Your Global Automation Partner

TURCK

RFID Tags
with Password Function

Instructions for Use

Contents

1 About These Instructions

These instructions for use describe the structure, functions and the use of the product and will help you to operate the product as intended. Read these instructions carefully before using the product. This is to avoid possible damage to persons, property or the device. Retain the instructions for future use during the service life of the product. If the product is passed on, pass on these instructions as well.

1.1 Target groups

These instructions are aimed at qualified personal and must be carefully read by anyone mounting, commissioning, operating, maintaining, dismantling or disposing of the device.

1.2 Explanation of symbols used

The following symbols are used in these instructions:

	**DANGER** DANGER indicates a dangerous situation with high risk of death or severe injury if not avoided.
	**WARNING** WARNING indicates a dangerous situation with medium risk of death or severe injury if not avoided.
	**CAUTION** CAUTION indicates a dangerous situation of medium risk which may result in minor or moderate injury if not avoided.
	**NOTICE** NOTICE indicates a situation which may lead to property damage if not avoided.
	**NOTE** NOTE indicates tips, recommendations and useful information on specific actions and facts. The notes simplify your work and help you to avoid additional work.
▶	**CALL TO ACTION** This symbol denotes actions that the user must carry out.
⇨	**RESULTS OF ACTION** This symbol denotes relevant results of actions.

1.3 Other documents

Besides this document the following material can be found on the Internet at www.turck.com:

- Data sheet
- Quick start guide
- Configuration manual
- Startup manuals

1.4 Naming convention

Read/write devices are called “read/write heads” for the HF range and “readers” for the UHF range. Common synonyms for “data carriers” are “tags”, “transponders” and “mobile data memory”.

1.5 Feedback about these instructions

We make every effort to ensure that these instructions are as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to techdoc@turck.com.

2 Notes on the Product

2.1 Product identification

These instructions apply to the following tags:

Tag	Chip type
IN TAG 200 SLIX2	NXP ICODE SLIX2
IN TAG 300 SLIX2	NXP ICODE SLIX2
IN TAG 500 SLIX2	NXP ICODE SLIX2
TW-L36-18-F-B320-4KPCS	NXP ICODE SLIX2
TW-L36-18-F-B320-100PCS	NXP ICODE SLIX2
TW-R10-M-B146	EM4233SLIC
TW-R12-M-B146	EM4233SLIC
TW-R4-3-M-B320	NXP ICODE SLIX2
TW-R20-B320	NXP ICODE SLIX2
TW-R30-B320	NXP ICODE SLIX2
TW-R34-M-B320	NXP ICODE SLIX2
TW-R50-B320	NXP ICODE SLIX2

2.2 Scope of delivery

The delivery consists of the tag.

2.3 Legal requirements

The device is subject to the following EU directive:

- 2014/53/EU (RED Directive)

This directive stipulates the following requirements related to health and safety as well as electromagnetic compatibility:

- Health and safety: Compliance with the objectives of safety requirements from directive 2014/35/EU (Low Voltage Directive), however, without the application of the voltage limits
- Electromagnetic compatibility: Compliance with the special requirements of directive 2014/30/EU (EMC Directive)

2.4 Turck service

Turck supports you with your projects, from initial analysis to the commissioning of your application. The Turck product database under www.turck.com contains software tools for programming, configuration or commissioning, data sheets and CAD files in numerous export formats.

The contact details of Turck subsidiaries worldwide can be found on p. [▷ 46].

3 For Your Safety

The product is designed according to state-of-the-art technology. However, residual risks still exist. Observe the following warnings and safety notices to prevent damage to persons and property. Turck accepts no liability for damage caused by failure to observe these warning and safety notices.

3.1 Intended use

These devices are designed solely for use in industrial areas.

The passive BL ident tags are designed for contactless write and read operations from several BL ident HF read/write heads with an operating frequency of 13.56 MHz. The TW…-M-… tags are suitable for mounting in and on metal. The achievable read/write distances may vary according to factors such as component tolerances, mounting locations, ambient conditions and the effect of materials. For this reason, the application must be tested under real conditions (particularly with read and write operations in motion).

The devices may only be used as described in these instructions. Any other use is not in accordance with the intended use. Turck accepts no liability for any resulting damage.

3.2 General safety notes

- The device may only be assembled, installed, operated, parameterized and maintained by professionally-trained personnel.
- The device may only be used in accordance with applicable national and international regulations, standards and laws.
- The device only meets the EMC requirements for industrial areas and is not suitable for use in residential areas.

4 Product Description

The tags can be read or written with BL ident read/write heads and Turck handhelds.

Tags are available with 146 bytes or 320 bytes of EEPROM memory. The round tags are available with a diameter of 10…50 mm. The TW…-M-… types are suitable for direct mounting on or in metal.

4.1 Device overview

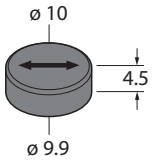

Fig. 1: Dimensions –
TW-R10-M-B146

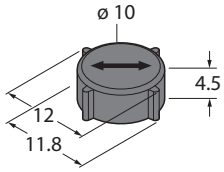

Fig. 2: Dimensions –
TW-R12-M-B146

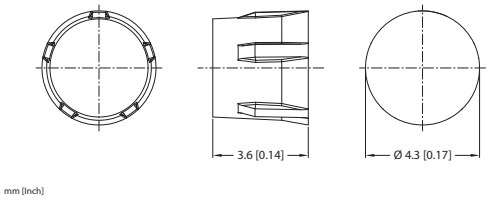

Fig. 3: Dimensions –
TW-R4-3-M-B320

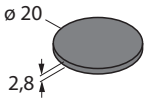

Fig. 4: Dimensions –
TW-R20-B320

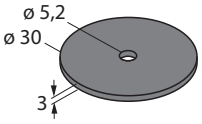

Fig. 5: Dimensions –
TW-R30-B320, IN TAG 300 SLIX2

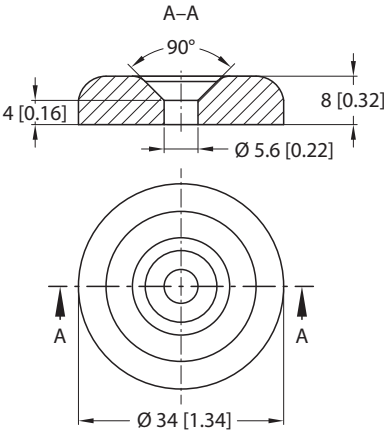

Fig. 6: Dimensions –
TW-R34-M-B320

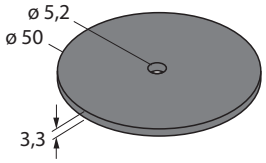

Fig. 7: Dimensions –
TW-R50-B320

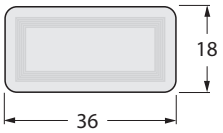

Fig. 8: Dimensions –
TW-L36-18-F-B320…

4.2 Properties and features

- Tags available for direct mounting on and in metal
- EEPROM memory
- 128 or 316 bytes of freely usable memory

4.3 Functions and operating modes

The passive BL ident HF tags can be written and read by HF read/write heads at an operating frequency of 13.56 MHz. The tags have an EEPROM memory of 146 bytes (TW…-B146) or 320 bytes (TW…-B320). Refer to the data sheets for the maximum achievable read/write distances. The memory areas of the tag can be password protected from write and read access.

4.4 Technical accessories

The tags can only be written or read with the appropriate read/write heads and handhelds. Information about compatible devices is provided in the relevant product data sheet.

An overview of other RFID system components is provided in the RFID engineering manual.

5 Installing

5.1 Installing standard tags

NOTE
Refer to the product-specific data sheets for the tags to find the mounting conditions.

- Install the tags according to application requirements. The tags can be stuck on or mounted with screws.
- Use the plastic screws for screw mounting the tags.

5.1.1 Aligning tags to the read/write head

- Position the tags parallel to the active face of the read/write head.

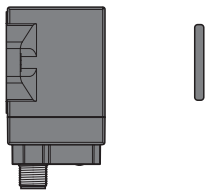

Fig. 9: Parallel alignment of tag and read/write head (example)

5.1.2 Installing the tags in metallic environments

The TW-…-M-… tags are suitable for direct mounting on and in metal.

Other types of tag must not be mounted directly on metal. The following measures must be taken if these tags nevertheless have to be mounted in metal environments.

- ▶ Observe the required minimum distance a from metal when installing. The minimum distance a depends on the design of the tag, a = 10 mm serves as a guideline.

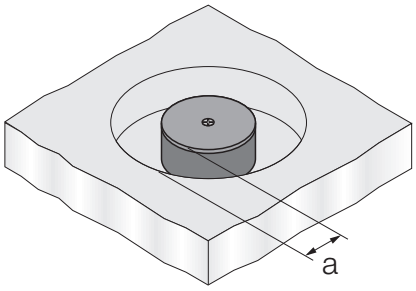

Fig. 10: Minimum distance a

- ▶ Fit a non-metallic spacer between the metal environment and the tag. The height h is at least 10 mm and depends on the combination of tag and read/write head.
- ▶ Carry out tests in application conditions.

NOTE
Non-metallic spacers enable mounting that does not interrupt the correct operation of functions. The possible read/write distance is nevertheless reduced.

