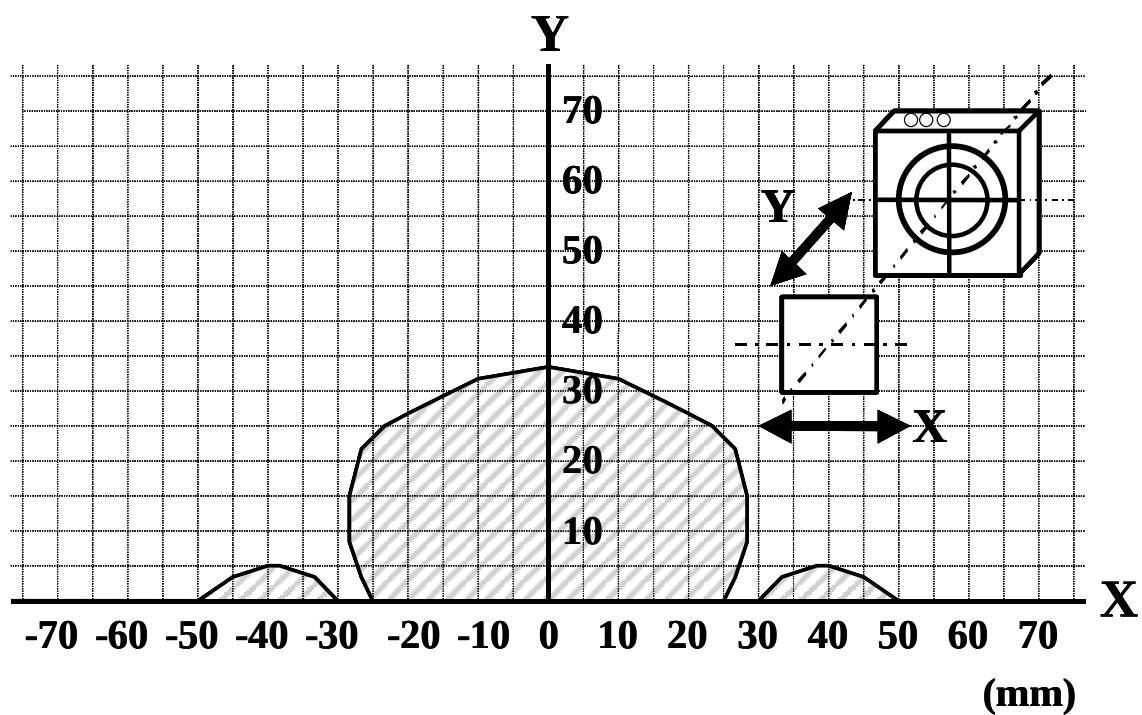
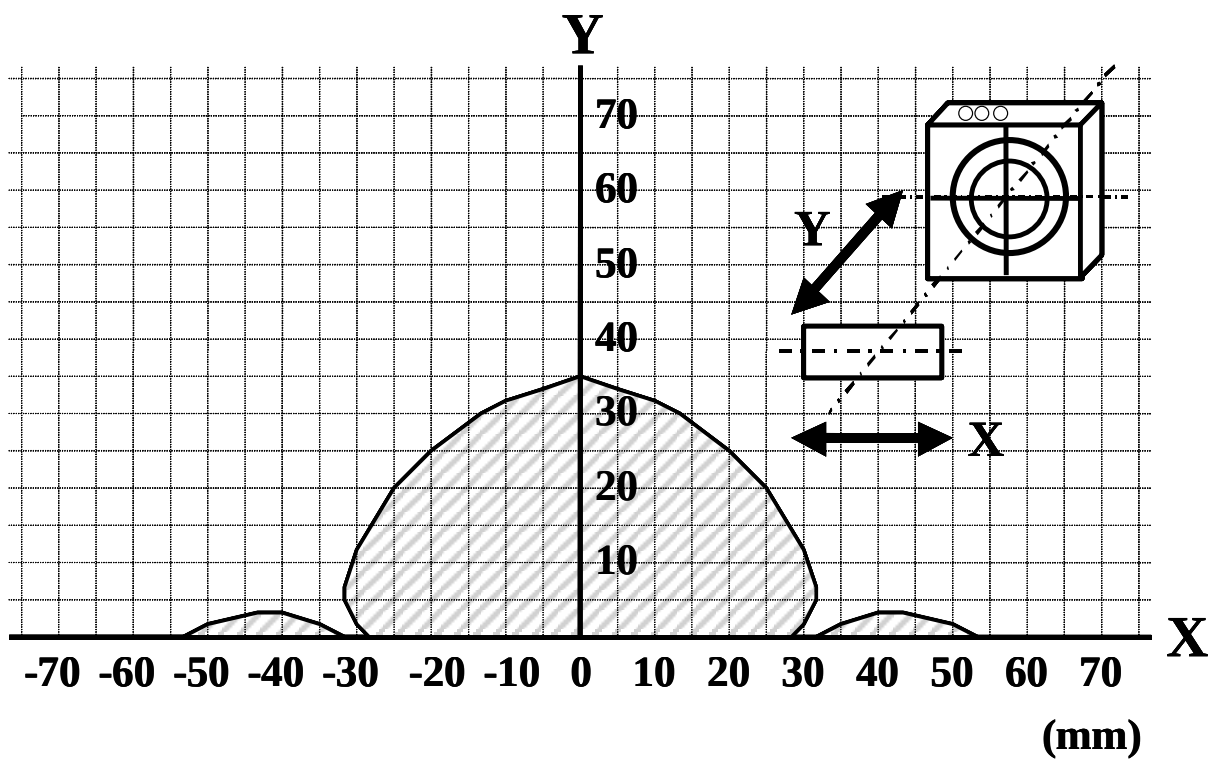
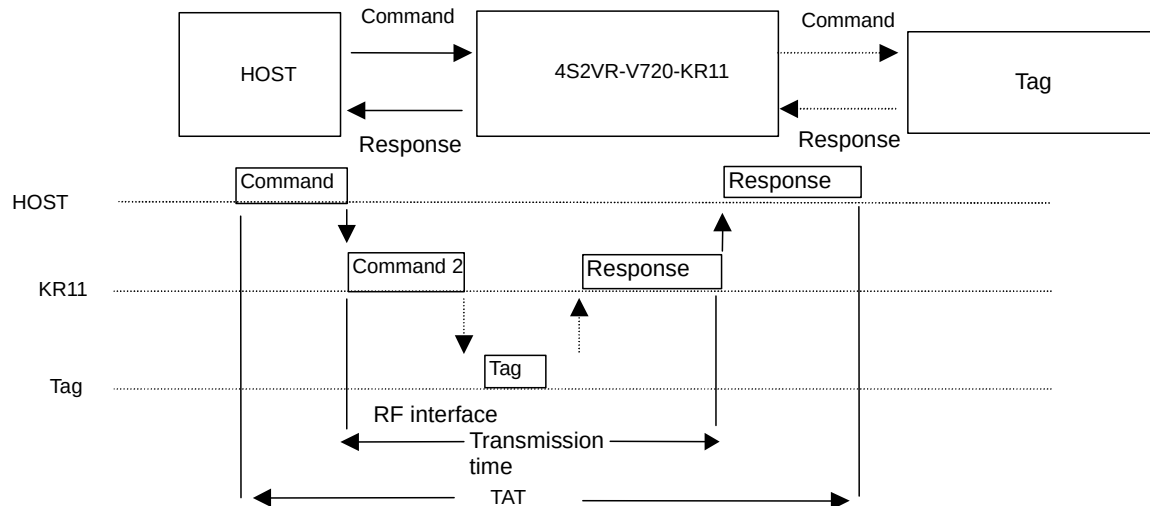


