HF RFID SYSTEM
READ/WRITE MODULES (RWM)
RLS-1181-320

HOUSING	READ/WRITE DISTANCE
M18	42 mm*

- ✓ M18 Metal threaded housing
- ✓ Sensing face of PBTP
- ✓ Insensible to dirt
- ✓ IO-Link V1.1
- ✓ 2 x PNP output in SIO mode configurable
- ✓ RWM reconfigurable via a Master Tag

CE

IP 67

HF ISO 15693

IO-Link

M18x1
10
4
SW 24
63.5
8
Ø 16,4
LED (4x)
13.5
11
8
M12x1

* Please refer to table page 8

GENERAL DATA

Carrier frequency	13.56 MHz
Compatible standard	ISO 15693
Maximum transmission speed	26.5 kbit/s
Read-write distance max.	42 mm with RTP-0502-022

INTERFACE

Data transfer rate	38 400 baud
LED green on	RWM live
LED green blinking	IO-Link communication
LED yellow on	Transponder detected
LED yellow blinking	Transponder + IO-Link communication
IO-Link	✓

ELECTRICAL DATA

Supply voltage range (Ub)	11...32 VDC
No-load supply current (field off)	20 mA
Max. current consumption (no load)	50 mA
Polling current	30 mA
Short-circuit protection	✓
Voltage reversal protection	✓
Max. output current	≤ 200 mA

MECHANICAL DATA

Protection degree	IP67
Ambient temperature range TA*	-25...+80 °C
Storage temperature range TS**	-25...+80 °C
Sensing face material	PBTP
Housing material	Chrome-plated brass
Connector type	M12 4-pin
Weight (incl. nuts)	37 g

* Read/write operations possible
** Data retention and mechanical stability limit

MOUNTING RECOMMENDATIONS

CLEARANCE

Read/write modules must not mutually influence each other. For this reason, a minimum distance of 2 x D between the devices must be observed.
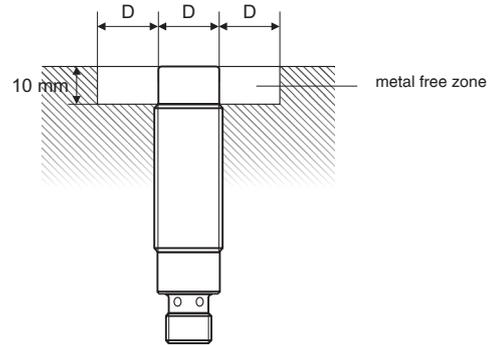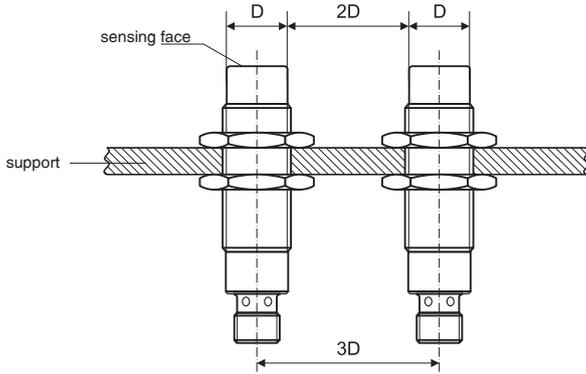
WIRING DIAGRAM

PIN ASSIGNMENT
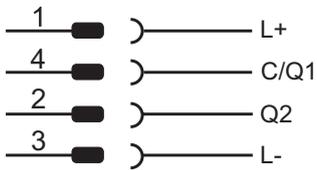
Pin	Signal	Function
1	L+	+24 V
2	Q2	DO (tag presence or data comparison)
3	L-	0V
4	C/Q1	SDCI/SIO (tag presence or data comparison)

M12
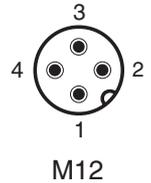
IO-Link characteristics	Value for RLS-1181-320
IO-Link Protocol	1.1
COM-Mode	COM2 (38.4 kBaud)
Min. cycle time	14.4 ms
Process data width in	9 bytes
Process data width out	10 bytes
Profile	Smart Sensor Profile
SIO-Mode support	Yes
Port type	A
Memory request for data management	41 bytes
Device ID	0xAB0201
Vendor ID	0x0156

CONFIGURATION PARAMETER (IO-LINK / SIO MODE)

