Ultrasonic Flow Meter For Natural Gas and Factory Air

AS-W(For Natural Gas) AS-C(For Factory Air)

MODBUS RTU Communication Specifications

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1. Communication Specifications

Interface	EIA RS485 compliant
Communication method	Half-duplex
Synchronization method	Asynchronous
Connection topology	1: N (Unbalanced bus connection)
Communication mode	Modbus RTU
Transmission speed [bps]	Selectable from the following by parameter setting: 4800, 9600
Bit length [bits]	8
Stop bit [bits]	1
Parity	N/A
Sending/receiving buffer size [bytes]	100
Response time [s]	3 (max)

2. Message frame configuration

Start	Address	Function code	Data	CRC check	End
Silent interval *	1 byte	1 byte	n bytes	2 bytes	Silent interval *

* Silent communication for 3.5 characters or more

<Address>
Specify the RTU address set for the flowmeter. 00H is set at the time of shipment.

<Function code>
The following function codes are available. Other codes are not available.

Code (Hex)	Function
03	Reading of parameters, flowmeter information, and history information
06	Writing of a single parameter
10	Writing of multiple parameters

Note that the broadcast function is not available by all of the function codes.

<Data>
Used to transmit date associated with a function code. The data length is variable and there is no data if it's not associated with a function code.

<CRC check>
Error check is performed in the CRC method. CRC is 16-bit binary value and is calculated and added by the sender side. The receiver calculates the CRC value from the sent message and compares with the sent CRC value. An error is declared if these two values do not match.

3.Internal address and data details

Function code (Hex)	Address (Hex)	Area name	Function	Details
	0000〜00FF		System area	
03 or 06 or 10	0100	Parameter	Working pressure set value valid/invalid	0x0000: Invalid 0x0001: Valid
	0101		Working pressure [abs]	0x0000 to 0x2710 (0.0 to 1000.0 [kPa], Set value multiplied by 10)
	0102		Output pulse constant	0x0004: 100L/P 0x0005: 1000L/P 0x0006: 10000L/P
	0103		Flow-rate compensation selection	0x0000: Without compensation 　　　(Actual flow) 0x0001: With compensation
	0104		Selection of flow value for pulse output	0x0000: Instantaneous flow-rate without compensation. 0x0001: Instantaneous flow-rate with compensation.
	0105		Instantaneous flow-rate moving average number of times	0x0001 to 0x0010 (1 to 16 [times])
	0106		Compressibility factor fixed value	0x 0000,0x0320 to 0x04B0 (0.800 to 1.200, Set value multiplied by 1000. 0x 0000: The compressibility factor calculated by composition input is used for flow conversion.)
	0107		Communication bit rate	0000: 4800bps 0001: 9600bps
	0108		RTU address	0x0000 to 0x00FF (0 to 255)
	0109		Low flow cutoff value	0 to Qmin, Set value multiplied by 100
	010A		System area	
	010B			
	010C		Selection of Alarm output contact state	0x0000 : Normal open 0x0001 : Normal close
	010D		System area	
	010E		Time setting (year)	0x0000〜0xFFFF (Set in A.D.)
	010F		Time setting (month)	0x0001〜0x000C (January to December)
	0110		Time setting (day)	0x0001〜0x001F (1st to 31st)
	0111		Time setting (hour)	0x0000〜0x0017 (0 to 23)
	0112		Time setting (minute)	0x0000〜0x003B (0 to 59)
	0113		History storage interval	0x0001〜0x0120（5 minutes to 24 hours） （Set value×5 minutes＝Storage interval）
	0114		System area	
	0115		Pulse output method and ON time at one-shot pulse	0x0000：One-shot pulse and ON time 1000ms 0x0001：One-shot pulse and ON time 500ms 0x0002：One-shot pulse and ON time 250ms 0x0003：One-shot pulse and ON time 125ms 0x0004：One-shot pulse and ON time 50ms 0x0005：duty50
	0116		Pressure value moving average number of times	0x0001〜0x0004 (1〜4[times])
	0117		System area	