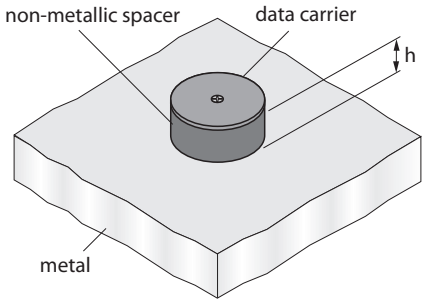

Fig. 11: Mounting with a non-metallic spacer

Reducing the influence of metals

Metal supports above the transmission zone between tag and read/write head affect the entire field. The transmission zone is reduced.

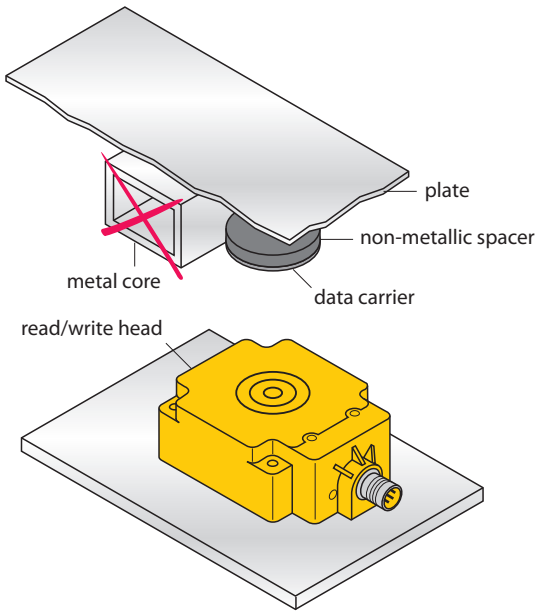

Fig. 12: Interfering metal supports

- ▶ Position the tags and read/write head in such a way that there are no metal supports in the transmission zone.

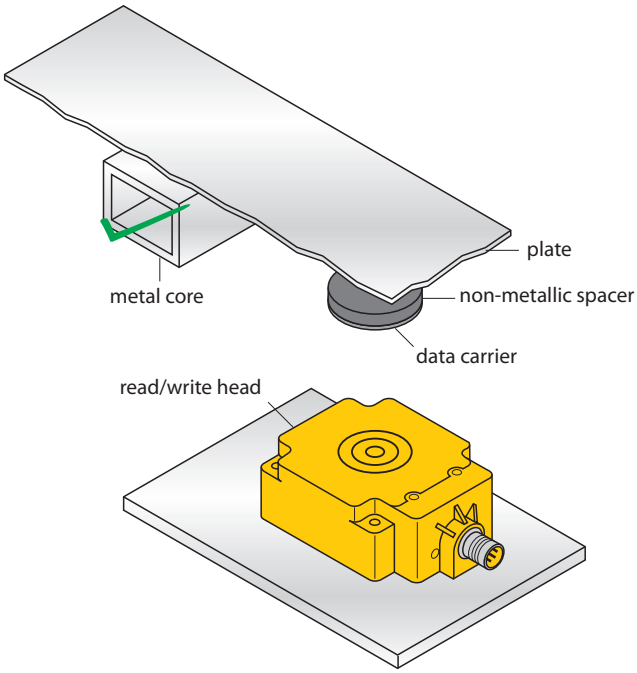

Fig. 13: Metal support outside of the transmission zone between the tag and the read/write head

5.2 Installing ferrite tags – TW-R…-M-B146

The TW-R10-M-B146 and TW-R12-M-B146 tags can be fitted flush to the installation environment. An undermount installation (1 mm in metal) will reduce the read/write distance by approx. 30 %.

5.2.1 Aligning tags to the read/write head

- Align tags to the read/write head as shown in the following figure.

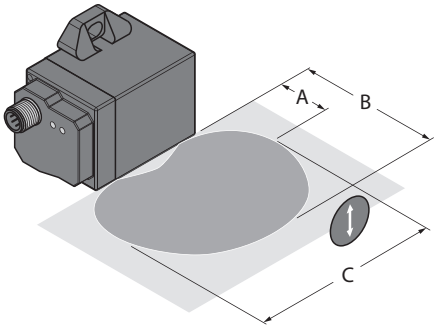

Fig. 14: Aligning tags to the read/write head (example: TNSLR-Q42TWD-H1147)

- Take read/write distances into account. Refer to the product data sheet for the values for recommended distance (A), maximum distance (B) and the length of the transmission zone (C) at the recommended distance.
- Position the tag so that it moves past the edges of the read/write head housing during a read or write operation (see green areas).

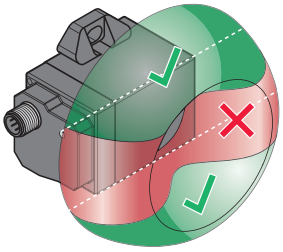

Fig. 15: Highlighting of usable transmission zone (example: TNSLR-Q42TWD-H1147)

5.2.2 Fastening tags to the object

- Cut the hole as shown in the following figures.

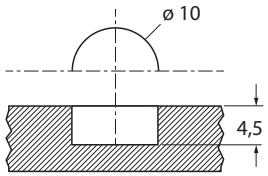

Fig. 16: Hole dimensions for inserting the tag in metal (TW-R10…)

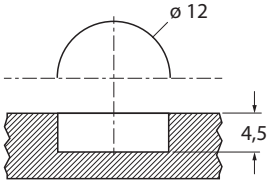

Fig. 17: Hole dimensions for inserting the tag in metal (TW-R12…)

- Fill the hole with an adequate quantity of adhesive material or potting material.

NOTE
Turck can provide on request a recommendation for adhesives that meet FDA and EU requirements for accidental contact with food. This recommendation does not release the user from an examination regarding the suitability of a particular adhesive for the relevant application.

- Push the tag correctly aligned in the hole. The tags cannot be correctly aligned in the hole at a later time.
- Let the adhesive cure in order prevent the tags from turning.
- Optional: Fill any recess or cavity with adhesive.
- Optional: Spread the adhesive to produce a flush surface.

6 Operation

NOTE
The achievable read/write distances may vary according to factors such as component tolerances, mounting locations, ambient conditions and the effect of materials. For this reason, the application must be tested in all cases under real conditions (particularly with read and write operations in motion).

7 Protecting the Sensor with a Password

NOTE
The following describes the password function with the BL…-2RFID-A and BL…-2RFID-S RFID electronic modules. The use of the password function with the TBEN… and TBEC… compact RFID interfaces is described in the operating instructions of the relevant interfaces.

The password function enables the memory areas of the tags to be protected from write and read access.

The password function consists of different commands that are executed via a Get command. The password must consist of 4 bytes.

The assignment of a password is only possible in Standard access mode.

NOTE
The password function only offers basic access protection. The function contains no encryption and does not meet the requirements of increased access protection. The password function is not suitable for safety-related applications.

7.1 Component and firmware version

In order to use the password function, the RFID components used must have at least the following firmware versions. The required firmware version of the read/write heads depends on the chip type of the tag.

Read/write heads – firmware version

Read/write head	ID	Firmware status	
		EM4233SLIC	SLIX2
TB-M12-H1147	100003024	1v85	1v97
TB-M12-H1147/C53	100003025	1v85	1v97
TN-M12-H1147	100003026	1v85	1v97
TN-M12-H1147/C53	100003027	1v85	1v97
TB-M18-H1147	7030001	1v85	1v97
TB-M18-H1147/C53	7030729	1v85	1v97
TN-M18-H1147	7030002	1v85	1v97
TB-M18-H1147/C53	7030728	1v85	1v97
TB-M30-H1147	7030003	1v85	1v97
TB-M30-H1147/C53	7030731	1v85	1v97
TN-M30-H1147	7030004	1v85	1v97
TN-M30-H1147 /C53	7030730	1v85	1v97
TN-CK40-H1147	7030006	1v85	1v97
TN-CK40-H1147/C53	7030732	1v85	1v97
TN-Q80-H1147	7030007	7v85_TN_TNLR-Q80	7v97_TN_TNLR_Q80
TN-Q80-H1147/C53	100010648	7v85_TN_TNLR-Q80	7v97_TN_TNLR_Q80
TN-Q14-0.15-RS4.47T	7030235	1v85	1v97
TN-Q14-0.15-RS4.47T/C53	7030779	1v85	1v97

Read/write head	ID	Firmware status	
		EM4233SLIC	SLIX2
TNLR-Q80-H1147	7030230	3v85 7v85_TN_TNLR-Q80	7v97_TN_TNLR_Q80
TNLR-Q80-H1147/C53	100010649	3v85 7v85_TN_TNLR-Q80	7v97_TN_TNLR_Q80
TB-EM18WD-H1147	7030224	1v85	1v97
TN-EM18WD-H1147	7030223	1v85	1v97
TB-EM30WD-H1147	7030221	1v85	1v97
TN-EM30WD-H1147	7030222	1v85	1v97
TB-Q08-0.15-RS4.47T	7030553	1v85	1v97
TB-Q08-0.15-RS4.47T/C53	7030778	1v85	1v97
TNLR-Q80L400-H1147	7030204	5v85 7v85_SLR-Q350_Q80L	7v97_Q350
TNLR-Q80L400-H1147L	7030234	5v85 7v85_SLR-Q350_Q80L	7v97_Q350
TNLR-Q80L800-H1147	7030522	7v85_SLR-Q350_Q80L	7v97_Q350
TNSLR-Q80WD-H1147	7030418	7v85_SLR-Q42_Q80	7v97_Q42_Q80
TNSLR-Q80WD-H1147/C53	100001312	7v85_SLR-Q42_Q80	7v97_Q42_Q80
TNSLR-Q42TWD-H1147	7030424	7v85_SLR-Q42_Q80	7v97_Q42_Q80
TNSLR-Q42-H1147/C53	7030733	7v85_SLR-Q42_Q80	7v97_Q42_Q80
TNSLR-Q350-H1147	7030454	7v85_SLR-Q350_Q80L	7v97_Q350
TN-Q80-H1147-EX	7030302	1v85	7v97_TN_TNLR_Q80
TNLR-Q80-H1147-EX	7030303	3v85	7v97_TN_TNLR_Q80
TB-EM18WD-H1147-EX	7030381	1v85	1v97
TN-EM18WD-H1147-EX	7030382	1v85	1v97
TB-EM30WD-H1147-EX	7030385	1v85	1v97
TN-EM30WD-H1147-EX	7030386	1v85	1v97