**Model 4S2VR-V720-KR11□ vs Model 4S2VR-V720-D13P02ST****Model 4S2VR-V720-KR11□ vs Model 4S2VR-V720-D13P06ST**

### 3-3 Communication Time

Transmission time and TAT (Turn Around Time) is displayed below as the communication time.



TAT is the sum of (host communication time + RF interface communication time + processing time of controller). Since the baud rate is 9600bps, compute the host communication time for the length of the communication frame of command and response (byte), letting 1 byte=2ms. The processing time of the controller (for two communication times) is shorter enough to be ignored, compared with the communication time. The RF interface communication time is described below. The RF interface communication time refers to the transmission processing time between the reader and tag. This processing time varies in accordance with the number of pages to be read and written and specified method.

- When the number of pages to be read and written are continuously specified.

Calculating formula

| Command | Transmission time (ms) |
|---------|------------------------|
| Read    | $T=1.3N+6.0$           |
| Write   | $T=13.6N+15.5$         |

N: Number of pages to be processed

- When the number of pages to be read and written are not specified continuously.

Calculating formula

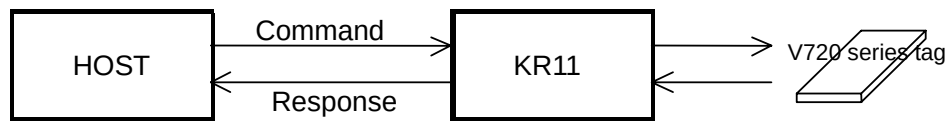
| Command | Transmission time (ms)  |
|---------|-------------------------|
| Read    | $T=1.3N_R+6.0$          |
| Write   | $T=12.3N_W+1.3N_R+15.5$ |

$N_R$ : Largest specified page number - Smallest specified page number)

$N_W$ : Number of pages to be written

# Chapter 4 Functions

## 4-1 Procedure of Communication and Outline of Operation



When the host issues a command to Model 4S2VR-V720-KR11 □, Model 4S2VR-V720-KR11 □ communicates with the tag according to the command and returns a response to the host.

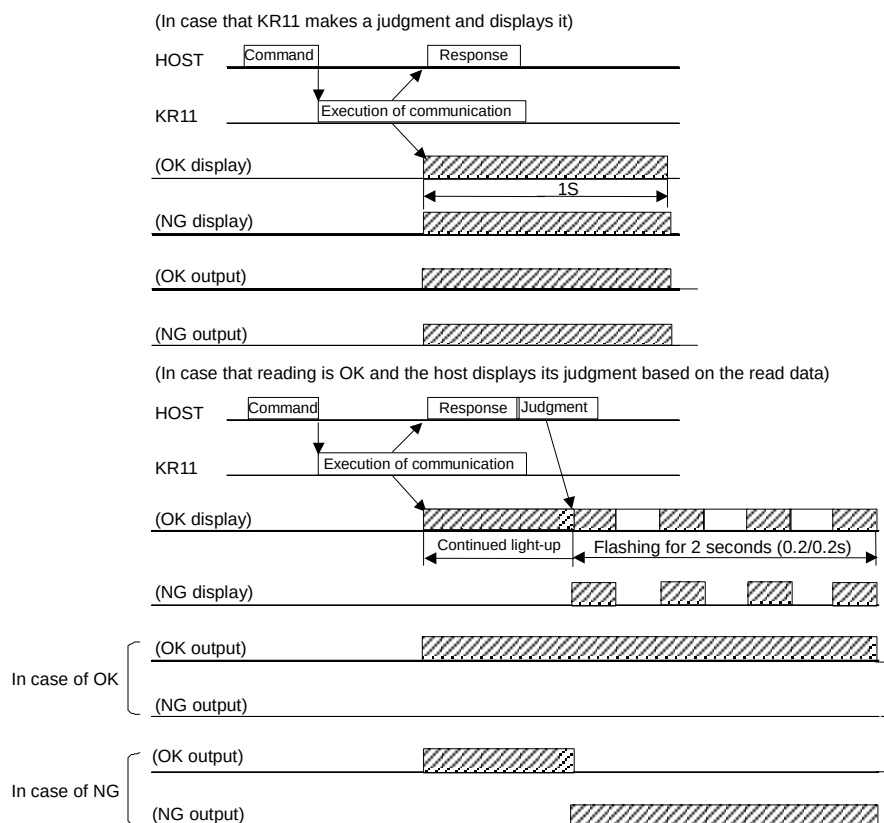
A command specifies:

- 1) page of the tag to be accessed "Specification of Access Page (4-3)"
- 2) communication procedure to be used "Specification of Communication mode (4-4)"
- 3) what to do "Specification of Command (4-5)"

As a response, the result of execution of the command added with a message of an exit code is returned to the host "Exit Code (4-7)".

