommand Get_MAC_Address (cyclic data transmission)

Command request (Get_MAC_Address)

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command codex “Get”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**01h**	Current user data block length 4 bytes (Byte 12)	
12	SubCmd	**C9h**	SubCmd Get_MAC_Parameter	SubCmd code

Command acknowledge response (Get_MAC_Address)

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command response “Get”	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**07h**	Response data length 07 bytes	
12	SubCmd	**C9h**	SubCmd echo Get_MAC_Parameter	SubCmd echo
13	MAC address [Octet 1]	XXh	Ethernet Media access control register	SubCmd data
14	MAC address [Octet 2]	XXh		
15	MAC address [Octet 3]	XXh		
16	MAC address [Octet 4]	XXh		
17	MAC address [Octet 5]	XXh		
18	MAC address [Octet 6]	XXh		

Subcommand Get_Ident_Unit_Parameter (cyclic data transmission)

Command request (Get_Ident_Unit_Parameter):

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command codex “Get”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**01h**	Current user data block length 1 byte (Byte 12)	
12	SubCmd	**C2h**	SubCmd Get_Ident_Unit_Parameter	SubCmd code

Command acknowledge response (Get_Ident_Unit_Parameter):

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command response “Put”	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**04h**	Response data length [bytes]	
12	SubCmd	**C2h**	SubCmd response Get_Ident_Unit_Parameter	Response data

13	UDF	0Xh	State of the user data format of the Profibus interface 00h = Big Endian format. (Default) 01h = Little Endian format.	SubCmd data
14	OVL	0Xh	State of the overload protection flags of IO-n channel 0000 0000b = Overload protection IO-n off 0000 0001b = Overload protection IO-n on (Default value)	
15	HIGH_CUR	0Xh	State of the “High current enable” flags of IO-n channel: 0000 0000b = High current IO-n off (Default value) 0000 0001b = High current IO-n on	
16	ID_CR1	XXh	Phy control register 1 of channel IO-n	
17	ID_CR2	XXh	Phy control register 2 of channel IO-n	

Subcommand Get_Clock (cyclic data transmission)

Command request (Get_Clock):

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command codex “Get”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**01h**	Current user data block length 1 byte (Byte 12)	
12	SubCmd	**C3h**	SubCmd Get _Clock	SubCmd code

Command acknowledge response (Get_Clock):

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command response “Get”	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**08h**	Response data length 8 bytes	
12	SubCmd	**C3h**	SubCmd response Get _Clock	SubCmd echo
13	YY	XXh	XXh = Year, ex. 0xA = 2010	SubCmd data
14	MM	XXh	XXh = Month, ex 0x3 = March	
15	DD	XXh	XXh = Day, ex. 0xF = 15 th.	
16	HH	XXh	XXh = Hour, ex. 0xD = 1.00 p.m.	
17	MM	XXh	XXh = Minutes, ex. 0x11 = 17 min.	
18	SS	XXh	XXh = Seconds, ex. 0x24 = 36 sec.	
19	HS	XXh	XXh = Hundredths of a second, ex. 0x20 = 0.32 sec.	

Subcommand Get_Ant_Type (cyclic data transmission)

Command request (Get_Ant_Type):

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command codex “Get”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**01h**	Current user data block length 1 byte (Byte 12)	
12	SubCmd	**C5h**	SubCmd Get _Ant_Type	SubCmd code

Command acknowledge response (Get_Ant_Type):

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command response “Get”	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**0Eh**	Response data length 14 bytes	
12	SubCmd	**C5h**	SubCmd response Get _Ant_Type	SubCmd echo
13	ANO1	XXh	Article number exp.: “ANT512“	SubCmd data
14	ANO2	XXh		
15	ANO3	XXh		
16	ANO4	XXh		
17	ANO5	XXh		
18	ANO6	XXh		
19	DT	XXh	Device Type of antenna	
20	DHW	XXh	Device type hardware revision	
21	DSW	XXh	Device type software revision	
22	IDSW	XXh	ID-Link stack revision	
23	PD_YY	XXh	Production date year	
24	PD_MM	XXh	Production date month	
25	PD_DD	XXh	Production date day	

Subcommand Get_Block_Parameter (cyclic data transmission)

Command request (Get_Block_Parameter):

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command codex “Get”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**01h**	Current user data block length 1 byte (Byte 12)	
12	SubCmd	**C6h**	SubCmd Get _Block_Parameter	SubCmd code

Command acknowledge response (Get_Block_Parameter):

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command response “Get”	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**05h**	Response data length 5 bytes	
12	SubCmd	**C6h**	SubCmd response Get_Block_Parameter	SubCmd echo
13	BL_No high	XXh	Max. Block number set in evaluation unit ([1]) (Default value : 28)	SubCmd data
14	BL_No low	XXh		
15	BL_SZ high	XXh	Block size set in evaluation unit ([2]) Ex.: 4 = 4 bytes (default) 8 = 8 bytes	
16	BL_SZ low	XXh		

([1]) = Maximum number of blocks supported by the evaluation unit. This value is taken to check the maximum allowed linear address.

([2]) = Size of one block. This value defines the smallest accessible area within the antenna.

Calculation linear address mapping of the transponder to the block-orientated address model:

Block number = (linear address / BL_SZ)

Calculation block orientated address model to the linear address mapping of the transponder:

Linear address = (block number * BL_SZ)

Remark: The evaluation unit uses this value to calculate the number of blocks and the block number from the linear address given in the commands Physical-Read and Physical-Write.

Subcommand Get_Transponder_Type (cyclic data transmission)

Command request (Get_Transponder_Type):

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command codex “Get”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**01h**	Current user data block length 1 byte (Byte 12)	
12	SubCmd	**C7h**	SubCmd Get _Tansponder_Type	SubCmd code

Command acknowledge response (Get_Transponder_Type):

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command response “Get”	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**05h**	Response data length 5 bytes	
12	SubCmd	**C7h**	SubCmd response Get _Transponder_Type	SubCmd echo
13	TR_BL_No high	XXh	Max. block number of the transponder detected by the antenna ([1])	SubCmd data
14	TR_BL_No low	XXh		
15	TR_BL_SZ high	XXh	Block size of the transponder detected by the antenna ([2]) Ex.: 4 = 4 bytes 8 = 8 bytes	
16	TR_BL_SZ low	XXh		

Subcommand Get_Ident_Diagnosis (cyclic data transmission)

Command request (Get_Ident_Diagnosis):

Byte no	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command codex “Get”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**01h**	Current user data block length 1 byte (Byte 12)	
12	SubCmd	**C8h**	SubCmd Get _Ident_DIagnosis	SubCmd code

Command acknowledge response (Get_Ident_Diagnosis):

