User's Manual

ADMAG TI Series
AXW Magnetic Flowmeter
BRAIN Communication Type

ADMAG *Total Insight*

YOKOGAWA ◆
Yokogawa Electric Corporation

**ADMAG TI Series
AXW Magnetic Flowmeter
BRAIN Communication Type**

IM 01E24A02-01EN 4th Edition

Contents

1.   Introduction

This manual provides the basic guidelines for basic operation of ADMAG TI (Total Insight) Series AXW magnetic flowmeters with BRAIN protocol.
For the items which are not covered in this manual, read the applicable user's manuals and general specifications as listed in Table 1.1. These documents can be downloaded from the website of YOKOGAWA. To ensure correct use of the instrument, read these manuals thoroughly and fully understand how to operate the instrument before operating it. For method of checking the model and specifications, read general specifications as listed in Table 1.1.
Website address: http://www.yokogawa.com/fld/doc/
These manuals can be downloaded from the website of YOKOGAWA or purchased from the YOKOGAWA representatives.

Table 1.1   Manual and General Specifications List

Model	Document Title	Document No.
AXW□□□ AXW□□□G AXW□□□W AXW4A AX01C	ADMAG TI Series AXG/AXW Magnetic Flowmeter Read Me First	IM 01E21A21-01Z1
	ADMAG TI Series AXG/AXW Magnetic Flowmeter Safety Manual	IM 01E21A21-02EN
	ADMAG TI Series AXW Magnetic Flowmeter [Size: 25 to 400 mm (1 to 16 in.)] Installation Manual	IM 01E24A01-01EN
	ADMAG TI Series AXW Magnetic Flowmeter [Size: 500 to 1800 mm (20 to 72 in.)] Installation Manual	IM 01E25A01-01EN
	ADMAG TI Series AXW Magnetic Flowmeter [Size: 25 to 1800 mm (1 to 72 in.)] Maintenance Manual	IM 01E24A01-02EN
	ADMAG TI Series AXW Magnetic Flowmeter BRAIN Communication Type	IM 01E24A02-01EN (this manual)
	ADMAG TI Series AXW Magnetic Flowmeter HART Communication Type	IM 01E24A02-02EN
	ADMAG TI Series AXW Magnetic Flowmeter [Size: 25 to 400 mm (1 to 16 in.)] General Specifications	GS 01E24A01-01EN
	ADMAG TI Series AXW Magnetic Flowmeter [Size: 500 to 1800 mm (20 to 72 in.)] General Specifications	GS 01E25D11-01EN
AXFA11G	AXF Series Magnetic Flowmeter Read Me First	IM 01E20A21-01Z1
AXFA11G AXFC	AXFA11G Remote Converter [Hardware Edition/Software Edition]	IM 01E20C01-01E
	AXFA11G Remote Converter General Specifications	GS 01E20C01-01E

⚠ NOTE

When describing the model name like AXW□□□ in this manual, "□□□" means any of the following.
For AXW□□□:
    025, 032, 040, 050, 065, 080, 100, 125, 150, 200, 250, 300, 350, 400
For AXW□□□G or AXW□□□W:
    500, 600, 700, 800, 900, 10L, 11L, 12L, 13L, 14L, 15L, 16L, 18L

■ **Precautions Related to the Protection, Safety, and Alteration of the Instrument**

The following safety symbol marks are used in this manual and instrument.

⚠ WARNING

A WARNING sign denotes a hazard. It calls attention to procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in injury or death of personnel.

⚠ CAUTION

A CAUTION sign denotes a hazard. It calls attention to procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.

⚠ IMPORTANT

An IMPORTANT sign denotes that attention is required to avoid damage to the instrument or system failure.

⚠ NOTE

A NOTE sign denotes information necessary for essential understanding of operation and features.

The following symbols are used in the Instrument and the manual to indicate the accompanying safety precautions:

⏚ Protective grounding terminal

⏛ Functional grounding terminal (This terminal should not be used as a protective grounding terminal.)

∿ Alternating current

⎓ Direct current

⚠ Caution
This symbol indicates that the operator must refer to an explanation in the user's manual in order to avoid the risk of injury or death of personnel or damage to the instrument.

For the protection and safe use of the instrument and the system in which this instrument is incorporated, be sure to follow the instructions and precautions on safety that is stated in user's manual as listed in Table 1.1 whenever you handle the instrument. Take special note that if you handle the instrument in a manner that violated these instructions, the protection functionality of the instrument may be damaged or impaired. In such cases, YOKOGAWA does not guarantee the quality, performance, function, and safety of instrument.

■ **Regarding This User's Manual**

• This manual should be provided to the end user.
• The contents of this manual are subject to change without prior notice.
• All rights reserved. No part of this manual may be reproduced in any form without YOKOGAWA's written permission.
• YOKOGAWA makes no warranty of any kind with regard to this manual, including, but not limited to, implied warranty of merchantability and fitness for a particular purpose.
• If any question arises or errors are found, or if any information is missing from this manual, inform the nearest YOKOGAWA sales office.
• The specifications covered by this manual are limited to those for the standard type under the specified model number break-down and do not cover custom-made instruments.
• Note that changes in the specifications, construction, or component parts of the instrument may not immediately be reflected in this manual at the time of change, provided that postponement of revisions will not cause difficulty to the user from a functional or performance standpoint.
• This manual is intended for the following personnel;
Engineers responsible for installation and wiring of the instrument.
Personnel responsible for normal daily operation of the instrument.
• To ensure correct use, read this manual and the applicable manuals as listed in Table 1.1 thoroughly before starting operation. Read the general specifications as listed in Table 1.1 for its specification.

■ **Trademarks:**

• All the brands or names of Yokogawa Electric's products used in this manual are either trademarks or registered trademarks of Yokogawa Electric Corporation.
• All other company and product names mentioned in this manual are trade names, trademarks or registered trademarks of their respective companies.
• In this manual, trademarks or registered trademarks are not marked with ™ or ®.

1.1   For Safe Use of Product

For the protection and safe use of the instrument and the system in which this instrument is incorporated, be sure to follow the instructions and precautions on safety that is stated in user's manual as listed in Table 1.1 whenever you handle the instrument. Take special note that if you handle the instrument in a manner that violated these instructions, the protection functionality of the instrument may be damaged or impaired. In such cases, YOKOGAWA shall not be liable for any indirect or consequential loss incurred by either using or not being able to use the Instrument.

(1) General

⚠ **WARNING**

- Do not open the cover in wet weather or humid environment. When the cover is open, stated enclosure protection is not applicable.
- When opening the cover, wait for more than 20 minutes after turning off the power. Only expert engineer or skilled personnel are permitted to open the cover.

(2) Operation

⚠ **WARNING**

Be sure to enable the write protect function to prevent the overwriting of parameters after finishing parameter setting.
In rare cases, the IR switches may respond unexpectedly to water drops or extraneous substances sticking on the surface of display panel, due to the operating principal. The possibility of malfunction arises after rain or cleaning operation near the place where the flowmeter is installed. Turning on and off the flashlight etc. towards the IR switch may also be a cause of malfunction.
Read the installation manual as listed in Table 1.1 for the hardware write protect function, and Section 4.14 for the software write protect function.

(3) Maintenance

⚠ **WARNING**

- If dirt, dust or other substances surfaces on the glass of display cover, wipe them clean with a soft dry cloth.
- Maintenance of this flowmeter should be implemented in a maintenance service shop where the necessity tools and environment condition are provided.
  The necessity of this environmental condition is that ambient temperature is 5 to 40°C (the maximum relative humidity is 80 % for temperature 5 to 31°C, and decreasing linearly to 50 % relative humidity at 40°C).

(4) microSD Card

✋ **IMPORTANT**

- Do not store or use the microSD card in places with static electricity, near electrically charged objects, or where electrical noise is present. Doing so can result in shock or damage.
- Do not disassemble or modify the microSD card.
- Do not physically shock, bend, or pinch the microSD card.
- During reading/writing of data, do not turn off the power, apply vibration or shock, or pull out the card. Data can corrupt or be permanently lost.
- Use only micro SD cards sold by YOKOGAWA. Operation cannot be guaranteed when other cards are used.
- When inserting the microSD card into the instrument, make sure to orient the microSD card correctly (face up or down) and insert it securely. If not inserted correctly, the microSD card will not be recognized by the instrument.
- Do not touch the microSD card with wet hands.
- Do not use the microSD card if it is dusty or dirty.
- The microSD card comes formatted. If you want to format the microSD card, use the instrument's Format function.
- YOKOGAWA provides no warranty for damage to, or loss of data recorded on the microSD card, regardless of the cause of such damage or loss.
  We recommend making backup copies of your data.

1.2 Warranty

- The warranty shall cover the period noted on the quotation presented to the purchaser at the time of purchase. Problems occurred during the warranty period shall basically be repaired free of charge.
- In case of problems, the customer should contact the YOKOGAWA representative from which the instrument was purchased, or the nearest YOKOGAWA office.
- If a problem arises with this instrument, please inform us of the nature of the problem and the circumstances under which it developed, including the model specification and serial number. Any diagrams, data and other information you can include in your communication will also be helpful.
- Responsible party for repair cost for the problems shall be determined by YOKOGAWA based on our investigation.
- The Purchaser shall bear the responsibility for repair costs, even during the warranty period, if the malfunction is due to:
  - Improper and/or inadequate maintenance by the purchaser.
  - Failure or damage due to improper handling, use or storage which is out of design conditions.
  - Use of the product in question in a location not conforming to the standards specified by YOKOGAWA, or due to improper maintenance of the installation location.
  - Failure or damage due to modification or repair by any party except YOKOGAWA or an approved representative of YOKOGAWA.
  - Malfunction or damage from improper relocation of the product in question after delivery.
  - Reason of force majeure such as fires, earthquakes, storms/floods, thunder/lightening, or other natural disasters, or disturbances, riots, warfare, or radioactive contamination.

