IS-TR-241
User Manual Version 2.2

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Introduction

I Introduction

This manual covers the function and the configuration information of the IS-TR-241 reader.

FCC Note

FCC ID: PMF-IS-TR-241
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.

NOTE: "Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment."

"We, DTE Automation GmbH, Heidestr. 38, 32051 Herford, Germany, declare that the IS-TR-241 will be marketed with the ferrites:
- DC power cable with ferrite 18 coils, Ferrite type 7427015 (Würth Elektronik)
- RS232 cable with ferrite 5 coils, Ferrite type 7427014 (Würth Elektronik)
- Control cable with ferrite 5 coils, Ferrite type 7427014 (Würth Elektronik)

fitted to the supplied cables as indicated in the test report for this product. The product must be fitted at installation to ensure compliance with the CFR 47, Part 15, Subpart C for FCC ID: PMF-IS-TR-241. Please note that the unit does not comply with Part 15, Subpart C without these ferrites installed as indicated."

Warnings

Under no circumstances try to open the IS-TR-241. Electrical safety cannot be guaranteed if the device is opened by a non-expert. Your health and life are endangered due to high voltage in the electronics.
In case of damage do not continue to use the devices. Send back the device to your local distributor or - along with a copy of the invoice - to DTE Automation GmbH in Herford, Germany for service support.
Do not dip the device into water. Since it is only protected against water splash and rain, serious damages may occur when using or storing this device under water.
Only use original cables and spare parts with this device.

Copyright

Function

II Function

Basically, the reader works in a continuous read mode. In this mode the green LED is always on.

At power up or after restart (use the restart button) the reader can read a configuration transponder to get new settings. After reading the new configuration, the reader goes into normal operation mode.

Whenever a transponder appears, the reader reads its level and wedge information out of the transponder. If the level and wedge number is the same as stored in its configuration block the drop (relay 1) will be switched on and the red LED turns on, otherwise the no drop (relay 2) will be switched on and the yellow LED turns on.

IMPORTANT: The antenna is integrated in the center of the upper shell of the housing. The best read range is achieved, when the glass transponder points to antenna.

III Reader Configuration

At power up or after reset the reader tries to read for a fixed duration of 5 seconds the configuration page of the transponder. If there is a valid block (checksum ok), the reader stores the configuration in its non volatile memory.

There are 8 configuration bytes.

Table:

CFG0	operating mode
CFG1	lane full trigger time or read trigger time (depends on operating mode)
CFG2	lane free trigger time or read error time (depends on operating mode)
CFG3	relay 1/2 delay time
CFG4	relay 1/2 on time
CFG5	level number
CFG6	wedge number
CFG7	checksum

IV Configuration Bytes

CFG0

OPERATING_MODE

Description:

This byte specifies the operating mode of the reader:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Stand Alone	Front Key	reserved	Lane	Beep	Error		Trigger

Bit 0	
Trigger	Function
0	**ignore trigger sensor (continuous read)**
1	enable read trigger sensor (input 1)

Bit 2	Bit 1	
Error		Function
0	**0**	**no error handling**
0	1	set error output (beep) and error (relay 4) for ERR_TIME
1	0	set error output (beep) and error (relay 4), must be externally accepted by sensor (input 2) or with a short press at the front button

Bit 3	
Beep	Function
0	**no beep**
1	beep if wedge information is valid

Bit 4	
Beep	Function
0	**enable lane full sensor (input 3)**
1	ignore lane full sensor

Bit 6	
Beep	Function
0	**enable front key for read configuration transponder**
1	disable front key

Bit 7	
Beep	Function
0	**enable stand alone wedge mode**
1	disable stand alone mode

Bit 5	
reserved	Function
0	**reserved, do not use**

The default settings are in bold characters.

CFG1

LANE_FULL_TRIGGER_TIME (if lane full sensor enabled, bit 4 operating mode = 0)

Description:

This byte specifies the valid trigger time for the lane full sensor (input 3). If the senor is active for a LANE_FULL_TRIGGER_TIME period, the lane full (relay 3) will be turned on. If so, each transponder, valid or not, activates the no drop (relay 2) function. Valid values are 0 to 255. That means the lane full trigger time can range between 0 and 25.5 seconds.

TRIGGER_TIME (if trigger selected , bit 0 operating mode = 1)

Description:

This byte specifies the valid trigger time. If the trigger mode is enabled and an external trigger signal occurs (input 1) the trigger timer starts. Within the TRIGGER_TIME a wedge transponder (valid or not valid) must be read, otherwise the error output will be set as specified in the OPERATING_MODE. Valid values are 0 to 255. That means the trigger time can range between 0 and 25.5 seconds.
In trigger mode the green LED flashes if the reader starts the read cycle.