Byte no	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command response “Get”	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**05h**	Response data length 5 bytes	
12	SubCmd	**C8h**	SubCmd response Get_Transponder_Type	SubCmd echo
13	IU_Diag	XXh	Evaluation unit diagnose register	SubCmd data
14	PH_ST	XXh	Phy status register ID-n → see "Evaluation unit diagnose register"	
15	TEC_IDn high	XXh	Telegram error counter ID-n, high byte	
16	TEC_IDn low	XXh	Telegram error counter ID-n, low byte	

Evaluation unit diagnose register:

D7	D6	D5	D4	D3	D2	D1	D0	Description
X	X	X	X	X	X	X	**ATE**	Permissible temperature exceeded
X	X	X	X	X	X	**PFA**	X	Power fail at AUX
X	X	X	X	X	**HWF**	X	X	Hardware failure

Phy status register:

D7	D6	D5	D4	D3	D2	D1	D0	Description
X	X	X	X	X	X	X	**PE**	Parity check error
X	X	X	X	X	X	**REG_LN**	X	Undervoltage linear regulator
X	X	X	X	**LOL**	X	X	X	L+ overload
X	X	X	**CQOL**	X	X	X	X	C/Q overload
X	X	**OVT**	X	X	X	X	X	Overtemperature
PO	X	X	X	X	X	X	X	Power On L+ low

X = Do not care

Bit=0 = No fault

Bit=1 = Fault detected

Subcommand Get_Ant_Diagnosis (cyclic data transmission)

Command request (Get_Ant_Diagnosis):

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command codex “Get”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**02h**	Current user data block length 1 byte (Byte 12)	
12	SubCmd	**CAh**	SubCmd Get _Ant_Diagnosis	SubCmd code
13	DiagObject	**XXh**	Diagnosis object to be read out	

Diag_Object codes:

Name	Value [hex]	Description
DiagObject	E0h	Errors on the air interface (e.g. CRC Error, Framing Error).
DiagObject	E1h	Errors on air interface, when a command is sent to the tag, but the tag does not answer.
DiagObject	E2h	Gives the number of retries of the last command (executed on air interface).
DiagObject	F0h	CRC error counter of the ID-Link interface.
DiagObject	F1h	Unknown object counter of the ID-Link interface.
DiagObject	F2h	Timeout counter of the ID-Link interface.
DiagObject	F3h	Physical error counter of the ID-Link interface (Frame, Start/Stop bit, Baudrate).

Command acknowledge response (Get_Ant_Diagnosis):

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command response “Get”	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**03h**	Response data length 4 bytes	
12	SubCmd	**CAh**	SubCmd response Get_Ant_Diagnosis	SubCmd echo
13	DiagObject	**XXh**	DiagObject code	SubCmd data
14	DiagInfo	**XXh**	DiagObject counter value. Overflows at 255. Reset at startup.	

Subcommand Get_Channel_Mode (cyclic data transmission)

Command request (Get_Channel_Mode):

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command codex “Get”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**01h**	Current user data block length 1 byte (Byte 12)	
12	SubCmd	**CBh**	SubCmd Get _Channel_Mode	SubCmd code

Command acknowledge response (Get_Channel_Mode):

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command response “Get”	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**02h**	Response data length 2 bytes	
12	SubCmd	**CBh**	SubCmd response Get_Channel_Mode	SubCmd echo
13	ModuleConfig	XXh	Module configuration (→ 10.2.7)	SubCmd data

Subcommand Get_UID (cyclic data transmission)

Command request (Get_UID)

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command codex “Get”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**01h**	Current user data block length 1 byte (Byte 12)	
12	SubCmd	**CDh**	SubCmd Get_UID	SubCmd code

Command acknowledge response (Get_UID)

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command response “Get”	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	0Xh	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	0Xh	Current data block, low byte	
11	DBL	**XXh**	Response data length 2 bytes. (Byte 12…21/25/29)	
12	SubCmd	**CDh**	SubCmd response Get_UID	SubCmd echo
13	UID data length	XXh	Number of UID bytes read from transponder.	SubCmd data
14	UID Byte 1 (MSBy)	XXh	UID of transponder. 64 bit or 96 bit or 128 bit UID of transponder which is detected by the antenna. Unused bits are set to 0b.	
15	UID Byte 2	XXh		
16	UID Byte 3	XXh		
17	UID Byte 4	XXh		
18	UID Byte 5	XXh		
19	UID Byte 6	XXh		
20	UID Byte 7	XXh		
21	UID Byte 8	XXh		
…	...			
25/29	UID Byte 12/16	XXh		

Remark:

If no transponder is detected, the data of UID data length is 0x0, also the UID bytes 1 …8/12/16.

9.2.8 Command Put (cyclic data transmission)

With the command PUT the Ident commands are transferred to the evaluation unit.

Command request data structure (PUT):

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header data structure
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**65h**	Command codex “Put”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	XXh	Total number of data blocks, high byte	
8	TDB [D7…D0]	XXh	Total number of data blocks, low byte	
9	DBN [D15...D8]	XXh	Current data block, high byte	
10	DBN [D7…D0]	XXh	Current data block, low byte	
11	DBL	**XXh**	User data block length (bytes 12...nn)	
12	SubCmd	**XXh**	SubCmd code	SubCmd request data structure
13 … nn	SubCmd data	**XXh**	SubCmd request data	

Command response data structure (PUT) with positive acknowledge:

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header data structure
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**65h**	Command response “Put”	
6	Status	X0h	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**00h**	Response data length	

Command response data structure (PUT) with negative acknowledge:

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**65h**	Command response “Put”	
6	Status	01h	Status information Bit D0 = 1: Command terminated with error. Data bytes 12...15 contain error information.	
7	TDB [D15...D8]	**00h**	Total number of data blocks, high byte. Fix set to 00h	
8	TDB [D7…D0]	**01h**	Total number of data blocks, low byte. Fix set to 01h	
9	DBN [D15...D8]	**00h**	Current data block ,high byte. Fix set to 00h.	
10	DBN [D7…D0]	**01h**	Current data block ,low byte. Fix set to 01h.	
11	DBL	**04h**	Response data length [bytes] Fix set to 04h.	
12	Function_Num	XXh	Error_Code_1 provides error information related to **evaluation unit.**	Response data
13	Error_Decode	FEh	Profile-specific error	
14	Error_Code_1	XXh	Command-specific error	
15	Error_Code_2	00h	Copy of status	

SubCmd overview over Put (cyclic)

SubCmd	Name	Description
D1h	Set_Ethernet_Parameter	Sets Ethernet parameter of the evaluation unit
D2h	Set_Ident_Unit_Parameter	Sets the parameter data of the evaluation unit
D3h	Set _Clock	Sets the clock of the evaluation unit
D4h	reserved	-
D5h	Set_Defaults	Sets the default state of the AWE (factory reset)