As a result of communication of 4S2VR-V720-KR11 □ with the tag, the OK or NG LED display lights up for about 1 second. In addition, the host can present its judgment such as judgment on checking of read data by flashing the LED display on the terminal, Model 4S2VR-V720-KR11 □, for about 2 seconds (See the diagram below).

Data exchange between the host and Model 4S2VR-V720-KR11 □ is executed smoothly by exchanging status information with each other. "Response Status of Command (4-6)"



## 4-2 Memory Map of Tag

Kanban reader Model 4S2VR-V720-KR11 □ can have access to banks 0 - F, 16 pages per bank, and 4 bytes per page.

Each tag has a user memory area of 4 bytes per page, and 112 byte for 28 pages as shown in the memory map below. A user can use all the area freely for reading and writing for each page. When an area out of the memory for the tag is accessed, the tag absence error occurs.

| Bank | Page | Byte0 | Byte1 | Byte2 | Byte3 |
|------|------|-------|-------|-------|-------|
| 00h  | 0h   |       |       |       |       |
|      | 1h   |       |       |       |       |
|      | 2h   |       |       |       |       |
|      | 3h   |       |       |       |       |
|      | 4h   |       |       |       |       |
|      | 5h   |       |       |       |       |
|      | 6h   |       |       |       |       |
|      | 7h   |       |       |       |       |
|      | 8h   |       |       |       |       |
|      | 9h   |       |       |       |       |
|      | Ah   |       |       |       |       |
|      | ...  |       |       |       |       |
|      | Fh   |       |       |       |       |
| 01h  | 0h   |       |       |       |       |
|      | 1h   |       |       |       |       |
|      | ...  |       |       |       |       |
|      | Bh   |       |       |       |       |
|      | ...  |       |       |       |       |
|      | F    |       |       |       |       |
| ...  | ...  |       |       |       |       |
| 0Fh  | 0h   |       |       |       |       |
|      | 1h   |       |       |       |       |
|      | ...  |       |       |       |       |
|      | Fh   |       |       |       |       |

When I = Code II.



#### 4-4 Specification of Communication Mode

A communication mode optimum for object motion according to the intended application is selected. The specification of the communication mode is represented by ASCII digits.

| Transmission operation | No. | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Trigger                | '0' | <p>When the host puts object movement under control, a command is issued after ensuring that the tag is present before Model 4S2VR-V720-KR11 □.</p> <p>Immediately after receiving the command, the Kanban reader 4S2VR-V720-KR11 □ communicates with the tag and sends a response. If the tag is not present, a tag absence error is transmitted. After sending the response, the reader stands by for a new command. It is essential that one tag is present in the communication area.</p>                                                                                                                                                                                                                                                          |
| Auto                   | '1' | <p>When the host puts object motion under control mostly, and if a command has been issued in advance when the tag is approaching the Kanban reader 4S2VR-V720-KR11 □, transmission is made when the tag comes into the communication area.</p> <p>After completing the transmission and sending a response, the reader stands by for a new command. When it receives a command and is waiting for the tag, the T/R lights up. When a stop command is received, the command is cancelled and the T/R goes out. It is essential that one tag is present in the communication area.</p>                                                                                                                                                                  |
| Continue               | 'A' | <p>Even when the host is not controlling object movement at all, if a command has been received in advance, the reader makes a communication with the tag waiting for the tag to come into the communication area. Reading can be executed in synchronization with objects using the EXT input of the I/O of 4S2VR-V720-KR11 □. Even when the host cannot keep synchronization, the reader 4S2VR-V720-KR11 □ as a local control can keep synchronization.</p> <p>In this case, if an error occurs as the result of communication, it is reflected on the response.</p> <p>In the continue mode, too, reading by keeping synchronization via the reader 4S2VR-V720-KR11 □ is recommended because it will be easier to recover from an error status.</p> |

#### Caution!

As a rule, reading and writing operation of Kanban information by the reader should be performed for one Kanban. If communication is executed when more than one Kanban is present within the communication area, a communication is made with any one of tags or no communication is made, causing a tag absence error and resulting in incorrect information collection.

#### 4-5 Types of Commands

A command is specified by 2 digits ASCII.

|                                     | Command name      | Code | Description                                                                         |
|-------------------------------------|-------------------|------|-------------------------------------------------------------------------------------|
| Communication<br>control<br>command | Test              | '10' | Returns the received data to the host as it is.                                     |
|                                     | Stop              | '13' | Cancels the command under execution.                                                |
| Communication<br>command            | Read              | '31' | Tag data is read for each page.                                                     |
|                                     | Write             | '32' | Data is written on the tag for each page.<br>(Verify After Write)                   |
|                                     | Same Data Write   | '35' | Same data is written on the tag for each page.<br>Data for one page can be written. |
|                                     | Write Protect Set | '39' | The setting to disable writing on the tag is made for each page.                    |

\* At the time of power-on or at the startup of the system, send the stop command and initialize the setting.

## 4-6 Status

### (1) Command status

This is a message given from the host to the reader. It is used to modify a reply for communication or the whole command.

It is represented by 8 bits (1 byte), each bit having its own meaning.

|    | Name   | Description                                                                                                                                                                                                                |
|----|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D7 | Verify | The host requests a response to the reader.                                                                                                                                                                                |
| D6 | ACK    | The host acknowledges the acceptance to the reader.                                                                                                                                                                        |
| D5 | STM    | Switches the communication mode with the host.<br>0: Realtime mode Requests a prompt reply to a command.<br>1: Polling mode A response to a command is withheld and requested at another time by data request by "Verify". |
| D4 | ATM    | Used when an indicator is connected.<br>0: Data is not sent to the indicator<br>1: Data is sent to the indicator                                                                                                           |
| D3 | NGU    | Turned on when judgment by the host is NG.                                                                                                                                                                                 |
| D2 | OKU    | Turned on when judgment by the host is OK.                                                                                                                                                                                 |
| D1 |        | "0": NOP                                                                                                                                                                                                                   |
| D0 | EXT    | When the communication mode is "Continue", reading and writing can be executed in synchronization with EXT inputs of the reader by setting this to "1".                                                                    |