2. Basic Operating Procedures

2.1 Operation by Display unit

The parameter settings from display unit can be carried out using the three IR (infra-red) switches - namely, the [SET] [SHIFT] and [▼] switches. The IR switches enable the user to set parameters from the outside of the glass of the display cover.
This section provides descriptions of basic parameter configuration and operation procesures of IR switches. This instrument can be also operated using the dedicated handheld terminal or the FieldMate (Versatile Device Management Wizard). For operation in details, read Chapter 4 or the hardware/software edition (for AXFA11) as listed in Table 1.1.

⚠ WARNING

Be sure to enable the write protect function to prevent the overwriting of parameters after finishing parameter setting.
In rare cases, the IR switches may respond unexpectedly to water drops or extraneous substances sticking on the surface of display panel, due to the operating principal. The possibility of malfunction arises after rain or cleaning operation near the place where the flowmeter is installed. Turning on and off the flashlight etc. towards the IR switch may also be a cause of malfunction.
Read the installation manual as listed in Table 1.1 for the hardware write protect function, and Section 4.14 for the software write protect function.

✋ IMPORTANT

Operate the display unit under the condition where direct sunlight, etc... do not shine to the IR switches directly when the parameter setting operation is carried out.

✋ NOTE

- Always keep the cover closed and operate the setting switches from the outside of the glass window.
- If dirt, dust or other substances surfaces on the glass of display cover, wipe them clean with a soft dry cloth.
- The operation with dirty gloves may cause a switch response error.

✋ NOTE

The language on the display is set to "English" as default at the factory shipment. Select the adequate language referring to Subsection 2.2.2 and Subsection 4.9.1. The menu pass of the display on this manual is selected to "English".

2.2 Display and Basic Configuration

The display unit of AXW Integral Flowmeter and AXW4A Remote transmitter has various functions below.

2.2.1 Display

microSD card (Optional code: /MC)
Status icon and time
Data display (Abbreviation: see Table 2.2.1)
Switch On/Off status (On: inverted)
IR switches
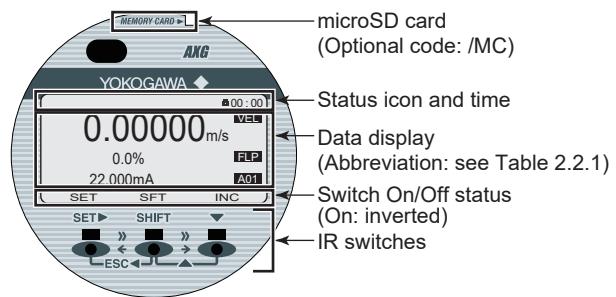
F0201.ai

(1) Basic operation of IR switches

The operation from display panel is done by using the three IR switches; [SET], [SHIFT] and [▼]. The combination of the two switches provides a different function, and the function is indicated on the display.

IR switch (Note 1)	Indicate of switch (Note 2)	Function
[SET▶]	SET	▪ Apply parameter (Note 3) ▪ Enter data (Note 3) ▪ Move to next menu
[SHIFT]	SFT	▪ Move cursor right (Numeric type parameter)
[▼]	INC	▪ Move cursor down (Select type parameter) ▪ Increment value (Numeric type parameter) ▪ Change position of decimal point (Numeric type parameter)
[SHIFT] + [▼] (=[▲])	DEC	▪ Move cursor up (Select type parameter) ▪ Decrement value (Numeric type parameter)
SHIFT + SET▶ (=[ESC◀])	ESC	▪ Cancel ▪ Back to previous menu

Note 1: [A] + [B] (=[C]): The function is changed to switch [C] when switch [B] is pushed while pushing switch [A].
Note 2: [SET], [SFT], [INC], [DEC] and [ESC] indicate the assigned function in accordance with display mode at that time.
Note 3: "Apply" and "Enter" are executed by pushing [SET] twice. If the execution does not work properly, release the finger from the display glass completely after the first push of [SET], and then make the second push.

(2) Status icons

Icon	Contents	Icon	Contents
	Write protect Invalid		Write protect Valid
	Device Busy		Device Fault
	Ready for microSD card		Accessing microSD card
	Disable to access microSD card		Uploading parameters
	Downloading parameters		Trend graph executing
	BRAIN communication		Setting alarm occurs
	System alarm occurs		Information occurs
	Process alarm occurs		Operation level: Operator
	Warning occurs		Operation level: Specialist
	Display Damping Valid		Operation level: Maintenance

(3) Data indication part

The process values are available to select 8 items maximum on the display. It is possible to indicate 4 items maximum on the display at the same time, and the rest 4 items are able to show by scrolling.

Table 2.2.1 Abbreviation table of process values to be indicated on the display.

Abbreviation	Contents
FLP(*1)	Flow rate %
PRV(*1)	Process value
VEL(*1)	Flow velocity
VFL(*1)	Volumetric flow
MFL(*1)	Mass flow
FLB	Flow rate in % bar graph
TL1(*1)	Totalization value 1
TL2(*1)	Totalization value 2
TL3(*1)	Totalization value 3
TAG	Tag No.
COM	Communication protocol
ADH	Adhesion diagnostic Level (Alarm at Level 4)
AO1(*1)	Analog output value 1

*1: Available to display the online trend graph.

⚠ NOTE

The PRV (PV value), FLP (flow rate%), VEL (flow velocity), VFL (volume flow), and MFL (mass flow) are not affected by the low cut function for analog output. Their values are displayed as they are.

2.2.2 Basic Configuration for Display

For paramter setting from display panel, configurable parameters differ by the three operational levels specfied in Table 2.2.2, and a passcode is needed to enter into Setting mode. No passcode requires for "Operator", and a passcode corresponding to each level requires for "Maintenance" or "Specialist".
For parameter in details, read Section 4.9.

Table 2.2.2 Parameter setting from display panel and operation level

Operation Level	Reading parameters	Writing parameters
Operator	All parameters	Parameters related with basic display settings including display language.
Maintenance	All parameters	Parameters allowed for Operator level. Parameters related with Zero adjustment.
Specialist	All parameters	All Parameters

The following parameters are available to "Operator" level without passcode.

(1) Display Language Setting

Display Menu Path:
   Device setup ► Language

The language on the display is set to "English" as default at the factory shipment. Select the adequate language.

The selectable display language is different by the model and suffix code (display code) specified when ordering.
Position of the display code:
   Integral type:
      AXW□□□-□□□□□□□□□□□□□-□□□□■
      AXW□□□G-□□□□□□-□□□□-□■□
   Remote transmitter:
      AXW4A-□□□□□□□□□■

Display code	Selectable display language
1	English, French, German, Italian, Spanish, Portuguese, Japanese, or Russian
2	English or Chinese

(2) Display Contrast Setting (shading)

Display Menu Path:
   Device setup ► Detailed setup ► Display set ► Optional config ► Contrast

Available to change the contrast of the display.

Setting item	Contents
-5 to +5	Set the contrast of the display (The value is small: Low, and the value is big: High)

(3) Display Line Setting

Display Menu Path:
   Device setup ► Detailed setup ► Display set ► Optional config ► Line mode

Available to select the number of lines of process value to be indicated on the display.
Up to four lines can be displayed at the same time.
The character size changes depending on the number of line.

Setting item	Contents
1 line(big)	Number of displayable process value : One (without unit)
1 line	Number of displayable process value : One (with unit)
2 line	Number of displayable process values : Two
3 line	Number of displayable process values : Three
4 line	Number of displayable process values : Four

Table 2.2.3   Display line setting and display example

Lines of display	Example 1	Example 2
1 line(big)	0.50000 VEL	FNL * Flow noise status is displayed. (Status label is not displayed.)
1 line	0.50000 m/s VEL	FNL Normal * Flow noise status and status label are displayed.
2 line	0.5000 m/s VEL 50.0 % FLP	Normal FNL Long tag 1234567 89ABCDEFGabcdefg LTG
3 line	0.50000 m/s VEL 50.0 % FLP 12.00 mA AO1	FNL Normal Long tag 1234567... LTG TAG12345 TAG
4 line	0.50000 m/s VEL 50.0 % FLP 12.000 mA AO1 FNL Normal	Normal FNL LTG Long tag 1234567... TAG12345 TAG
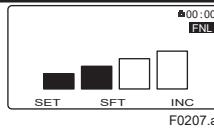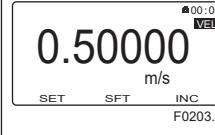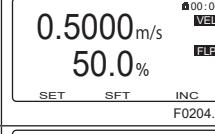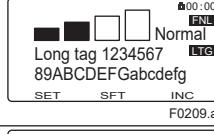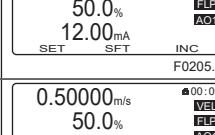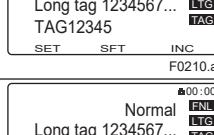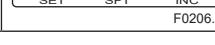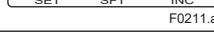
(4) Date Display Formant Setting

Display Menu Path:
   Device setup ► Detailed setup ► Display set ► Optional config ► Format date

The date display format can be specified below.

Setting item	Contents
MM/DD/YYYY	Displays the date in "month/day/year".
DD/MM/YYYY	Displays the date in "day/month/year".
YYYY/MM/DD	Displays the date in "year/month/day".

The date needs to be set every time when the power is turned on.
In case the date is not set:
   • BRAIN communication: Date counting starts from the date stored in the memory.