Subcommand Set_Ethernet_Parameter (cyclic data transmission)

Command request (Set_Ethernet_Parameter)

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**65h**	Command codex “Put”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**15h**	Current user data block length 21 bytes (bytes 12..32)	
12	SubCmd	**D1h**	SubCmd Set_Ethernet_Parameter	SubCmd code
13	DHCP	0Xh	DHCP off = 00h (1) (Default) DHCP on = 01h (2)	SubCmd data
14	ANEG	XXh	Autonegotiation on: FFh Autonegotiation off: 100MB/duplex: 00h 100MB/simplex: 01h (default) 10MB/duplex: 02h 10MB/simplex: 03h	
15	IP [Octet 1]	XXh	Requested IP address of evaluation unit Ex: 192.168.0.10	
16	IP [Octet 2]	XXh		
17	IP [Octet 3]	XXh		
18	IP [Octet 4]	XXh		
19	GW [Octet 1]	XXh	Requested Gateway address Ex: 192.168.0.100	
20	GW [Octet 2]	XXh		
21	GW [Octet 3]	XXh		
22	GW [Octet 4]	XXh		
23	SN [Octet 1]	XXh	Requested subnet mask of evaluation unit Ex: 255.255.255.0	
24	SN [Octet 2]	XXh		
25	SN [Octet 3]	XXh		
26	SN [Octet 4]	XXh		

(1) If parameter DHCP = off is set, the parameters IP, GW and SN must be set.

(2) If parameter DHCP = on is set, the parameters IP, GW and SN are ignored.

Command response “Set_Ethernet_Parameter” with positive acknowledge
(→ chapter 9.2.8: Command response data structure (PUT) with positive acknowledge).

Command response “Set_Ethernet_Parameter” with negative acknowledge
(→ chapter 9.2.8 Command response data structure (PUT) with negative acknowledge).

Remark: If the password is enabled with subcommand Set_IdentUnit_Parameter (0xC3) and the evaluation unit has not received the correct password string, the command returns with error.

Subcommand Set_Ident_Unit_Parameter (cyclic data transmission)

Command request (Set_Ident_Unit_Parameter)

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**65h**	Command codex “Put”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**04h / 06h**	Current user data block length 4 / 6 bytes (Byte 12...15 / 17)	
12	SubCmd	**D2h**	SubCmd Set_Ident_Unit_Parameter	SubCmd code
13	UDF	00h	User data format Profibus DP interface: 00h = Big Endian format (default) 01h = Little Endian format ([1])	SubCmd data
14	OVL	0Xh	Overload protection channel IO-n off ([2]) Default value: 0000 0000b = overload IO-n on 0000 XXX1b = overload protection off	
15	HIGH_CUR	0Xh	High current enable channel ([3]) Default value: 0000 0000b = high current IO-n off 0000 XXX1b = high current IO-n on	

Optional, only for development:

16	ID_CR1		Phy Control register 1 of IO-n channel [cannot be changed by the user]	SubCmd data
17	ID_CR2		Phy Control register 2 of IO-n channel [cannot be changed by the user]	

([1]) Byte order of the Profibus DP data frame is swapped (D1,D0,D3,D2,D5,D4…)

([2]) The overload protection of the channels IO-1…IO-4 are controlled with this parameter. By default, the channels are monitored for overcurrent and switch on current on L+ and C/Qo. With this parameter it is possible to shut off the monitoring.

Remark: The power stage is always protected against destruction via thermal supervision.

([3]) With this parameter it is possible to allow a current of 1.0A on C/Qo on the channels IO-3 and IO-4. By default, the channels IO-1 .. IO-4 provide 0.5A output current on C/Qo.

Command response “Set_Ident_Unit_Parameter” with positive acknowledge
(→ chapter 9.2.8: Command response data structure (PUT) with positive acknowledge).

Command response “Set_Ident_Unit_Parameter” with negative acknowledge
(→ chapter 9.2.8 Command response data structure (PUT) with negative acknowledge).

Subcommand Set_Clock (cyclic data transmission)

Command request (Set_Clock)

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**65h**	Command codex “Put”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	**08h**	Current user data block length 8 bytes (Byte 12...19)	
12	SubCmd	**D3h**	SubCmd Set_Clock	SubCmd code
13	YY	XXh11	XXh = Year, ex. 0xA = 2010	SubCmd data
14	MM	XXh	XXh = Month, ex 0x3 = March	
15	DD	XXh	XXh = Day, ex. 0xF = 15 th.	
16	HH	XXh	XXh = Hour, ex. 0xD = 1.00 p.m.	
17	MM	XXh	XXh = Minutes, ex. 0x11 = 17 min.	
18	SS	XXh	XXh = Seconds, ex. 0x24 = 36 sec.	
19	HS	XXh	XXh = Hundredths of a second, ex. 0x20 = 0.32 sec.	

Command response “Set_Clock” with positive acknowledge
(→ chapter 9.2.8: Command response data structure (PUT) with positive acknowledge).

Command response “Set_Clock” with negative acknowledge
(→ chapter 9.2.8 Command response data structure (PUT) with negative acknowledge).

Subcommand Set_Defaults (cyclic data transmission)

Command request (Set_Defaults)

Byte no.	Name	Value [hex]	Description	Remark
1	CCW high	XXh	Cyclic control word, high byte	Command header
2	CCW low	XXh	Cyclic control word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**65h**	Command codex “Put”	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	01h	Current user data block length 01 byte (byte 12)	
12	SubCmd	**D5h**	SubCmd Set_Defaults ([1])	SubCmd code

([1]) Set the default values of the evaluation unit (factory setting). These values are valid after the next power on.

Remark: The Profibus-specific parameters are not reset, as these values are always transferred via the Set_Prm telegram in the DP State “WAIT_PRM”.

Parameter	Value	Section
Language of web interface	English	Web interface
Data hold time of tag data of channels IO-1… IO-4	100 milliseconds	Interface IO-1 … IO-4
Delay time channels IO-1…IO-4, signal C/Qi.	100 milliseconds	
DHCP	Off	Communication interface “COM”
IP address	192.168.0.79	
Gateway mask	192.168.0.100	
Subnet mask	255.255.255.0	
Autonegotiation	On	
Password protection	Off	
Data format communication interface	Big-Endian	
Date and time of internal clock.	YY = 0xA (2010) MM = 0xC (Dec.) DD = 0x1F (31th) HH = 0x17 (11 p.m.) MM = 0x3B (59 min.) SS = 0x3B (59 sec.) HS = 0x63 (0.99 sec)	Internal clock
ID-Link Error counter	0	ID-Link
ID-Link error trigger value	3	
Profibus DP address	126	Profibus DP slave settings
Profibus „No_Address_Change“	FALSE	

Remark: The fieldbus properties and the IO-1 … IO-4 mode settings are not changed as these are not stored remanently or could be altered by additional commands.