### (2) Response status

This is a message given from the reader to the host. It is used to send a reply for communication or the hardware status of the reader. It is represented by 8 bits (1 byte), each bit having its own meaning.

|    | Name | Description                                                                        |
|----|------|------------------------------------------------------------------------------------|
| D7 |      | "0": NOP                                                                           |
| D6 | ACK  | Acknowledges the acceptance to the host.                                           |
| D5 | NON  | Replies to the host that the reader has not completed RF interface communications. |
| D4 | EXT  | Displays the status of the EXT signal of reader I/O                                |
| D3 | NGL  | Turned on when the reader failed in RF interface communications.                   |
| D2 | OKL  | Turned on when the reader succeeded in RF interface communications                 |
| D1 | T/R  | Turned on when the reader is emitting radio waves.                                 |
| D0 | RUN  | Turned on when the reader is in normal operation.                                  |

## 4-7 Exit Code

The exit code is sent by the reader as a reply to the host, which is represented by 2 digits ASCII, showing the status of the reader as the result of execution of the command.

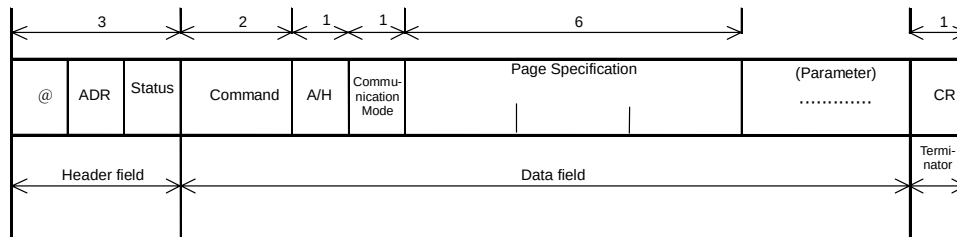
|                                                      | Exit code | Name                | Description                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------|-----------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| When an error occurs in communication with the host. | '10'      | Parity error        | <ul style="list-style-type: none"> <li>The received command includes a character with which a parity error occurred. [In case of CR control]</li> </ul>                                                                                                                                                             |
|                                                      | '11'      | Framing error       | <ul style="list-style-type: none"> <li>The received command includes a character with which a framing error occurred.</li> </ul>                                                                                                                                                                                    |
|                                                      | '12'      | Overrun error       | <ul style="list-style-type: none"> <li>The received command includes a character with which an overrun error occurred.</li> </ul>                                                                                                                                                                                   |
|                                                      | '13'      | BCC error           | <ul style="list-style-type: none"> <li>When the BCC of the received frame is invalid [In case of character control]</li> </ul>                                                                                                                                                                                      |
|                                                      | '14'      | Format error        | <ul style="list-style-type: none"> <li>The command format does not meet the specifications. Ex. command-section is undefined. Specification of page and address is not correct.</li> </ul>                                                                                                                          |
|                                                      | '18'      | Frame error         | <ul style="list-style-type: none"> <li>When the received character spacing is 2 sec. or more [In case of CR control]</li> <li>When the received frame is 140 or more [In case of CR control]</li> <li>When the received frame is 73 bytes or more [In case of character control]</li> </ul>                         |
|                                                      | 'IC'      | System error        | <ul style="list-style-type: none"> <li>Including power interruption (*)</li> <li>When an error other than specified above occurred.</li> </ul>                                                                                                                                                                      |
| When an error occurs in RF interface communication   | '70'      | Communication error | <ul style="list-style-type: none"> <li>Due to disturbance by noises etc. during communication with the tag, communication was not normally completed.</li> </ul>                                                                                                                                                    |
|                                                      | '71'      | Write error         | <ul style="list-style-type: none"> <li>"Write" was requested on a page on which write-protect has been specified.</li> <li>The tag is present in an area where "Read" is enabled but "Write" is disabled.</li> <li>Due to the expiration of the writing life of the tag, correct data cannot be written.</li> </ul> |
|                                                      | '72'      | Tag absence error   | <ul style="list-style-type: none"> <li>The tag is not present in the communication area when executing a command.</li> <li>The specified page is not present [In case of I-CODE 2]</li> </ul>                                                                                                                       |
|                                                      | '79'      | Command error       | <ul style="list-style-type: none"> <li>(See "Comparison with ISO error code")</li> </ul>                                                                                                                                                                                                                            |
|                                                      | '7A'      | Address error       | <ul style="list-style-type: none"> <li>The specified page is not present</li> </ul>                                                                                                                                                                                                                                 |

### Caution!

In the event of a system error including power interruption, if the reader is operating in the continue mode, take an action to restart the system normally by issuing a command again. When the power is turned on according to normal system start-up procedure, the IC is returned. Then follow the restart procedure.

# Chapter 5 Communication Frame

## 5-1 Overview of Communication Frame



The frame format is comprised of the header field of 3 bytes starting by @, the data field represented by ASCII characters and the terminator <CR> (ASCII code (0D) h).

| Name         |                    | Frame length (Byte) | Description                                                                                                                                                                                                                                                        | Page                               |
|--------------|--------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Header field | @                  | (1)                 | Start of communication (40) h                                                                                                                                                                                                                                      | Fixed header field, 3 bytes<br>4-6 |
|              | ADR                | (1)                 | Reader No. Hexadecimal notation 0 - F expressed in ASCII.                                                                                                                                                                                                          |                                    |
|              | Status             | (1)                 | Controls, by a flag, the communication status between the host and RF interface described in 4-6.                                                                                                                                                                  |                                    |
| Data field   | Command            | (2)                 | Indicates an operation instruction to the host or RF interface (4-5).<br>The communication control command does not execute RF interface communications.<br>A header of 4 bytes as given below is further added to the RF interface communication control command. | 4-5                                |
|              | A/H                | (1)                 | Specify the format of data to be written on the tag.<br>Specify '2' for hex format and '3' for ASCII format.                                                                                                                                                       |                                    |
|              | Communication Mode | (1)                 | Select the form of the RF interface communications (4-4).                                                                                                                                                                                                          | 4-4                                |
|              | Page Specification | (6)                 | Specify pages for communication with the tag (4-3).                                                                                                                                                                                                                | 4-3                                |

## 5-2 Command format (When the communication mode with the host is the realtime mode)

**Note)** In the following description, (\*\*) h is represented in the hexadecimal notation while '\*\*' included in quotation marks is represented in ASCII notation.