(5) Inverse Display Setting

Display Menu Path:
   Device setup ► Detailed setup ► Display set ► Optional config ► Inversion

Available to change from normal diplay to white/black reverse display.

Setting item	Contents
Normal	Characters in the display is Black.
Inverse	Outline characters

2.3 Display Mode and Setting Mode

The device runs in the Display Mode when the power is turned on. For check or change of parameters, the Setting Mode must be activated. The following procesure explains how to change to the Setting Mode. For the function of IR switches, read Subsection 2.2.1.

[Procedure]

1) Turn on the power and wait for several seconds to move to display mode.
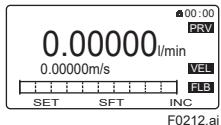
2) Keep touching [SET] switch for two seconds. The screen moves to the menu of Operation Level.
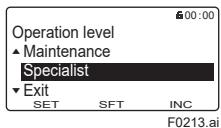
3) Select an appropreate operation level by moving the cursor with [INC] or [DEC] switch. Passcode is not necessary for "Operator". For "Maintenance" and "Specialist", passcode is necessary for each.
   For passcode setting, [SFT] is for position change, and [INC] is for number, then twice [SET] is for entry completion.
   The default passcode at the factory shipment is set to "0000".
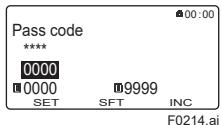
4) When the Operation Level is determined, the screen moves to "Device setup" as the Setting Mode where parameters can be configured.

5) After completing parameter setting, push [ESC] switch. The screen returns to the Display Mode.

[Passcode Confirmation and Change]

The confirmation and change of the passcode are allowed only by parameter setting from the display unit.

> Display Menu Path:
> Device setup ► Detailed setup ► Access cfg ► Chg mainte
> Device setup ► Detailed setup ► Access cfg ► Chg special

(1) Passcode for "Maintenance" operation level
   To change the passcode (Maintenance code), "Maintenance" or "Specialist" as the operational level is required.

(2) Passcode for "Specialist" operation level
   To change the passcode (Specialist code), "Maintenance" or "Specialist" as the operational level is required.

✋ IMPORTANT

> Display Menu Path:
> Device setup ► Wizard

When parameters are changed in the Wizard of Easy setup, "Setting download" in the menu of each parameter must be executed after parameter is changed. Without the execution, any parameter changed is not stored into the device.

✋ NOTE

If 10 minutes past without operation in the Setting Mode, the screen goes back to the Display Mode.

Parameter form

There are three types of parameter form below.

Type	Example of display	Contents
Select type		Select the adequate data from among alternatives which are demined in advance.
Numeric type		Specify the data with a combination of number and a decimal point into each digit.
Alphanumeric type		Configure the data with a combination of alphanumeric characters. (Tag No., Special unit, etc…)

The alphanumeric type indicates alphanumeric characters in the following order.

> 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz!"#$%&'()*+,-./:;<=>?@[\]^_`{|}~"space"

2.4 Parameter Setting from Display Panel

This section explains how to specify the parameters from display panel. Select "Specialist" at the Operation Level referring to Section 2.3. And select the parameters to be specified in the Setting Mode.

✋ NOTE

For the device with the ordering information specified at ordering, the specified parameters (flow span and unit, tag number, etc.) are stored in the device at the factory shipment. Without the ordering information specified, parameter setting needs to be done by user.

2.4.1 Setting example of Select type Data: Flow rate unit

The following is the procedure of changing the flow rate unit as Select type parameter.
The flow rate unit needs to be specified with "Physical unit" and "Time unit" individually. When the flow rate unit needs to be set "l/min", select "l (litter)" at the Physical unit and "/min" at the Time unit.

Display Menu Path:
Device setup ▶ Detailed setup ▶ Pro var ▶ Volume ▶ Unit
Device setup ▶ Detailed setup ▶ Pro var ▶ Volume ▶ Time Unit

F0218.ai
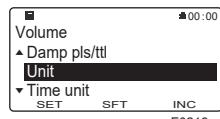
Specify the Physical unit for volumetric flow. Move cursor with [INC] and [DEC] according to the menu path above, and select the "unit" then push [SET].

F0219.ai
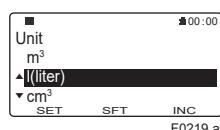
Move cursor with [INC] and [DEC], and select the "l(liter)" then push [SET]. As the selected unit is blinking, push [SET] to determin. The screen returns to the setting page.

F0220.ai
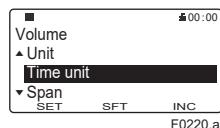
Specify the Time unit for volumetric flow. Move cursor with [INC] and [DEC] according to the menu path above, and select the "Time unit" then push [SET].

F0221.ai
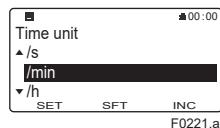
Move cursor with [INC] and [DEC], and select the "/min" then push [SET]. As the selected unit is blinking, push [SET] to determin. The screen returns to the setting page after the setting.

F0222.ai
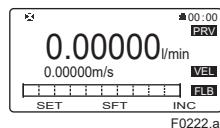
After completing the parameter setting, push [ESC] then the screen returns to the Display Mode.

✋ NOTE

Be sure to set the Flow rate unit in the beginning when the Flow rate unit and Flow span value are changed at the same time.
When the unit is changed, the value of flow rate span is converted to related values automatically according to the unit change.

2.4.2 Setting example of Numeric type Data: Flow rate span

The following is the procedure of changing the Flow rate span as Numeric type parameter.

Display Menu Path:
Device setup ▶ Detailed setup ▶ Pro var ▶ Volume ▶ Span

✋ NOTE

Be sure to set the Flow rate unit in the beginning when the Flow rate unit and Flow span value are changed at the same time.
When the unit is changed, the value of flow rate span is converted to related values automatically according to the unit change.

F0223.ai
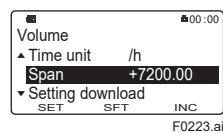
Specify the Flow rate span unit. Move cursor with [INC] and [DEC] according to the menu path above, and select the "Span" then push [SET].
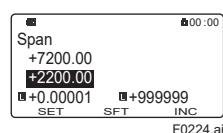
F0224.ai

The switch's functionality of setting the Flow rate span is as below:
Plus/minus and mumeric change: [INC]
Movement on digits: [SFT]
Determination of parameter: [SET]
Ⓛ : Minimum value
Ⓤ : Maximum value
Push [SET] to decide while the value of Flow rate span is blinking. The screen returns to the setting page after the setting.

2.4.3 Setting Example of Alphanumeric type Data: Tag No.

The following is the procedure of changing the Tag No. as Alphanumeric type parameter.

Display Menu Path:
Device setup ▶ Detailed setup ▶ Device info ▶ Order info ▶ Tag No.

F0225.ai
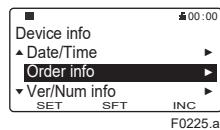
Specify the Tag No..
Move cursor with [INC] and [DEC] according to the menu path above, and select the "Order info" then push [SET].

F0226.ai
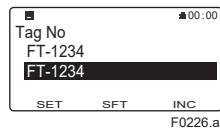
For Tag No., up to 8 characters can be entered from display panel.
The switch's functionality of setting the Flow rate span is as below:
Plus/minus and mumeric change: [INC]
Movement on digits: [SFT]
Determination of parameter: [SET]
Available characters: ASCII characters
Push [SET] to decide while the value of Tag No. is blinking. The screen returns to the setting page after the setting.

2.5 microSD Card Insertion/ Removal

For the device with optional code MC, by setting the dedicated microSD card into the slot on the display unit, the parameter setting can be stored into it. The stored data can be restored to the device. For the detailed function, read Chapter 4.

> ⚠ **WARNING**
>
> Use only micro SD cards sold by YOKOGAWA. Operation cannot be guaranteed when other cards are used.

(1) microSD Card Insertion
Carefully insert the dedicated microSD card into the slot on the display unit until the slot holds the card. (see Figure 2.5).
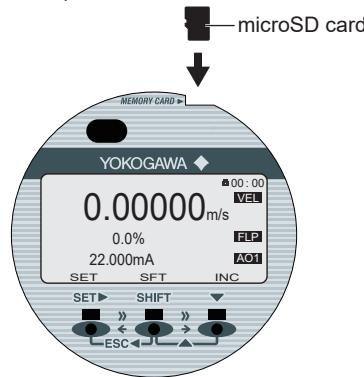
F0227.ai

Figure 2.5   microSD Card Insertion

(2) microSD Card Removal
The microSD is removed from the slot by pushing it. To prevent from losing the microSD card, be careful to handle the card.

> ✋ **IMPORTANT**
>
> If the microSD card is removed without execution of "Unmount" on parameter setting, it may result in the corruption of stored data and the abnormal operation of device.

Display Menu Path:
Device setup ▶ microSD ▶ Unmount

3. Operation with BRAIN Configuration Tool

This chapter describes the connection of this instrument and BRAIN configuration tool (BRAIN TERMINAL (BT200) or FieldMate (Versatile Device Management Wizard)), and the operation using BT200.
Read the user's manual of BT200 (IM 01C00A11-01E) for details about the BT200. Read the user's manual of FieldMate (IM 01R01A01-01E) for details about the FieldMate.

3.1 Connecting the BRAIN Configuration Tool

The communication signal is superimposed onto the 4 to 20 mA DC analog signal to be transmitted. The BRAIN configuration tool can interface with this device from the control room, this device site, or any other wiring termination point in the loop, provided there is a minimum load resistance of 250 Ω between the connection and the receiving instrument.
To communicate, it must be connected in parallel with this device, and the connections must be non-polarized. See Figure 3.1.