RFID electronic modules – firmware version

Electronic module	ID	Firmware status
BL20-2RFID-A	6827233	SR49
BL67-2RFID-A	6827225	SR49
BL20-2RFID-S	6827306	SR49
BL67-2RFID-S	6827305	SR49

7.2 BL…-2RFID-A module – overview of the commands

The commands required for the password function are sent to the BL…-2RFID-A module via a Get command.

For this the following entries must be made with all commands:

- CMDREF[x].CMD = 0x62
- Refer to the descriptions of the individual commands for the values for CMDREF[x].length.

7.2.1 Set Transceiver PWD command

The **Set Transceiver PWD** command sets a password in the read/write head via a Get command. The password is stored temporarily in the memory of the read/write head. After the power supply of the read/write head is reset, the password must be set again in the read/write head. If an incorrect password is sent, this causes a timeout (unknown error, error code E1FE8100).

The password set in the read/write head must match the tag password. Refer to the chapter “Setting the password protection for the tag” for the procedure in the application.

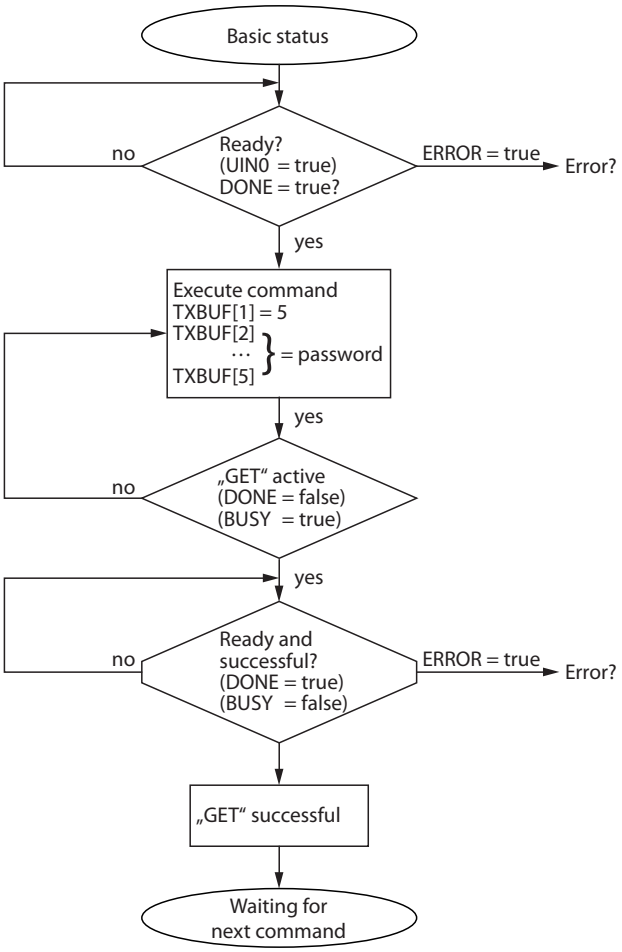

Fig. 18: Flow chart

Get.request	
TXBUF[1]	5
TXBUF[2]	Password byte [0]
TXBUF[3]	Password byte [1]
TXBUF[4]	Password byte [2]
TXBUF[5]	Password byte [3]

Get.response	
RXBUF[1]	5

7.2.2 Set Tag password command

The **Set Tag PWD** command sets a password in the tag via a Get command. After the password is sent, other commands (e.g. Set_Tag_Protection) can be sent to the tag.

The password set in the read/write head must match the tag password. Refer to the chapter "Setting the password protection for the tag" for the procedure in the application.

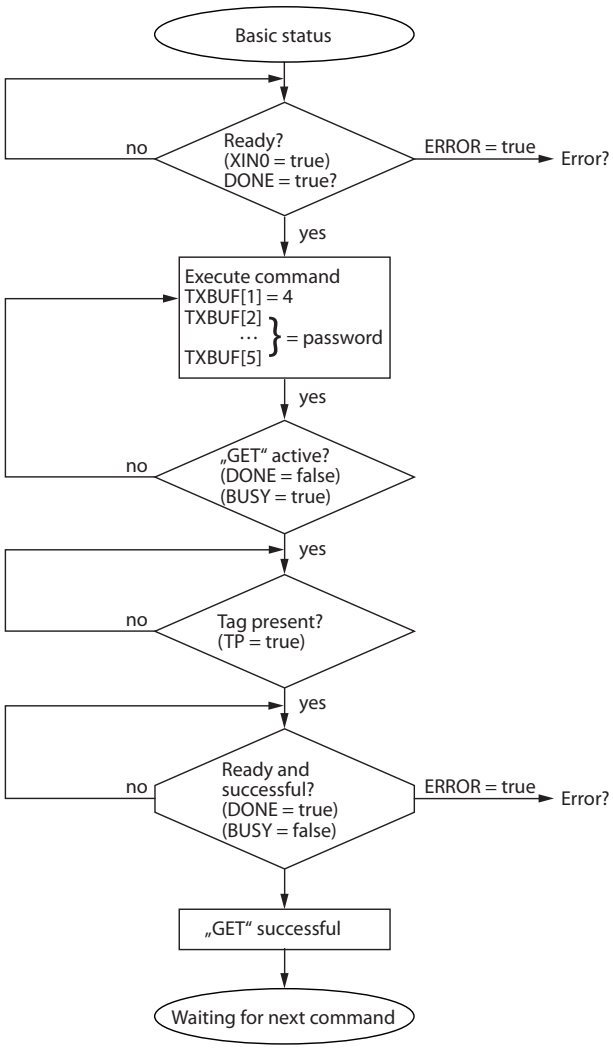

Fig. 19: Flow chart

Get.request	
TXBUF[1]	4
TXBUF[2]	Password byte [0]
TXBUF[3]	Password byte [1]
TXBUF[4]	Password byte [2]
TXBUF[5]	Password byte [3]

Get.response	
RXBUF[1]	4

7.2.3 Set Tag Protection command

The **Set Tag Protection** command defines the password protection for the tag via a Get command. For this it has to be specified whether a write protection or a read protection should be set and the area of the tag to which the password applies. Protection for all areas is defined with one command.

Write protection is always also contained in a read protection. The tags consist of 8 pages (EM4233-SLIC chip) or 20 pages (NXP-ICODE-SLIX2 chip). One page consists of 4 blocks of 4 bytes each.

EM4233-SLIC		
Page	**Block**	**Status bit**
0	0…3	0…15
1	4…7	16…31
2	8…11	32…47
3	12…15	48…63
4	16…19	64…79
5	20…23	80…95
6	24…27	96…111
7	28…31	112…127

NXP ICODE SLIX2		
Page	**Block**	**Status bit**
0	0…3	0…15
1	4…7	16…31
2	8…11	32…47
3	12…15	48…63
4	16…19	64…79
5	20…23	80…95
6	24…27	96…111
7	28…31	112…127
8	32…35	128…143
9	36…39	144…159
10	40…43	160…175
11	44…47	176…191
12	48…51	192…207
13	52…55	208…223
14	56…59	224…239
15	60…63	240…255
16	64…67	256…271
17	68…71	272…287
18	72…75	288…303
19	76…79	304…319

16 bytes can be write protected with a flag. A second flag must be set in order to set additional read protection.