Index	Sub Hex	Name	Access	Data Type	Value	Default
				IDENTIFICATION		
10_h		Vendor Name	R	char []	"Contrinex"	
11_h		Vendor Text	R	char []	"www.contrinex.com"	
12_h		Product Name	R	char []	"RLS-1301-320"	
13_h		Product ID	R	char []	"00000000"	
14_h		Product Text	R	char []	"IO-Link RFID reader"	
15_h		Serial Number	R	char []	"00000001"	
17_h		Firmware Revision	R	char []	"01.09.01"	
18_h		Application Specific Tag	R/W	char []	<user string, 16 byte (variable length)>	<vendor specific>
				READER PARAMETER PROCESS DATA		
40_h	01_h	Operating Mode	R/W	uint8	FF_h : Scan UID 00_h : Scan User Data 01_h : Read / Write Command	FF_h
	02_h	Data Hold Time	R/W	uint8	FF_h : No Hold Time 00_h : Hold Time 100 ms 01_h : Hold Time 200 ms 02_h : Hold Time 500 ms 03_h : Hold Time 1000 ms 04_h : Hold Time 2000 ms	FF_h
	03_h	Scan Address	R/W	uint8	Address to scan	FF_h
				READER PARAMETER SIO		
41_h	01_h	C/Q1 PIN SIO Operating Mode	R/W	uint8	FF_h : Presence Transponder 00_h : Compare Data 01_h : No SIO	FF_h
	02_h	C/Q1 SIO Data to compare H	R/W	uint32	Comparison value Byte 7 to 4	FF_h, FF_h, FF_h, FF_h,
	03_h	C/Q1 SIO Data to compare L	R/W	uint32	Comparison value Byte 3 to 0	FF_h, FF_h, FF_h, FF_h,
	04_h	SIO Compare Data Address (C/Q1 & Q2)	R/W	uint8	Comparison address for C/Q1 and Q2 (A valid address must be chosen)	FF_h
	05_h	Data Hold Time Output (C/Q1 & Q2)	R/W	uint8	FF_h : No Hold Time 00_h : Hold Time 100 ms 01_h : Hold Time 200 ms 02_h : Hold Time 500 ms 03_h : Hold Time 1000 ms 04_h : Hold Time 2000 ms	FF_h
	06_h	C/Q1 PIN SIO Polarity	R/W	uint8	FF_h : Output "close" if condition = true 00_h : Output "open" if condition = true	FF_h
	07_h	Q2 PIN SIO Operating Mode	R/W	uint8	FF_h : Presence Transponder 00_h : Compare data (C/Q1 must be also in compare data) 01_h : No SIO	FF_h
	08_h	Q2 SIO Data to compare H	R/W	uint32	Comparison value Byte 7 to 4	FF_h, FF_h, FF_h, FF_h,
	09_h	Q2 SIO Data to compare L	R/W	uint32	Comparison value Byte 3 to 0	FF_h, FF_h, FF_h, FF_h,
	$0A_h$	Q2 PIN SIO Polarity	R/W	uint8	FF_h : Output "close" if condition = true 00_h : Output "open" if condition = true	FF_h

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PROCESS DATA MODE SCAN UID MODE

PROCESS DATA INPUT

Bitoffset

	7	6	5	4	3	2	1	0
0			TAG	ANT	NB TAG			
1	UID 0							
2	UID 1							
3	UID 2							
4	UID 3							
5	UID 4							
6	UID 5							
7	UID 6							
8	UID 7							

TAG :	0 = No tag present in front of the RWM
	1 = 1 tag or more present in front of the RWM
ANT :	0 = RF field off
	1 = RF field on
NB TAG :	Number of tag in front of the RWM
UID 0 :	UID LSB
UID 7 :	UID MSB

PROCESS DATA OUTPUT

Bitoffset

	7	6	5	4	3	2	1	0
0				N_ANT	TAG NB			
1								
2								
3								
4								
5								
6								
7								
8								
9								

N_ANT :	0 = Switch on RF field
	1 = Switch off RF field
TAG NB :	Index of tag to be printed in UID area (index from 0)

PROCESS DATA MODE SCAN USER DATA

PROCESS DATA INPUT

Bitoffset

	7	6	5	4	3	2	1	0
0	RDY	ERR	TAG	ANT				EXT
1	Data 0 / Error Code							
2	Data 1							
3	Data 2							
4	Data 3							
5	Extended Data 4							
6	Extended Data 5							
7	Extended Data 6							
8	Extended Data 7							

RDY :	0 = No data available yet
	1 = Memory scanned and data available
ERR :	0 = Memory scanned and no error
	1 = Memory scanned but error;
TAG :	0 = No tag present in front of the RWM
	1 = Tag present in front of the RWM
ANT :	0 = RF field off
	1 = RF field on
EXT :	0 = 4 bytes data
	1 = 8 bytes data
Data 0 :	User data LSB / Error Code
Data 3 / 7 :	User data MSB