F0301.ai
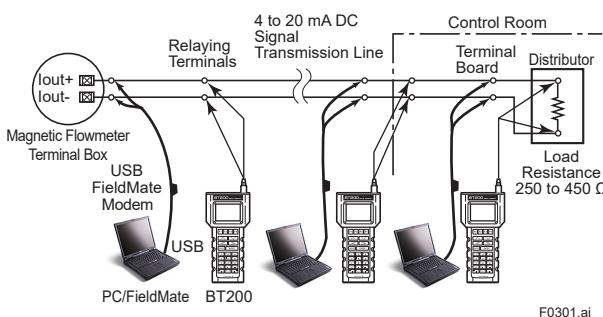
Table 3.1   Connecting the BRAIN Configuration Tool

⚠ **IMPORTANT**

Communication signal is superimposed on analog output signal. It is recommended to set a low-pass filter (approximately 0.1s) to the receiver in order to reduce the output effect from communication signal. Before online communication, confirm that communication signal does not give effect on the upper system.

⚠ **IMPORTANT**

Restrictions exist with regard to the distance over which communication is possible. Read the general specifications as listed in Table 1.1.

After connecting the BT200, check that it operates properly.
(1) When the BT200 is turned on, the message "Please wait ..." is displayed for several seconds, and then press the Enter key.
(2) Initial data screen is displayed.
Press the function key "F4" [OK] or the Enter key.

Initial data screen

F0302.ai

[01:MODEL]: Model code
[02:TAG NO]: Tag No.
             (If specified upon ordering information)
[03:SELF CHECK]: Self-diagnostics "GOOD" or "ERROR"
(3) When the menu screen is displayed, the parameters can set using the BT200.

Since communications will be unsuccessful if there is a problem in the connection to the BT200, "communication error" is displayed.

Menu screen   Communication error (Faulty wiring)

F0303.ai

3.2 BT200 Operating Procedures

3.2.1 Key Layout and Screen Display

Screen Display
(21 characters
× 8 lines)

Function keys
Used to execute commands displayed at the bottom of the screen.
(See Table 3.2.)

Movement keys
• Move the cursor
• Change pages

Power
ON/OFF key

Enter key
• Enter selected items
• Set up input data on the connected instrument.
• Run BT200 functions.

Alphanumeric keys
• Enter numbers
• Enter alphabetic characters in combination with the shift keys.

Shift keys

F0304.ai

Menu screen

```
MENU
A:DISPLAY
B:EASY SETUP
C:BASIC SETUP
D:TOTAL SET
E:PULSE OUT
F:STATUS I/O
HOME SET ADJ ESC
```

Screen title

Menu
(Max: 6 lines)

Function commands

Parameter screen

```
PARAM
A10:FLOW RATE(%)
        0.0%
A20:FLOW RATE
     0.00000m3/h
A21:FLW RATE(mA)
        0.000mA
DATA DIAG PRNT ESC
```

Parameter
(Max: 3 items)

Function commands

F0305.ai

3.2.2 Key Descriptions

Use the alphanumeric keys in conjunction with the shift keys to enter numbers, symbols, and alphabetic characters.

Alphanumeric keys

Shift keys

F0306.ai
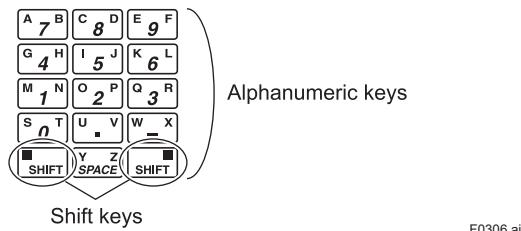
(1) Entering Numbers, Spaces and Hyphen

Simply press the alphanumeric keys.

Entry	Key-in sequence
−4	W_X G 4 H
0.3	S 0 T U.V Q 3 R
1 ⌴ −9	M 1 N Y Z SPACE W_X E 9 F

F0307.ai

(2) Entering Alphabetic Characters

Press either the left or right shift key and then an alphanumeric key to enter the desired alphabetic character. The shift key must be pressed each time an alphabetic character is entered.

Letter on left side of the alphanumeric key — SHIFT · Letter on right side of the alphanumeric key — SHIFT
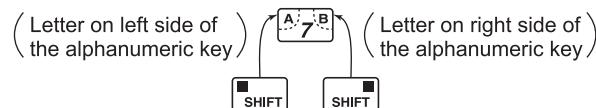
Entry	Key-in sequence
W	SHIFT W_X
IC	SHIFT I 5 J SHIFT C 8 D
J. B	SHIFT I 5 J U.V SHIFT A 7 B

F0308.ai

(3) Entering Uppercase and Lowercase

Use the function key "F2" [CAPS] to select uppercase and lowercase (for alphabetic characters only). The case toggles between uppercase and lowercase each time "F2" [CAPS] is pressed.

Entering uppercase
CODE CAPS CLR ESC

Entering lowercase
CODE caps CLR ESC

Entry	Key-in sequence
Boy	to lower case SHIFT A 7 B F2 SHIFT O 2 P SHIFT Y Z SPACE (B) (o) (y)

F0309.ai

(4) Entering Symbols

Use the function key "F1" [CODE] to enter symbols. The following symbols will appear in sequence, one at a time, at the cursor each time "F1" [CODE] is pressed:

/ . − , + *) (' & % $ # " !

To enter characters next to these symbols, press movement key to move the cursor.

Entry	Key-in Sequence
l/m	symbol command F2 SHIFT K 6 L F1 > SHIFT M 1 N (l) (/) (m)

F0310.ai

3.2.3 Function Keys

The functions of the function keys depend on the function commands on display.

```
MENU
A:DISPLAY
B:EASY SETUP
C:BASIC SETUP
D:TOTAL SET
E:PULSE OUT
F:STATUS I/O
HOME SET ADJ ESC
```
⎫ Function commands

F1   F2   F3   F4   ⎫ Function keys
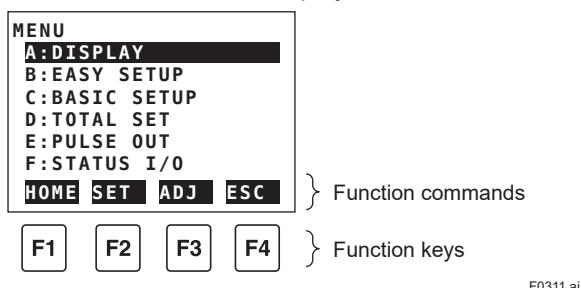
F0311.ai

Table 3.2   Function Command

Command	Function
ADJ	Displays the ADJ menu
CAPS/caps	Selects uppercase or lowercase
CODE	Selects symbols
CLR	Erases input data or deletes all data
DATA	Updates parameter data
DEL	Deletes one character
DIAG	Calls the self-check panel
ESC	Returns to the most recent display
HOME	Displays the menu panel
NO	Quits setup and returns to the previous display
OK	Proceeds to the next panel
PRAM	Enters the parameter number setup mode
SET	Displays the SET menu
SLOT	Returns to the slot selection panel
UTIL	Calls the utility panel
*COPY	Prints out parameters on display
*FEED	Paper feed
*LIST	Lists all parameters in the menu
*PON/POFF	Automatic printout mode on or off
*PRNT	Changes to the print mode
*GO	Starts printing
*STOP	Cancels printing

* Available on BT200-P00 (with printer).

3.3 Calling Up Menu Addresses

Calling up menu addresses is as follows.

Press movement keys to move the cursor.

Use function keys and enter key to move the screen.
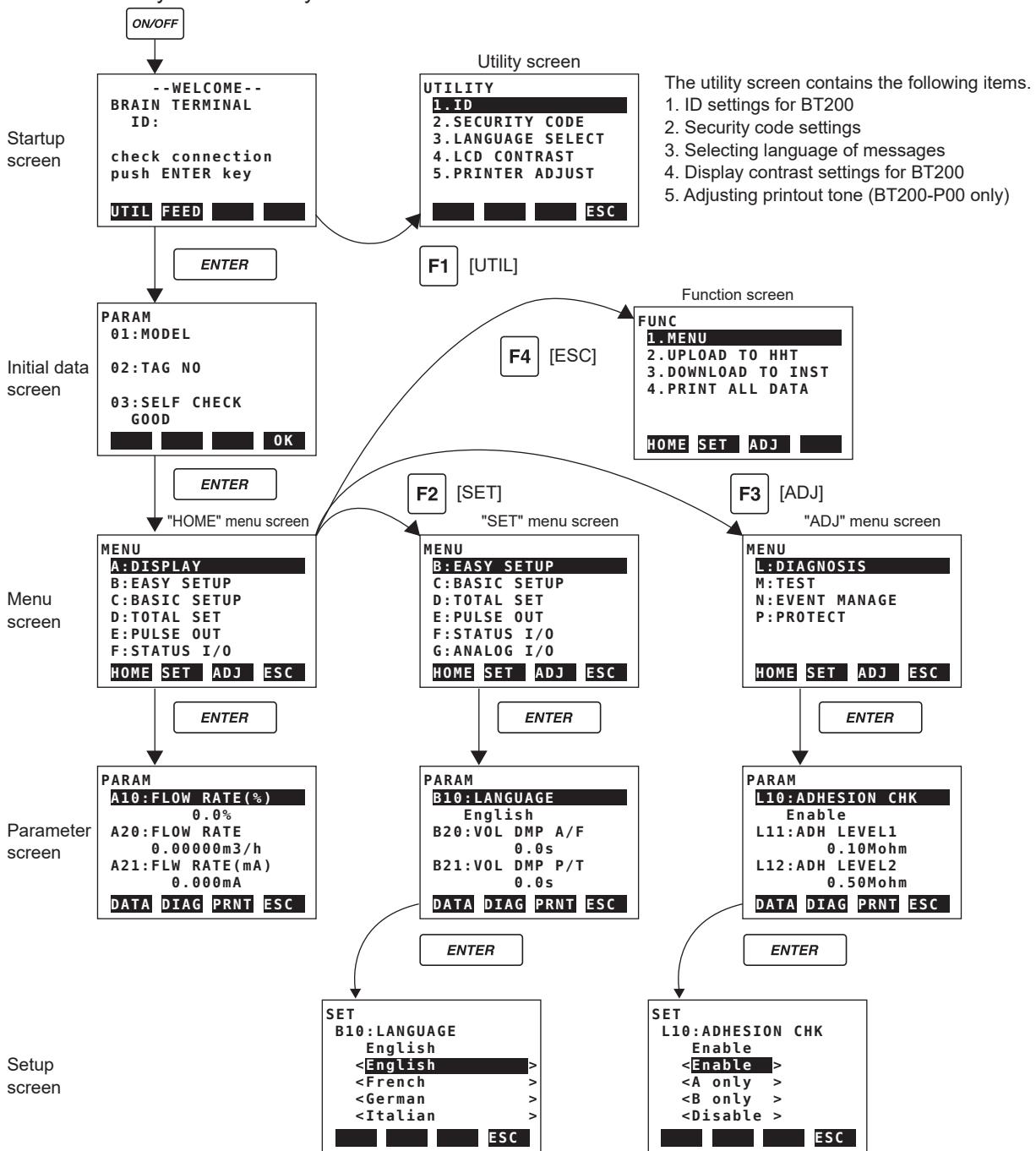
F0312.ai