Command response “Set_Defaults” with positive acknowledge
(→ chapter 9.2.8: Command response data structure (PUT) with positive acknowledge).

Command response “Set_Defaults” with negative acknowledge
(→ chapter 9.2.8 Command response data structure (PUT) with negative acknowledge).

10 Profibus DP communication (MS1 / MS2)

The DPV1 mode of the RFID evaluation unit allows the access of the 4 channels via slot and index addressing.

10.1 Address model of the evaluation unit (MS1 / MS2 connection)

The MS1 connection allows the user to access the following data via the slot / index address model:

Slot ([1])	Index	Description	Remark
nn	0 … 100	reserved	Not supported
1…4	101	Parameterisation channels 1…4	Only acyclic command Write-Config allowed
Nn	102 … 110	reserved	Not supported
1…4	111	Data transfer channels 1…4	All acyclic commands, except Write-Config, allowed
Nn	112 … 196	reserved	Not supported
nn	197	PROFILE_ID	**Optional** Profile ID, for RFID = 5B00h
nn	198	PROFILE_VER	**Optional** PIB profile version, here 1.60
nn	199	WRITE_CODE	**Optional** Password assignment for write protection to parameters Indices 120 ... 254
nn	200	WRITE_PROTECT	**Optional** Password for write protection to parameters Indices 120 … 254
nn	201 … 253	Manufacturer specific	Not supported ([2])
nn	254	Manufacturer specific, here I&M1 data record	I&M1 data record supported ([3])
nn	255	I&M functions	I&M0 data record supported ([4])

([1]) Slots 1…4 select IO-1…IO-4. The MS2 connection must not have access to indices 101...108 and 111...118 as it would influence the synchronisation of the PIB and the evaluation unit.

([2]) Read/write calls to not supported slots and indices are acknowledged with negative result codes of the corresponding Profibus function number.

([3]) The index 254 is also accessible via an MS2 connection to read/write the I&M1 data record of the evaluation unit.

([4]) The index 255 is also accessible via an MS2 connection to read the I&M0 data record. Access of the I&M1 data record is currently not supported.

10.1.1 Selection of the process interfaces IO-1, IO-2, IO-3, IO-4

The selection, to which process interface the commands are transferred, is done via write/read calls to slots 1…4 via index 101/111.

10.1.2 I&M data access

Data unit frame

FN (Function_Number)	Slot	Index	Length	IM_Index	Content
5Eh, 5Fh	**1..n**	FFh	XXh	65000	I&M0 data record
5Eh, 5Fh	**1..n**	FFh	XXh	65001	I&M1 data record

Access via Profibus Function_Number:

– Write-REQ, Write-RES (FN = 5Eh)

– Read-REQ, Read-RES (FN = 5Fh)

I&M0 data record

Byte	Name	Description	Value	Remark
1..10	Header	Manufacturer specific	00h , … , 00h	10 bytes filled with 00h (currently not used)
11..12	MANUFACTURER_ID	Assigned by the PNO business office	136h (310d)	2 bytes 310d = ifm
13..32	ORDER_ID	Order number that allows unambiguous identification of the device	“DTE100AA”	8-character order number. Unused filled with 00h
33..48	SERIAL_NUMBER		“001213000004“	12-character MAC-ID. Unused filled with 00h
49..50	HARDWARE_REVISION		“AA”	2 characters device release
51..54	SOFTWARE_REVISION		“V” 01h 02h 03h	1 character release type 1 byte major version 1 byte minor version 1 byte build version
55..56	REVISION_COUNTER		1h	1 word revision counter Currently fixed to 1
57..58	PROFILE_ID		5B00h	1 word RFID profile
59..60	PROFILE_SPECIFIC_TYPE		0000h	1 word “No specific profile type”
61..62	IM_VERSION		01h,00h	2 bytes I&M version
63..64	IM_SUPPORTED		0000h	1 word (I&M0 only supported)

I&M1 data record

Byte	Name	Description	Value	Remark
1..10	Header	Manufacturer specific	00h	Only for Profibus
11..42	TAG_FUNCTION	Unique label within a plant for the identification of its function or task	Filled with 20h	Settable by user (string)
43..64	TAG_LOCATION	Unique label within a plant for the identification of its location.	Filled with 20h	Settable by user (string)

10.2 Command overview (Combined MS0 / MS1 connection, MS2 connection)

Command codex [char]	Command codex [hex]	Name	Description
‘p’	70h	**Physical-Read**	Command to read data from a transponder using a physical start address and the length of data to be read.
‘b’	62h	**Get**	Command to read manufacturer-specific data from the evaluation unit.
‘q’	71h	**Physical-Write**	Command to write data to a transponder using a physical start address and the length of data to be written.
‘e’	65h	**Put**	Command to write manufacturer-specific data to the evaluation unit.
‘x’	78h	**Write-Config**	This service is used to modify operation of the evaluation unit except interruption of the communication. It is possible to send new parameters to the evaluation unit (ConfigData). A reset can also be initiated requesting the evaluation unit to restart operation.
‘a’	61h	**Read-Config**	This service is used to read config data out of the evaluation unit. Config data is manufacturer specific.
‘t’	74h	**Dev-Status**	This service is used to read the status of an evaluation unit. The RXBUF is used as a manufacturer-specific area for status data. Status data is manufacturer-specific. With this command the channel-related I&M information is read out.

Remark:

For using the acyclic command transmission, the module PIB_STATE must be configured.

The acyclic commands are transferred via MS1/MS2 telegrams, using the DS_Write and DS_Read request.

The commands “Mem_Status” and “Inventory” are currently not supported.

If the channel mode is not set, the error code “Channel mode not set” is sent in the command Response.

10.2.1 Command Physical-Read (acyclic data transmission)

Command header request:

Byte no.	Name	Value [hex]	Description	Remark
1	Res.		Reserved	Command header
2	Res.		Reserved	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**70h**	Command codex	
6	CI	41h	Command index	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	23h	Data block length, 35 bytes fix.	
12	Fill byte	00h		Command parameter
13 .. 20	UID [D63...D0]	XXh	This parameter identifies a single transponder to be read. If UID = 0000h, the tag currently present is read.	
21…32	Fill byte	00h	Always fix.	
33	Read data length [D15...D8]	XXh	This parameter specifies the number of bytes to be read from the transponder starting at the address indicated by the parameter start address.	
34	Read data length [D7…D0]	XXh		
35	32 bit start address [D31...D24]	XXh	This parameter specifies a physical address within the transponder memory.	
36	32 bit start address [D23…D16]	XXh		
37	32 bit start address [D15...D8]	XXh		
38	32 bit start address [D7…D0]	XXh		
39…46	Fill byte	00h	Always fix.	

