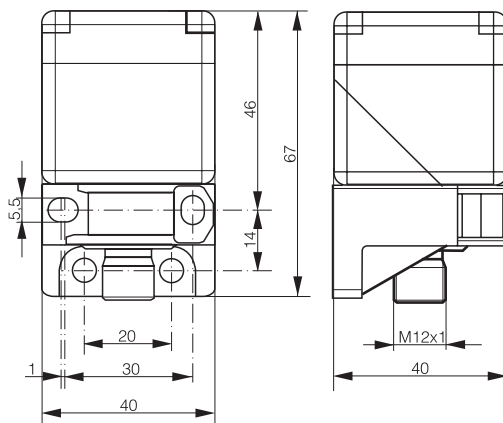


| HOUSING | READ/WRITE DISTANCE | <ul style="list-style-type: none"> ✓ 40x40 mm plastic housing ✓ Sensing face of PBTP ✓ Insensitive to dirt ✓ IO-Link V1.1 | <ul style="list-style-type: none"> ✓ 2 x PNP output in SIO mode configurable |
|---------|---------------------|---|---|
| C44 | 80 mm | | |



| GENERAL DATA | | INTERFACE | |
|-------------------------------------|--------------------------|--------------------|---------------------|
| Carrier frequency | 13.56 MHz | Data transfer rate | 230 400 baud |
| Compatible standard | ISO 15693* | LEDs | See LED Status p. 8 |
| Maximum transmission speed | 26.5 kbit/s | IO-Link | ✓ |
| Maximum field strength (at 3m/30m) | 66.7 / 26.4 dBμV/m | MTTF (@40°C) | 322 y |
| Read-write distance max. (RSSI ≥ 0) | 80 mm with RTH-D50QA-NC0 | | |

| ELECTRICAL DATA | | MECHANICAL DATA | |
|--|-------------|---------------------------------|---------------------------|
| Supply voltage range (U _b) | 11...32 VDC | Housing material | PBTP |
| Max. current consumption (no load) | ≤ 50 mA | Sensing face material | PBTP |
| Max. output current | ≤ 200 mA | Max tightening torque | 0.6 Nm (on M12 connector) |
| Short-circuit protection | ✓ | Ambient temperature range TA** | -25...+80 °C |
| Voltage reversal protection | ✓ | Storage temperature range TS*** | -25...+80 °C |
| Cable length max. | ≤ 20 m | Enclosure rating | IP68 & IP69K |
| | | Weight (incl. nuts) | 105 g |

* Protocol anti-collision excluded. A maximum of one transponder can be detected at a time by the RWM, otherwise "CollisionError" is reported

** Read/write operations possible

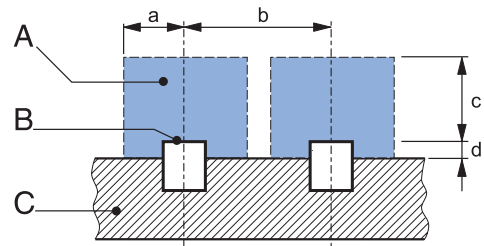
*** Data retention and mechanical stability limit