3.4   Parameter Update and Upload/ Download Function

(1) Updating Parameters

The display of the following parameters are updated automatically every seven seconds.

Item	Name	Item	Name
A10	FLOW RATE(%)	I54	ALM RECORD3
A20	FLOW RATE	I55	ALM TIME3
A21	FLW RATE(mA)	I56	ALM RECORD4
A30	TOTAL1	I57	ALM TIME4
A31	TOTAL2	K02	OPERATE TIME
A32	TOTAL3	K03	CUR DATE
A33	TOTAL1 CNT	K04	CUR TIME
A34	TOTAL2 CNT	L16	ADH MEAS VAL
A35	TOTAL3 CNT	L17	ADH STATUS
C40	VELOCITY CHK	L41	IEX COIL R
F14	SI3 STATE	L42	ELEC VOL A
H22	IEX PWR FREQ	L43	ELEC VOL B
H23	MES PWR FREQ	L44	EMPTY STS
I50	ALM RECORD1	N21	RESTORE RSLT
I51	ALM TIME1	P20	WRT PROTECT
I52	ALM RECORD2	P23	SOFT SEAL
I53	ALM TIME2		

(2) Upload/Download Function

The upload function is used for copying the parameters of the instrument to a BT200. The download function is used for setting the copied parameters in the BT200 into other instrument. The following parameters are available.

Item	Name	Item	Name
B10/J32	LANGUAGE	B31/E14	P1 RATE VAL
B20/C12	VOL DMP A/F	B32/E17	F1 AT 0%
B21/C13	VOL DMP P/T	B33/E18	F1 AT 100%
B22/C32	VOL F UNIT	B40/J10	LINE1 SEL
B23/C35	TIME UNIT	B41/J11	LINE2 SEL
B24/C36	VOL F SPAN	B42/J12	LINE3 SEL
B30/E13	P1 RATE UNIT	B50/C51	AUTOZERO EXE

3.5   Parameter Setting

This section describes procedures for setting parameters using the BT200.

✋ IMPORTANT

After setting and sending data with the BT200, wait 30 seconds before turning off the magnetic flowmeter. If it is turned off too soon, the settings will not be stored in the magnetic flowmeter.

✋ IMPORTANT

Be sure to enable the write protect function to prevent the overwriting of parameters after finishing parameter setting.
Read the installation manual as listed in Table 1.1 for the hardware write protect function, and Section 4.14 for the software write protect function.

✋ NOTE

Before updating any setting, be sure to check the data content you want to change as described in Chapter 5.

3.5.1   Setting Example for Selection-Type Data: Flow rate units

A procedure of changing flow unit [B22: VOL F UNIT] from "m³" to "l(liter)" is as follows;

(1) Move to [B:EASY SETUP] → [B22:VOL F UNIT].
(2) Move to setup screen, select the flow unit. Move the cursor to [l(liter)], press the enter key. When the selected unit blinks, press the enter key.

```
SET
 B22:VOL F UNIT
   m3
  <Kl(kiloliter)   >
  <l(liter)        >
  <cm3             >
  <kcf             >
              ESC
```
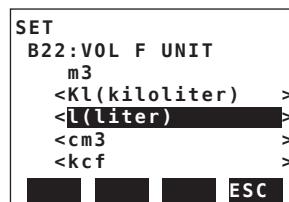
F0313.ai

(3) The flow unit have been changed to "l (liter)".
Press the function key "F4" [OK], and then the screen is back to the parameter screen.
Press the function key "F3" [NO], and then the screen is back to the setup screen.
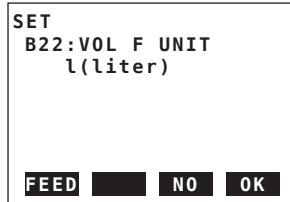
```
SET
 B22:VOL F UNIT
    l(liter)


 FEED        NO   OK
```
F0314.ai

3.5.2 Setting Example for Numeric-Type Data: Flow rate span

A procedure of changing flow span [B24: VOL F SPAN] from "100.000 l/min" to "120.000 l/min".

(1) Move to [B:EASY SETUP] → [B24:VOL F SPAN].
(2) Move to setup screen, enter the flow span value.
Enter the value "120.000", press the enter key.
When the entered value blinks, press the enter key.

```
SET
 B24:VOL F SPAN
     100.000l/min
 +120.000


         DEL  CLR  ESC
```
F0315.ai

(3) The flow span have been changed to "120.000 l/min".
Press the function key "F4" [OK], and then the screen is back to the parameter screen.
Press the function key "F3" [NO], and then the screen is back to the setup screen.
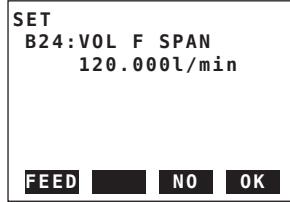
```
SET
 B24:VOL F SPAN
     120.000l/min


 FEED        NO   OK
```
F0316.ai

3.5.3 Setting Example for Alphanumeric-Type Data: Tag No.

A procedure of changing Tag No. [K01: TAG NO] from "F-123" to "F-456".

(1) Move to [K:DEVICE INFO] → [K01:TAG NO].
(2) Move to setup screen, enter the Tag No..
Enter the alphanumeric character "F-456", press the enter key.
When entered the alphanumeric character blinks, press the enter key.
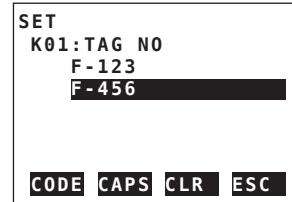
```
SET
 K01:TAG NO
    F-123
    F-456


 CODE CAPS CLR  ESC
```
F0317.ai

(3) The Tag No. have been changed to "F-456".
Press the function key "F4" [OK], and then the screen is back to the parameter screen.
Press the function key "F3" [NO], and then the screen is back to the setup screen.
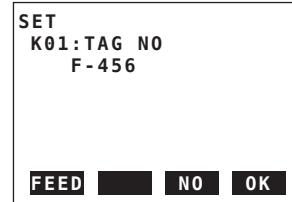
```
SET
 K01:TAG NO
    F-456


 FEED        NO   OK
```
F0318.ai

4.　Functions

This chapter describes each function of the instrument. The followings present an overview of each function.

- **Basic settings**

This instrument can measure the process values of the flow velocity, volumetric flow rate, and mass flow rate, simultaneously. In addition, the damping time constant for each process value can be specified.
For details about how to check the measurement result and the setting procedure, read Section 4.1.

- **Totalization function**

This instrument has three totalizers for the process values. In addition to the display with the totalized value, the totalizer function is provided to scale the totalized value with the conversion factor and count a specific flow rate. Also, it has a totalization switch function that compares the specified target value with the totalized value to output the result with the status output, and a totalization preset function that specifies the preset value.
For details about the totalization function and setting procedure, read Section 4.2.

- **Pulse output, frequency output, and status output**

The measurement result can be output with one of the pulse output, frequency output, or status output. When the pulse output is used, the pulse width or pulse rate can be selected. When the frequency output is used, an output at 0% or 100% for the span of the process value can be specified. When the status output is used, the device status can be output with the status output. Both pulse output and frequency output can be set their low cut value each.
For details about each output and the setting procedure, read Section 4.3.

- **Status input**

The status input terminal is provided to use the totalizer preset function or the zero-adjustment function depending on an external status input.
For details about the setting procedure, read Section 4.4.

- **Current output**

These are the high/low limit function, forward/reverse flow rate function (reverse flow rate: 4 to 12 mA, forward flow rate: 12 to 20 mA), alarm output function, low cut function, and other functions. For details about the current output setting procedures, read Section 4.5.

- **Multi range function**

This function performs to make measurements while switching multiple ranges. It is possible to switch the range depending on the flow rate, flow rate direction, or status input.
For details about the multi range function, read Section 4.6.

- **Auxiliary calculation function**

For details about the auxiliary calculation function, read Section 4.7.

- **Alarm**

A detected error can be notified as an alarm or warning. This function shows its status based on NAMUR NE107 to suit parameter settings. It is also to record the previously detected alarms as a history and mask unnecessary alarms to disappear them from the display.
For details about the alarm contents and the setting procedure, read Section 4.8.