Function code (Hex)	Address (Hex)	Area name	Function	Details
06 or 10	0118	Parameter	Accumulated forward flow volume (upper 4 digits) Actual flow specifications：Accumulated forward actual flow volume Compensated specifications：Accumulated forward compensated flow volume	Set upper 4 digits of accumulated display digits in decimal system. Refer to the following when set value 4 digits are shown as WXYZ |	Digit position	
	25A～80A	100A～200A
W	0	0
X	0	0
Y	0	10^9 digits
Z	10^7 digits	10^8 digits	
	0119		Accumulated forward flow volume (middle 4 digits) Actual flow specifications：Accumulated forward actual flow volume Compensated specifications：Accumulated forward compensated flow volume	Set middle 4 digits of accumulated display digits in decimal system. Refer to the following when set value 4 digits are shown as WXYZ |	Digit position	
	25A～80A	100A～200A
W	10^6 digits	10^7 digits
X	10^5 digits	10^6 digits
Y	10^4 digits	10^5 digits
Z	10^3 digits	10^4 digits	
	011A		Accumulated forward flow volume (lower 4 digits) Actual flow specifications：Accumulated forward actual flow volume Compensated specifications：Accumulated forward compensated flow volume	Set lower 4 digits of accumulated display digits in decimal system. Refer to the following when set value 4 digits are shown as WXYZ |	Digit position	
	25A～80A	100A～200A
W	10^2 digits	10^3 digits
X	10^1 digits	10^2 digits
Y	10^0 digits	10^1 digits
Z	10^{-1} digits	10^0 digits	
	011B		Accumulated forward flow volume (upper 2 bytes) Actual flow specifications：Accumulated forward volume compensated flow volume Compensated specifications：Accumulated forward actual flow volume	Unsigned 4-byte data, Value multiplied by 10
	011C		Accumulated forward flow volume (lower 2 bytes) Actual flow specifications：Accumulated forward compensated flow volume Compensated specifications：Accumulated forward actual flow volume	
	011D		Accumulated reverse compensated flow volume (upper 2 bytes)	Unsigned 4-byte data, Value multiplied by 10
	011E		Accumulated reverse compensated flow volume (lower 2 bytes)	
03	011F		Software version	Not configurable, read only
	0120		System area	
	0121			
	0122			

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Function code (Hex)	Address (Hex)	Area name	Function	Details
03 or 06 or 10	0123	Parameter	Compensated standard temperature	0xFF9C～0x0258(+/-Signed data) (-10.0～+60.0[℃]、Value multiplied by 10)
	0124		Compensated standard pressure (Gauge pressure)	0x0000～0x03E8 (0.00～10.00kPa, Value multiplied by 100)
	0125～012E		System area	
03 or 06 or 10	012F	Parameter	CH_4	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	0130		N_2	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	0131		CO_2	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	0132		C_2H_6	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	0133		C_3H_8	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	0134		$i\text{-}C_4H_{10}$	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	0135		$n\text{-}C_4H_{10}$	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	0136		$i\text{-}C_5H_{12}$	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	0137		$n\text{-}C_5H_{12}$	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	0138		C_6H_{14}	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	0139		C_7H_{16}	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	013A		C_8H_{18}	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	013B		C_9H_{20}	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	013C		$C_{10}H_{22}$	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	013D		H_2	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	013E		O_2	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	013F		CO	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	0140		H_2O	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)
	0141		H_2S	0x0000～0x03E8 (0.000～1.000[Mole fraction],Value multiplied by 1000)