MOUNTING RECOMMENDATIONS

PIN ASSIGNMENT

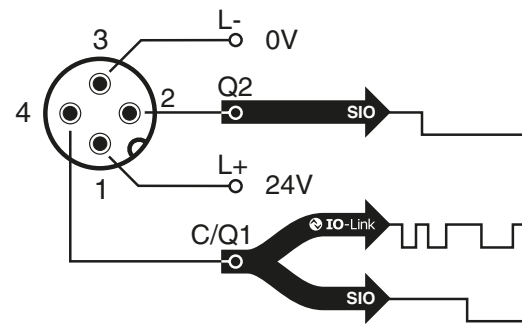
CLEARANCE

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



A : unique transponder zone
B : sensing face
C : support

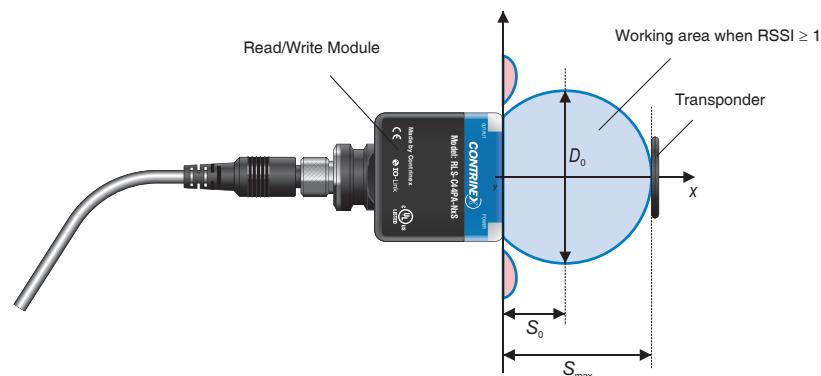
a : 60 mm
b : 120 mm
c : 120 mm
d : 10 mm



| IO-LINK CHARACTERISTICS | VALUE FOR RLH-C44PA-NIS |
|-------------------------|--|
| Vendor ID | 0x0156 |
| Device ID | 0xAB0202 |
| IO-Link Protocol | 1.1 |
| SIO-Mode | Supported |
| Process data | 32 bytes input / 32 bytes output |
| Baudrate | COM3 (230.4 kBaud) |
| Minimum cycle time | 10 ms |
| Supported Access Locks | Parameter: no, Data Storage: yes, Local Parameterization: no, Local User Interface: no |
| Sub Index Access | No sub index addressing possible except otherwise specified |

POSSIBLE COMBINATION AND RECOMMENDED WORKING DISTANCE - RLH-C44PA-NIS

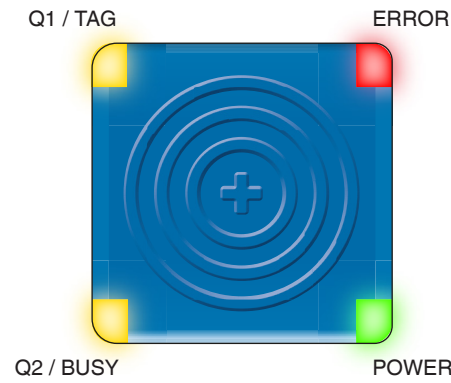
| Transponder type | S_{max} [mm] | S_0 [mm] | D_0 [mm] |
|--------------------|----------------|------------|------------|
| Ø 9 RTP-0090-020 | 24 | 11 | 32 |
| Ø 16 RTP-0160-020 | 40 | 20 | 44 |
| Ø 20 RTH-D20QA-NC0 | 40 | 18 | 44 |
| Ø 20 RTH-D20QA-ND0 | 38 | 17 | 42 |
| Ø 26 RTP-0263-020 | 38 | 17 | 44 |
| Ø 30 RTH-D30QA-NC0 | 40 | 19 | 46 |
| Ø 30 RTH-D30QA-ND0 | 46 | 23 | 52 |
| Ø 50 RTH-D50QA-NC0 | 64 | 32 | 68 |
| Ø 50 RTH-D50QA-ND0 | 58 | 26 | 66 |
| Ø 50 RTP-0502-022 | 78 | 41 | 80 |
| Ø 50 RTP-0502-062 | 58 | 27 | 66 |
| Ø 50 RTP-0502-082 | | | |



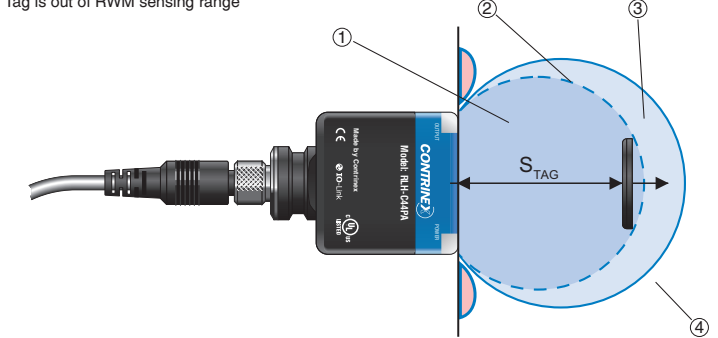
AVAILABLE TYPES

| Part number | Part reference | Sensing Face | Mounting | Connection |
|-------------|----------------|--------------|----------------|------------|
| 720 100 210 | RLH-C44PA-NIS | 40 x 40 mm | Non-embeddable | M12 4-pin |