- **Display**

This display supports multiple languages to select the language to be used on the display. Also, this function shows a time change of the selected parameter as a trend graph on the display.
For details about the display settings, read Section 4.9.

> ⚠ **NOTE**
>
> The default setting of the language is English upon shipment from the manufacturing plant. Change the language by referring to Subsection 2.2.2 or Subsection 4.9.1 if necessary.
> This user's manual shows English at the menu pass of the display.

- **Device information**

This function is to check the parameters specified at the time of ordering, model code, and suffix code of this instrument on the display.
For details about how to check device information, read Section 4.10.

- **Diagnostic function**

There are many kinds of diagnostic functions, and it is possible to diagnose failure of the instrument or process status. For example, this function is useful to diagnose the health of the instrument using the electrode adhesion detecting function, sensor empty check function, or the verification function.
For details about various diagnostic functions, read Section 4.11.

- **Test mode**

This mode is arbitrarily to specify the process value or the value to be output from a connection terminal and test a response from the device.
For details about the test mode, read Section 4.12.

- **Backup, restore, and duplicate functions**

The backup function can be store the setting parameters into the built-in memory in the display. If the optional code MC is selected, the setting parameters are stored in the microSD card supplied with this instrument in addition to the built-in memory in the display.
The backup data can be used to restore settings in the instrument in which they were backed up, or duplicate settings to another instrument.
For details about the backup, restore, and duplicate functions, read Section 4.13.

- **Software write protection function**

The software write protection function for disabling a parameter change is provided separately from the hardware write protection.
For details about the software write protection function, read Chapter 4.14.

4.1   Basic Settings

4.1.1   Overview

This instrument can simultaneously measure the flow velocity, volumetric flow rate, and mass flow rate. The measurement result can be output as the current output, frequency output, pulse output, and/or status output.
The table below shows the communication / input-output codes, connection terminals, and input and output for each terminal.

Communication and I/O code		Connection Terminal			
BRAIN		I/O1	I/O2	I/O3	I/O4
DA	D	Iout1 Active	P/Sout1 Passive	-	-
DE	H			Sin No-voltage	P/Sout2 Passive
DG	K			Sin No-voltage	P/Sout2 Active (Without resistor)

Iout1: Current output with BRAIN communication
P/Sout1: Pulse output or status output
P/Sout2: Pulse output or status output
Sin: Status input
The position of Communication and I/O code:
  Integral Type:
    AXW□□□-□□□□□□□□□□□□□□-□■■□□
    AXW□□□G-■□□□□□-□□□□-□□□
  Remote Transmitter:
    AXW4A-□□□□□□□■■□□

⚠ **NOTE**

The available functions vary depending on the connection terminal type selected at the time of ordering. Need to read above table carefully before use which terminal is applicable to allocate each function.

4.1.2 PV Mapping of Process Value

This function can allows you to map the flow velocity, volumetric flow rate, and mass flow rate as the primary variable (PV). The PV-mapped process value is output from the I/O1 terminal.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Pro var ►
PV flow select ► (see below)

Velocity	Sets the flow velocity to the Primary Value.
Volume	Sets the volumetric flow rate to the Primary Value.
Mass	Sets the mass flow rate to the Primary Value.

BRAIN communication:
C30: PV FLOW SEL ► (see below)

Velocity	Sets the flow velocity to the Primary Value.
Volume	Sets the volumetric flow rate to the Primary Value.
Mass	Sets the mass flow rate to the Primary Value.

Setting example: If the volumetric flow rate is set to PV, and the volumetric flow rate span is set to 100 m^3/h for use, set the parameters as follows.

    C30: PV FLOW SEL="Volume"
    C32: VOL F UNIT="m^3"
    C35: TIME UNIT="/h"
    C37: VOL F SPAN="100"

Setting example: If the mass flow rate is set to PV, with the mass flow rate span being set to 10,000 kg/h and the density to 1000 kg/m^3 for use, set the parameters as follows.

    H31: DENSITY UNIT="kg/m^3"
    H32: FIXED DENS="1000"
    C30: PV FLOW SEL="Mass"
    C33: MASS F UNIT="kg"
    C35: TIME UNIT="/h"
    C38: MASS F SPAN="10000"

4.1.3 Display of the Process Value

The flow velocity, volumetric flow rate, mass flow rate, and totalized value can be viewed with the following parameters.

Display menu path:
Device setup ► Process variables ► (see below)

Flow rate(%)	Displays the range rate for the process value set to the Primary Value.
Flow rate	Displays the process value set to the Primary Value.
Velocity	Displays the flow velocity.
Volume	Displays the volumetric flow rate.
Mass	Displays the mass flow rate.
Totalizer ► Totalizer 1	Displays the totalized value of totalizer 1.
Totalizer ► Totalizer 2	Displays the totalized value of totalizer 2.
Totalizer ► Totalizer 3	Displays the totalized value of totalizer 3.

BRAIN communication:

A10:FLOW RATE(%)	Displays the range rate for the process value set to the Primary Value.
A20:FLOW RATE	Displays the process value set to the Primary Value.
A30:TOTAL1	Displays the totalized value of totalizer 1.
A31:TOTAL2	Displays the totalized value of totalizer 2.
A32:TOTAL3	Displays the totalized value of totalizer 3.

4.1.4 Engineering Unit Setting

The unit can be specified for the flow velocity, volumetric flow rate, and mass flow rate. Each parameter can be specified using the physical unit and time unit.
For example, when setting "m^3/h" as the volumetric flow rate, specify "m^3" (physical quantity) and "h" (time unit) individually.
However, the time unit is commonly set regardless of the kinds of fluid.
The time unit of the flow velocity is fixed to "/s" which do not require settings to be made by the user.
The setting can be configured with the following parameters.

Display menu path:
Physical unit
Device setup ► Detailed setup ► Pro var ►
(see below)

Velocity ► Unit	Specify the physical unit of the flow velocity.
Volume ► Unit	Specify the physical unit of the volumetric flow rate.
Mass ► Unit	Specify the physical unit of the mass flow rate.

Time unit
Device setup ► Detailed setup ► Pro var ►
(see below)

Volume ► Time unit	Specify the time unit of the volumetric flow rate, or mass flow rate..
Mass ► Time unit	

BRAIN communication:
Physical unit

C31:VELO F UNIT	Specify the physical unit of the flow velocity.
B22/C32:VOL F UNIT	Specify the physical unit of the volumetric flow rate.
C33:MASS F UNIT	Specify the physical unit of the mass flow rate.

Time unit

B23/C35:TIME UNIT	Specify the time unit of the volumetric flow rate, or mass flow rate.

4.1.5   Span Setting

The span can be specified for the flow velocity, volumetric flow rate, and mass flow rate.
However, the span unit conforms to that specified in Subsection 4.1.4. If the unit is changed, the span value is changed to the corresponding value synchronously with the changed unit.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Pro var ►
(see below)

Velocity ► Span	Specify the span of the flow velocity.
Volume ► Span	Specify the span of the volumetric flow rate.
Mass ► Span	Specify the span of the mass flow rate.

BRAIN communication:

C36:VELO F SPAN	Specify the span of the flow velocity.
B24/C37:VOL F SPAN	Specify the span of the volumetric flow rate.
C38:MASS F SPAN	Specify the span of the mass flow rate.

⚠ NOTE

Be sure to note the following points when specifying the flow rate span.
*   For a line with a significant flow change, set the flow rate span to the maximum flow rate. If the flow rate exceeds the flow rate span, the flow rate error as its percentage increases.
*   For a line with the stable flow rate, set the flow rate span to approximately 1.5 to 2.0 times toward the normal flow rate.
*   Specify the flow rate for which the flow velocity is included within the range from 0.3 to 10 m/s. The flow velocity can be checked using the sizing data described in the general specifications as listed in Table 1.1. If the flow velocity is checked using the parameter, it displays the value obtained by converting the specified flow rate span to the flow velocity.

⚠ NOTE

Be sure to set the flow rate unit in the beginning when the span value and its flow rate unit are changed at the same time.

4.1.6   Damping Time Constant Setting

The damping time constant (63.2% response) can be specified for the flow velocity, volumetric flow rate, and mass flow rate. When reducing an output fluctuation or changing the response speed, change the damping time constant (default value as 3.0 seconds).

It is possible to measure the pulsing flow up to 1 Hz with the value of 0.1 second on this function in case of a piston pump, etc...

This function is applicable to specify each output of the process value (current output or frequency output, and pulse output or totalized value).

This setting can be configured with the following parameters.

Display menu path:

Current output / Frequency output

Device setup ► Detailed setup ► Pro var ► (see below)

Velocity ► Damp AO/F	Specify the damping time constant toward flow velocity.
Volume ► Damp AO/F	Specify the damping time constant of the volumetric flow rate.
Mass ► Damp AO/F	Specify the damping time constant of the mass flow rate.

Pulse output / Totalization

Device setup ► Detailed setup ► Pro var ► (see below)

Velocity ► Damp pls/ttl	Specify the damping time constant of the flow velocity.
Volume ► Damp pls/ttl	Specify the damping time constant of the volumetric flow rate.
Mass ► Damp pls/ttl	Specify the damping time constant of the mass flow rate.

BRAIN communication:

Current output / Frequency output

C10:VELO DMP A/F	Specify the damping time constant of the flow velocity.
B20/C12:VOL DMP A/F	Specify the damping time constant of the volumetric flow rate.
C14:MASS DMP A/F	Specify the damping time constant of the mass flow rate.