As a rule, ASCII codes are transmitted for all serial communication data. However, a hex code of 1 byte should be transmitted for the Status data alone.

### 1. Test

This is a command for conducting a test of host communications. When the reader receives this command, it sends the same data to the host.

#### ■ Command

| Header |     |        | Command | Test Data |      |      |      |        | Terminator |
|--------|-----|--------|---------|-----------|------|------|------|--------|------------|
| @      | ADR | Status | '10'    | Data 1    | .... | .... | .... | Data n | CR         |

ADR represents the address number expressed by '30-39' and '41-46' in ASCII converted from the hexadecimal 0-F. Send (00) h for the Status in 1:1 communication in general.

#### ■ Response

| Header |     |        | Exit Code | Test Data |      |      |      |      | Terminator |
|--------|-----|--------|-----------|-----------|------|------|------|------|------------|
| @      | ADR | Status | '00'      | Data 1    | .... | .... | .... | Data | CR         |

### 2. Stop

Used to stop the processing of the reader. When the reader receives this command, it stops the processing currently being executed and stands by for a command.

Data waiting to be transmitted are cleared.

When radio waves are being emitted, emission is stopped.

#### ■ Command

| Header |     |        | Command | Terminator |
|--------|-----|--------|---------|------------|
| @      | ADR | Status | '13'    | CR         |

ADR represents the address number expressed by '30-39' and '41-46' in ASCII converted from the hexadecimal 0-F. Send (00) h for the Status in 1:1 communication in general.

#### ■ Response

| Header |     |        | Exit Code | Terminator |
|--------|-----|--------|-----------|------------|
| @      | ADR | Status | '00'      | CR         |

### 3. Read

This command is used to read data from the tag. Data in a desired page can be read.

#### ■ Command

The tag data on the page specified in the Page Specification box is read in the specified communication mode.

| Header |     |        | Command | A/H | Commu-<br>nication<br>Mode | Bank<br>Specification |  | Page Specification |  |  |  | Termina-<br>tor |
|--------|-----|--------|---------|-----|----------------------------|-----------------------|--|--------------------|--|--|--|-----------------|
| @      | ADR | Status | '31'    |     |                            |                       |  |                    |  |  |  | CR              |

ADR represents the address number expressed by '30-39' and '41-46' in ASCII converted from the hexadecimal 0-F. Send (00) h for the Status in 1:1 communication in general.

#### ■ Response

An exit code ("00" in normal state) and the read data are returned. The read data are returned in ascending sequence starting from the smallest number of the specified pages. If an error occurs, the error code is returned as an exit code.

| Header |     |        | Exit Code | Read Data |      |      |      |           | Termina-<br>tor |
|--------|-----|--------|-----------|-----------|------|------|------|-----------|-----------------|
| @      | ADR | Status | '00'      | Data<br>1 | .... | .... | .... | Data<br>n | CR              |

Number of data n = Number of specified pages × 4

#### <Examples of commands>

The table below shows the examples of commands and responses in the user memory of the tag.

| Page | Byte 0 | Byte 1 | Byte 2 | Byte 3 |
|------|--------|--------|--------|--------|
| 0    | 30h    | 31h    | 32h    | 33h    |
| 1    | 34h    | 35h    | 36h    | 37h    |
| 2    | 38h    | 39h    | 30h    | 30h    |
| 3    | 40h    | 41h    | 42h    | 43h    |
| 4    | 44h    | 45h    | 46h    | 47h    |
| 5    | 48h    | 49h    | 4Ah    | 4Bh    |
| 6    | 4Ch    | 4Dh    | 4Eh    | 4Fh    |
| 7    | 50h    | 51h    | 52h    | 53h    |
| 8    | 54h    | 55h    | 56h    | 57h    |
| 9    | 58h    | 59h    | 5Ah    | 61h    |
| 10   | 62h    | 63h    | 64h    | 65h    |

- \* To read all four pages (1, 3, 5, and 6) in the trigger mode in ASCII format, the sequence is as follows.

Command '@0\* 31 30 00 006A'<CR>

Response in normal state '@0\* 00 4567 @ABC HIJK LMNO'<CR>

**All the information included in ' ' is ASCII codes except the mark \*.**

**The mark \* represents (00) h.**

- \* To read all four pages (1, 3, 5, and 6) in the trigger mode in hex format, the sequence is as follows.

Command '@0\* '31 20 00 006A'<CR>'

Response in normal state '@0\* '00 343536374041424348494A4B4C4D4E4F'<CR>

**All the information included in ' ' is ASCII codes except the mark \*.  
The mark \* represents (00) h.**

■ Response in abnormal state

| Header |     |        | Exit Code | Terminator |
|--------|-----|--------|-----------|------------|
| @      | ADR | Status | 'XX'      | CR         |

The exit code is represented by 2 digits (1 byte) in ASCII as defined in 4-7.

■ Judgment notify command

Based on the result of the read data, the host can notify the RF interface of the result of judgment in checking, etc.

| Header |     |        | Terminator |
|--------|-----|--------|------------|
| @      | ADR | Status | CR         |

The Status of (44) h sends OK.

The Status of (48) h sends NG.

4. Write

This command is used to write data on the tag for each page. Data can be written on a desired page. Since this command also performs the verify read operation, there is no need to execute the verify read operation again.

■ Command

Sends the data to be written and pages to be written on as parameters. The number of data to be written must be equal to "(Number of specified pages) × 4". The data to be written are specified in ascending sequence starting from the smallest number of the specified page.

| Header |     |        | Command | A/H | Communication Mode | Bank Specification | Page Specification |  |  |  | Write Data |      |      |      |        | Terminator |
|--------|-----|--------|---------|-----|--------------------|--------------------|--------------------|--|--|--|------------|------|------|------|--------|------------|
| @      | ADR | Status | '32'    |     |                    |                    |                    |  |  |  | Data 1     | .... | .... | .... | Data n | CR         |

ADR represents the address number expressed by '30-39' and '41-46' in ASCII converted from the hexadecimal 0-F. Send (00) h for the Status in 1:1 communication in general.