The flags for the password protection are described in the following tables:

EM4233-SLIC		
Page	**Block**	**Status bit**
0	Write, Bit 0	Read, Bit 0
1	Write, Bit 1	Read, Bit 1
2	Write, Bit 2	Read, Bit 2
3	Write, Bit 3	Read, Bit 3
4	Write, Bit 4	Read, Bit 4
5	Write, Bit 5	Read, Bit 5
6	Write, Bit 6	Read, Bit 6
7	Write, Bit 7	Read, Bit 7

NXP ICODE SLIX2		
Page	**Block**	**Status bit**
0	Write, Bit 0	Read, Bit 0
1	Write, Bit 1	Read, Bit 1
2	Write, Bit 2	Read, Bit 2
3	Write, Bit 3	Read, Bit 3
4	Write, Bit 4	Read, Bit 4
5	Write, Bit 5	Read, Bit 5
6	Write, Bit 6	Read, Bit 6
7	Write, Bit 7	Read, Bit 7
8	Write, Bit 8	Read, Bit 8
9	Write, Bit 9	Read, Bit 9
10	Write, Bit 10	Read, Bit 10
11	Write, Bit 11	Read, Bit 11
12	Write, Bit 12	Read, Bit 12
13	Write, Bit 13	Read, Bit 13
14	Write, Bit 14	Read, Bit 14
15	Write, Bit 15	Read, Bit 15
16	Write, Bit 16	Read, Bit 16
17	Write, Bit 17	Read, Bit 17
18	Write, Bit 18	Read, Bit 18
19	Write, Bit 19	Read, Bit 19

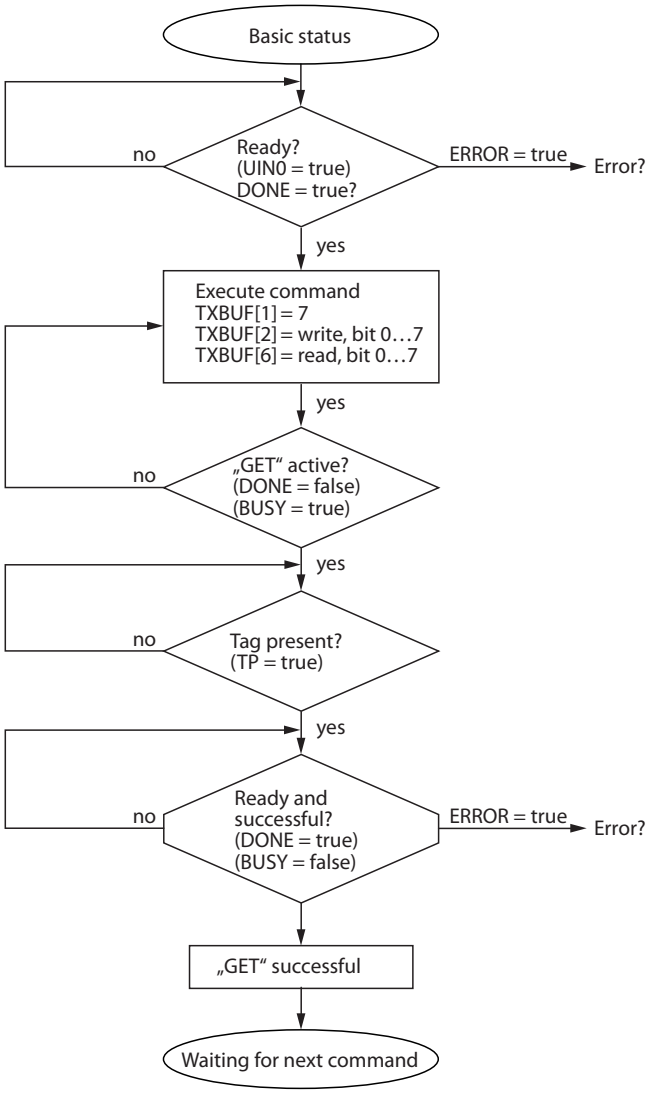

Fig. 20: Flow chart

Get.request	
TXBUF[1]	7
TXBUF[2]	EM4233-SLIC: write, Bit 0…7 NXP ICODE SLIX2: write, Bit 0…19
TXBUF[3…5]	0
TXBUF[6]	EM4233-SLIC: read, Bit 0…7 NXP ICODE SLIX2: read, Bit 0…19

Get.response	
RXBUF[1]	7

7.2.4 Get Tag Protection Status command

The **Get Tag Protection Status** command scans whether a specific area of the tag is password protected.

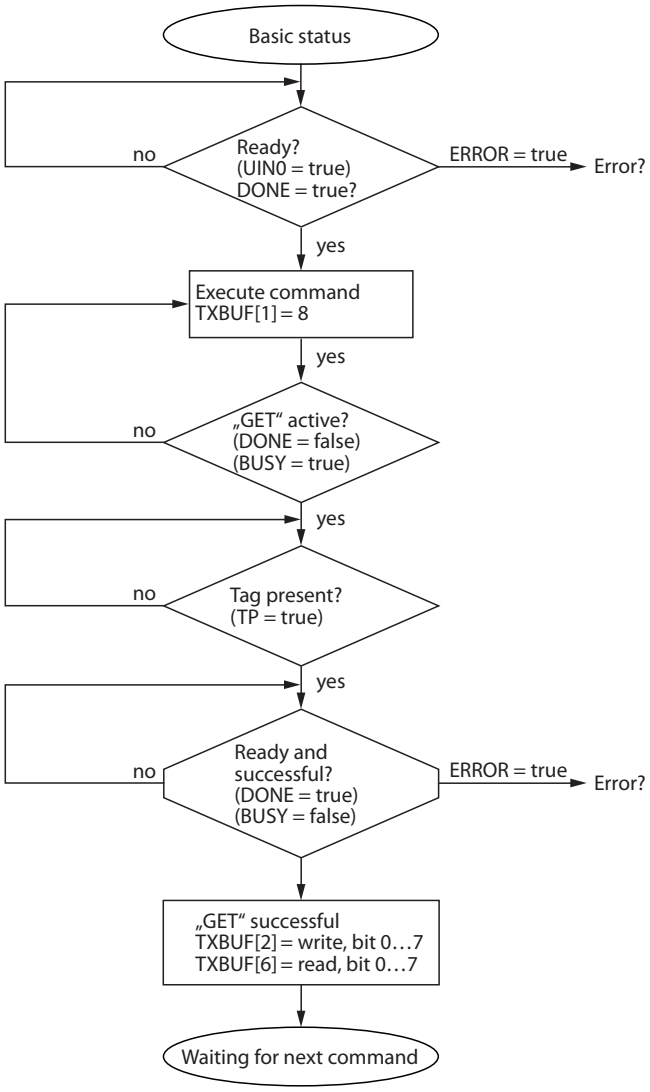

Fig. 21: Flow chart

Get.request	
TXBUF[1]	8

Get.response	
RXBUF[1]	8
RXBUF[2]	Write, Bit 0…7
RXBUF[3…5]	0
RXBUF[6]	Read, Bit 0…7

7.2.5 Resetting the password in the read/write head

The **Reset Password in the Read/Write Head** command deletes the password in the read/write head via a Get command.

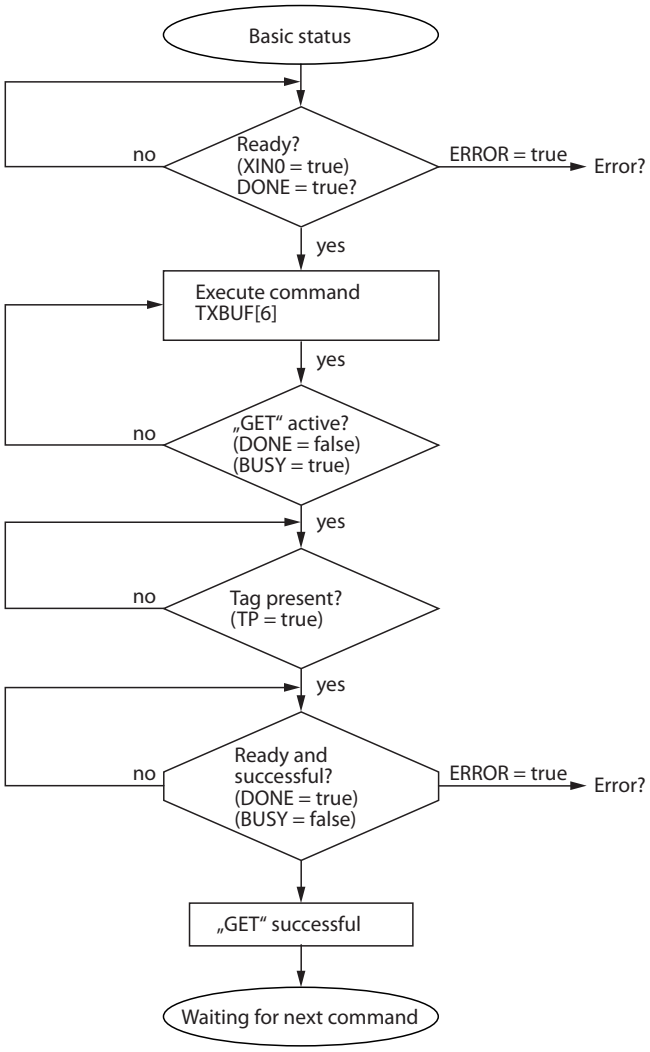

Fig. 22: Flow chart

Get.request	
TXBUF[1]	6

Get.response	
RXBUF[1]	6

7.3 BL…-2RFID-S module – overview of the commands

7.3.1 BL…-2RFID-S module – process output data

Byte no.	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
0	XCVR	NEXT	TAG_ID	Read	WRITE	TAG_INFO	XCVR _INFO	RESET
1	GET	Reserved	DOMAIN_COUNT		Reserved	BYTE_ COUNT 2	BYTE_ COUNT 1	BYTE_ COUNT 0
2	MSB	AddrHi						LSB
3	MSB	AddrLo						LSB
4	8 Bytes WRITE_DATA							
5								
6								
7								
8								
9								
10								
11								

7.3.2 Set Transceiver PWD command

The **Set Transceiver PWD** command sets a password in the read/write head via a Get command. The password is stored temporarily in the memory of the read/write head. After the power supply of the read/write head is reset, the password must be set again in the read/write head. If an incorrect password is sent, this causes a timeout (unknown error, error code E1FE8100).