Pulse output / Totalization

C11:VELO DMP P/T	Specify the damping time constant of the flow velocity.
B21/C13:VOL DMP P/T	Specify the damping time constant of the volumetric flow rate.
C15:MASS DMP P/T	Specify the damping time constant of the mass flow rate.

⚠ **NOTE**

The output fluctuation increases when the damping time constant is set to lower value. Set the damping time constant to 5 seconds or longer for control processing application.

4.1.7   Low-cut Function Setting

The low-cut value can be specified for the current output, frequency output, pulse output, and totalizer. The fluctuation output at the flow rate "0" can be reduced when this function is used, because the output of the set value or less becomes "0" forcibly. However, the unit of low-cut value conforms to that specified in Subsection 4.1.4. If the unit is changed, the low-cut value is changed to the corresponding value synchronously with the changed unit.

Set "0" to the low-cut value if it is unnecessary to use this function.

This setting can be configured with the following parameters.

Display menu path:

Current output

Device setup ► Detailed setup ► Analog out/in ► (see below)

AO1 ► Low cut	Specify the low-cut value of current output 1.

Frequency output / Pulse output

Device setup ► Detailed setup ► Pulse/Status out ► (see below)

PO1/SO1 ► Low cut	Specify the low-cut value of frequency output 1 or pulse output 1.
PO2/SO2 ► Low cut	Specify the low-cut value of frequency output 2 or pulse output 2.

Totalization

Device setup ► Detailed setup ► Totalizer ► (see below)

Totalizer 1 ► Low cut	Specify the low-cut value of totalizer 1.
Totalizer 2 ► Low cut	Specify the low-cut value of totalizer 2.
Totalizer 3 ► Low cut	Specify the low-cut value of totalizer 3.

BRAIN communication:

Current output

G01:AO1 LOW CUT	Specify the low-cut value of current output 1.

Frequency output / Pulse output

E15:P1 LOW CUT	Specify the low-cut value of frequency output 1 or pulse output 1.
E37:P2 LOW CUT	Specify the low-cut value of frequency output 2 or pulse output 2.

Totalization

D12:TOT1 LOWCUT	Specify the low-cut value of totalizer 1.
D22:TOT2 LOWCUT	Specify the low-cut value of totalizer 2.
D32:TOT3 LOWCUT	Specify the low-cut value of totalizer 3.

The hysteresis is set in each case in which the output is changed to "0" through the specified low-cut value and a case in which the output returns to measuring value through the specified low-cut value. The hysteresis in each case is obtained as shown below.
For details about the multi range function, read Section 4.6.
(1) A value with the output changed to "0" through the specified low-cut value
= Low-cut value - (Minimum span specified in multi range x 0.5%)
(2) A value with the output returned through the specified low-cut value
= Low-cut value + (Minimum span specified in multi range x 0.5%)

Example:
Span of volumetric flow rate = 10.0 m³/h,
Low-cut value = 1.0 m³/h
In this case, each value is obtained as shown below.
(1) The value with output changed to "0" through the specified low-cut value
= 1.0 [m³/h] – (10.0 [m³/h] × 0.5 [%])
= 0.95 [m³/h]
(2) The value with output returned through the specified low-cut value
= 1.0 [m³/h] + (10.0 [m³/h] × 0.5 [%])
= 1.05 [m³/h]

F0401.ai
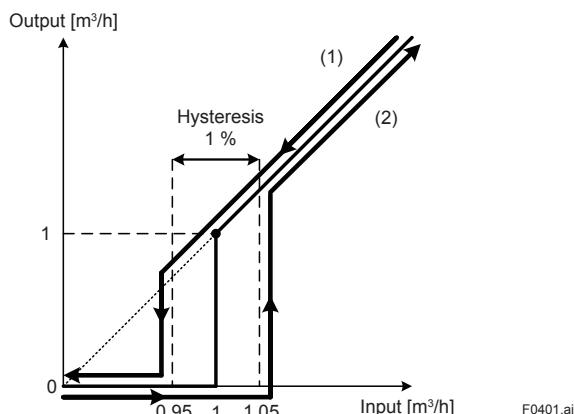
NOTE

Note that, if the low-cut value is lower, the totalization might be counted due to an influence of output fluctuation near the output 0%.
In particular, if the flow rate span, damping time constant, or conductivity is small or low, the totalization is easily counted when the flow rate is "0". In such a case, increase the flow rate span, damping time constant, or low-cut value.

NOTE

When the output process value is changed, specify the low-cut value again.

4.1.8 Sensor's Nominal Size Setting

To combine the remote transmitter with other remote sensor, the nominal size of the remote sensor must be specified.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Sensor ► (see below)

| Nominal size unit | Specify the unit of the nominal size. |
| Nominal size | Specify the nominal size. |

BRAIN communication:

| C26:SIZE UNIT | Specify the unit of the nominal size. |
| C27:NOMINAL SIZE | Specify the nominal size. |

NOTE

For the integral type, the nominal size and its unit have been set at the factory shipment. Do not change the these parameters.

4.1.9 Density Setting

The density setting is required to measure the mass flow rate.
It will result in a setting error that "0" is set to the density in the situation of mapping the mass flow to PV.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Pro var ►
Density ► (see below)

Unit	Specify the unit of the density.
Fixed density	Specify the fixed density value.

BRAIN communication:

H31:DENSITY UNIT	Specify the unit of the density.
H32:FIXED DENS	Specify the fixed density value.

4.1.10 Zero Adjustment

Zero adjustment is carried out to ensure that
the output for zero flow is 0% (i.e., 4 mA).
Although adjustment to zero is performed at
the manufacturing plant prior to shipment, this
procedure must be carried out once again following
the installation of piping in order to match the
magnetic flowmeter to its operating conditions.
This subsection describes the zero adjustment
procedure using the display unit. For AXFA11, read
the applicable user's manual as listed in Table 1.1.

✋ IMPORTANT

- Zero adjustment should be carried out before
  actual operation. Note that setting and
  update functions cannot be carried out during
  this procedure (i.e., for approximately 30
  seconds).
- Zero adjustment should only be carried
  out when the sensor has been filled with
  measurement fluid and the fluid velocity is
  completely zero by closing the valve.
- Each time that the fluid being measured
  is changed, it will be necessary for zero
  adjustment to be carried out for the new fluid.

A procedure of executing zero adjustment is as
follows;

Display Menu Path:
Device setup ► Diag/Service ► Autozero ► Execute
Device setup ► Diag/Service ► Autozero ► Result ► Zero value

Enter the Setting Mode. (Read Section 2.3)

- **Execution of zero adjustment**

Select "Diag/Service" accoridng to the menu path above.

F0402.ai

Select "Autozero".

F0403.ai

Select "Execute".

F0404.ai

Select "Execute".

F0405.ai

When "Execute" blinks, touch [SET] to execute.

F0406.ai
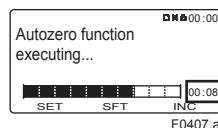
Autozero starts, and the progress is desplayed with a remaining time and a bar graph. Wait for the completion.

← The time remaining until the end.

F0407.ai
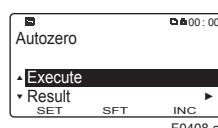
After Autozero finished, the display returns to "Autozero" menu.

F0408.ai
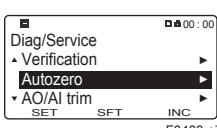
- **Confirmation of zero adjustment result**
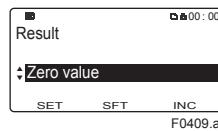
For the result of Autozero, select "Result" and then "Zero value".

F0409.ai
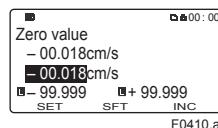
Result of Autozero is indicated as on the left.

F0410.ai

✋ NOTE

When the zero adjustment result exceeds defined
value, the warning [092: AZ wam] is indicated.

Zero adjustment can be executed with the following
parameter.

BRAIN:
B50:AUTOZERO EXE

4.2   Totalization Function

4.2.1   Totalized Value and Unit Setting

This function can totalize the volumetric flow rate, and mass flow rate. This instrument provides three totalizers, which can simultaneously operate them for process values.

Totalizer 1 is for the process value PV-mapped described in Subsection 4.1.2. Totalizers 2 and 3 are for the process value in the selected unit.
This setting can be displayed and configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Totalizer ► (see below)

Totalizer 1 ► Unit	Displays the unit of totalizer 1.
Totalizer 2 ► Unit	Specify the unit of totalizer 2.
Totalizer 3 ► Unit	Specify the unit of totalizer 3.

BRAIN communication:

D10:TOT1 UNIT	Displays the unit of totalizer 1.
D20:TOT2 UNIT	Specify the unit of totalizer 2.
D30:TOT3 UNIT	Specify the unit of totalizer 3.

⚠ NOTE

The flow velocity cannot be totalized. If the flow velocity is selected as the Primary Value, totalizer 1 obtains the volumetric flow rate and unit based on "m^3".

4.2.2   Totalized-Value Display and Totalizer Function

The totalization result can be checked with the totalized value or its value which is scaled with the conversion factor. When the totalized value is scaled with the conversion factor, the specified flow rate is totalized in 1-count increments, which can be used as a totalizer.

If the totalized value on the display exceeds ±99999999, the maximum value of the displayed digits, the displayed value is reset to 0. In addition, if the values of A30-A35 exceed the limit of the displayed digits, they are reset to 0 in the same way as the value on the display.

The totalized value can be displayed and specified with the following parameters.

Display menu path:
Display of totalized value
Device setup ► Detailed setup ► Totalizer ► (see below)

Totalizer 1	Displays the totalized value of totalizer 1.
Totalizer 2	Displays the totalized value of totalizer 2.
Totalizer 3	Displays the totalized value of totalizer 3.