LED STATUS



- 1: Tag RSSI level \geq RSSI threshold - Transponder is located in RWM recommended working area
- 2: RWM RSSI threshold limit set by the end user in the RWM configuration parameter menu (idx: 43, sub_idx: 03,)
- 3: Tag RSSI level < RSSI threshold - Transponder is located in RWM maximal sensing range
- 4: Tag is out of RWM sensing range



| | Q1 / TAG | | Q2 / BUSY | | ERROR | POWER |
|---------------|----------|---|----------------|--|----------------|---------------------------------|
| | IO-Link | SIO | IO-Link | SIO | | |
| ON | Area 1 | Q1 is ON | - | Q1 is ON | Error occurred | RWM is ON and SIO Mode used |
| OFF | Area 4 | Q1 is OFF | No pending CMD | Q2 is OFF | No error | RWM is OFF |
| Blinking 1 Hz | - | - | RWM is Busy | - | - | RWM is ON and IO-Link Mode used |
| Blinking 5 Hz | Area 3 | Q1 is TAG presence or data compare & Area 3 | - | Q2 is TAG presence or data compare & Area 3- | - | - |

DISCLAIMERS

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

Caution: 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.

IC information

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference
- (2) this device must accept any interference, including interference that may cause undesired operation of the device

Cet appareil contient des émetteurs / récepteurs exempts de licence conformes aux RSS (RSS) d'Innovation, Sciences et Développement économique Canada. Le fonctionnement est soumis aux deux conditions suivantes:

- (1) Cet appareil ne doit pas causer d'interférences
- (2) Cet appareil doit accepter toutes les interférences, y compris celles susceptibles de provoquer un fonctionnement indésirable de l'appareil.

Simplified EU DoC:

Hereby, Contrinex declares that the radio equipment type RLS-C44PA-NIS is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: https://www.contrinex.com/wp-content/uploads/2019/11/Conformity_RLS-HF_191001.pdf

Contrinex information

Operators of the products we supply are responsible for compliance with measures for the protection of persons. The use of our equipment in applications where the safety of persons might be at risk is only authorized if the operator observes and implements separate, appropriate and necessary measures for the protection of persons and machines. Terms of delivery and rights to change design reserved.



IODD files may be downloaded from
www.contrinex.com/product-range/RFID/.
 Select the product name to display the product page with corresponding downloads.
 Alternatively, just click/scan the QR code on the left.

CONFIGURATION PARAMETER (IO-LINK / SIO MODE)