The password set in the read/write head must match the tag password. Refer to the chapter “Setting the password protection for the tag” for the procedure in the application.

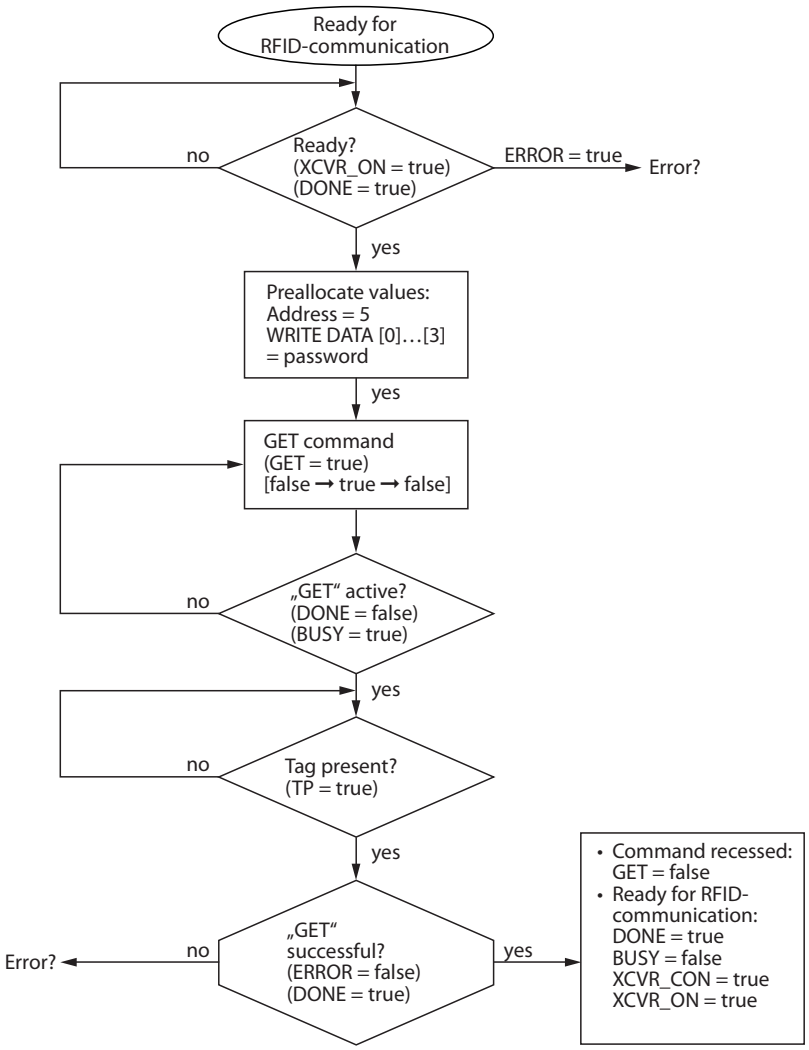

Fig. 23: Flow chart

Get.request	
TXBUF[1]	5
TXBUF[2]	Password byte [0]
TXBUF[3]	Password byte [1]
TXBUF[4]	Password byte [2]
TXBUF[5]	Password byte [3]

7.3.3 Set Tag password command

The **Set Tag PWD** command sets a password in the tag via a Get command. After the password is sent, other commands (e.g. Set_Tag_Protection) can be sent to the tag.

The password set in the read/write head must match the tag password. Refer to the chapter "Setting the password protection for the tag" for the procedure in the application.

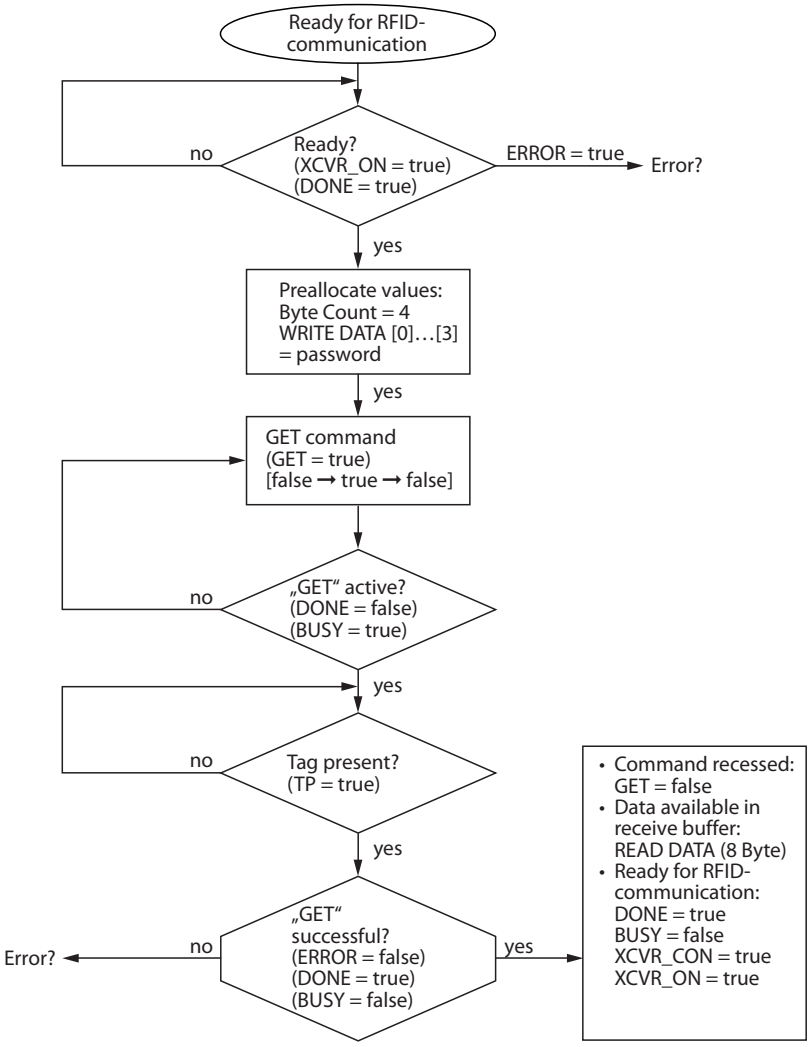

Fig. 24: Flow chart

Get.request	
TXBUF[1]	4
TXBUF[2]	Password byte [0]
TXBUF[3]	Password byte [1]
TXBUF[4]	Password byte [2]
TXBUF[5]	Password byte [3]

7.3.4 Set Tag Protection command

The **Set Tag Protection** command defines the password protection for the tag via a Get command. For this it has to be specified whether a write protection or a read protection should be set and the area of the tag to which the password applies. Protection for all areas is defined with one command.

Write protection is always also contained in a read protection. The tags consist of 8 pages (EM4233-SLIC chip) or 20 pages (NXP-ICODE-SLIX2 chip). One page consists of 4 blocks of 4 bytes each.

EM4233-SLIC		
Page	**Block**	**Status bit**
0	0…3	0…15
1	4…7	16…31
2	8…11	32…47
3	12…15	48…63
4	16…19	64…79
5	20…23	80…95
6	24…27	96…111
7	28…31	112…127

NXP ICODE SLIX2		
Page	**Block**	**Status bit**
0	0…3	0…15
1	4…7	16…31
2	8…11	32…47
3	12…15	48…63
4	16…19	64…79
5	20…23	80…95
6	24…27	96…111
7	28…31	112…127
8	32…35	128…143
9	36…39	144…159
10	40…43	160…175
11	44…47	176…191
12	48…51	192…207
13	52…55	208…223
14	56…59	224…239
15	60…63	240…255
16	64…67	256…271
17	68…71	272…287
18	72…75	288…303
19	76…79	304…319

16 bytes can be write protected with a flag. A second flag must be set in order to set additional read protection.

The flags for the password protection are described in the following tables:

EM4233-SLIC		
Page	**Block**	**Status bit**
0	Write, Bit 0	Read, Bit 0
1	Write, Bit 1	Read, Bit 1
2	Write, Bit 2	Read, Bit 2
3	Write, Bit 3	Read, Bit 3
4	Write, Bit 4	Read, Bit 4
5	Write, Bit 5	Read, Bit 5
6	Write, Bit 6	Read, Bit 6
7	Write, Bit 7	Read, Bit 7

NXP ICODE SLIX2		
Page	**Block**	**Status bit**
0	Write, Bit 0	Read, Bit 0
1	Write, Bit 1	Read, Bit 1
2	Write, Bit 2	Read, Bit 2
3	Write, Bit 3	Read, Bit 3
4	Write, Bit 4	Read, Bit 4
5	Write, Bit 5	Read, Bit 5
6	Write, Bit 6	Read, Bit 6
7	Write, Bit 7	Read, Bit 7
8	Write, Bit 8	Read, Bit 8
9	Write, Bit 9	Read, Bit 9
10	Write, Bit 10	Read, Bit 10
11	Write, Bit 11	Read, Bit 11
12	Write, Bit 12	Read, Bit 12
13	Write, Bit 13	Read, Bit 13
14	Write, Bit 14	Read, Bit 14
15	Write, Bit 15	Read, Bit 15
16	Write, Bit 16	Read, Bit 16
17	Write, Bit 17	Read, Bit 17
18	Write, Bit 18	Read, Bit 18
19	Write, Bit 19	Read, Bit 19

