Your Global Automation Partner

TURCK

TN...-IOL2...
HF Read/Write Heads

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
- IO-Link parameters manual
- Commissioning manual IO-Link devices
- Configuration manual
- Declarations of conformity

1.4 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 HF read/write heads:

- TN-M18-IOL2-H1141
- TN-M30-IOL2-H1141
- TN-Q40-IOL2-H1141

2.2 Scope of delivery

The scope of delivery includes:

- HF read/write head
- 2 fixing nuts (with threaded barrel devices)
- Quick Start Guide

2.3 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. [▷ 37].

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

Read/write heads work on a frequency of 13.56 MHz and are used as a means of contactless data exchange with tags within the HF RFID system. It is only possible to connect to and operate the devices via IO-Link masters corresponding to specification V1.1.

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 meets the EMC requirements for industrial areas. When used in residential areas, take measures to avoid radio interference.

4 Product description

The TN-M…-IOL2-H1141 cylindrical read/write heads are provided with a metal housing with an M18 or M30 male thread. The TN-Q40-IOL2-H1141 rectangular read/write heads are provided with a plastic housing.

The devices can be set and operated via an IO-Link interface. All devices are provided with a metal-bodied M12 male connector (plug) for connecting the cable.

4.1 Device overview

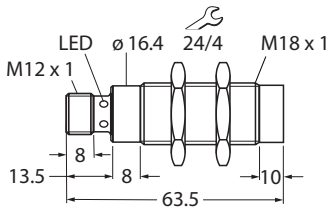


Fig. 1: TN-M18-…

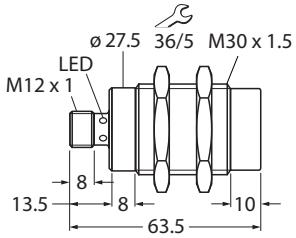
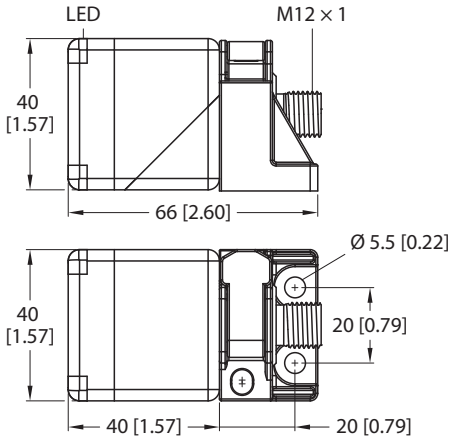


Fig. 2: TN-M30-…



mm [Inch]

Fig. 3: TN-Q40…

4.2 Properties and features

- Process value in 32-byte IO-Link telegram
- Operation in SIO mode possible
- RSSI value output
- Alarm outputs, parameterizable (e.g. for RSSI threshold value)
- Password function for accessing the tag (separate hardware must be used to activate the password function)
- Operating hours counter
- Male connector, M12 × 1, 4-pin

4.3 Functional principle

The read/write heads are used for contactless data exchange with tags. For this the controller sends commands and data via the interface to the read/write head and receives the corresponding response data from the read/write head. The reading of the UIDs of all RFID tags in the read area or the writing of an RFID tag with a specific production date are examples of typical commands. To communicate with the tag, the data is coded by the read/write head and transferred via an electromagnetic field, which at the same time supplies the tags with power.

A read/write head contains a transmitter and a receiver, an interface to the interface module and a coupling element (coil antenna) for communicating with the tag. Inductive coupling is used for the transmission between read/write head and tag on devices for the HF range.

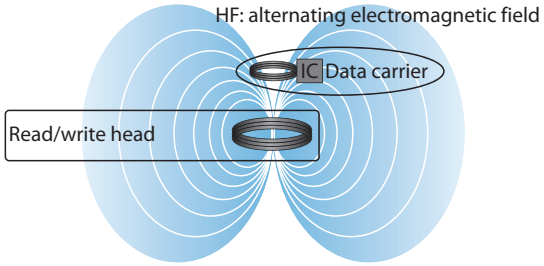


Fig. 4: Operating principle of HF-RFID

The coupling element of the read/write head generates an electromagnetic AC field. This produces a transmission window as a so-called air interface in which the data exchange with the tag takes place. The size of the transmission window depends on the combination of read/write heads and tags.

Each Turck read/write head can communicate with a number of Turck tags. This requires the read/write head and the tag to operate in the same frequency range. Depending on the power and frequency used, the device ranges vary from a few millimeters up to several meters. The specified maximum read/write distances only represent typical values under laboratory conditions without allowing for the effect of materials. The achievable distances may vary due to component tolerances, the mounting situation in the application, ambient conditions and the effect of materials (particularly metal and liquids).

4.4 Functions and operating modes

The devices enable passive HF tags to be read or written in single and multitag operation. For this the devices form a transmission zone that varies in size and range according to the tags used and the operating conditions of the application. Refer to the data sheets for the applicable maximum read/write distances.

The read/write heads are only suitable for use in static operation or in slow moving applications.

The devices can be operated in IO-Link mode or in standard I/O mode (SIO mode). IO-Link mode provides bidirectional IO-Link communication between an IO-Link master and the read/write heads. For this the devices are integrated in the controller level via an IO-Link master. The data to be read or written is made available with the process data via the IO-Link interface. Besides the read data, diagnostics and identification messages can also be queried via IO-Link.

Different device functions can be configured via the IO-Link interface.

The presence of tags can be queried in SIO mode. The data on the tags can also be compared with a data record stored in the read/write head.

4.4.1 IO-Link mode

The devices must be connected to an IO-Link master for operation in IO-Link mode. If the port is configured in IOL mode, bidirectional IO-Link communication is provided between the IO-Link master and the device. For this the device is integrated in the controller level via an IO-Link master. The communication parameters are exchanged first of all; the cyclic data exchange of the process data (process data objects) then starts.