| Index | Sub Hex | Name | Access | Data Type | Value | Default |
|-----------------------------|-----------------|-----------------------------------|--------|-----------|--|---|
| SYSTEM | | | | | | |
| 02 _h | - | Standard Command | W | uint8 | 5 = ParamDownloadStore, 128 = Device Reset, 130 = Restore Factory Settings, 160 = Locate device (force all leds to blink during 30 seconds) | N/A |
| 0C _h | - | Device Access Lock | R/W | uint16 | Parameter Access, Data Storage, Local Parameterization and Local User Interface Locks | 0000 _h |
| 0D _h | - | Profile Characteristic | R | uint16 | No profile for identification devices - 0000 _h | - |
| 0E _h | - | PD Input Descriptor | R | array | Scan UID Mode {{1, 3, 4}, {1, 2, 8}, {2, 6, 10}, {2, 8, 16}, {2, 64, 24}, {2, 64, 88}, {2, 64, 152}} Scan R/W Mode {{2, 3, 0}, {1, 4, 4}, {1, 2, 8}, {2, 5, 10}, {2, 8, 16}, {0, 224, 24}} | - |
| 0F _h | - | PD Output Descriptor | R | array | Scan UID Mode {{1, 1, 4}} Scan R/W Mode {{2, 4, 0}, {1, 1, 4}, {1, 1, 7}, {2, 3, 8}, {2, 8, 16}, {0, 224, 24}} | - |
| IDENTIFICATION | | | | | | |
| 10 _h | - | Vendor Name | R | char [] | "Contrinex" | - |
| 11 _h | - | Vendor Text | R | char [] | "www.contrinex.com" | - |
| 12 _h | - | Product Name | R | char [] | "RLH-C44PA-NIS" | - |
| 13 _h | - | Product ID | R | char [] | "00000000" | - |
| 14 _h | - | Product Text | R | char [] | "IO-Link RFID reader" | - |
| 15 _h | - | Serial Number | R | char [] | "00000000" | - |
| 17 _h | - | Firmware Revision | R | char [] | "2.2.7" | - |
| 18 _h | - | Application Specific Tag | R/W | char [] | <user string, 32 byte (variable length)> | <vendor specific> |
| READER PARAMETER SIO | | | | | | |
| 41 _h | 01 _h | C/Q1 PIN SIO Operating Mode | R/W | uint8 | 00 _h : Transponder Presence 01 _h : Compare Data 02 _h : Alarm 1 03 _h : Alarm 2 04 _h : No SIO | 00 _h |
| | 02 _h | SIO Start Address C/Q1 | R/W | uint8 | Transponder memory block address where to make the "Compare Data" operation | 00 _h |
| | 03 _h | C/Q1 SIO Data to compare | R/W | uint32 | Reference data value stored in RWM memory to be compared to transponder data | 00 _h , 00 _h , 00 _h , 00 _h |
| | 04 _h | C/Q1 PIN SIO Polarity | R/W | uint8 | 00 _h : Output "close" if condition = true 01 _h : Output "open" if condition = true | 00 _h |
| | 05 _h | Data Hold Time Output (C/Q1 & Q2) | R/W | uint8 | 00 _h : No Hold Time 01 _h : Hold Time 100 ms 02 _h : Hold Time 200 ms 03 _h : Hold Time 500 ms 04 _h : Hold Time 1000 ms 05 _h : Hold Time 2000 ms | 00 _h |
| | 06 _h | Q2 PIN SIO Operating Mode | R/W | uint8 | 00 _h : Transponder Presence 01 _h : Compare Data 02 _h : Alarm 1 03 _h : Alarm 2 04 _h : No SIO | 00 _h |
| | 07 _h | SIO Start Address Q2 | R/W | uint8 | Transponder memory block address where to make the "Compare Data" operation | 00 _h |
| | 08 _h | Q2 SIO Data to compare | R/W | uint32 | Reference data value stored in RWM memory to be compared to transponder data | 00 _h , 00 _h , 00 _h , 00 _h |
| | 09 _h | Q2 PIN SIO Polarity | R/W | uint8 | 00 _h : Output "close" if condition = true 01 _h : Output "open" if condition = true | 00 _h |

RF CONFIGURATION

| | | | | | | |
|-----------------|-----------------|-----------------------------------|-----|--------|--|---|
| 42 _h | 03 _h | RSSI Threshold | R/W | uint8 | 0 = 0 1 = 1 2 = 2 3 = 3 4 = 4 5 = 5 6 = 6 7 = 7 | 01 _h |
| TAG INFO | | | | | | |
| 43 _h | 01 _h | UID | R | uint64 | Data available only if transponder is in the RWM detection range when TAG INFO fields are read | - |
| | 02 _h | Transponder DSFID | R | uint8 | Data available only if transponder is in the RWM detection range when TAG INFO fields are read | - |
| | 03 _h | Transponder AFI | R | uint8 | Data available only if transponder is in the RWM detection range when TAG INFO fields are read | - |
| | 04 _h | Number of Memory Blocks | R | uint8 | Data available only if transponder is in the RWM detection range when TAG INFO fields are read | - |
| | 05 _h | Memory Block Size | R | uint8 | Data available only if transponder is in the RWM detection range when TAG INFO fields are read | - |
| | 06 _h | RSSI | R | uint8 | Data available only if transponder is in the RWM detection range when TAG INFO fields are read | - |
| | 07 _h | IC Manufacturer Code | R | uint8 | Data available only if transponder is in the RWM detection range when TAG INFO fields are read | - |
| | 08 _h | IC Reference | R | uint8 | Data available only if transponder is in the RWM detection range when TAG INFO fields are read | - |
| UID LIST | | | | | | |
| 44 _h | 01 _h | Tag history 1 | R | uint64 | Last transponder UID seen by RWM | - |
| | 02 _h | Time stamp Tag history 1 | R | uint64 | System time record when tag 1 entered in the RWM range | - |
| | 03 _h | Tag history 2 | R | uint64 | - | - |
| | 04 _h | Time stamp Tag history 2 | R | uint64 | System time record when tag 2 entered in the RWM range | - |
| | 05 _h | Tag history 3 | R | uint64 | - | - |
| | 06 _h | Time stamp Tag history 3 | R | uint64 | System time record when tag 3 entered in the RWM range | - |
| | 07 _h | Tag history 4 | R | uint64 | - | - |
| | 08 _h | Time stamp Tag history 4 | R | uint64 | System time record when tag 4 entered in the RWM range | - |
| | 09 _h | Tag history 5 | R | uint64 | First transponder UID seen by RWM (on a shift register of 5 UIDs) | - |
| | 0A _h | Time stamp Tag history 5 | R | uint64 | System time record when tag 5 enters in the RWM range | - |
| ALARM | | | | | | |
| 47 _h | 01 _h | Measurement Alarm 1 Configuration | R/W | uint8 | 0 = Always OFF 1 = Active | 00 _h |
| | 02 _h | Measurement Alarm 1 Threshold | R/W | uint32 | ALR1 goes TRUE if : RSSI ≤ Alarm 1 Threshold Tag IN RANGE Time ≤ Alarm 1 Threshold | 00 _h , 00 _h , 00 _h , 00 _h |
| | 03 _h | Measurement Alarm 1 Source | R/W | uint8 | 2 = RSSI 3 = Tag IN RANGE Time [ms] | 00 _h |
| | 04 _h | Measurement Alarm 2 Configuration | R/W | uint8 | 0 = Always OFF 1 = Active | 00 _h |