Function code (Hex)	Address (Hex)	Area name	Function	Details
03 or 06 or 10	0142	Parameter	He(Helium)	0x0000〜0x03E8 (0.000〜1.000[Mole fraction],Value multiplied by 1000)
	0143		Ar(Argon)	0x0000〜0x03E8 (0.000〜1.000[Mole fraction],Value multiplied by 1000)
	0144〜01FE	System area		
03	01FF	Flowmeter information	Instantaneous actual flow-rate (upper 2 bytes)	+/- signed 4-byte data (long type) Value multiplied by 100
	0200		Instantaneous actual flow-rate (lower 2 bytes)	
	0201		Instantaneous compensated flow-rate (upper 2 bytes)	+/- signed 4-byte data (long type) Value multiplied by 100
	0202		Instantaneous compensated flow-rate (lower 2 bytes)	
	0203		Pressure (upper 2 bytes)	+/- signed 4-byte data (long type) Valued multiplied by 100
	0204		Pressure (lower 2 bytes)	
	0205		Temperature (upper 2 bytes)	+/- signed 4-byte data (long type) Valued multiplied by 100
	0206		Temperature (lower 2 bytes)	
	0207		Accumulated forward actual flow volume (upper 2 bytes)	Unsigned 4-byte data (unsigned long type) Value multiplied by 10 (Value multiplied by 1 for bigger size than AS-W,-C-100)
	0208		Accumulated forward actual flow volume (lower 2 bytes)	
	0209		Accumulated forward compensated flow volume (upper 2 bytes)	Unsigned 4-byte data (unsigned long type) Value multiplied by 10 (Value multiplied by 1 for bigger size than AS-W,-C-100)
	020A		Accumulated forward compensated flow volume (lower 2 bytes)	
	020B		Accumulated reverse compensated flow volume (upper 2 bytes)	Unsigned 4-byte data (unsigned long type) Valued multiplied by 10 (Value multiplied by 1 for bigger size than AS-W,-C-100)
	020C		Accumulated reverse compensated flow volume (lower 2 bytes)	
	020D		Error information (2 bytes)	Unsigned 2-byte data (unsigned int type)
	020E		Sound velocity information (2 bytes)	Unsigned 2-byte data (unsigned int type) Valued multiplied by 100
	020F〜021E	System area		
03	021F	Flowmeter information	Model information 1	Unsigned 2-byte data upper 1 byte：Nominal diameter lower 1 byte：Version
	0220		Model information 2	Unsigned 2-byte data Pressure type+Pressure
	0221		Serial number 1	Unsigned 2-byte data upper 1 byte：Year of manufacture lower 1 byte：Month of manufacture
	0222		Serial number 2	Unsigned 2-byte data upper 1 byte：By size of nominal diameter＋Version lower 1 byte：5-digit number（upper）
	0223		Serial number 3	Unsigned 2-byte data 5-digit number（lower）
	0224〜03FF	System area		

Function code (Hex)	Address (Hex)	Area name	Function	Details
03	0400	History 1	Instantaneous compensated flow-rate (4 bytes)	+/- signed 4-byte data (long type) Value multiplied by 100
			Pressure (4 bytes)	+/- signed 4-byte data (long type) Value multiplied by 100
			Temperature (4 bytes)	+/- signed 4-byte data (long type) Value multiplied by 100
			Accumulated forward flow volume (4 bytes)	Unsigned 4-byte data (unsigned long type) Value in accordance with the flow compensation selection, multiplied by 10
			Error information (2 bytes)	Unsigned 2-byte data (unsigned int type)
			Instantaneous actual flow-rate (4 bytes)	+/- signed 4-byte data (long type) Value multiplied by 10 (Value multiplied by 1 for bigger size than AS-W,-C-100)
			Accumulated forward actual volume (4 bytes)	+/- signed 4-byte data (long type) Value multiplied by 10 (Value multiplied by 1 for bigger size than AS-W,-C-100)
			Storage time (year)	Unsigned 2-byte data
			Storage time (month/ day)	Unsigned 2-byte data Upper 1 byte: Month Lower 1 byte: Day
			Storage time (hour/ minute)	Unsigned 2-byte data Upper 1 byte: Hour Lower 1 byte: Minute
			Accumulated forward compensated volume of the acquisition interval (4 bytes)	+/- signed 4-byte data (long type) Value multiplied by 10 (Value multiplied by 1 for bigger size than AS-W,-C-100)
			Accumulated forward actual volume of the acquisition interval (4 bytes)	+/- signed 4-byte data (long type) Value multiplied by 10 (Value multiplied by 1 for bigger size than AS-W,-C-100)
			Accumulated reverse compensated volume (4 bytes)	+/- signed 4-byte data (long type) Value multiplied by 10 (Value multiplied by 1 for bigger size than AS-W,-C-100)
	0401	History 2	Refer to 'History 1' for details	
	0402	History 3	Refer to 'History 1' for details	

03	1DC7	History 6600	Refer to 'History 1' for details	
	1DC8～FFFF		System area	

4.Function Codes

4-1. Reading of parameters, flowmeter information, and history information (03H)

Reads parameters, flowmeter information, and history information.