Command acknowledge response:

Byte no.	Name	Value [hex]	Description	Remark
1	Res.		Reserved	Response header
2	Res.		Reserved	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**70h**	Command codex	
6	Status	XXh	Status information	
7	TDB [D15...D8]	XXh	Total number of data blocks, high byte	
8	TDB [D7…D0]	XXh	Total number of data blocks, low byte	
9	DBN [D15...D8]	XXh	Current data block, high byte	
10	DBN [D7…D0]	XXh	Current data block, low byte	
11	DBL	XXh	Response data length [bytes]	
12…240	Data Byte 1..229	XXh	Response data 1 up to max. 229 bytes per data block	Response data

10.2.2 Command Physical-Write (acyclic data transmission)

Command header request:

Byte no.	Name	Value [hex]	Description	Remark
1	Res.		Reserved	Command header
2	Res.		Reserved	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**71h**	Command codex	
6	CI	41h	Command index	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	XXh	Data block length, bytes 12 … nn	
12	Fill byte	00h	Always fix.	Command parameter
13 .. 20	UID [D63...D0]	XXh	This parameter identifies a single transponder to be read. If UID = 0000h, the tag currently present is read.	
21…32	Fill byte	00h	Always fix.	
33	Write data length [D15...D8]	XXh	This parameter specifies the number of bytes to be sent to the transponder starting at the address indicated by the parameter start address.	
34	Write data length [D7…D0]	XXh		
35	32 bit start address [D31...D24]	XXh	This parameter specifies a physical address within the transponder memory.	
36	32 bit start address [D23…D16]	XXh		
37	32 bit start address [D15...D8]	XXh		
38	32 bit start address [D7…D0]	XXh		
39…46	Fill byte	00h	Always fix.	
47…nn (240 max.)	Data bytes 1… nn (194 max.)	XXh	Data to write to tag	Command data

Command acknowledge response:

Byte no.	Name	Value [hex]	Description	Remark
1	Res.		Reserved	Response header
2	Res.		Reserved	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**71h**	Command codex	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	00h	Response data length [bytes]	

10.2.3 Command Write-Config (acyclic data transmission)

Command header request:

Byte no.	Name	Value [hex]	Description	Remark
1	Res.		Reserved	Command header
2	Res.		Reserved	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	78h	Command codex Write-Config	
6	CI	41h	Command index (fix)	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	XXh	Data block length. (Set to 35 bytes if no optional data has to be written to the evaluation unit.)	
12	Config		Config in request: 00h = used for negotiation of packet size, MaxPacketSize shall be used for packet size negotiation	Command parameter
13…32	Fill byte	00h	Always fix.	
33	Config data length, [D15...D8]	XXh	This parameter specifies the number of optional data bytes to write to the evaluation unit. (Set to 0 bytes, if no optional data has to be written to the evaluation unit.)	
34	Config data length, [D7…D0]	XXh		
35 … 46	Fill byte	00h	Always fix.	
47… 240	Data bytes 1…194	XXh	Optional data to write to the evaluation unit.	Command data

Command Write-Config acknowledge response (Config in request = 04h):

Byte no.	Name	Value [hex]	Description	Remark
1	Data block length [D15...D8]	00h	Data block length high (*)	Response header
2	Data block length [D7…D0]	02h	Data block length low (*)	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	78h	Command codex	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	02h	Response data length [bytes]	
12	MaxPacketSize [D15...D8]	XXh	Max. length of the Ident PDU (Ident header + data) the slave device is able to receive or send: 0000h = default (240 bytes) 0001h…003Fh = reserved 0040h…00F0h = max. permitted PDU size	Response data
13	MaxPacketSize [D7…D0]	XXh		

Command Write Config acknowledge response (Config in request = 00h):

Byte no.	Name	Value [hex]	Description	Remark
1	Data block length [D15...D8]	00h	Data block length high (*)	Response header
2	Data block length [D7…D0]	XXh	Data block length low (*)	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	78h	Command codex	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	01h	Response data length [bytes]	
12	MaxPacketSize [D7…D0]	XXh	Max. length of the Ident PDU (Ident header + data) the Slave device is able to receive or send [bytes].	Response data

(*) Former PNO ident profile versions (<= V1.20) use byte 11 as the only counter for the data block length.

According to the current version of the profile, byte 11 and byte 1 have the same value in case MaxPacketSize <= 240 (checked with the Write-Config during start-up).

In case MaxPacketSize > 240, only byte 1 and byte 0 are used to carry the data block length (DBL).

10.2.4 Command Read-Config (acyclic data transmission)

Command Read-Config header request:

Byte no.	Name	Value [hex]	Description	Remark
1	Data block length [D15...D8]	00h	Data block length high (*)	Command header
2	Data block length [D7…D0]	23h	Data block length low (*)	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**61h**	Command codex	
6	CI	41h	Command index	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	23h	Data block length, 35 bytes fix.	
12…46	Fill byte	00h	Always fix.	Command parameter

Command Read Config acknowledge response:

Byte no.	Name	Value [hex]	Description	Remark
1	Data block length [D15...D8]	00h	Data block length high (*)	Response header
2	Data block length [D7…D0]	01h	Data block length low (*)	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**61h**	Command codex	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	01h	Fix response data length [bytes]	
12	MaxPacketSize [D7…D0]	XXh	Max. length of the Ident PDU (Ident header + data) the slave device is able to receive or send 00h = (240 bytes) 01h … 3Fh = reserved 40h … F0h = max. permitted PDU size F1H … FFh = reserved	Response data

(*) Former PNO ident profile versions (<= V1.20) use byte 11 as the only counter for the data block length.

According to the current version of the profile, byte 11 and byte 1 have the same value in case MaxPacketSize <= 240 (checked with the Write-Config during start-up).

In case MaxPacketSize > 240, only byte 1 and byte 0 are used to carry the data block length (DBL).