■ Response

Returns the exit code ("00" in normal state)

| Header |     |        | Exit Code | Terminator |
|--------|-----|--------|-----------|------------|
| @      | ADR | Status | '00'      | CR         |

ADR represents the address number expressed by '30-39' and '41-46' in ASCII converted from the hexadecimal 0-F. Send (00) h for the Status in 1:1 communication in general.

## &lt;Examples of commands&gt;

The table below shows the user memory of the tag when the following commands are executed.

| Page | Byte 0 | Byte 1 | Byte 2 | Byte 3 |
|------|--------|--------|--------|--------|
| 0    | 30h    | 31h    | 32h    | 33h    |
| 1    | 34h    | 35h    | 36h    | 37h    |
| 2    | 38h    | 39h    | 30h    | 30h    |
| 3    | 40h    | 41h    | 42h    | 43h    |
| 4    | 44h    | 45h    | 46h    | 47h    |
| 5    | 48h    | 49h    | 4Ah    | 4Bh    |
| 6    | 4Ch    | 4Dh    | 4Eh    | 4Fh    |
| 7    | 50h    | 51h    | 52h    | 53h    |
| 8    | 52h    | 46h    | 49h    | 44h    |
| 9    | 58h    | 59h    | 5Ah    | 61h    |
| 10   | 56h    | 37h    | 32h    | 30h    |

- \* In case that 'RFID' is written on page 8 and 'V720' on page 10 in ASCII codes in the continue mode.

Command '@0\* 32 3A 00 0500 RFID V720'<CR>

Response in normal state '@0\* 00'<CR>

**All the information included in ' ' is ASCII codes except the mark \*.**

**The mark \* represents (00) h.**

- \* In case that 'RFID' is written on page 8 and (5246494456373230) h 'V720' on page 10 in hex codes in the continue mode.

Command '@0\* 32 2A 00 0500 5246494456373230 RFID V720'<CR>

Response in normal state '@0\* 00'<CR>

**All the information included in ' ' is ASCII codes except the mark \*.**

**The mark \* represents (00) h.**

■ Response in abnormal state

| Header |     |        | Exit Code | Terminator |
|--------|-----|--------|-----------|------------|
| @      | ADR | Status | 'XX'      | CR         |

See 4-7 for the exit code.

## 5. Same Data Write

This command is used to write the same data on the tag for each page. It is convenient for clearing all the memory area of the tag.

The maximum pages that can be specified for writing at a time are restricted to one bank and pages across more than one bank cannot be specified.

Since this command also performs the verify read operation, there is no need to execute the verify read operation again.

### ■ Command

The same data as specified for one page in the Write Data box can be written on all specified pages.

| Header |     |        | Commnad | A/H | Commu-<br>nication<br>Mode | Bank<br>Specification | Page Specification |  |  |  | Write Data (for one page) |      |      |           | Termina-<br>tor |
|--------|-----|--------|---------|-----|----------------------------|-----------------------|--------------------|--|--|--|---------------------------|------|------|-----------|-----------------|
| @      | ADR | Status | '33'    |     |                            |                       |                    |  |  |  | Data<br>1                 | .... | .... | Data<br>4 | CR              |

ADR represents the address number expressed by '30-39' and '41-46' in ASCII converted from the hexadecimal 0-F. Send (00) h for the Status in 1:1 communication in general.

### ■ Response

Returns the exit code ('00' in normal state).

| Header |     |        | Exit Code | Termina-<br>tor |
|--------|-----|--------|-----------|-----------------|
| @      | ADR | Status | '00'      | CR              |

<Examples of commands>

The table below shows the user memory of the tag when the following commands are executed.

| Page | Byte 0 | Byte 1 | Byte 2 | Byte 3 |
|------|--------|--------|--------|--------|
| 0    | 30h    | 31h    | 32h    | 33h    |
| 1    | 34h    | 35h    | 36h    | 37h    |
| 2    | 38h    | 39h    | 30h    | 30h    |
| 3    | 40h    | 41h    | 42h    | 43h    |
| 4    | 44h    | 45h    | 46h    | 47h    |
| 5    | 48h    | 49h    | 4Ah    | 4Bh    |
| 6    | 4Ch    | 4Dh    | 4Eh    | 4Fh    |
| 7    | 50h    | 51h    | 52h    | 53h    |
| 8    | 30h    | 30h    | 30h    | 30h    |
| 9    | 30h    | 30h    | 30h    | 30h    |
| 10   | 30h    | 30h    | 30h    | 30h    |

- \* In case that '0000' is written on all 8,9 and 10 pages in ASCII codes in the continue mode.

Command '@0\* 33 3A 00 0700 0000'<CR>

Response '@0\* 00'<CR>

**All the information included in ' ' is ASCII codes except the mark \*.**  
**The mark \* represents (00) h.**

- \* In case that (30 30 30 30) h is written on all 8,9 and 10 pages in hex codes in the continue mode.

Command '@0\* 33 2A 00 0700 30303030'<CR>

Response

'@0\* 00'&lt;CR&gt;

## 6. Tag write Protect Set

This command is used to set write protect on the tag.

The maximum pages that can be specified for write protect at a time are restricted to one bank and pages across more than one bank cannot be specified for write protect.

■ Command

Pages for which write protect is specified in the data field are sent. Writing is disabled on the specified pages. To read the write protect information, set all the Page Specification boxes to OFF by the same command, and the current write protect information can be read.

| Header |     |        | Command | A/H | Commu-<br>nication<br>Mode | Bank<br>Specification |  | Page Specification |  |  |  | Termina-<br>tor |
|--------|-----|--------|---------|-----|----------------------------|-----------------------|--|--------------------|--|--|--|-----------------|
| @      | ADR | Status | '39'    |     |                            |                       |  |                    |  |  |  | CR              |

ADR represents the address number expressed by '30-39' and '41-46' in ASCII converted from the hexadecimal 0-F. Send (00) h for the Status in 1:1 communication in general.