The following shows an example of reading the communication bit rate (0x0107) and RTU address.

\<Query configuration\>

Field name	Data example (Hex)
Start	N/A
Slave address	05
Function code	03
Start address (upper)	01
Start address (lower)	07
Number of registers (upper)	00
Number of registers (lower)	02
Error check	(CRC) (lower)
Error check	(CRC) (upper)
End	N/A

\<Response configuration\>

Field name	Data example (Hex)
Start	N/A
Slave address	05
Function code	03
Number of data bytes	04
Data at address 0x0107 (upper)	00
Data at address 0x0107 (lower)	01
Data at address 0x0108 (upper)	00
Data at address 0x0108 (lower)	05
Error check	(CRC) (lower)
Error check	(CRC) (upper)
End	N/A

*1 Reading of history information
When reading of "history 1～6600", only "0001" is available at number of registers.

*2 Details of flowmeter information and history information
- Instantaneous actual flow-rate: +/- signed 4-byte value, multiplied by 100
(Example) 0x00003039 → 123.45 [m3/h], 0xFFFE7E33 → -987.65 [m3/h]
- Pressure: +/- signed 4-byte value, multiplied by 100
(Example) 0x00003039 → 123.45 [kPa] (abs)
- Temperature: +/- signed 4-byte value, multiplied by 100
(Example) 0x000004D2 → 12.34 [℃], 0xFFFFFC50 → -9.45 [℃]
- Accumulated forward actual volume, accumulated forward compensated volume, and accumulated reverse compensated volume: Unsigned 4-byte value, multiplied by 10
(Example) 0x075BCD15 → 12345678.9 [m3]
- Error information: 2-byte value and each bit have error information. "1" is indicated for error condition, and "0" is indicated for normal condition. Unused bit is read as "0" or indefinite value.

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0

Bit name	Details
B0	Disuse: Read as 0
B1	
B2	Disuse: Read as indefinite value
B3	EEPROM error (0: Normal, 1: Error)
B4	Low battery voltage (0: Normal, 1: Low battery)
B5	Pressure measurement failure (0: Normal, 1: Error)
B6	Temperature measurement failure (0: Normal, 1: Error)
B7	Ultrasonic measurement failure (0: Normal, 1: Error)

Bit name	Details
B8	Disuse: Read as indefinite value
B9	
B10	
B11	Disuse: Read as 0
B12	
B13	
B14	
B15	

*3   Details of model information and Serial number

●Model information 1(upper 1 byte：Nominal diameter,lower 1 byte：Version)

Detail	Nominal diameter								Version
	25A	32A	40A	50A	80A	100A	150A	200A	Ver.5
Readout	0x19	0x20	0x28	0x32	0x50	0x64	0x96	0xC8	0x05

●Model information 2（upper 0.5 byte：Pressure type,lower 1.5 byte：Pressure）

Detail	Pressure type	Pressure			
	A	0	200	500	1000
Readout	0x0	0x000	0x0C8	0x1F4	0x3E8

●Serial number 1(upper 1 byte：year of manufacture,lower 1 byte：Month of manufacture)

Detail	Year of manufacture (last two digits of the year)	Month of manufacture	
	2019	January	December
Readout	0x13	0x01	0x0C

●Serial number 2(upper 1 byte：size of nominal diameter + version,lower 1 byte：5-digit number(upper))

Detail	Size of nominal diameter			Version
	S	M	L	Ver.5
Readout	0x0	0x1	0x2	0x05

●Serial number 3(5-digit number(lower))
          (Example) 5-digit numbe=67890（0x10932）
                Serial number 2=0x**01   Serial number 3=0x0932

4-2. Writing of a single parameter (06H)
   Changes (i.e., writes) a single parameter.
   The following shows an example of changing "Flow-rate compensation selection" to with compensation.