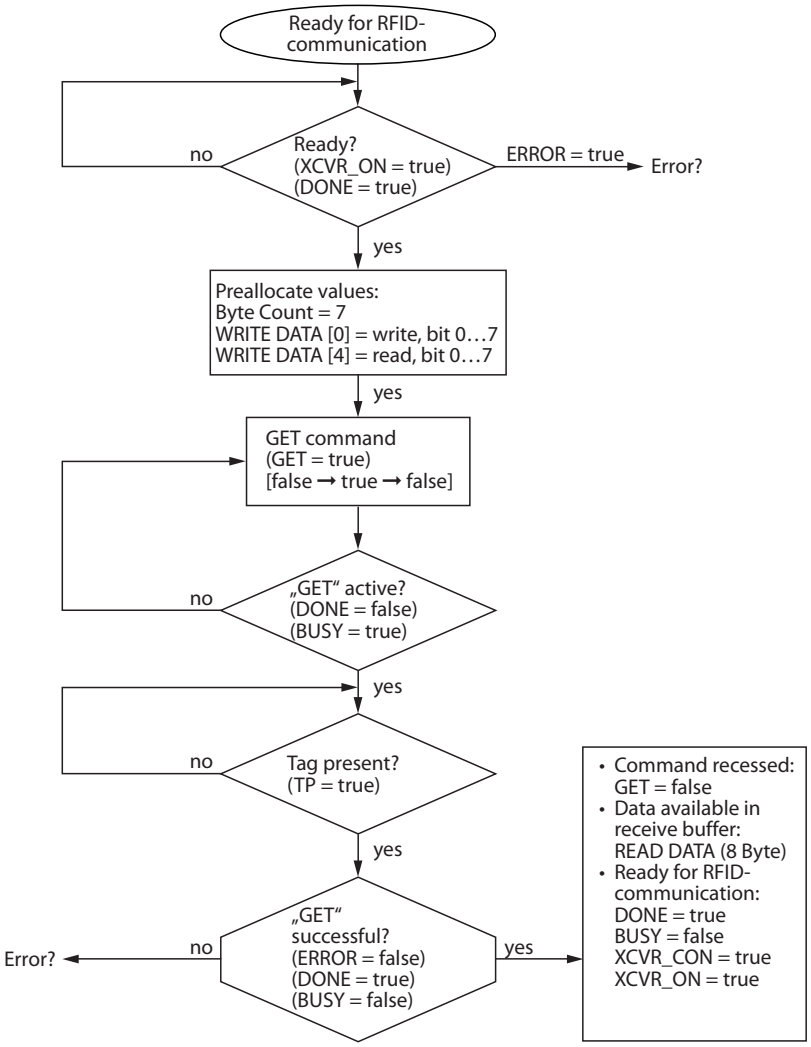

Fig. 25: Flow chart

Get.request	
TXBUF[1]	7
TXBUF[2]	EM4233-SLIC: write, Bit 0…7 NXP ICODE SLIX2: write, Bit 0…19
TXBUF[3…5]	0
TXBUF[6]	EM4233-SLIC: read, Bit 0…7 NXP ICODE SLIX2: read, Bit 0…19

7.3.5 Get Tag Protection Status command

The **Get Tag Protection Status** command scans whether a specific area of the tag is password protected.

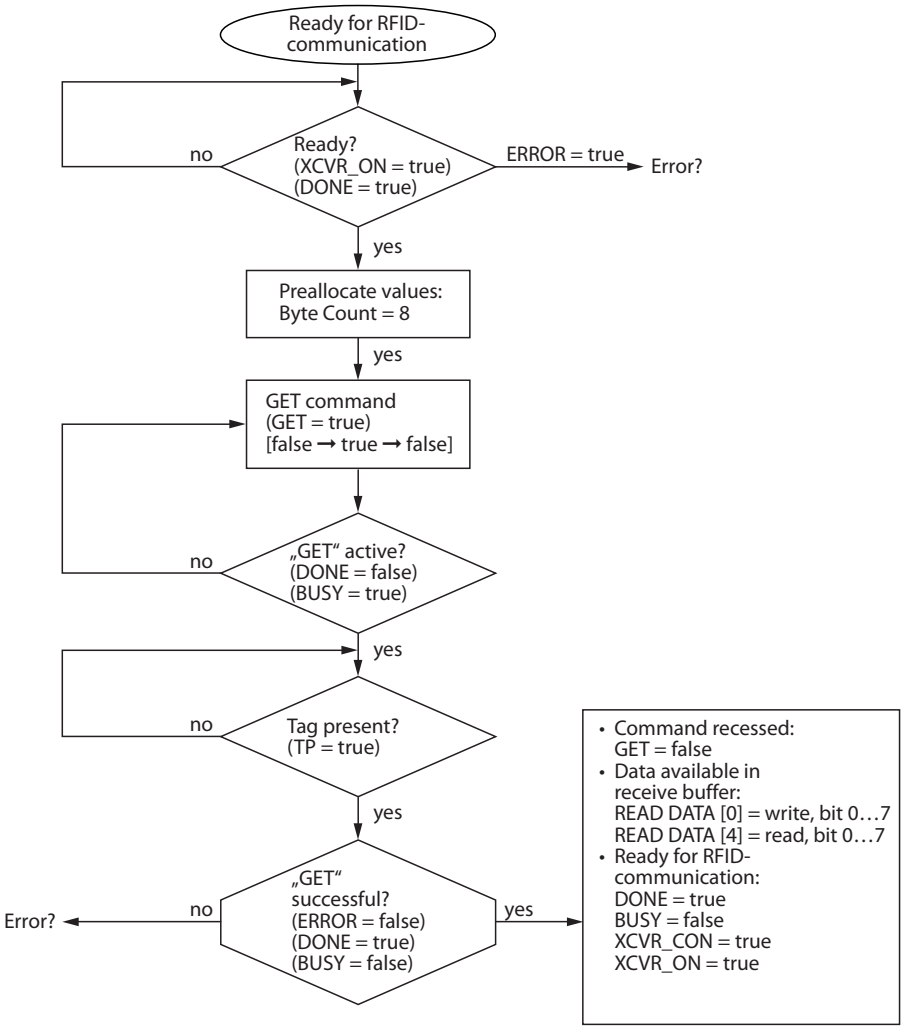

Fig. 26: Flow chart

Get.request	
TXBUF[1]	8

Get.response	
RXBUF[1]	8
RXBUF[2]	Write, Bit 0…7
RXBUF[3…5]	0
RXBUF[6]	Read, Bit 0…7

7.3.6 Resetting the password in the read/write head

The **Reset Password in the Read/Write Head** command deletes the password in the read/write head via a Get command.

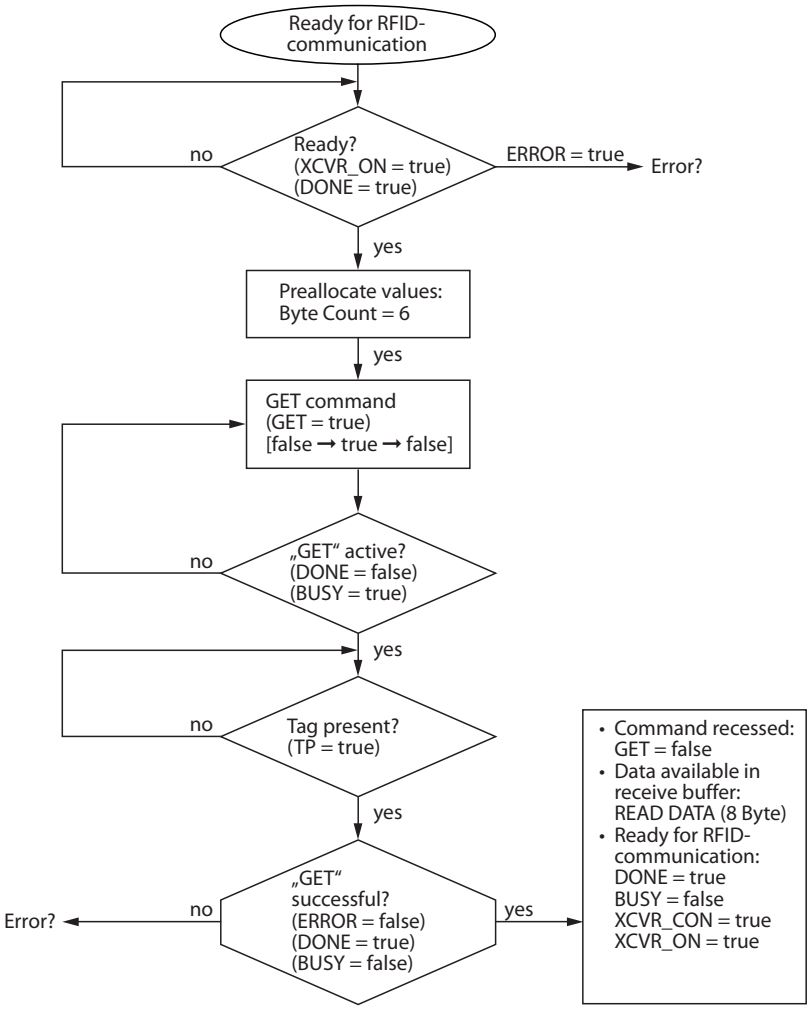

Fig. 27: Flow chart

Get.request	
TXBUF[1]	6

Get.response	
RXBUF[1]	6

7.4 Setting password protection for tags

The following flow charts describe the programming of the tags.