PROCESS DATA OUTPUT

Bitoffset

	7	6	5	4	3	2	1	0
0				N_ANT				
1								
2								
3								
4								
5								
6								
7								
8								
9								

N_ANT :	0 = Switch on RF field
	1 = Switch off RF field

PROCESS DATA MODE READ/WRITE

PROCESS DATA INPUT

Bitoffset

	7	6	5	4	3	2	1	0
0	RDY	ERR	TAG	ANT				EXT
1	Data 0 / Error Code							
2	Data 1							
3	Data 2							
4	Data 3							
5	Extended Data 4							
6	Extended Data 5							
7	Extended Data 6							
8	Extended Data 7							

RDY :   0 = No data available yet
            1 = Command executed and data ready for user
ERR :   0 = Command executed and no error
            1 = Command executed but error
TAG :   0 = No tag present in front of the RWM
            1 = Tag present in front of the RWM
ANT :   0 = RF field off
            1 = RF field on
EXT :   0 = 4 bytes data
            1 = 8 bytes data
Data 0 :   Read data LSB / Error Code
Data 3 / 7 :   Read data MSB

Error Code Definition
CommandNotSupported   = 1,
FormatError   = 2,
OptionNotSupported   = 3,
CommandProblem   = 5,
CommTagError   = 6,
TagError   = 15,
NoMomoryBloc   = 16,
BlocProtected   = 18,

PROCESS DATA OUTPUT

Bitoffset

	7	6	5	4	3	2	1	0
0	START			N_ANT		CMD		EXT
1	ADD							
2	Data 0							
3	Data 1							
4	Data 2							
5	Data 3							
6	Extended Data 4							
7	Extended Data 5							
8	Extended Data 6							
9	Extended Data 7							

START :   0 = Do not execute the command
            1 = Execute the command
N_ANT :   0 = Switch on RF field
            1 = Switch off RF field
CMD :   0 = No command
            1 = Read
            2 = Write
EXT :   0 = 4 bytes data
            1 = 8 bytes data
ADD :   Block address
Data 0 :   Write data LSB
Data 3 / 7 :   Write data MSB

SYSTEM COMMAND (idx 02$_h$)

Value hex	Value dec	Function
05$_h$	5	ParamDownloadStore
80$_h$	128	Device Reset
82$_h$	130	Restore factory settings*

*always do a reset after the restore of factory settings

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For the RLS-1181-320, the IO-Link mode or the SIO (standard I/O mode) can be configured via IO-Link or via a Master Tag.

For the configuration via a Master Tag, a transponder (called Master Tag) will contain all the data used for the configuration. The structure of the data are explained in the table on page 7.

There is a simple procedure to configure the RWM. Once all the data are written in the Master Tag, you need to put it in front of the RWM sensing face, to switch off the RWM power supply and to switch on again. The RWM will detect that it's a Master Tag and read all the data and configure the outputs accordingly.

On the Contrinex webpage (www.contrinex.com) it is possible to download a software to setup the Master Tag via a Contrinex USB RWM. This program is called "IO-Link Master Tag programmer".

SIO MODE POSSIBILITIES

If you use the RLS-1181-320 in a SIO mode, you will have two main possibilities:

1. Presence Transponder:
   In this mode, the output will switch if a transponder is in the field of the RWM.

2. Compare Data:
   In this mode, the output will switch if the data red in the defined block memory of the transponder matches with the data stocked in the RWM.

MASTER TAG

To build a Master Tag it's possible to use any ISO15693 chip with at least eight memory blocks with 32 bits each.

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CONFIGURATION PARAMETER (IO-LINK / SIO MODE)