CFG2

LANE_FREE_TIME (if lane full sensor enabled, bit 4 operating mode = 0)

Description:

This byte specifies the valid trigger time where the lane full sensor must be inactive, to turn off the lane full (relay 3) function. After this, a valid transponder activates the drop (relay 1) function.
Valid values are 0 to 255. That means the err time can range between 0 and 25.5 seconds.

ERR_TIME (if trigger and err time selected)

Description:

This byte specifies the err time x 100 milliseconds for the error output signal (internal buzzer and relay 4). The output will be set if an error occurs.
Valid values are 0 to 255. That means the err time can range between 0 and 25.5 seconds.

CFG3

RELAY_DELAY_TIME

Description:

This byte specifies the relay delay time x 100 milliseconds for a wedge number.
Valid values are 0 to 255. That means the delay time can range between 0 and 25.5 seconds.
The delay time will be used for the drop (relay 1) and no drop (relay 2) function.
NOTE:
If the relay delay timer is running, no new wedge transponder will be read!

CFG4

RELAY_ON_TIME

Description:

This byte specifies the relay on time x 100 milliseconds for a wedge number after the delay time has reached. Valid values are 0 to 255. That means the relay on time can range between 0 and 25.5 seconds. If the relay on time is equal 0, the relay on function is disabled.
The relay on time will be used for the drop (relay 1) and no drop (relay 2) function.

CFG5

LEVEL_NUMBER

Description:

This byte specifies the level number of the reader. The level value can range from 0 to 128.
Level 0 means the wedge function is disabled.

CFG6

WEDGE_NUMBER

Description:

This byte specifies the wedge number of the reader. The Wedge value can range from 0 to 255.
Wedge 0 means the wedge function is disabled.

CFG7

CHECKSUM

Description:

This byte is the checksum for the above configuration bytes. It must be valid, otherwise the reader ignores the new configuration information. The checksum is calculated as follows:
CFG7 = **NEG** (CFG0 **XOR** CFG1 **XOR** CFG2 **XOR** CFG3 **XOR** CFG4 **XOR** CFG5 **XOR** CFG6)

V Protocol

Basically, the protocol in the Reader works in a polling mode.

It is necessary to give a level and a wedge number to each Wedge Reader.

Level number:	1.....128
Wedge number:	1…255

This lets the PC manage more than one Wedge Reader at one serial port. The PC 'polls', which means the PC sends messages to all the readers that are connected to the serial port, one after another.

It is also possible to start a GENERAL POLL. Level number 0 and Wedge number 0 are dedicated to this feature. If, for example, the PC polls for the Level 0 / Wedge 0, every reader answers this call.

Several readers answering at the same time will cause a data collision on the BUS. The PC will recognise this, and by special polling, be able to identify a specific Wedge Reader.

The serial port of the PC is used for transmitting data to the Wedge Reader unit. Usually this would be COM1.

Parameters for the transmission are fixed to:

Baud Rate:	9600
Start Bit:	1
Data Bits:	8
Parity Bit:	none
Stop Bits:	1

Interface to reader unit

The integrated signal converter can generate serial RS232 or RS422 level.
It can be changed with two jumpers. For more information contact our technical support.

Features

The number of net data bytes per second, compared with the protocol overhead, depends on the data size of the command.

The typical reader reply time for a polling call is about 1 msec.
Only if the stand alone mode is disabled and no tag read or write command will be used.

Typ. Reply Time:	1 msec
Type Of Protocol:	POLLING
Transmission Security Per Byte:	none
Transmission Security Per Block:	BCC (EXOR) Block check character Block length check

Protocol Syntax

VI Protocol Syntax

The basic principle for communication is that the PC is always the MASTER, the Wedge Reader is always the SLAVE. Every action is initiated by the PC. This is required by the polling mode.

There are COMMANDS from the PC to the reader and there are REPLIES from the reader to the PC.

COMMANDS and REPLIES consist of HEADER, DATA and END part. The HEADER is always the same for all COMMANDS and REPLIES. The length of the transmitted DATA is coded in the HEADER.

If, in the following description, some parameters are not named, the parameter will not be evaluated by the reader.