| | | | | | | |
|------------------------------------|-----------------|-------------------------------|-----|---------|--|--|
| | 05 _h | Measurement Alarm 2 Threshold | R/W | uint32 | ALR2 goes TRUE if : RSSI ≤ Alarm 2 Threshold Tag IN RANGE Time ≤ Alarm 2 Threshold | 00 _h , 00 _h , 00 _h , 00 _h |
| | 06 _h | Measurement Alarm 2 Source | R/W | uint8 | 2 = RSSI 3 = Tag IN RANGE Time [ms] | 00 _h |
| DEVICE DESCRIPTION | | | | | | |
| 48 _h | 01 _h | Function Tag | R/W | char [] | <user string, 32 byte (variable length)> | <vendor specific> |
| | 02 _h | Location Tag | R/W | char [] | <user string, 32 byte (variable length)> | <vendor specific> |
| DEVICE CHARACTERISTIC | | | | | | |
| 49 _h | 01 _h | RFID Compatibility | R | char [] | "13.56 MHz, ISO15693" | - |
| | 02 _h | Read-write distance max | R | char [] | "60 mm with diam 50mm SLIX tag" | - |
| | 03 _h | Supply voltage range (Ub) | R | char [] | "11...32 VDC" | - |
| | 04 _h | Max. output current | R | char [] | "≤ 200 mA" | - |
| | 05 _h | Ambient temperature range TA | R | char [] | "-25...+80°C" | - |
| | 06 _h | Storage temperature range TS | R | char [] | "-25...+80°C " | - |
| | 07 _h | Enclosure rating | R | char [] | "IP68 & IP69K" | - |
| TRANSPONDER TIME MONITORING | | | | | | |
| 4A _h | 01 _h | System Time - Transponder IN | R | uint64 | Record system time when transponder enters the RWM detection range [ms] | - |
| | 02 _h | System Time - Transponder OUT | R | uint64 | Record system time when transponder leaves the RWM detection range [ms] | - |
| | 03 _h | Transponder IN RANGE Time | R | uint64 | IN RANGE = Transponder OUT - Transponder IN | - |
| SECURITY | | | | | | |
| 58 _h | 01 _h | Security Mode | R/W | uint8 | 0 = Security mode inactive 1 = SLI-S or SLIX-2 Security mode active (perform a login with the specified password before each read or write operation) 12 = EM4233SLIC Security mode active (perform a login with the specified password before each read or write operation) | 00 _h |
| | 02 _h | Password | W | uint32 | Password is never readable to avoid end-user application counterfeiting | 8 x 00 _h |
| DIAGNOSTIC | | | | | | |
| 59 _h | 01 _h | System Time | R | uint64 | The system time is reset at each RWM power down or in case the standard command 128 = Device Reset is sent to the RWM. System Time is given in [ms] | - |
| | 02 _h | Successful Login counter | R | uint32 | Counter which counts the number of successful transponder Login since last RWM startup / reset | - |
| | 03 _h | Error Login counter | R | uint32 | Counter which counts the number of unsuccessful transponder Login since last RWM startup / reset | - |
| | 04 _h | Error counter | R | uint32 | Counter which counts the number of RMW error since last RWM startup / reset | - |
| | 05 _h | Power-on cycles | R | uint32 | Counter which counts the number of RMW Power on. This counter cannot be reset. Device must be powered > 550ms to see the power on cycle counter incremented | - |