■ Response

An exit code ('00' in normal state) and the write protect set status are returned.

| Header |     |        | Exit Code | Bank<br>Specification |  | Page Specification |  |  |  | Termina-<br>tor |
|--------|-----|--------|-----------|-----------------------|--|--------------------|--|--|--|-----------------|
| @      | ADR | Status | '00'      |                       |  |                    |  |  |  | CR              |

Caution!

The write protect setting cannot be cancelled. Data cannot be written again on pages any more where the write protect is set. Caution should be used in setting the write protect.

### 5-3 Command format (When the communication mode with the host is the polling mode)

a) The stop, write, same data write, and tag write protect commands are always in the realtime mode.

b) Read

#### ■ Command A

Specifies the bank and page to be read.

| Header |     |        | Command | A/H | Communi-<br>cation<br>Mode | Bank<br>Specification |  | Page Specification |  |  |  | Termina-<br>tor |
|--------|-----|--------|---------|-----|----------------------------|-----------------------|--|--------------------|--|--|--|-----------------|
| @      | ADR | Status | '31'    |     |                            |                       |  |                    |  |  |  | CR              |

ADR represents the address number expressed by '30-39' and '41-46' in ASCII converted from the hexadecimal 0-F. Send (00) h for the Status in 1:1 communication in general.

#### ■ Response A to command A

| Header |     |        | Termina-<br>tor |
|--------|-----|--------|-----------------|
| @      | ADR | Status | CR              |

When a command is received normally, the ACK flag of the Status box is received as '1'.

#### ■ Command B

This command is sent to request for the tag data read verify.

| Header |     |        | Termina-<br>tor |
|--------|-----|--------|-----------------|
| @      | ADR | Status | CR              |

ADR represents the address number expressed by '30-39' and '41-46' in ASCII converted from the hexadecimal 0-F. Send (00) h for the Status in 1:1 communication in general.

#### ■ Response B to command B

The exit code ('00' in normal state) and the read data are returned. The read data is returned in ascending sequence starting from the smallest number of the specified pages. If an error occurs, the error code is returned as the exit code.

| Header |     |        | Exit Code | Read Data |      |      |      |           | Termina-<br>tor |
|--------|-----|--------|-----------|-----------|------|------|------|-----------|-----------------|
| @      | ADR | Status | '00'      | Data<br>1 | .... | .... | .... | Data<br>n | CR              |

## 2. Test

This is a command to perform a test on host communications which allows communication tests on an applicable address.

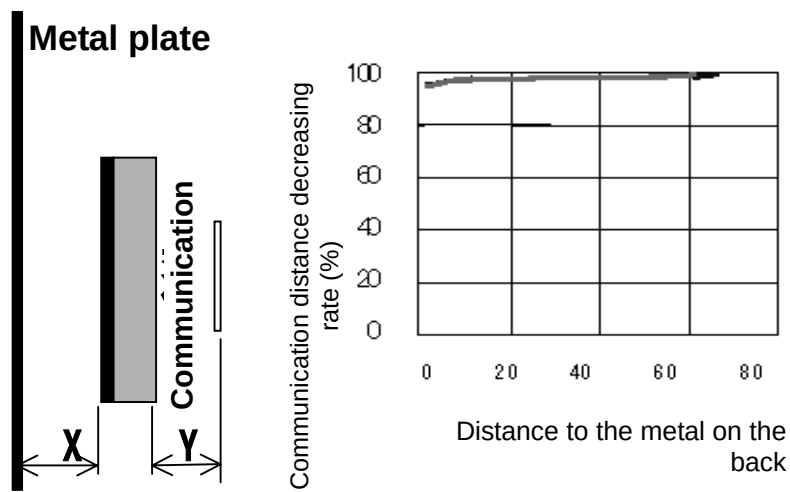
As is the case with the command Read, the response B is returned via the response A and command B.

The response B has the same contents as those of command A.

# Chapter 6 Cautions in Operation

## 6-1 Effects of Metal on The Back Face upon Communication Area of Reader

**Size of metal on the back face** (For reference)  
If metal is present on the back face of the R/W module, the communication distance with the tag is reduced.



Measurement condition  
Metal on the back (aluminium) 300 × 300 × t1.5

## 6-2 Effects of Supply Voltage on Communication Area of Reader (For reference)

### Effects of Supply Voltage (For reference)

The communication distance (read & write) of the R/W module varies according to the value of the supply voltage. Refer the values listed in the table below for proper operation. The changing rate of the communication distance is defined with the distance at the supply voltage of 5V set as 100%.

| Tag type                     | Changing rate of communication distance |      |      |
|------------------------------|-----------------------------------------|------|------|
|                              | 4.5V                                    | 5.0V | 5.5V |
| Model 4S2VR-V720-D13P Series | 92                                      | 100  | 101  |

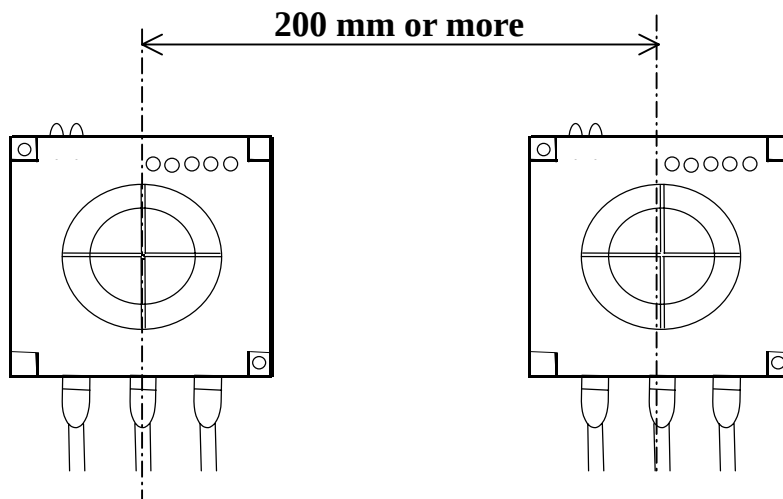
### 6-3 Cautions in handling of tag

1. The tag is not provided with a rigidly protected construction.  
If it is bend or subjected to external pressure, its internal circuit could be damaged, thereby resulting in communication failure.  
The system should be designed so as to have a recovery function in case of a possible damage of the tag.
2. The communication distance may vary depending on objects lying between the reader and tag.
3. The communication area may vary according to the types of tags.  
Kanban reader Model 4S2VR-V720-KR11□ is developed for interfacing between man and equipment. Be sure to contact sales personnel of the Information Product Section of the Sales Department of Omron when you intend to use this reader in fixed installation.