4.4.2 SIO mode (standard I/O mode)

In standard I/O mode no IO-Link communication takes place between the device and the master. The device only transfers the switching state of its binary outputs and can also be run via a fieldbus device or controller with digital PNP or NPN inputs. An IO-Link master is not required for operation.

The device parameters can be set via IO-Link and then operated at the digital inputs with the appropriate settings in SIO mode. Not all functions and properties of the device can be used in SIO mode.

4.4.3 RSSI value output

The RSSI value denotes the signal strength of the response from the tag to the read/write head. The RSSI value is not output as a physical value but as a value on a scale from 0…7. The RSSI value does not have a linear characteristic in relation to the read/write distance.

An RSSI value can be set via IO-Link as a limit value (e.g. for alarm functions).

The RSSI value depends on the following factors:

- Distance between read/write head and tag: The shorter the distance between read/write head and tag, the greater the RSSI value.
- Dimensions of the tag: The larger the tag, the greater the RSSI value.
- Effect of metal: Metal has an effect on the electromagnetic field of the read/write head and thus the RSSI value.
- Tolerances: A tolerance of up to 30 % must be calculated for the achievable range of the tags. The 30 % tolerance also applies to the RSSI value.

4.4.4 Password function

The password function enables the memory areas of the tags with the following chip types to be protected from write or read access:

- NXP ICODE SLIX2
- EM4233SLIC

A password for the tags cannot be defined with the IO-Link read/write heads. The tags must be provided with a password via the standard HF read/write head with a TBEN interface. Alternatively, Turck offers preconfigured tags with a password on request.

4.5 Technical accessories

Accessories for mounting, connecting and parameterizing can be found in product database under **www.turck.com**. The accessories are not part of the scope of delivery.

5 Installing

5.1 Installing cylindrical devices

The maximum tightening torque of the housing nut is 25 Nm (M18 design) and 70 Nm (M30 design).

- Install the device with the appropriate fixing accessories so that the front cap of the devices fully protrudes from the surrounding area.
- Observe the minimum distances between read/write heads.

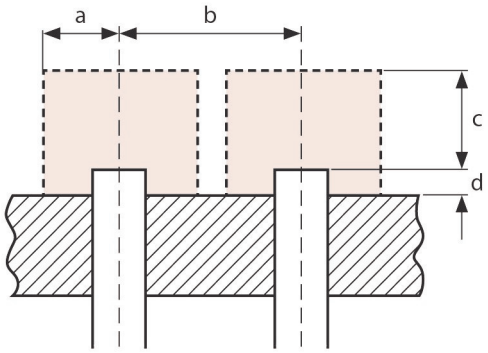


Fig. 5: Mounting distances

	a	b	c	d
M18	30 mm	54 mm	60 mm	10 mm
M30	45 mm	90 mm	90 mm	10 mm

- Avoid metal in the proximity of the read/write head. Metal rails or similar objects must not intersect the transmission zone.
- Protect the device from heat radiation, rapid temperature fluctuations, severe contamination, electrostatic charge and mechanical damage.

5.2 Installing rectangular devices

- Install the device with the appropriate fixing accessories so that the front cap of the devices fully protrudes from the surrounding area.
- Observe the minimum distances between read/write heads.

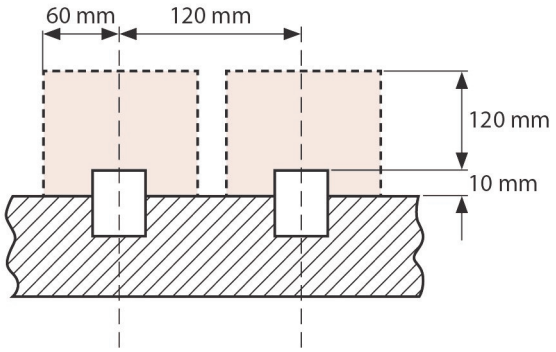


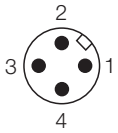
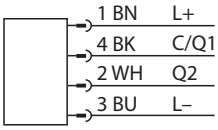
Fig. 6: Mounting distances

- Avoid metal in the proximity of the read/write head. Metal rails or similar objects must not intersect the transmission zone.
- Protect the device from heat radiation, rapid temperature fluctuations, severe contamination, electrostatic charge and mechanical damage.

6 Connection

- Connect the open end of the connection cable (e.g. RKC4.4T-2/TXL, ID 6625503) to an IO-Link master.
- Connect the female connector of the connection cable to the male connector at the back end of the device.

6.1 Wiring diagram

Pin assignment	Wiring diagram	Description
		1 BN L+ 24 VDC 2 WH Q2 SIO 3 BU L- 0 V 4 BK C/Q1 IO-Link/SIO

7 Commissioning

After connecting and switching on the power supply, the device is automatically ready for operation.

When the device is connected to an IO-Link master, IO-Link communication will start automatically. To do this, the IO-Link master sends a wake-up request to the device.

7.1 Initiating IO-Link mode

- ▶ Set the cycle time on the IO-Link master.
- ⇨ The device is ready for operation.

7.2 Initiating SIO mode

- ▶ Connect the device to a standard I/O port.
- ⇨ The device is ready for operation.

In SIO mode, the functions relating to **data synchronization** and **tag presence** are available. For more information on setting up the functions, refer to the IO-Link parameters manual.

8 Setting and parameterization

8.1 Settable functions and features

The following functions and properties can be set via the IO-Link interface:

- Operating mode for SIO mode:
  - Querying the presence of tags (**Tag presence**)
  - Comparing tags (**Data update**)
  - Alarm output
- Output configuration Q1 and Q2: NC contact or NO contact
- RSSI limit value for alarm outputs and setting the optimum detection range
- Type of the alarm outputs: time-triggered or RSSI-triggered
- Password

More information on setting the device via IO-Link is provided in the IO-Link parameter manual.

8.2 Setting with IO-Link function block

The read/write heads can be set and configured via IO-Link function blocks. The function blocks for the CODESYS V3 and Siemens TIA V14 programming environments are available as free downloads from www.turck.com.