PROCESS DATA REPRESENTATION

PROCESS DATA STRUCTURE

PROCESS DATA INPUT

Bitoffset

| Byte | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|------|--|-----|-----|-----|-----|---------|------|------|
| 0 | RDY | ERR | TAG | ANT | RFU | CMDCOPY | | |
| 1 | ERROR CODE | | | | | | ALR2 | ALR1 |
| 2 | RSSI | | | | | | | |
| 3 | ADDRESS | | | | | | | |
| 4-31 | DATA 0...27 / UID7...0, STT17...0, TIRT7...0 | | | | | | | |

| ERROR CODE | Error Name | Description |
|------------|---------------------|--|
| 1 | CommandNotSupported | |
| 2 | FormatError | |
| 3 | OptionNotSupported | Error code values replied by the transponder to the RWM interrogation. |
| 5 | CommandProblem | Depend of ISO15693 command set supported by the different transponder IC of the market. These are error code values defined by the IOS15693 standard |
| 6 | CommTagError | |
| 15 | TagError | |
| 16 | NoMemoryBlock | |
| 18 | BlockProtected | |
| 27 | AppLOGError | RWM password (index 0x58) is not matching transponder password |
| 30 | TAGCommError | Indicates a transponder communication error (e.g. more than 1 transponder detected or transponder reply not understood) |
| 255 | AppGeneralError | General Error |

PROCESS DATA OUTPUT

Bitoffset

| Byte | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|------|-----------------|-----|---|---|-------|-----|----------|---|
| 0 | START | RFU | | | N_ANT | CMD | | |
| 1 | RFU | | | | | | NB BLOCK | |
| 2 | RFU | | | | | | | |
| 3 | ADDRESS | | | | | | | |
| 4-31 | DATA 0- DATA 27 | | | | | | | |

| Name | Value | Description |
|-------------|----------------|--|
| RDY | 0 → 1 1 → 0 | Command executed and new data available. If Auto-Read, Auto-Write or UID command is selected, bit toggling runs automatically as long as a transponder is inside the RWM range |
| | 0 1 | No new data available yet |
| 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 |
| RSSI | | RSSI signal level coming from the transponder |
| ERROR CODE | | See ERROR CODE list below |
| ALR2 | 0 | Alarm 2 OFF |
| | 1 | Alarm 2 ON |
| ALR1 | 0 | Alarm 1 OFF |
| | 1 | Alarm 1 ON |
| ADDRESS | | First transponder memory block address where the R/W command was executed |
| DATA 0...27 | | Read data LSB |
| UID7...0 | | Transponder unique ID number |
| STT17...0 | | System time transponder IN. Data record when a transponder enters in the RWM range |
| TIRT7...0 | | Transponder IN RANGE time |

| Name | Value | Description |
|----------|---------------------|--|
| START | 0 → 1 1 → 0 | Start the selected RFID operation when bit toggles. If Auto-Read, Auto-Write or UID command is selected, the bit is not used. The RFID command are sent automatically as long as a transponder is inside the RWM range |
| | 0 1 | IDLE |
| N_ANT | 0 | Switch ON RF Field |
| | 1 | Switch OFF RF Field |
| CMD | 0 | No command |
| | 1 | Auto-Read |
| | 2 | Auto-Write |
| | 3 | Read |
| | 4 | Write |
| 5 | UID and tag timings | |
| NB BLOCK | | Number of transponder memory block to R/W |
| ADDRESS | | First transponder memory block address where the R/W command will be executed |
| Data 0 | | Data to be written LSB |
| Data 27 | | Data to be written MSB |