7.4.1 Multiple tags with the same password in an application (example)

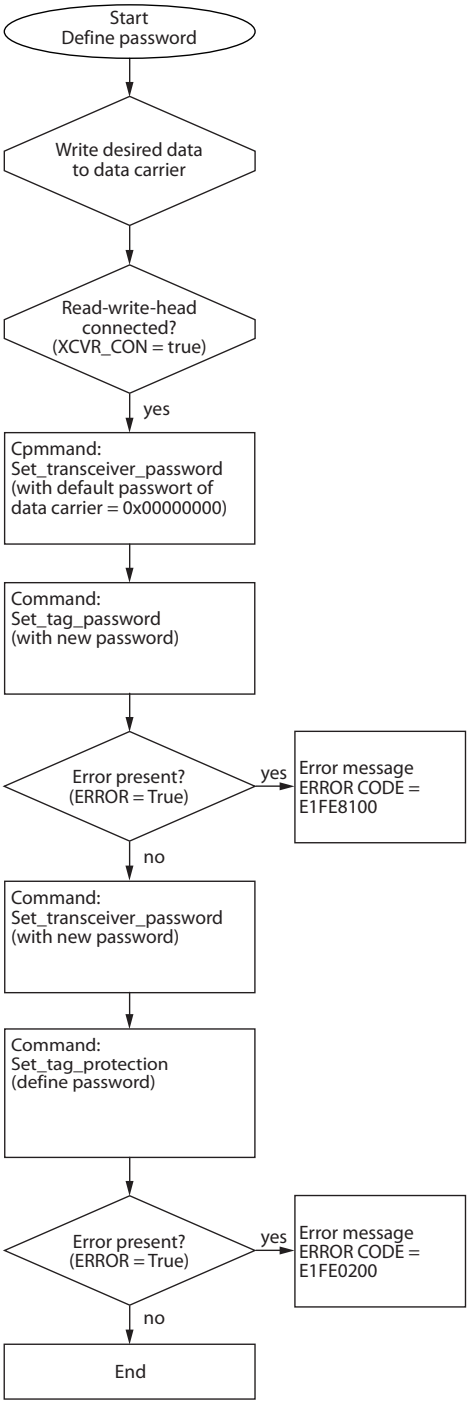

Fig. 28: Programming tags – multiple tags with one password

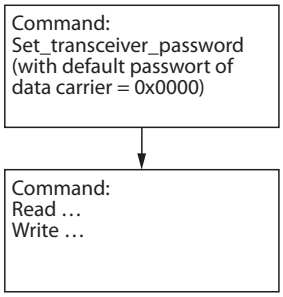

Fig. 29: Access in the application – multiple tags with one password

7.4.2 Multiple tags with different passwords in an application (example)

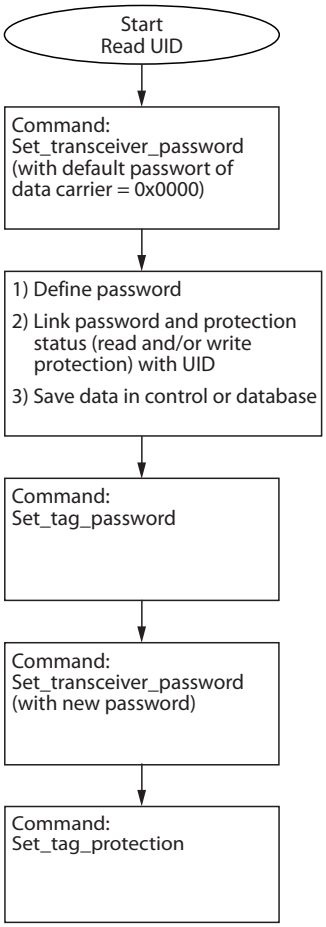

Fig. 30: Programming tags – multiple tags with different passwords

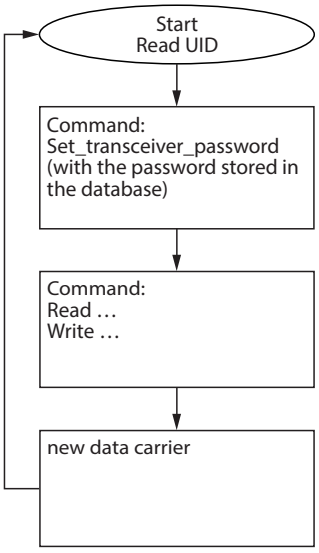

Fig. 31: Access in the application – multiple tags with different passwords

7.4.3 Setting password protection via FDT/DTM

The BL…-2RFID-S module enables the password protection to be set by a PC via the FDT/DTM.

The example uses the following components:

- FDT: PACTware with the DTM for BL67-2RFID-S
- BL67-GW-EN gateway
- BL67-2RFID-S RFID electronic module
- TN-Q80-H1147 read/write head

▶ Connect the gateway with a PC.
▶ Launch PACTware.
▶ Define a password for the tag.
▶ Start the **Simulation** function in PACTware: Right-click the RFID electronics module and select **Simulation** in the context menu.
▶ Write the user data to the tag (in the example: 8 bytes, data 1122334455667788).

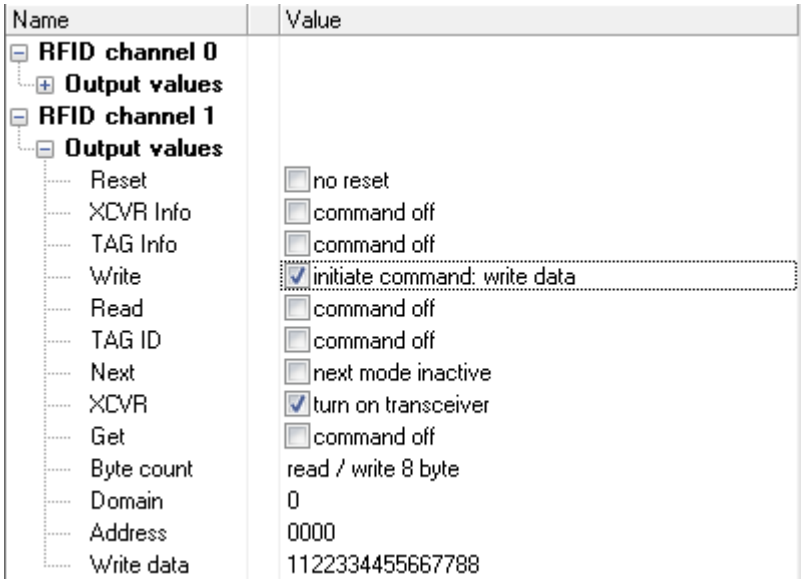

Fig. 32: Writing user data to the tag

- Set the password of the read/write head to 0 (default setting of the tag).

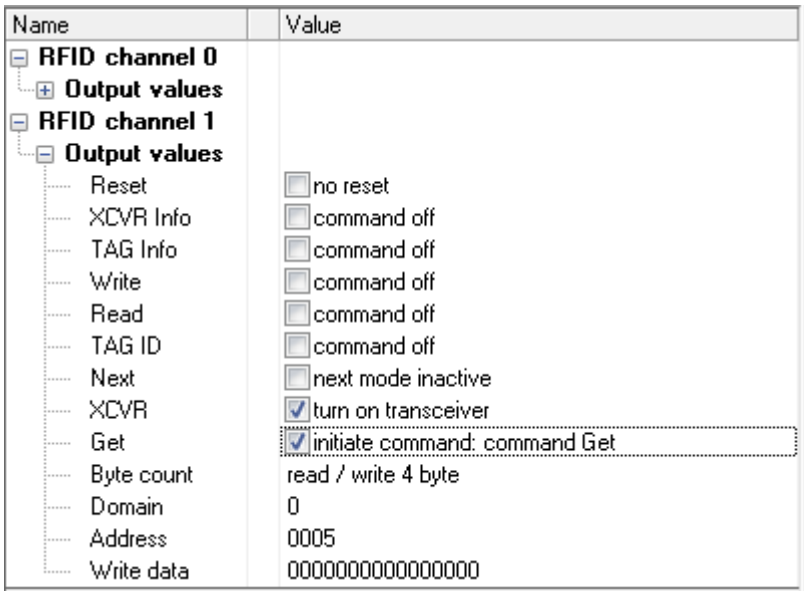

Fig. 33: Setting the password of the read/write head to 0

- Set a new password in the tag.

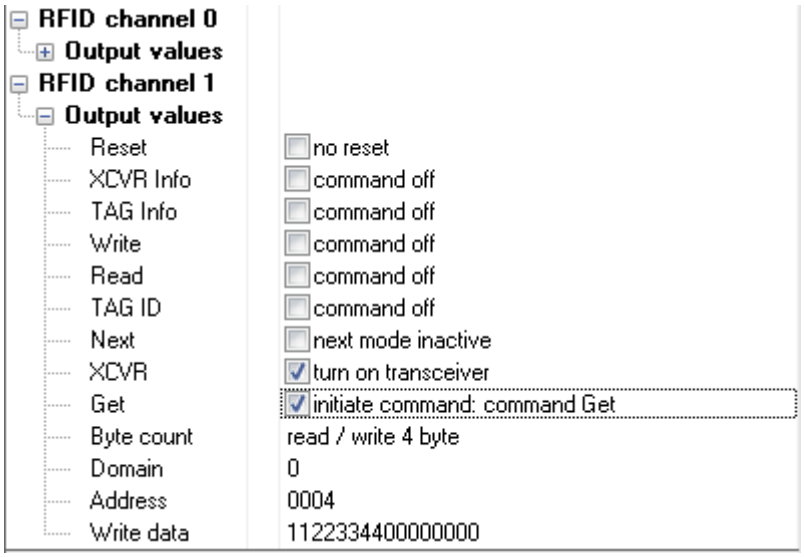

Fig. 34: Setting a new password in the tag (example: 11223344)

- Set a new password in the read/write head.