Further information on programming the function blocks is provided in the description of the process data.

Function block for CODESYS V3

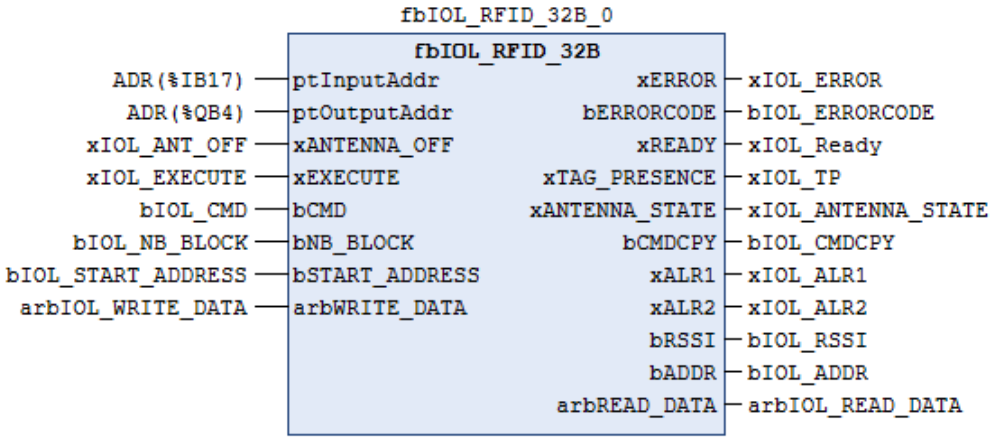


Fig. 7: Function block for CODESYS V3

Function block for TIA-Portal V14

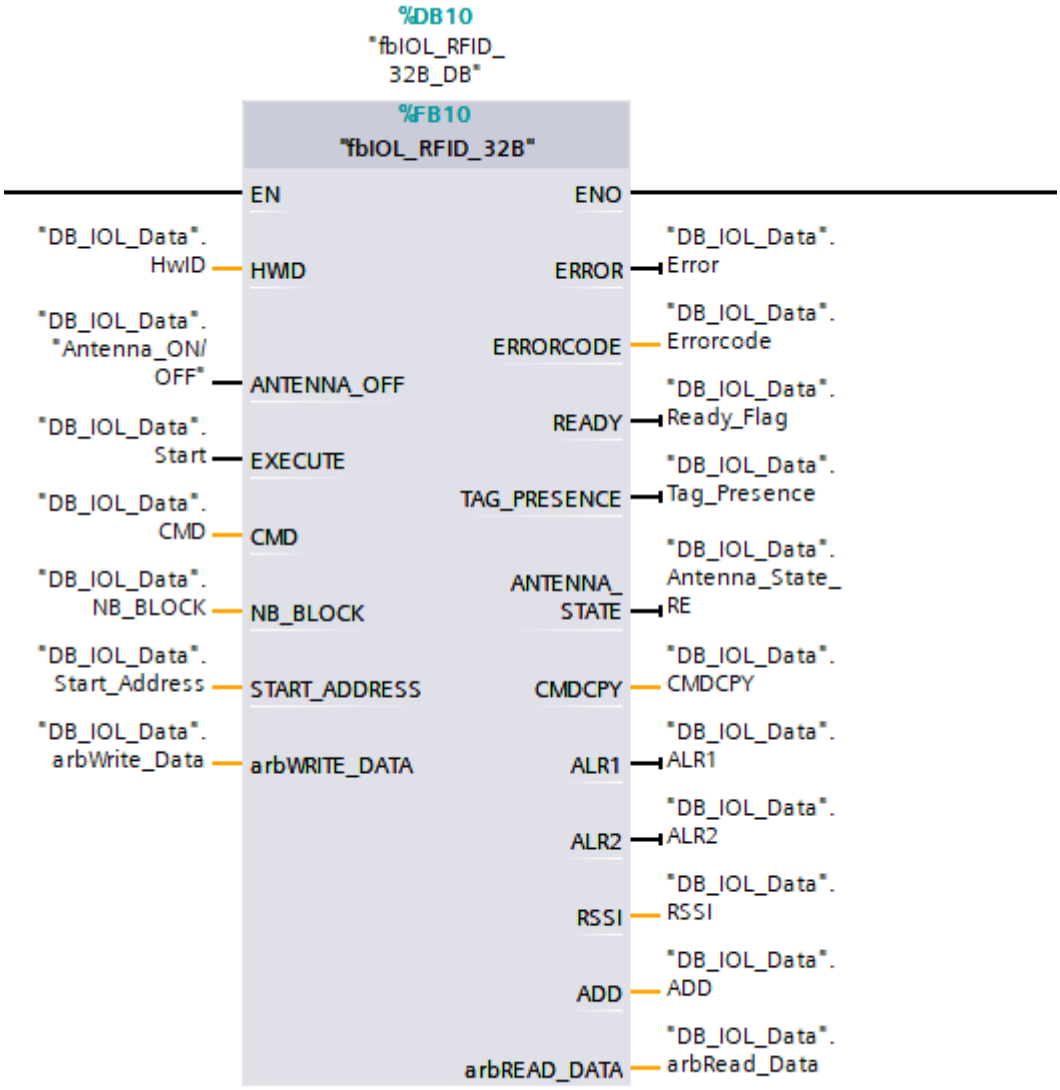


Fig. 8: Function block for TIA-Portal V14

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8.3 IO-Link mode – process data

8.3.1 IO-Link mode – process input data

Byte no.	Bit							
	7	6	5	4	3	2	1	0
0	RDY	Error	Tag	ANT	CMDCPY			
1	Error code						ALR1	ALR2
2	RSSI							
3	ADD							
4…31	DATA 0…27 or UID7…0, STTI7…0, TIRT7…0							