Bloc + A1:H18	Byte	Offset	Name	Data Type	Value	Default	Comment
READER PARAMETER PROCESS DATA (IO-LINK MODE)							
0_h	0_h	0_h	Operating Mode	uint8	FF_h : Scan UID 00_h : Scan User Data 01_h : Read / Write Command	FF_h	See process data organisation
0_h	1_h	1_h	Data Hold Time	uint8	FF_h : No Hold Time 00_h : Hold Time 100 ms 01_h : Hold Time 200 ms 02_h : Hold Time 500 ms 03_h : Hold Time 1000 ms 04_h : Hold Time 2000 ms	FF_h	
0_h	2_h	2_h	Scan Address	uint8	Address to scan	FF_h	Addres to scan in user data
READER PARAMETER SIO (SIO MODE)							
0_h	3_h	3_h	C/Q1 PIN SIO Operating Mode	uint8	FF_h : Presence Transponder 00_h : Compare Data 01_h : No SIO	FF_h	
1_h	$3_h...0_h$	4_h	C/Q1 SIO Data to compare H	uint32	Comparison value Byte 7 to 4	FF_h, FF_h, FF_h, FF_h,	Ext. Data 7 Ext. Data 6 Ext. Data 5 Ext. Data 4
2_h	$3_h...0_h$	8_h	C/Q1 SIO Data to compare L	uint32	Comparison value Byte 3 to 0	FF_h, FF_h, FF_h, FF_h,	Data 3, Data 2, Data 1, Data 0
3_h	0_h	C_h	SIO Compare Data Address (C/Q1 & Q2)	uint8	Comparison address for C/Q1 and Q2 (A valid address must be chosen)	FF_h	
3_h	1_h	D_h	Data Hold Time Output (C/Q1 & I/Q2)	uint8	FF_h : No Hold Time 00_h : Hold Time 100 ms 01_h : Hold Time 200 ms 02_h : Hold Time 500 ms 03_h : Hold Time 1000 ms 04_h : Hold Time 2000 ms	FF_h	
3_h	2_h	E_h	C/Q1 PIN SIO Polarity	uint8	FF_h : Output "close" if condition = true 00_h : Output "open" if condition = true	FF_h	
3_h	2_h	F_h	Q2 PIN SIO Operating Mode	uint8	FF_h : Presence Transpondere 00_h : Compare Data 01_h : No SIO	FF_h	
4_h	$3_h...0_h$	10_h	Q2 SIO Data to compare H	uint32	Comparison value Byte 7 to 4	FF_h, FF_h, FF_h, FF_h,	Ext. Data 7 Ext. Data 6 Ext. Data 5 Ext. Data 4
5_h	$3_h...0_h$	14_h	Q2 SIO Data to compare L	uint32	Comparison value Byte 3 to 0	FF_h, FF_h, FF_h, FF_h,	Data 3, Data 2, Data 1, Data 0
6_h	0_h	18_h	Q2 PIN SIO Polarity	uint8	FF_h : Output "close" if condition = true 00_h : Output "open" if condition = true	FF_h	
CRC							
7_h	$3_h...0_h$	$1C_h$	CRC CHECK	uint32	CRC32 on all config field with polynom: $X^{32}+X^{26}+X^{23}+X^{22}+X^{16}+X^{12}+X^{11}+X^{10}+X^8+X^7+X^5+X^4+X^2+X^1+X^0$		

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POSSIBLE COMBINATION AND TYPICAL DISTANCE - RLS-1181-320

Transponder type	S_{max}	S_0	D_0
Ø 9 RTP-0090-020	9	2.5	13
Ø 20 RTP-0201-020	14	4.5	19
Ø 26 RTP-0263-020	22	9	26
Ø 30 RTP-0301-020	29	12	34
Ø 50 RTP-0501-020	24	1	46
Ø 50 RTP-0502-022	42	17	50
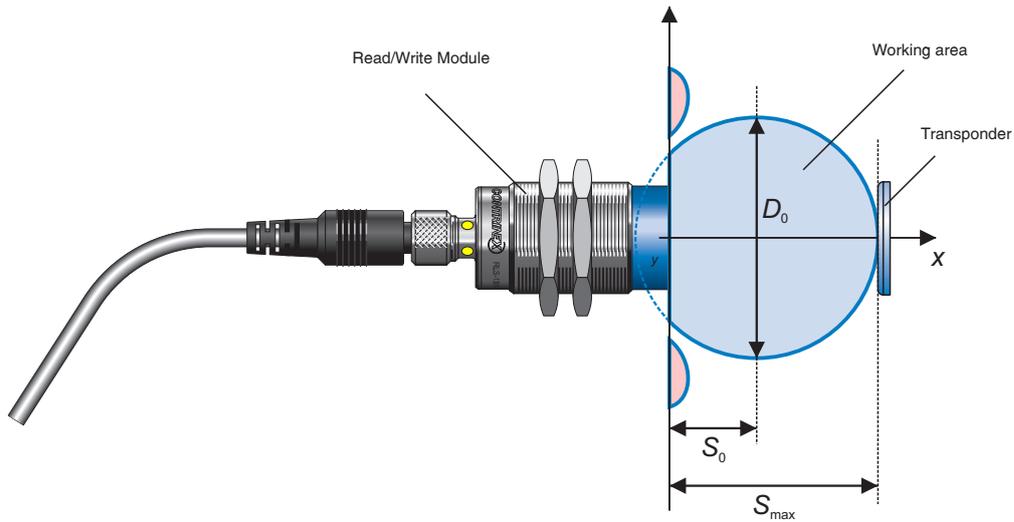
AVAILABLE TYPES

Part number	Part reference	Ø	Mounting	Connection
720 100 206	RLS-1181-320	M18	Non-embeddable	M12 4-pin

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