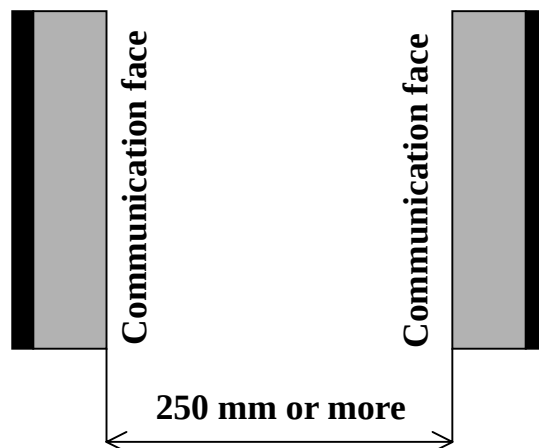
#### 6-4 Mutual Interference

When a number of R/W modules are used in proximity, allow the spacing as shown below between them in order to prevent a malfunction due to mutual interference.

- In case that antennas are disposed in parallel.



- In case that antennas are faced with each other



Since the effects of mutual interference may vary due to the effects of metals in the neighborhood, check for the presence of metals in the neighborhood.

## 6-5 Specifications of Tags

### ■ General specifications

|                                  |                                                                                                                                                                                                                     |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Memory capacity                  | 112 bytes (User area)                                                                                                                                                                                               |
| Memory type                      | 128 bytes EEPROM                                                                                                                                                                                                    |
| Operating frequency              | 13.56 MHz                                                                                                                                                                                                           |
| Data retention time              | 10 years after data is written                                                                                                                                                                                      |
| Number of data re-writable times | 100,000 times for each address                                                                                                                                                                                      |
| Working ambient temperature      | For reading & writing<br>-10°C - +55°C                                                                                                                                                                              |
|                                  | For data retention<br>-30°C - +70°C                                                                                                                                                                                 |
| Storage ambient temperature      | -30°C - +70°C                                                                                                                                                                                                       |
| Heat resistance                  | 85°C (for 250 hours)                                                                                                                                                                                                |
| Operation & Storage              | Ambient humidity 35 - 95%                                                                                                                                                                                           |
| Resistance to vibration          | Durability: Variable vibration at frequency 100Hz - 2kHz, 1.5 mm double amplitude, at acceleration 150 m/S <sup>2</sup> with 10 sweeps in X, Y, and Z directions for 11 minutes, each.                              |
| Shock resistance                 | Durability: Impact of 500 m/S <sup>2</sup> in X, Y, and Z directions, 3 times, each (18 times in total).                                                                                                            |
| Water resistance                 | No water seepage after being immersed in water of 1m depth for 30 minutes. IP66                                                                                                                                     |
| Protective construction          | IEC60529: IP66                                                                                                                                                                                                      |
| Material (Enclosure)             | Polyolefin (PET in case of P03 type)                                                                                                                                                                                |
| Outside dimensions               | Model 4S2VR-V720-D13P01S :86×54×3.2(mm)<br>Model 4S2VR-V720-D13P01ST :86×54×2 (mm)<br>Model 4S2VR-V720-D13P03 :86×54×0.6 (mm)<br>Model 4S2VR-V720-D13P02ST :56×56×2 (mm)<br>Model 4S2VR-V720-D13P06ST :72×32×2 (mm) |

### ■ Chemical resistance

|                       |   |
|-----------------------|---|
| 10% sulfuric acid     | ○ |
| 10% hydrochloric acid | ○ |
| 10% acetic acid       | ○ |
| 10% citric acid       | ○ |
| 10% caustic soda      | ○ |
| 10% ammonia           | ○ |
| 10% saline solution   | ○ |
| Ethanol               | ○ |
| Toluene               | ○ |
| Trichlen              | ○ |
| Isopropyl myristate   | ○ |
| Mineral oil           | ○ |
| Butter                | ○ |
| Soy sauce             | ○ |
| Tomato ketchup        | ○ |
| Coke                  | ○ |
| Lip rouge             | ○ |
| India                 | ○ |
| Crayon                | ○ |
| Felt pen              | ○ |

\* The information on chemical resistance listed in this table is the data for Model 4S2VR-V720-D13P0□S/ST series.

## 6-6 Warranty

### Warranty

#### 1. Warranty period

The warranty shall apply for one (1) year after the delivery of the product to the designated delivery point.

#### 2. Scope of warranty

A defect incurred for a cause attributable to a fault of Omron during the warranty period shall be repaired or replaced free of charge, for the defective parts of the product at the place of purchase or delivery.

The warranty, however, shall be invalidated in case that a defect was caused in any of the following conditions:

- ① A defect caused by the use in inappropriate conditions, environment, application and handling other than those laid down in this Operation Manual and specifications delivered separately
- ② A defect caused for a reason of a problem not attributable to the delivered product
- ③ A defect caused by attempts of repairs and remodeling by a person other than those authorized by Omron
- ④ A defect caused by a use not intended for the product
- ⑤ A defect caused for a reason unrecognizable under scientific technology at the time of the shipment of the product
- ⑥ A defect caused for a reason not attributable to the fault of Omron such as a natural disaster and extraordinary accident

The warranty laid down herein applies to the defect of the delivered product itself, and shall not apply to incidental and consequential damages induced by a problem of the delivered product.

#### 3. Scope of service

The price of the delivered product does not include the service costs for dispatching an engineer and other services.

Such services are offered upon request at cost.

The warranty laid down herein is based on the assumption of sales and use of the product in Japan.

## 6-6 Notice

### 1. FCC WARNING

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

### 2. NOTICE

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 instructions, may cause harmful interference in which case the user will be required to correct the interference at his own expense.