Meaning of the status bits

Designation	Meaning
Ready Flag RDY	1 → 0 or 0 → 1: Command executed, new data available 0 or 1: No new data available
Error	0: Command executed error-free 1: Command executed with error
Tag	0: No tag within the detection range 1: Tag present at read/write head
Antenna State ANT	0: RF field switched off 1: RF field switched on
Error code	See list of error codes
ALR2	0: Alarm 2 off 1: Alarm 2 on
ALR1	0: Alarm 1 off 1: Alarm 1 on
ADD	Address of the first memory block on the tag on which a command was executed
DATA 0…27	Read data (LSB…MSB) The read data is shown in bytes. Observe the block size of the tag used when evaluating the read data: ■ EEPROM: 4 bytes per block ■ FRAM: 8 bytes per block
UID7…0	UID of the tag (MSB…LSB)
STTI7…0	System time at which the data was detected
TIRT7…0	Time in which the tag is located in the detection range

8.3.2 IO-Link mode – process output data

Byte no.	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
0	START	Reserved		N_ANT	CMD			
1	Reserved					NB BLOCK		
2	Reserved							
3	ADD							
4…31	DATA 0…27							

Meaning of the command bits

Designation	Meaning
START	1 → 0 or 0 → 1: Execute command. The START bit switches status automatically with the **auto read** and **auto write** commands. 0 or 1: Idle
Antenna state N_ANT	0: Switch on RF field 1: Switch off RF field
CMD	0: No command 1: Automatic read 2: Automatic write 3: Read 4: Write 5: Display UID and time stamp
NB BLOCK	Number of memory blocks to be read or written ■ EEPROM: max. 7 memory blocks ■ FRAM: max. 3 memory blocks
ADD	Address of the first memory block on the tag on which a command is to be executed
DATA 0…27	Write data (LSB…MSB) The write data is shown in bytes. Observe the block size of the tag used when specifying the write data: ■ EEPROM: 4 bytes per block ■ FRAM: 8 bytes per block The device does not output an error message if more than 28 bytes of write data are specified.

8.3.3 Process data – error codes

Error code (dec.)	Error code (hex.)	Name	Description
1	0x01	CommandNotSupported	Tag error in accordance with ISO 15693 (depending on the supported command set of the used tag)
2	0x02	FormatError	
3	0x03	OptionNotSupported	
5	0x05	CommandProblem	
6	0x06	CommTagError	
15	0x0F	TagError	
16	0x10	NoMemoryBlock	
18	0x12	BlockProtected	
27	0x1B	AppLOGError	Password read/write head and tag do not match
30	0x1E	TAGCommError	Error when communicating with the tag
255	0xFF	AppGeneralError	General error

9 Operation

The following figure shows the detection range of the read/write head. The optimum detection range for the specific application can be set via IO-Link by defining an RSSI value for the specific application.

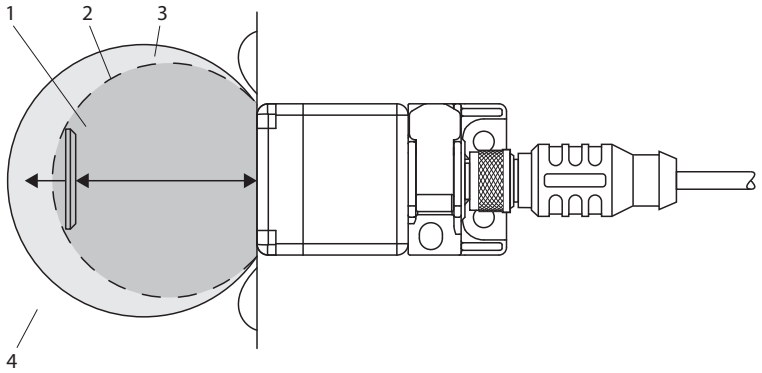


Fig. 9: Detection range of the read/write head

Position	Meaning
1	Optimum detection range (RSSI value within the set limit value)
2	RSSI limit value
3	Limit of the detection range (RSSI value outside the set limit value)
4	Tag outside the detection range

9.1 LED indication – TN-Q40…

9.1.1 LED indication – IO-Link mode

LED	Indication	Meaning
Q1/TAG	Off	No tag within the detection range
	Yellow	Tag within the optimum detection range
	Yellow flashing (5 Hz)	Tag at the limit of the detection range
Q2/BUSY	Yellow flashing (1 Hz)	Command is executed
ERROR	Red	Error detected
POWER	Green flashing (1 Hz)	IO-Link mode active

9.1.2 LED indication – SIO mode

LED	Indication	Meaning
Q1/TAG	Yellow	Output 1 active
	Yellow flashing (5 Hz)	Output 1: Tag in the **Data update** or **Tag presence** operating modes at the limit of the detection range
Q2/BUSY	Yellow	Output 2 active
	Yellow flashing (1 Hz)	Output 2: Tag in the **Data update** or **Tag presence** operating modes at the limit of the detection range
ERROR	Red	Error detected
POWER	Green	SIO mode active

9.2 LED indication – TN-M…

9.2.1 LED indication – IO-Link mode

Indication	Meaning
Green flashing (1 Hz)	IO-Link mode active
Yellow	Tag within the optimum detection range
Yellow flashing (5 Hz)	Tag at the limit of the detection range

9.2.2 LED indication – SIO mode

Indication	Meaning
Green	SIO mode active
Green flashing (5 Hz)	Output is configured for tag detection (**Tag presence**): Tag at the limit of the detection range
Yellow	Output 1 active
Yellow flashing (5 Hz)	Output is configured for the **data update**: Tag at the limit of the detection range

9.3 RFID commands – flow charts

9.3.1 Selecting an RFID command

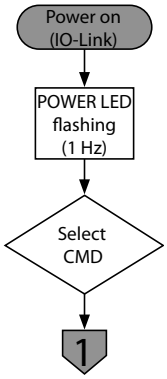


Fig. 10: Selecting an RFID command

9.3.2 Idle

The read/write head automatically executes an Inventory as soon as a tag is located in the detection range. The RSSI value of the tag in the detection range is forwarded to the controller.