   <Query configuration>

Field name	Data example (Hex)
Start	N/A
Slave address	05
Function code	06
Start address (upper)	01
Start address (lower)	03
Change data (upper)	00
Change data (lower)	01
Error check	(CRC) (lower)
Error check	(CRC) (upper)
End	N/A

   <Response configuration>

Field name	Data example (Hex)
Start	N/A
Slave address	05
Function code	06
Address (upper)	01
Address (lower)	03
Change data (upper)	00
Change data (lower)	01
Error check	(CRC) (lower)
Error check	(CRC) (upper)
End	N/A

* Details of writing data
Refer to "3. Internal address and data details" for the details of the writing data for the parameter area. The following describes the item especially be noted.

○ Working pressure
The working pressure can be set within a range from 0.0 to 1000.0kPa [abs]. When the working pressure is 500.0kPa, the set value is 0x1388(hexadecimal representation of 5000 (500×10).

○ Output pulse constant
The pulse constant can be chosen from 100, 1000, and 10000L/P.

○ RTU address and communication bit rate
In case of changing the RTU address or communication bit rate, the response message to the change order uses the parameter setting before the change and the new setting is used from the succeeding communication.

Example1) When changing the RTU address of the flowmeter from 1 to 2

Field name	Query	Response
	Data example (Hex)	
Start	N/A	N/A
Slave address	01	01
Function code	06	06
Start address (upper)	01	01
Start address (lower)	08	08
Change data (upper)	00	00
Change data (lower)	02	02
Error check	(CRC) (lower)	(CRC) (lower)
Error check	(CRC) (upper)	(CRC) (upper)
End	N/A	N/A

← Response is returned with 0x01.

The succeeding messages operate with address = 2.

Example2) When changing the communication bit rate of the flowmeter from 9600bps to 4800bp

Field name	Query	Response
	Data example (Hex)	Data example (Hex)
Start	N/A	N/A
Slave address	01	01
Function code	06	06
Start address (upper)	01	01
Start address (lower)	07	07
Change data (upper)	00	00
Change data (lower)	00	00
Error check	(CRC) (lower)	(CRC) (lower)
Error check	(CRC) (upper)	(CRC) (upper)
End	N/A	N/A

← Response is returned with 9600bps.

The succeeding messages are transmitted at 4800bps

○ Low flow cutoff value
The low flow cutoff value can be set up to two decimal place in m3/h units. Use a value multiplied by 100 as the set value.
To set the value to "1.2 [m3/h]," use 0x0078 (hexadecimal representation of 120 (1.2×100)).
The low flow cutoff value can be set within a range from 0 to Qmin [m3/h]. Qmin depends on the nominal diameter. The available range is as listed below.

	Nominal diameter							
	25A	32A	40A	50A	80A	100A	150A	200A
Qmin [m³/h]	0.7	1.3	1.6	3	6	10	24	40
Upper limit set value (Hex)	0×0046	0×0082	0×00A0	0×012C	0×0258	0×03E8	0×0960	0×0FA0

○Pulse output method and ON time at one-shot pulse
As for each diameter, set regulation for the set pulse constant is as below.
This setting will be performed after pulse constant setting because this set value will be automatically set as duty50 output when pulse constant is changed.

○: Selectable　　　×: Not selectable

〈25A〉

Pulse ON width [ms]	Pulse constant [L/P]		
	100	1000	10000
50	○	○	○
125	○	○	○
250	○	○	○
500	×	○	○
1000	×	○	○

〈32A〉

Pulse ON width [ms]	Pulse constant [L/P]		
	100	1000	10000
50	○	○	○
125	○	○	○
250	×	○	○
500	×	○	○
1000	×	○	○

〈40A〉

Pulse ON width [ms]	Pulse constant [L/P]		
	100	1000	10000
50	○	○	○
125	○	○	○
250	×	○	○
500	×	○	○
1000	×	○	○

〈50A〉

Pulse ON width [ms]	Pulse constant [L/P]		
	100	1000	10000
50	○	○	○
125	×	○	○
250	×	○	○
500	×	○	○
1000	×	○	○