10.2.5 Command Dev-Status (acyclic data transmission)

Command Dev-Status header request:

Byte no.	Name	Value [hex]	Description	Remark
1	Data block length [D15...D8]	00h	Data block length high (*)	Command header
2	Data block length [D7…D0]	23h	Data block length low (*)	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**74h**	Command codex	
6	CI	41h	Command index	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	23h	Data block length, 35 bytes fix.	
12…38	Fill byte	00h	Always fix.	Command parameter
39	Cmd attribute	XXh	0x04: channel-related I&M information (data record I&M0) 0x05: channel-related I&M information (data record I&M1) 0x0…0x3, 0x6…0xFF: not supported	Command attribute
40…46	Fill byte	00h	Always fix.	Command parameter

Command Dev-Status acknowledge response:

Byte no.	Name	Value [hex]	Description	Remark
1	Data block length [D15...D8]	00h	Data block length high (*)	Response header
2	Data block length [D7…D0]	01h	Data block length low (*)	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**74h**	Command codex	
6	Status	XXh	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	XXh	Data length, bytes 12 .. nn [bytes]	
12	Response attribute	XXh	0x04: channel-related I&M information (data record I&M0) 0x05: channel-related I&M information (data record I&M1)	Response attribute
13…nn	I&M Record	XXh	I&M0 or I&M1 data record	Response data

10.2.6 Command Get (acyclic data transmission)

Command Get header request:

Byte no.	Name	Value [hex]	Description	Remark
1	Data block length [D15...D8]	00h	Data block length high (*)	Command header
2	Data block length [D7…D0]	23h	Data block length low (*)	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command codex “Get”	
6	CI	41h	Command index	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	XXh	Data block length, bytes 12 … nn	
12…32	Fill byte	00h	Always fix.	Command parameter
33	Write data length [D15...D8]	XXh	Data length bytes 47… 240	
34	Write data length [D7…D0]	XXh		
35…46	Fill byte	00h	Always fix.	
47	SubCmd	XXh	See → SubCmd overview of GET	SubCmd code
48 … nn	SubCmd data 1…nn	XXh	See → SubCmd overview of GET	SubCmd data

Command Get acknowledge response:

Byte no.	Name	Value [hex]	Description	Remark
1	Data block length [D15...D8]	00h	Data block length high (*)	Response header
2	Data block length [D7…D0]	01h	Data block length low (*)	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**62h**	Command codex “Get”	
6	Status	X0h	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	XXh	Response data length byte 12…nn [bytes]	
12	SubCmd	XXh	See → SubCmd overview of GET	SubCmd echo
13… nn	Data Byte 1…228	XXh	See → SubCmd overview of GET	SubCmd data

SubCmd overview of Get (acyclic)

SubCmd	Name	Description
C1h	Get_Ethernet_Parameter	Read Ethernet parameter of the evaluation unit
C2h	Get_Ident_Unit_Parameter	Read settings of the evaluation unit
C3h	Get _Clock	Read the clock settings of the evaluation unit
C4h	reserved	-
C5h	Get_Ant_Type	Read out the properties of the antenna
C6h	Get_Block_Parameter	Read out the block parameter of the antenna
C7h	Get_Transponder_Type	Read out the data of the tag
C8h	Get_Ident_Diagnosis	Read out diagnosis of the evaluation unit
C9h	Get_MAC_Address	Read out Ethernet MAC address
CAh	Get_Ant_Diagnosis	Read out diagnosis of the antenna
CBh	Get_Channel_Mode	Read out operation mode of the channels IO-1 … IO-4
CCh	reserved	-
CDh	Get_UID	Read out UID of transponder

Remark:

The subcommands have a similar data structure as defined in the cyclic ident commands, except the fill bytes.

10.2.7 Command Put (acyclic data transmission)

With the command PUT the Ident commands are transferred to the evaluation unit.

Command request data structure (PUT):

Byte no.	Name	Value [hex]	Description	Remark
1	Data block length [D15...D8]	00h	Data block length high (*)	Command header
2	Data block length [D7…D0]	23h	Data block length low (*)	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**65h**	Command codex “Put”	
6	CI	41h	Command index	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	XXh	Data block length, bytes 12 … nn.	
12…32	Fill byte	00h	Always fix.	Command parameter
33	Write data length [D15...D8]	XXh	Data length bytes 47… nn	
34	Write data length [D7…D0]	XXh		
35…46	Fill byte	00h		
47	SubCmd	XXh	SubCmd code, see → SubCmd overview of PUT	SubCmd code
48…nn	Data bytes 1…nn	XXh	SubCmd data, see → SubCmd overview of PUT	SubCmd data

Remark:

The data structure of the command request header of the MS1 data transmission is different to the MS0 data transmission. Additionally some fill bytes are necessary to be compliant to the PNO profile [01].

The data structure of the SubCmd request, beginning at byte 47, has the same structure as defined in the MS0 data transmission, byte 12, “SubCmd code”.

Command response data structure (PUT) with positive acknowledge:

Byte no.	Name	Value [hex]	Description	Remark
1	Data block length [D15...D8]	00h	Data block length high (*)	Response header
2	Data block length [D7…D0]	01h	Data block length low (*)	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**65h**	Command codex	
6	Status	X0h	Status information	
7	TDB [D15...D8]	00h	Total number of data blocks, high byte	
8	TDB [D7…D0]	01h	Total number of data blocks, low byte	
9	DBN [D15...D8]	00h	Current data block, high byte	
10	DBN [D7…D0]	01h	Current data block, low byte	
11	DBL	00h	Data block length, bytes 12 … nn.]	

Remark:

The data structures of the command response header of the MS0 and MS1 data transmission are identical.

Command response data structure (PUT) with negative acknowledge

Byte no.	Name	Value [hex]	Description	Remark
1	CSW high	XXh	Cyclic status word, high byte	Response header
2	CSW low	XXh	Cyclic status word, low byte	
3	SN high	XXh	Sequence number high	
4	SN low	XXh	Sequence number low	
5	CC	**65h**	Command response “Put”	
6	Status	01h	Status information Bit D0 = 1: Command terminated with error. Data bytes 12...15 contain error Information.	
7	TDB [D15...D8]	**00h**	Total number of data blocks, high byte. Fix set to 00h	
8	TDB [D7…D0]	**01h**	Total number of data blocks, low byte. Fix set to 01h	
9	DBN [D15...D8]	**00h**	Current data block, high byte. Fix set to 00h.	
10	DBN [D7…D0]	**01h**	Current data block, low byte. Fix set to 01h.	
11	DBL	**04h**	Response data length [bytes] Fix set to 04h.	
12	Function_Num	XXh	Error_Code_1 provides error information related to **evaluation unit.**	Response data
13	Error_Decode	FEh	Profile-specific error	
14	Error_Code_1	XXh	Command-specific error	
15	Error_Code_2	00h	Copy of status	

SubCmd overview over Put (acyclic)

SubCmd	Name	Description
D1h	Set_Ethernet_Parameter (1)	Sets Ethernet parameter of the evaluation unit
D2h	Set_Ident_Unit_Parameter (1)	Sets the parameter data of the evaluation unit
D3h	Set_Clock (1)	Sets the clock of the evaluation unit
D4h	reserved	-
D5h	Set_Defaults (1)	Sets the default state of the evaluation unit (factory reset)

(1) These subcommands have a similar data structure as defined in the cyclic ident commands, except the fill bytes.