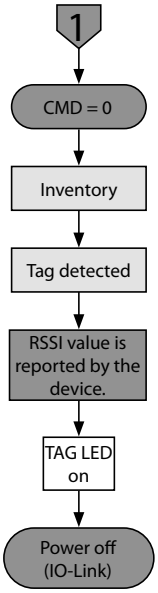


Fig. 11: Idle

9.3.3 Auto read

With an automatic read, the device automatically executes a read command as soon as the status of the start bit changes (rising or falling edge). The start bit is automatically switched if a tag enters the detection range.

28 bytes of user data can be transferred in each IO-Link cycle. The maximum number of transferable memory blocks depends on the chip type used (EEPROM or FRAM). The chip type of the tag used must be known in order to execute a write or read command. Because the chip type cannot be selected via the IO-Link parameters, 7 memory blocks can normally be selected. If a value > 3 is selected for FRAM tags, only three blocks are written or read. No error message is output.

▶ Select values for **NB Block** and **ADD** according to the following table:

Chip type	Tag (example)	Block size in the tag	Max. value NB BLOCK	Value ADD
EEPROM	TW…-B128	4 bytes	7	0…27
	TW…-B146	4 bytes	7	0…31
	TW…-B320	4 bytes	7	0…78
FRAM	TW…-K2	8 bytes	3	0…249

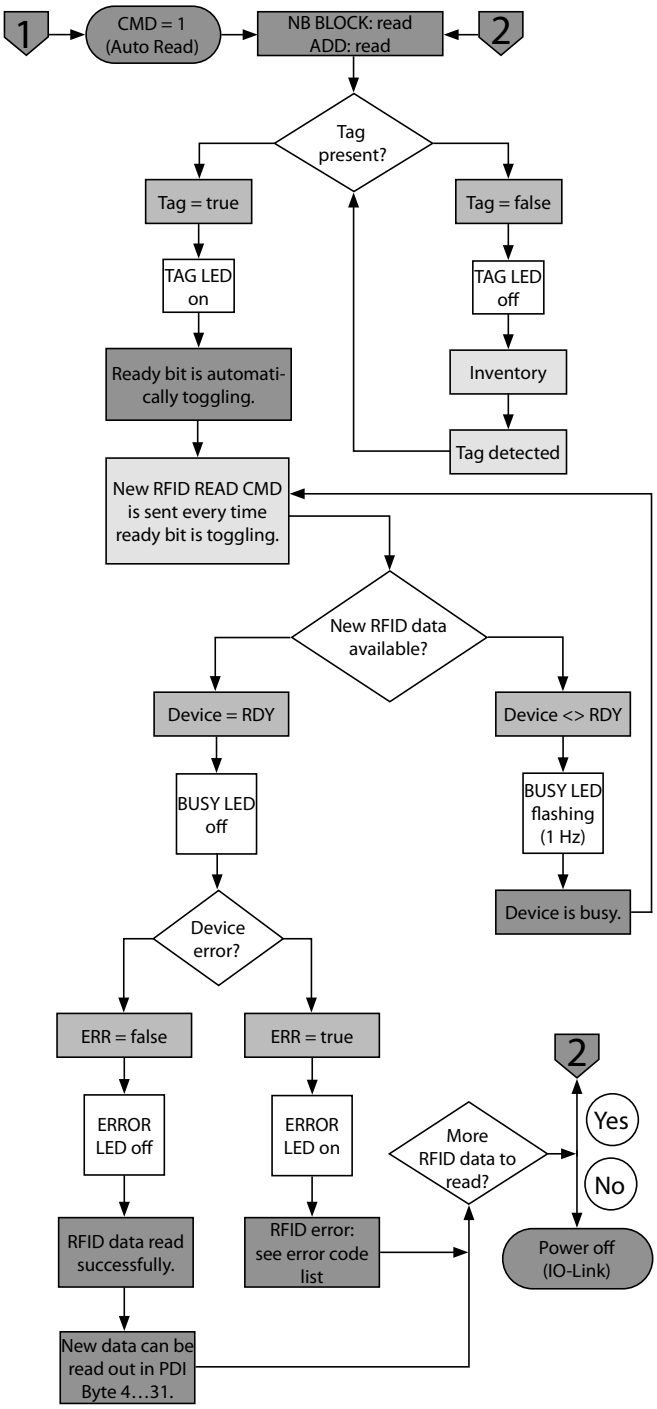


Fig. 12: Auto read

9.3.4 Auto write

With an automatic write operation, the device automatically executes a write command as soon as the status of the start bit changes (rising or falling edge). The start bit is automatically switched if a tag enters the detection range.

28 bytes of user data can be transferred in each IO-Link cycle. The maximum number of transferable memory blocks depends on the chip type used (EEPROM or FRAM). The chip type of the tag used must be known in order to execute a write or read command. Because the chip type cannot be selected via the IO-Link parameters, 7 memory blocks can normally be selected. If a value > 3 is selected for FRAM tags, only three blocks are written or read. No error message is output.

▶ Select values for **NB Block** and **ADD** according to the following table:

Chip type	Tag (example)	Block size in the tag	Max. value NB BLOCK	Value ADD
EEPROM	TW…-B128	4 bytes	7	0…27
	TW…-B146	4 bytes	7	0…31
	TW…-B320	4 bytes	7	0…78
FRAM	TW…-K2	8 bytes	3	0…249