HEADER

STX, LEVEL-NUMBER, WEDGE-NUMBER, LENGTH,

Type	Meaning	Length in bytes
STX	Start of Text, **02 Hex**	1
LEVEL-NUMBER	Level Number of the reader	1
WEDGE-NUMBER	Wedge Number of the reader	1
LENGTH	Length of DATA	1

DATA

COMMAND,[data,]

Type	Meaning	Length in bytes
COMMAND	Command	1
[data]	Depends on type of command	variable

END

BCC

Type	Meaning	Length in bytes
BCC	Block check character XOR linking of the characters after STX to BCC-1	1

VII Commands Overview

Command	General functions
0x21	get software version
0x22	enable stand alone mode (default)
0x23	disable stand alone mode
0x24	enable key for stand alone mode (default)
0x25	disable key for stand alone mode
0x26	read operating mode CFG0
0x26 + 0bxxxxxxxx	write operating mode and generate CFG7 CFG0
0x27	read configuration data CFG0 .. CFG7
0x27 + 7 x data	write configuration data and generate CFG7 CFG0 .. CFG6

Command	Relay functions
0x30	get relay states
0x30 + 0b0000xxxx	turn on/off relays directly
0x31	turn relay 1 on
0x32	turn relay 2 on
0x33	turn relay 3 on
0x34	turn relay 4 on
0x35	turn relay 1 off
0x36	turn relay 2 off
0x37	turn relay 3 off
0x38	turn relay 4 off

Command	Led and buzzer functions
0x40	get led status
0x40 + 0b0000xxx	turn on/off led directly
0x41	turn led 1 (green) on
0x42	turn led 2 (yellow) on
0x43	turn led 3 (red) on
0x44	turn led 1 (green) off
0x45	turn led 2 (yellow) off
0x46	turn led 3 (red) off
0x47	turn buzzer on
0x48	turn buzzer off

Command	Optical isolated input
	functions
0x50	get isolated input directly
0x51	get isolated input 1 with debounce
0x52	get isolated input 2 with debounce
0x53	get isolated input 3 with debounce
0x54	get isolated input 4 with debounce

Command	internal key input
	functions
0x56	get key input directly
0x57	get key input 1 with debounce
0x58	get key input 2 with debounce
0x59	get key input 3 with debounce

Command	special
	functions
0x61 +0bxxxxxxxx	turn relay **2** on for x X 0.1 seconds
0x62 +0bxxxxxxxx	turn buzzer on for x X 0.1 seconds
0x63 +0bxxxxxxxx	turn relay **1** and red led on for x X 0.1 seconds
0x64 +0bxxxxxxxx	turn relay **4** on for x X 0.1 seconds

Command	Transponder read
	functions
0x71 + 0b000xxxxx	read page (1..17)

Command	Transponder write
	functions
0x72 + 0b000xxxxx + 8 x data	write + page (1..17) + data

VIII Technical Data

Dimension / Weight

200 mm x 120 mm x 60 mm (7.9” x 4.7” x 2.4”)
App. 810 g (28.3 oz.)

Hardware

Power supply 24 V DC
Powerful two RISC processor system
Internal watchdog
3 high power LED
Internal buzzer
1 key input (upper right)
4 relay output, 60V/2A DC, 125V/2A AC
4 optical isolated input
1 error acknowledge input

Connector assignment

Power-Supply

1	+ 24 V DC power input
2	+ 24 V DC power input
3	GND power input
4	GND power input
5	connect with pin 6 (only if + 24 V DC power input)
6	connect with pin 5 (only if + 24 V DC power input)
7	+ 12 V DC power input
8	+ 12 V DC power input
9	GND power input
10	GND power input

INTERFACE

1	+ 5 V DC		
2	Txd +	RS422	
3	Txd -	RS422	
4	Rxd -	RS422	
5	Rxd +	RS422	
6	TXD	RS232	
7	RTS	RS232	(set, when data send)
8	RXD	RS232	
9	CTS	RS232	(not used)
10	GND		

INPUT

1	Optical isolated Input 1 +
2	Input 1 GND
3	Optical isolated Input 2 +
4	Input 2 GND
5	Optical isolated Input 3 +
6	Input 3 GND
7	Optical isolated Input 4 +
8	Input 4 GND

RELAY

1	Relay 1 break contact
2	Relay 1 turnkey contact
3	Relay 1 base contact
4	Relay 2 break contact
5	Relay 2 turnkey contact
6	Relay 2 base contact
7	Relay 3 break contact
8	Relay 3 turnkey contact
9	Relay 3 base contact
10	Relay 4 break contact
11	Relay 4 turnkey contact
12	Relay 4 base contact