Module configuration:

Group	Module identifier	IO-n hardware mode	Communication mode
Inactive	01h	Off (Hi-Z C/Qo, C/Qi and I/Q)	None
Input (1 Byte In)	02h	Input (Input C/Qi and I/Q active)	MS0 input data
Output (1 Byte In/Out)	03h	Output (Output C/Qo and Input I/Q active)	MS0 input and output data
PIB State (2 Byte In/Out)	04h	UART (Communication mode ID-Link)	MS0: control word, status word MS1: command data
RWH UID (11 Byte In/Out)	05h	UART (Communication mode ID-Link)	MS0: control word, status word, command data
RWH UID (15 Byte In/Out)	06h	UART (Communication mode ID-Link)	MS0: control word, status word, command data
RWH UID (19 Byte In/Out)	07h	UART (Communication mode ID-Link)	MS0: control word, status word, command data
RWH STRG (26 Byte In/Out)	08h	UART (Communication mode ID-Link)	MS0: control word, status word, command data
RWH STRG (34 Byte In/Out)	09h	UART (Communication mode ID-Link)	MS0: control word, status word, command data
RWH STRG (42 Byte In/Out)	0Ah	UART (Communication mode ID-Link)	MS0: control word, status word, command data

11 Profibus parameters

11.1 Evaluation unit parameterization

Section	Octet	Content	Remark
DPV0 norm. parameter	01	DP slave mode	Not settable by user (GSD def.)
	02	WD_Fact_1	Not settable by user (GSD def.)
	03	WD_Fact_2	Not settable by user (GSD def.)
	04	TSDR	Not settable by user (GSD def.)
	05	Ident number (high byte)	Not settable by user (GSD def.)
	06	Ident number (low byte)	Not settable by user (GSD def.)
	07	Group Ident number	Not settable by user (GSD def.)
DPV1 Parameter	08	DPV1 status 1	Not settable by user (GSD def.)
	09	DPV1 status 2	Not settable by user (GSD def.)
	10	DPV1 status 3	Not settable by user (GSD def.)
User parameter: Header	11	ifm user parameter header: A1h fix	
User parameter: DP configuration	12.0	Failsafe mode [on/off] Default: off	OFF = secure state ON= keep outputs
	12.1	Extended Profibus DP diagnosis [on/off] Default: off	OFF = standard diag. only
	12.2	Diagnosis interrupt via “Diag.Ext.” [on/off] Default: on	OFF = Ext.Diag bit is not set, only state message
User parameter: Evaluation unit configuration	13.0	Profibus DP data format [Motorola/Intel] Default: Motorola	
	13.1	Tracebuffer read out enable [on/off] Default: on	
	13.2	Communication interface enable [on/off] Default: on	
	13.3 – 13.7	Reserved for future use	
User parameter: Communication interface configuration	14.0	DHCP [on/off] Default: off	
	14.1	Autonegotiation [on/off] Default: on	
	14.2 – 14.7	Reserved for future use	
User Parameter: IO-Interface configuration	15	Phy 1 control register 1: fix value: F9h	Not settable by user (GSD def.)
	16	Phy 1 control register 2: fix value: A3h	Not settable by user (GSD def.)
	17	Phy 2 control register 1: fix value: F9h	Not settable by user (GSD def.)
	18	Phy 2 control register 2: fix value: A3h	Not settable by user (GSD def.)
	19	Phy 3 control register 1: fix value: F9h	Not settable by user (GSD def.)
	20	Phy 3 control register 2: fix value: A3h	Not settable by user (GSD def.)
	21	Phy 4 control register 1: fix value: F9h	Not settable by user (GSD def.)
	22	Phy 4 control register 2: fix value: A3h	Not settable by user (GSD def.)
Module parameters	23 … 42	See module parameterization (→ 11.2)	

11.2 Module parameterization

11.2.1 Module „Inactive“:

Section	Octet	Content	Remark
User parameter: Module ID 0	N	Module number [1…4]	Depends on user selection
	N+1	Module identifier, fix value 00h	
	N+2	Fix value 00h	
	N+3	Fix value 00h	
	N+4	Fix value 00h	

11.2.2 Module „Input“:

Section	Octet	Content	Remark
User parameter: Module ID 1	N	Module number [1…4]	Depends on user selection
	N+1	Module identifier, fix value 01h	
	N+2	Data hold time [0…2 s] Default: 0 ms	Hold time C/Qi and I/Q
	N+3	Fix value 00h	
	N+4.0	Overload detection [on/off] Default : on	Overload on output L+ > 500mA
	N+4.1- N+4.7	Reserved for future use	

11.2.3 Module „Output“:

Section	Octet	Content	Remark
User parameter: Module ID 2	N	Module number [1…4]	Depends on user selection
	N+1	Module identifier, fix value 02h	
	N+2	Data hold time [0 … 2 s] Default: 0 ms	Hold time I/Q
	N+3	Fix value 00h	
	N+4.0	Overload detection [on/off] Default : on	Overload on output L+ > 500mA
	N+4.1	Overcurrent detection [on/off] Default : on	Overcurrent on output C/Qo > 500mA
	N+4.2	High current 1A enable [on/off] Default : off	Output current enable on output C/Qo = 1A. Only valid for channel I/Q3 and channel I/Q4
	N+4.3- N+4.7	Reserved for future use	

11.2.4 Module „PIB State“:

Section	Octet	Content	Remark
User parameter: Module ID 3	N	Module number [1…4]	Depends on user selection
	N+1	Module identifier, fix value 03h	
	N+2	Data hold time [0 … 2 s] Default: 0 ms	Hold time I/Q
	N+3	Fix value 00h	
	N+4.0	Overload detection [on/off] Default : on	Overload on output L+ > 500 mA
	N+4.1	Overcurrent detection [on/off] Default : on	Overcurrent on output C/Qo > 100mA
	N+4.2- N+4.7	Reserved for future use	

11.2.5 Modules „RWH UID“:

Section	Octet	Content	Remark
User parameter: Module ID 4…6	N	Module number [1…4]	Depends on user selection
	N+1	Module identifier, fix value 04h for RWH UID (11 bytes In/Out) 05h for RWH UID (15 bytes In/Out) 06h for RWH UID (19 bytes In/Out)	
	N+2	Data hold time [0 … 2 s] Default: 0 ms	Hold time I/Q
	N+3	Transponder data block length [1,2,4,8,16,32,64,128,255] Default: 4 bytes	
	N+4.0	Overload detection [on/off] Default: on	Overload on output L+ > 500 mA
	N+4.1	Overcurrent detection [on/off] Default: on	Overcurrent on output C/Qo > 100mA
	N+4.2	Read of UID edge controlled [on/off] Default: off	Reading of UID controlled via bit RD.
	N+4.3- N+4.7	Reserved for future use	