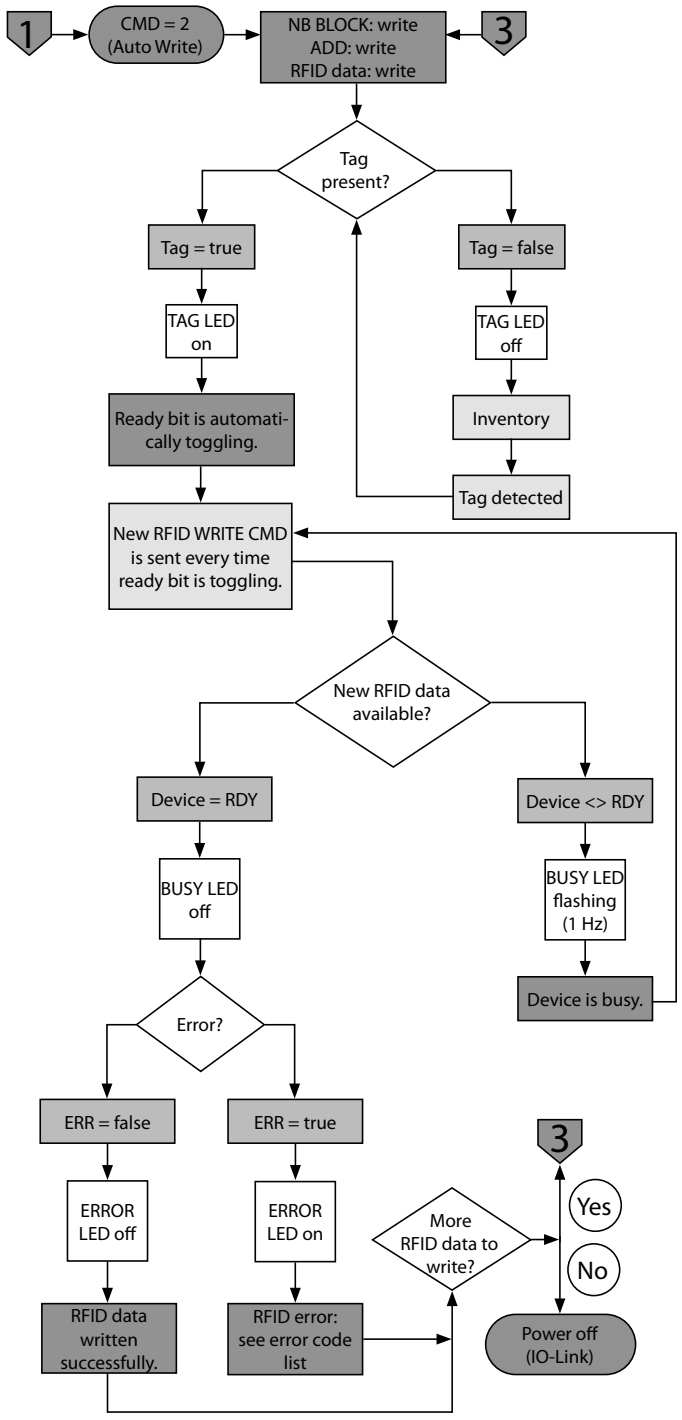


Fig. 13: Auto write

9.3.5 Read

With a read operation, the device automatically executes a read command as soon as the status of the start bit changes (rising or falling edge). The user must manually trigger the switching of the start bit.

28 bytes of user data can be transferred in each IO-Link cycle. The maximum number of transferable memory blocks depends on the chip type used (EEPROM or FRAM). The chip type of the tag used must be known in order to execute a write or read command. Because the chip type cannot be selected via the IO-Link parameters, 7 memory blocks can normally be selected. If a value > 3 is selected for FRAM tags, only three blocks are written or read. No error message is output.

- ▶ Select values for **NB Block** and **ADD** according to the following table:

Chip type	Tag (example)	Block size in the tag	Max. value NB BLOCK	Value ADD
EEPROM	TW…-B128	4 bytes	7	0…27
	TW…-B146	4 bytes	7	0…31
	TW…-B320	4 bytes	7	0…78
FRAM	TW…-K2	8 bytes	3	0…249

Proceed as follows to execute the command:

- ▶ Set rising edge at **START** bit.
- ▶ Evaluate the status of the **RDY** bit.

The **RDY** status bit behaves in the same way as the edge status of the **START** bit.

The **RDY** bit behaves as follows if during the command execution a tag is located in the detection range of the read/write head:

START	RDY	Meaning
0 → 1	0 → 1	Input data present
1 → 0	1 → 0	Input data present

The **RDY** bit behaves as follows if during the command execution no tag is located in the detection range of the read/write head:

START	RDY	Meaning
0 → 1	0	No tag within the detection range
	0 → 1	Tag was or is in the detection range, input data available
1 → 0	1	No tag within the detection range
	1 → 0	Tag was or is in the detection range, input data available