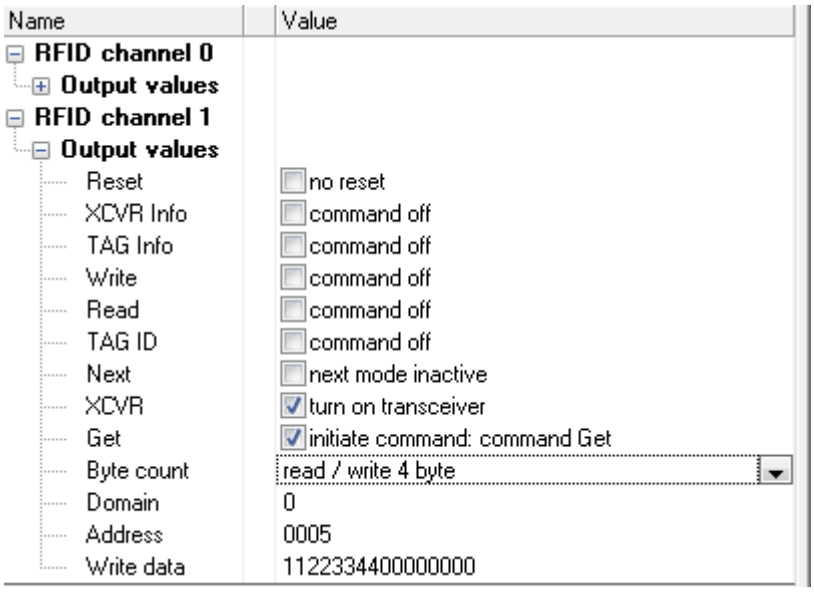

Fig. 35: Setting a new password in the read/write head (example: 11223344)

- Set write or read protection.

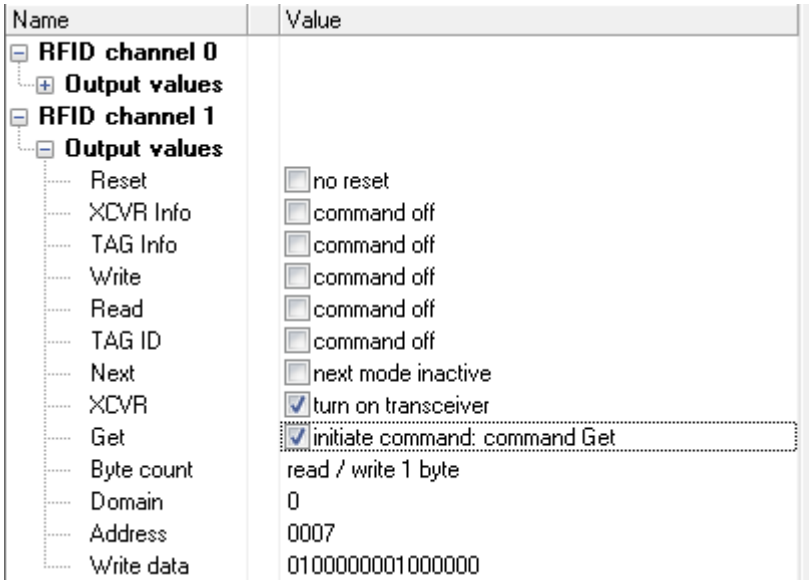

Fig. 36: Setting read/write protection

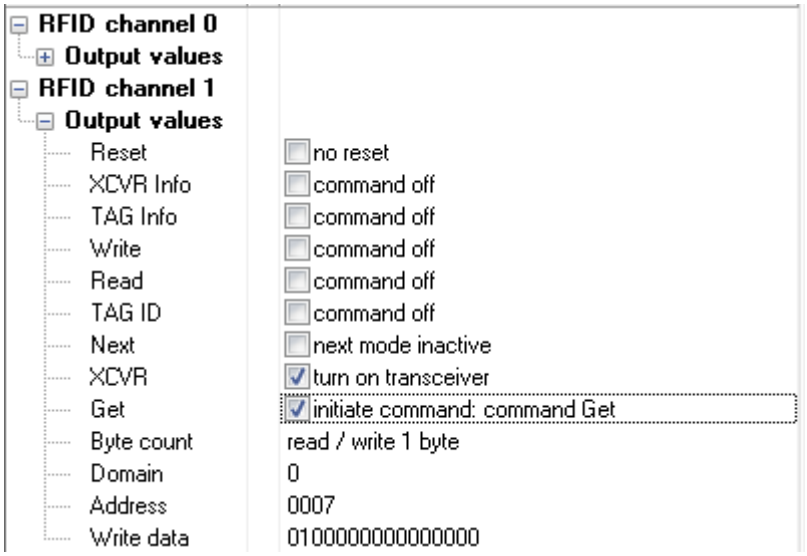

Fig. 37: Setting read protection

7.5 Addressing password protected areas of a tag

The following table shows the possible access options to the tag when password protection is set.

Action	Response of the tag	Remark
Access to read protected area without password or with incorrect password	Tag responds with **0**	The response of the tag with **0** can have two causes: Either the memory area of the tag is written with 0 or is read protected. Recommendation: in order to distinguish between a correct and an incorrect read operation, set a bit other than 0 in every page.
Access to write protected area without password or with incorrect password	Error message: E1FE0200	Error message E1FE0200 can have two causes: Either an incorrect password was sent or the tag was too short in the detection range. Remedy: Execute the **Get Tag Protection Status** command.
Inventory (scan UID)	Tag sends UID	The UID can always be read irrespective of password protection.
Access (read or write) with a password (in the read/write head) to an area not protected with a password		Access is carried out, and the **DONE** bit is set.
Access (read) with an incorrect password or without a password to a protected and unprotected area	The data from the unprotected area is displayed. The protected area is displayed as **0**.	
Access (write) to a protected and an unprotected area	Error message E1FE0200, data not written.	The protected area on the tag is in front of the unprotected area.
	The unprotected area is written, followed by error message E1FE0200.	The unprotected area on the tag is in front of the protected area.
Tag present at read/write head		The **TP** bit (Tag present) is set irrespective of password protection.

8 Troubleshooting

If the device does not function as expected, first check whether ambient interference is present. If there is no ambient interference present, check the connections of the device for faults.

If there are no faults, there is a device malfunction. In this case, decommission the device and replace it with a new device of the same type.

9 Maintenance

The devices are maintenance-free, clean dry if required.

10 Repair

The device must not be repaired by the user. The device must be decommissioned if it is faulty. Observe our return acceptance conditions when returning the device to Turck.

10.1 Returning devices

Returns to Turck can only be accepted if the device has been equipped with a Decontamination declaration enclosed. The decontamination declaration can be downloaded from
https://www.turck.de/en/retoure-service-6079.php
and must be completely filled in, and affixed securely and weather-proof to the outside of the packaging.

11 Disposal

The devices must be disposed of correctly and must not be included in general household garbage.

12 Technical Data

12.1 Technical data – TW-R…-M-B146

Technical data	TW-R10-M-B146	TW-R12-M-B146
ID	7030545	7030500
Data transmission	Inductive coupling	
Operating frequency	13.56 MHz	
Memory type	EEPROM	
Chip type	EM4233SLIC	
Memory size	146 bytes	
Memory	Read/write	
Freely usable memory	128 bytes	
Number of read operations	Unlimited	
Number of write operations	10^5	
Typical read time	2 ms/byte	
Typical write time	3 ms/byte	
Wireless communication and protocol standards	ISO 15693 NFC Type 5	

12.2 Technical data – TW-…-B320

Technical data	IN TAG 300 SLIX2	TW-L36-18-F-B320-4KPCS	TW-L36-18-F-B320-100PCS	TW-R4-3-M-B320
ID	100002356	100003272	100025059	100013771
Data transmission	Inductive coupling			
Operating frequency	13.56 MHz			
Memory type	EEPROM			
Chip type	NXP ICODE SLIX2			
Memory size	320 bytes			
Memory	Read/write			
Freely usable memory	316 bytes			
Number of read operations	Unlimited			
Number of write operations	10^5			
Typical read time	2 ms/byte			
Typical write time	3 ms/byte			
Wireless communication and protocol standards	ISO 15693 NFC Type 5			

Technical data	TW-R20-B320	TW-R30-B320	TW-R34-M-B320	TW-R50-B320
ID	100005244	100005245	100005036	100005246
Data transmission	Inductive coupling			
Operating frequency	13.56 MHz			
Memory type	EEPROM			
Chip type	NXP I-Code SLIX2			
Memory size	320 bytes			
Memory	Read/write			
Freely usable memory	316 bytes			
Number of read operations	Unlimited			
Number of write operations	10^5			
Typical read time	2 ms/byte			
Typical write time	3 ms/byte			
Wireless communication and protocol standards	ISO 15693 NFC Type 5			

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