11.2.6 Modules „RWH STRG“:

Section	Octet	Content	Remark
User parameter: Module ID 7…9	N	Module number [1…4]	depends on user selection
	N+1	Module identifier, fix value 07h for RWH UID (24 bytes In/Out) 08h for RWH UID (32 bytes In/Out) 09h for RWH UID (40 bytes In/Out)	
	N+2	Data hold time [0 … 2 s] Default: 0 ms	Hold time I/Q
	N+3	Transponder data block length [1,2,4,8,16,32,64,128,255] Default: 4 bytes	
	N+4.0	Overload detection [on/off] Default : on	Overload on output L+ > 500 mA
	N+4.1	Overcurrent detection [on/off] Default : on	Overcurrent on output C/Qo > 100mA
	N+4.2- N+4.7	Reserved for future use	

12 Enhanced Profibus Diagnosis

The Profibus DP diagnosis is transmitted via the standard diagnosis, the identifier related diagnosis, the module status and the channel related diagnosis.

12.1 Standard, identifier related, device related and channel related diagnosis

	Byte	Content								Remark
Standard diagnosis	01	Station status 1								
	02	Station status 2								
	03	Station status 3								
	04	Station number of DP Master								Default: 0FFh
	05	Manufacturer ID (High byte)								Fix: 0Dh
	06	Manufacturer ID (Low byte)								Fix: 33h
Device-related diagnosis:	07	Device related diagnosis header + length								Fix: 07h
	08	Status type: Status message								Fix: 81h (Bit 07..00)
	09	Slot Number								Fix: 00h (Bit 15..08)
Status message	10	0	0	0	0	0	0	0	0	Status specifier ([1]) 00b = no further differentiation 01b = status appeared 10b = status disappeared 11b = reserved (Bit 23..16)
	11	Module identifier IO-2				Module identifier IO-1				Coding see module identifier (bits 31..24) (→ 10.2.7)
	12	Module identifier IO-4				Module identifier IO-3				Coding see module identifier (bits 39..32) (→ 10.2.7)
	13	res	res	res	res	res	HWF	PFA	ATE	Device error flags ([1]) see definition (bits 47…40) (→ 9.2.7)

([1]) „Status Appeared“ is set, if one of the device error flags are active, DRD length always 13 bytes.

Identifier related diagnosis:

Identfier-related diagnosis ([1])	14	Identifier related diagnosis header + length							Fix: 42h
	15	0	0	0	0	Mod4	Mod3	Mod2	Mod1	**Module identifier:** 0 = module has no diagnosis data 1= module has diagnosis data

Device related diagnosis:

Device-related diagnosis:	16	Device related diagnosis header + length							Fix: 05h
	17	Status type: module							Fix: 82h (Bit 07..00)
	18	Slot number							Fix: 00h (Bit 15..08)
Module status ([1])	19	0	0	0	0	0	0	ST1	ST0	Status specifier (ST) 00b = no further differentiation 01b = status appeared 10b = status disappeared 11b = reserved (Bit 23..16)
	20	Module 4 state		Module 3 state		Module 2 state		Module 1 state		**Module state:** 00 = OK 01 = Data invalid cause fault 02 = wrong module 03 = module in use (Bit 31..24)

Channel related diagnosis:

Channel-related diagnosis ([1])	21	1	0	Module number (DPV0 slot)		**Module number:** 0 = slot 1 1 = slot 2 2 = slot 3 3 = slot 4
	22	S1	S0	Channel number		**Channel type S1/S0:** 0 = reserved 1 = input 2 = output 3 = input / output **Channel number:** 1 = channel 1 contains IO-n specific errors
	23	DT2	DT1	DT0	Error type	Data type + error type
…	…	…				-
Channel related diagnosis ([1])	N	Channel related diagnosis header + DPV0 slot number				Optional diagnosis information
	N+1					
	N+2	DT2	DT1	DT0	Error type	

([1]) The extended profibus DP diagnosis is activated by setting the Profibus DP parameter byte 12, bit 1.

Channel related diagnosis, data type and error type

Byte	Data type			Error type	Remark
N	DT2	DT1	DT0	X X X X X b	Data type + error type

Data type coding:

Data type			Description	Remark
DT2	DT1	DT0		
0	0	0	Unspecified type	Used for data arrays
0	0	1	1 bit	Not used
0	1	0	2 bit	Not used
0	1	1	4 bit	Not used
1	0	0	Octet	Not used
1	0	1	Word	Not used
1	1	0	2 words	Used for PIB
1	1	1	Reserved	Not used

Error type coding:

Error type					Description	Remark
ET4	ET3	ET2	ET1	ET0		Possible reason
0	0	0	0	0	Reserved	Not used
0	0	0	0	1	Module error: short circuit	**IO-n** (1) **:** L6360 short circuit C/Qo (CQOL)
0	0	0	1	0	Module error: undervoltage	**IO-n** (1) **:** L6360 undervoltage L+ (PO)
0	0	0	1	1	-	Not used
0	0	1	0	0	Module error: overload	**IO-n** (1) **:** L6360 overcurrent L+ (LOL)
0	0	1	0	1	Module error: overtemperature	**IO-n** (1) **:** L6360 overtemperature (OVT)
0	0	1	1	0	Module error: line break	**IO-n** (1) **:** timeout communication with antenna (no response)
0	0	1	1	1	Module error: upper limit reached	Not used
0	1	0	0	0	Module error: lower limit reached	**IO-n** (1) **:** L6360 undervoltage fault (REG LIN)
0	1	0	0	1	Module error: error	**IO-n** (1) **:** antenna failure (buffer overrun, general error, frontend error)
0	1	0	1	0	Reserved 1	Not used
..	..	..	..	..	….	Not used
0	1	1	1	1	Reserved 6	Not used
1	0	0	0	0	Module error: antenna communication	**IO-n** (1) **:** communication error with antenna (Ident-Unit UART + antenna IDLINK Error)
1	0	0	0	1	Module error: internal communication I²C	**IO-n** (1) **:** L6360 interrupt without error source

1	0	0	1	0	Module error: I²C parity check fault	**IO-n** [1] **:** L6360 Parity check fault (PE)
..	..	..	..	..	Reserved for device errors	..
1	1	1	1	1	User-specific error 15	Reserved for future use

Remark:

[1] Module errors are transmitted via channel 1 of the corresponding module.

13 Referenced documents

[01] “Profile Identification Systems”, PNO order 3.142, V1.9, 05/2010