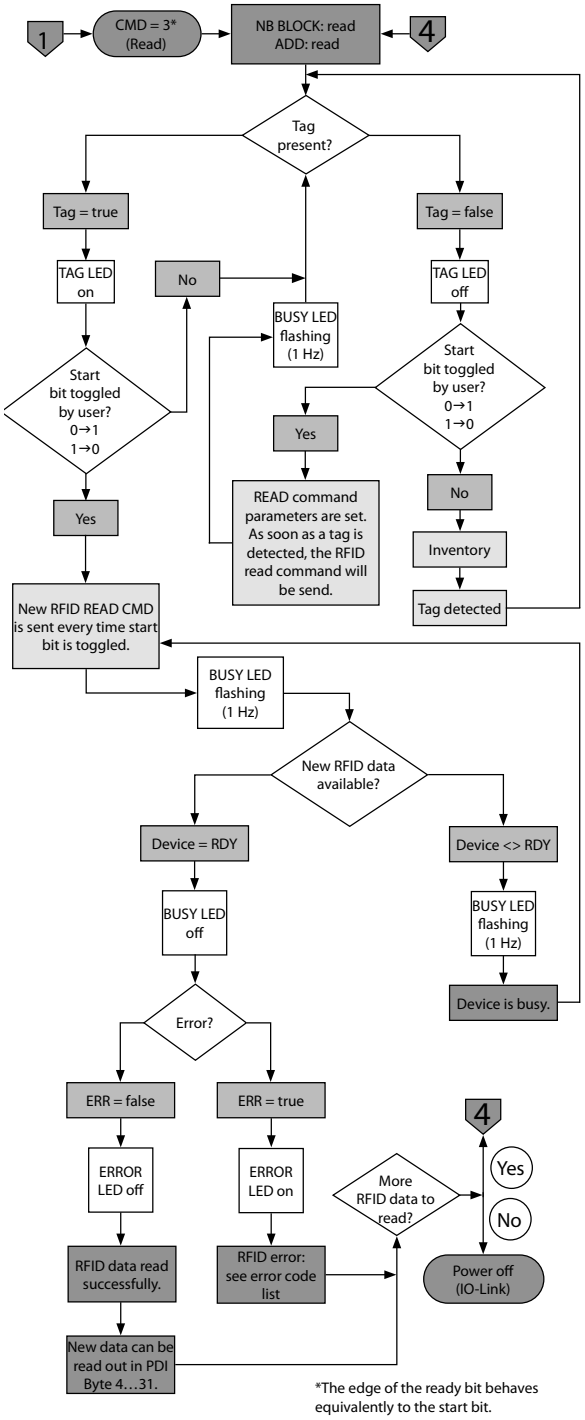

1
CMD = 3*
(Read)
NB BLOCK: read
ADD: read
4
Tag
present?
Tag = true
Tag = false
TAG LED
on
No
TAG LED
off
BUSY LED
flashing
(1 Hz)
Start
bit toggled
by user?
0→1
1→0
Yes
READ command
parameters are set.
As soon as a tag is
detected, the RFID
read command will
be send.
No
Inventory
Tag detected
New RFID READ CMD
is sent every time start
bit is toggled.
BUSY LED
flashing
(1 Hz)
New RFID data
available?
Device = RDY
Device <> RDY
BUSY LED
off
BUSY LED
flashing
(1 Hz)
Device is busy.
Error?
ERR = false
ERR = true
4
ERROR
LED off
ERROR
LED on
More
RFID data to
read?
Yes
No
RFID data read
successfully.
RFID error:
see error code
list
Power off
(IO-Link)
New data can be
read out in PDI
Byte 4…31.
*The edge of the ready bit behaves
equivalently to the start bit.

Fig. 14: Read

9.3.6 Write

With a write operation, the device automatically executes a write command as soon as the status of the start bit changes (rising or falling edge). The user must manually trigger the switching of the start bit.

28 bytes of user data can be transferred in each IO-Link cycle. The maximum number of transferable memory blocks depends on the chip type used (EEPROM or FRAM). The chip type of the tag used must be known in order to execute a write or read command. Because the chip type cannot be selected via the IO-Link parameters, 7 memory blocks can normally be selected. If a value > 3 is selected for FRAM tags, only three blocks are written or read. No error message is output.

- Select values for **NB Block** and **ADD** according to the following table:

Chip type	Tag (example)	Block size in the tag	Max. value NB BLOCK	Value ADD
EEPROM	TW…-B128	4 bytes	7	0…27
	TW…-B146	4 bytes	7	0…31
	TW…-B320	4 bytes	7	0…78
FRAM	TW…-K2	8 bytes	3	0…249

Proceed as follows to execute the command:

- Set rising edge at **START** bit.
- Evaluate the status of the **RDY** bit.

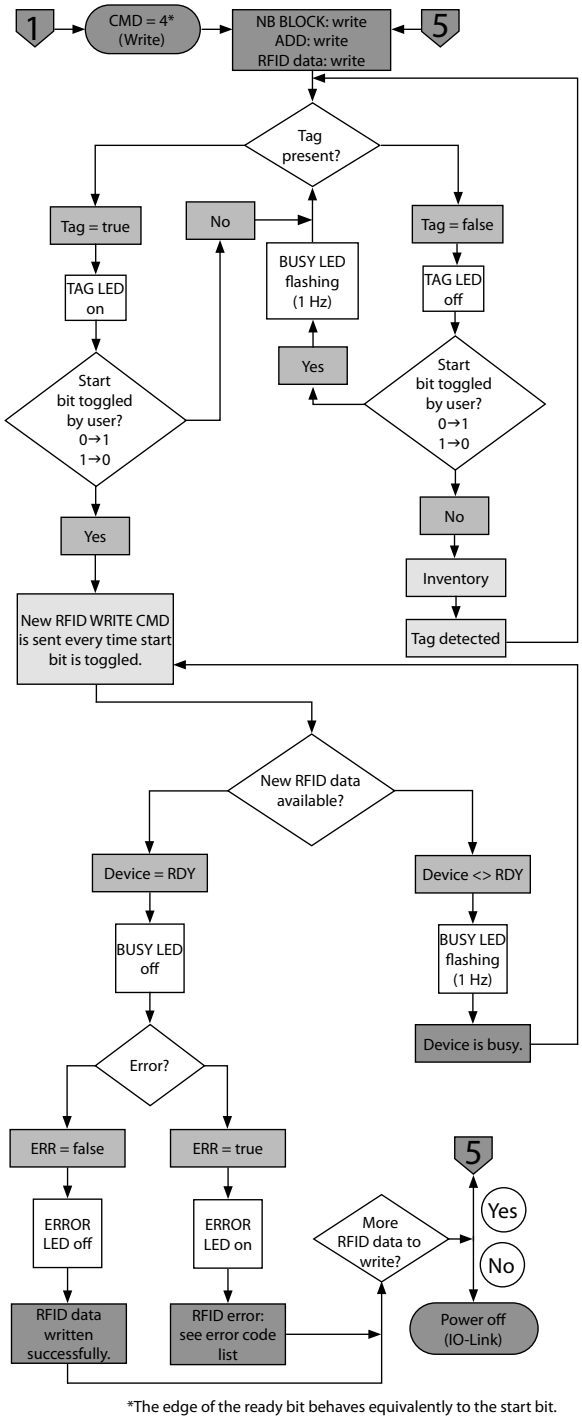
The **RDY** status bit behaves in the same way as the edge status of the **START** bit.