〈80A〉

Pulse ON width [ms]	Pulse constant [L/P]		
	100	1000	10000
50	○	○	○
125	×	○	○
250	×	○	○
500	×	○	○
1000	×	×	○

〈100A〉

Pulse ON width [ms]	Pulse constant [L/P]		
	100	1000	10000
50	×	○	○
125	×	○	○
250	×	○	○
500	×	×	○
1000	×	×	○

〈150A〉

Pulse ON width [ms]	Pulse constant [L/P]		
	100	1000	10000
50	×	○	○
125	×	○	○
250	×	×	○
500	×	×	○
1000	×	×	○

〈200A〉

Pulse ON width [ms]	Pulse constant [L/P]		
	100	1000	10000
50	×	○	○
125	×	×	○
250	×	×	○
500	×	×	○
1000	×	×	×

4-3. Writing of multiple parameters (10H)

Changes (i.e., writes) multiple parameters.

The following shows an example of changing the pulse output flow-rate to the instantaneous flow-rate value without compensation, and the instantaneous flow-rate moving average number of times to "3."

<Query configuration>

Field name	Data example (Hex)
Start	N/A
Slave address	05
Function code	10
Start address (upper)	01
Start address (lower)	04
Number of registers (upper)	00
Number of registers (lower)	02
Number of bytes	04
Change data (pulse output flow-rate value selection) (upper)	00
Change data (pulse output flow-rate value selection) (lower)	00
Change data (Instantaneous flow-rate moving average number of times) (upper)	00
Change data (Instantaneous flow-rate moving average number of times) (lower)	03
Error check	(CRC) (lower)
Error check	(CRC) (upper)
End	N/A

<Response configuration>

Field name	Data example (Hex)
Start	N/A
Slave address	05
Function code	10
Start address (upper)	01
Start address (lower)	04
Number of registers (upper)	00
Number of registers (lower)	02
Error check	(CRC) (lower)
Error check	(CRC) (upper)
End	N/A

Details of writing data for writing multiple parameters are the same as those for writing a single parameter as described in "4-2. Writing of a single parameter."

5. Communication Error

When following communication errors are detected, their contents are returned as response messages. No response will be returned for any other errors than listed below.

Code	Name	Meaning
0x01	Improper function	The function is not supported.
0x02	Improper data address	The address does not exist. An address exceeding the buffer size is specified.
0x03	Improper data	The specified data is out of range.

A response returned upon error detection consisted of the function code with its uppermost bit changed to "1" and of the error code appended to the function code.

Example) When 0x0003 is set for the flow-rate compensation selection. Since set data 0x0003 is out of the available range, an improper data is returned.

\<Query configuration\>

Field name	Data example (Hex)
Start	N/A
Slave address	05
Function code	06
Start address (upper)	01
Start address (lower)	03
Change data (upper)	00
Change data (lower)	03
Error check	(CRC) (lower)
Error check	(CRC) (upper)
End	N/A

\<Response configuration\>

Field name	Data example (Hex)	
Start	N/A	
Slave address	05	
Function code	86	◄——The uppermost bit of 0x06 is set to "1."
Error code	03	◄——Returns the error contents.
Error check	(CRC) (lower)	
Error check	(CRC) (upper)	
End	N/A	

About improper data processing

When improper data is detected while writing a single parameter, the improper data is not set.

When improper data is detected while writing multiple parameters, values preceding the improper data are set but the improper data and the values following it are not set.

Example1) When writing the pulse output flow-rate value selection = 0x0001 (normal data), instantaneous flow-rate moving average number of times = 0x0011 (improper data), and compression factor compensation value = 0x0320 (normal data) in a single operation, the pulse output flow rate value selection is set but the instantaneous flow-rate moving average number of times and compression factor compensation value are not set.

Example2) When writing the pulse output flow-rate value selection = 0x0002 (improper data), instantaneous flow-rate moving average number of times = 0x0004 (normal data), and compression factor compensation value = 0x0320 (normal data) in a single operation, all parameters are not set.