The **RDY** bit behaves as follows if during the command execution a tag is located in the detection range of the read/write head:

START	RDY	Meaning
0 → 1	0 → 1	Input data present
1 → 0	1 → 0	Input data present

The **RDY** bit behaves as follows if during the command execution no tag is located in the detection range of the read/write head:

START	RDY	Meaning
0 → 1	0	No tag within the detection range
	0 → 1	Tag was or is in the detection range, input data available
1 → 0	1	No tag within the detection range
	1 → 0	Tag was or is in the detection range, input data available



*The edge of the ready bit behaves equivalently to the start bit.

Fig. 15: Write

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9.3.7 Querying a UID and time stamp

The device queries the UID and the following time stamps:

- Time at which tag was detected
- Time in which the tag is located in the detection range

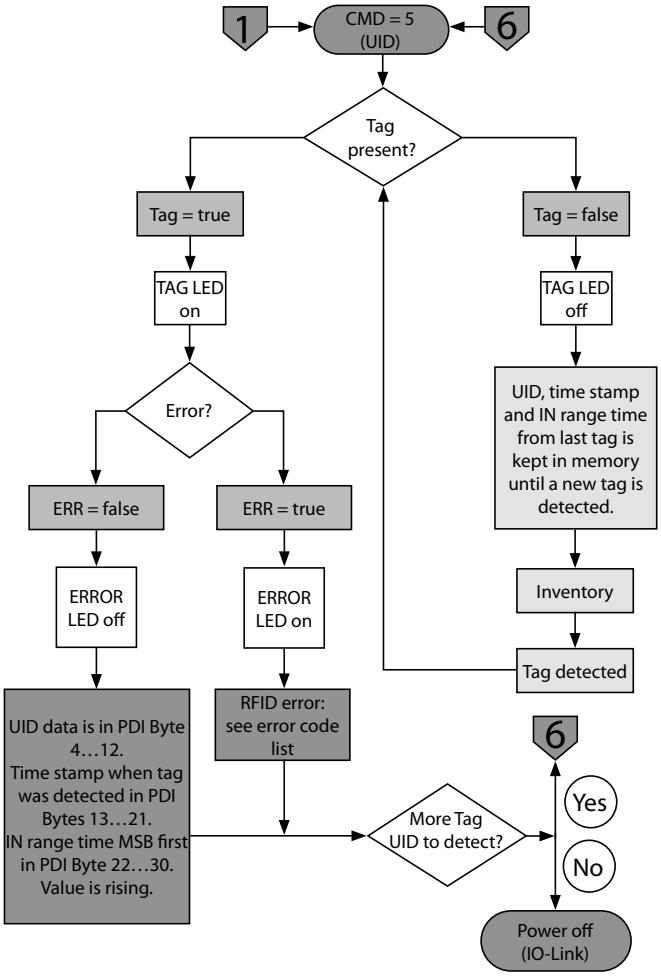

Fig. 16: Querying a UID and time stamp

9.4 Using the password function

NOTE
The IO-Link read/write head cannot set a password on a tag. In order to use the password function, the standard read/write head and a TBEN series RFID interface must store the password on the tag. Alternatively, Turck can offer preconfigured tags on request.

- Select the chip type of the tag used via the **Mode** parameter (index 0x58, subindex 0x01).
- Set the defined tag password via the **Password** parameter (index 0x58, subindex 0x02) in the read/write head: Enter the password in the reverse order to the password set via the TBEN-RFID interface. Example: The password 01020304 was written to the tag via the TBEN-RFID interface. The entry in the **Password** parameter is 04030201.

10 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.

11 Maintenance

Ensure that the plug connections and cables are always in good condition.

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

12 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.

12.1 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.

13 Disposal

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

14 Technical data

Technical data	TN-M18-IOL2-H1141	TN-M30-IOL2-H1141	TN-Q40-IOL2-H1141
ID	100012160	100012162	100012163
Electrical data			
Operating voltage	11…32 VDC		
DC rated operational current	≤ 50 mA		
Inrush current	700 mA for 1 ms		
Data transfer	Inductive coupling		
Technology	HF (13.56 MHz)		
Operating frequency	13.56 MHz		
Radio communication and protocol standards	ISO 15693 NFC Type 5		
Wire breakage / reverse polarity protection	Yes		
Output function	4-wire, read/write, IO-Link		
Mechanical data			
Installation conditions	Non-flush		
Ambient temperature	-25…+80 °C		
Design	Threaded barrel, M18 × 1	Threaded barrel, M30 × 1.5	Rectangular
Dimensions	63.5 mm		66 × 40 × 40 mm
Housing diameter	Ø 18 mm	Ø 30 mm	–
Housing material	Metal, CuZn, chrome-plated		Plastic, PBT
Material of active face	Plastic, PBT, yellow		
Vibration resistance	55 Hz (1 mm)		
Shock resistance	30 g (11 ms)		
Protection type	IP67		
Electrical connection	M12 × 1		
MTTF	756 years acc. to SN 29500 (Ed. 99) 20 °C		
Operating voltage indication	LED, green		
IO-Link			
IO-Link specification	Specified according to version 1.1		
IO-Link port type	Class A		
Parameterization	IO-Link, FDT/DTM		
Communication mode	COM 3 (230.4 kBaud)		
Process data width	256-bit		
Minimum cycle time	10 ms		
Function Pin 4	IO-Link/SIO		
Function Pin 2	SIO		
Transfer rate	230.4 kBaud		

15 Appendix: Conformity and approvals

15.1 Declaration of Conformity

Hans Turck GmbH & Co. KG hereby declares that the TN-…-IOL2-H1141 radio system types comply with Directive 2014/53/EU and the Radio Equipment Regulations 2017. The complete text of the EU declaration of conformity can be obtained from the following Internet address: **www.turck.com**

15.2 FCC information

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation. Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note:This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

15.3 IC information

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

(1) This device may not cause interference, and

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d`Industrie Canada applicables aux appareils radio exempts de licence. L`exploitation est autorisée aux deux conditions suivantes :

(1) L`appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l`appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d`en compromettre le fonctionnement.

16 Turck subsidiaries - contact information

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