Setting of the conversion factor for scaling
Device setup ► Detailed setup ► Totalizer ► (see below)

Totalizer 1 ► Conv factor	Specify the conversion factor of totalizer 1.
Totalizer 2 ► Conv factor	Specify the conversion factor of totalizer 2.
Totalizer 3 ► Conv factor	Specify the conversion factor of totalizer 3.

Display of the totalized value that is scaled with the conversion factor
Device setup ► Detailed setup ► Totalizer ► (see below)

Totalizer 1 count	Displays the scaled totalized-value of totalizer 1.
Totalizer 2 count	Displays the scaled totalized-value of totalizer 2.
Totalizer 3 count	Displays the scaled totalized-value of totalizer 3.

BRAIN communication:
Display of totalized value

A30:TOTAL1	Displays the totalized value of totalizer 1.
A31:TOTAL2	Displays the totalized value of totalizer 2.
A32:TOTAL3	Displays the totalized value of totalizer 3.

Setting of the conversion factor for scaling

D11:TOT1 CONV FC	Specify the conversion factor of totalizer 1.
D21:TOT2 CONV FC	Specify the conversion factor of totalizer 2.
D31:TOT3 CONV FC	Specify the conversion factor of totalizer 3.

Display of the totalized value that is scaled with the conversion factor

A33:TOTAL1 CNT	Displays the scaled totalized-value of totalizer 1.
A34:TOTAL2 CNT	Displays the scaled totalized-value of totalizer 2.
A35:TOTAL3 CNT	Displays the scaled totalized-value of totalizer 3.

Example:
Set the unit of totalizer 2 to "m^3" and the conversion factor to "2".
→If the totalized value of totalizer 2 is set to "10.123 m^3", the totalized value is scaled to "10.123÷2 = 5".

⚠ NOTE

If Main soft rev (K50:MAIN B REV/Main soft rev) is R1.01.07 or earlier, or Ind soft rev (K52:IND B REV/Ind soft rev) is R2.01.01 or earlier, the totalized value on the display is held at the upper limit if it exceeds ±99999999, the maximum value of the displayed digits. In addition, if the values of A30-A35 exceed the limit of the displayed digits, they are held at the upper limit in the same way as the value on the display. For details about how to check the device revision (Main soft rev and Ind soft rev), refer to Subsection 4.10.2.

4.2.3 Totalization Switch Function

The totalization switch function is available when the target value (set point) to be totalized is specified using the totalization function. The totalization switch function compares the specified target value with the totalized value to output the result with the status output.
The status output is active while the totalized value is out of the specified target value. Even if the totalized value exceeds the displayed digit limit and is reset to 0 under that state, the status output remains active.
For details about the output, active direction, and status output function setting for each terminal, read Section 4.3.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Totalizer ► (see below)

Totalizer 1 ► Set point	Specify the target value of totalizer 1.
Totalizer 2 ► Set point	Specify the target value of totalizer 2.
Totalizer 3 ► Set point	Specify the target value of totalizer 3.

BRAIN communication:

D18:TOT1 SETPNT	Specify the target value of totalizer 1.
D28:TOT2 SETPNT	Specify the target value of totalizer 2.
D38:TOT3 SETPNT	Specify the target value of totalizer 3.

Example: Setting procedure to use the totalization switch function with the I/O2 terminal
Follow the steps below to set the status output of the I/O2 terminal to "On active" when the totalized value of totalizer 1 reaches the target value.
(1) Set the output of the I/O2 terminal to "Status out", referring to Subsection 4.3.1.
(2) Set the active direction of the I/O2 terminal to "On active", referring to Subsection 4.3.4.
(3) Set the status output function to "Total limit 1", referring to Subsection 4.3.7.
(4) Specify the target value of totalizer 1, referring to this subsection.

4.2.4 Totalizer Operation at Alarm Occurrence

The totalizer operation can be specified to deal with an alarm that affects the totalization function.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Totalizer ► (see below)

Totalizer 1 ► Failure opts	Specify the totalizer 1 operation to be performed when an alarm has occurred.[1]
Totalizer 2 ► Failure opts	Specify the totalizer 2 operation to be performed when an alarm has occurred.[1]
Totalizer 3 ► Failure opts	Specify the totalizer 3 operation to be performed when an alarm has occurred.[1]

BRAIN communication:

D13:TOT1 F OPTS	Specify the totalizer 1 operation to be performed when an alarm has occurred.[1]
D23:TOT2 F OPTS	Specify the totalizer 2 operation to be performed when an alarm has occurred.[1]

D33:TOT3 F OPTS	Specify the totalizer 3 operation to be performed when an alarm has occurred.*1

*1: From the table below, select the operation of the totalization function.

Run	Continues the totalization function after an alarm has occurred.
Hold	Stops the totalization function after an alarm has occurred.
Last valid	Continues the totalization function with the last valid value before an alarm occurs.

4.2.5 Totalization Function Start/Stop Setting

The totalization function can be set to Start/Stop mode.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Totalizer ►
(see below)

Totalizer 1 ► Start/Stop	Sets Start/Stop to the totalization function of totalizer 1.
Totalizer 2 ► Start/Stop	Sets Start/Stop to the totalization function of totalizer 2.
Totalizer 3 ► Start/Stop	Sets Start/Stop to the totalization function of totalizer 3.

BRAIN communication:

D15:TOT1 EXEC	Sets Start/Stop to the totalization function of totalizer 1.
D25:TOT2 EXEC	Sets Start/Stop to the totalization function of totalizer 2.
D35:TOT3 EXEC	Sets Start/Stop to the totalization function of totalizer 3.

⚠ NOTE

The totalization function is set to "Stop" upon shipment from the manufacturing plant. To start the totalization function, be sure to set it to "Start".

4.2.6 Totalization Direction Setting

The totalization direction can be specified to use the totalization function.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Totalizer ►
(see below)

Totalizer 1 ► Options	Specify the totalization direction of totalizer 1.*1
Totalizer 2 ► Options	Specify the totalization direction of totalizer 2.*1
Totalizer 3 ► Options	Specify the totalization direction of totalizer 3.*1

BRAIN communication:

D14:TOT1 OPTS	Specify the totalization direction of totalizer 1.*1
D24:TOT2 OPTS	Specify the totalization direction of totalizer 2.*1
D34:TOT3 OPTS	Specify the totalization direction of totalizer 3.*1

*1: From the table below, select the totalization direction.

Balanced	Totalizes the differential flow rate between the forward and reverse directions.
Absolute	Totalizes the absolute value of the flow rate.
Only positive	Totalizes only the flow rate in the forward direction.
Only negative	Totalizes only the flow rate in the reverse direction.
Hold	Stops totalization processing (holds the current totalized-value).

4.2.7 Totalized Value Reset/Preset Function

The reset/preset function can be specified for the totalized value. Using the reset function resets the totalized value to "0". Using the preset function sets the totalized value in advance to the preset value. The preset function is available when starting counting of totalization with the specified value. This setting can be configured with the following parameters.

Display menu path:
Use of the reset/preset function
Device setup ► Detailed setup ► Totalizer ►
(see below)

Totalizer 1 ► Reset/Preset	Uses the reset/preset function of totalizer 1.[1]
Totalizer 2 ► Reset/Preset	Uses the reset/preset function of totalizer 2.[1]
Totalizer 3 ► Reset/Preset	Uses the reset/preset function of totalizer 3.[1]

Preset value setting
Device setup ► Detailed setup ► Totalizer ►
(see below)

Totalizer 1 ► Preset value	Specify the preset value of totalizer 1.
Totalizer 2 ► Preset value	Specify the preset value of totalizer 2.
Totalizer 3 ► Preset value	Specify the preset value of totalizer 3.

BRAIN communication:
Use of the reset/preset function

D16:TOT1 PRESET	Uses the reset/preset function of totalizer 1.[1]
D26:TOT2 PRESET	Uses the reset/preset function of totalizer 2.[1]
D36:TOT3 PRESET	Uses the reset/preset function of totalizer 3.[1]

Preset value setting

D17:TOT1 PRE VAL	Specify the preset value of totalizer 1.
D27:TOT2 PRE VAL	Specify the preset value of totalizer 2.
D37:TOT3 PRE VAL	Specify the preset value of totalizer 3.

[1]: From the table below, select the reset/preset function.

Not execute	Does not use the totalization value reset/preset function.
Reset	Uses the totalization value reset function.
Preset	Uses the totalization value preset function.

⚠ NOTE

The parameter returns to "Not execute" after the totalization value reset/preset function has been completed.

4.3 Pulse Output, Frequency Output, and Status Output

4.3.1 Outputs of I/O2, and I/O4 Terminals

The I/O2, and I/O4 terminals can be used as the pulse output, frequency output, and status output. This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ►
Pulse/Status out ► (see below)

PO1/SO1 ► Output mode	Specify the output of the I/O2 terminal.[1]
PO2/SO2 ► Output mode	Specify the output of the I/O4 terminal.[1]

BRAIN communication:

E10:P1 OUT MODE	Specify the output of the I/O2 terminal.[1]
E31:P2 OUT MODE	Specify the output of the I/O4 terminal.[1]

[1]: From the table below, select the output of each terminal.

No function	Does not use the terminal.
Fixed pulse output	Sets the output to the fixed pulse output.
Frequency output	Sets the output to the frequency output (Duty 50%).
Status output	Sets the output to the status output. For details about the status output, read Subsection 4.3.7.

4.3.2 Pulse Output / Frequency Output Mapping

The process value to be output can be selected to use the pulse output or frequency output.
When the I/O2 terminal is used for output, the process value PV-mapped in Subsection 4.1.2 is output.
When the I/O4 terminal is used for output, the process value to be output can be selected from the flow velocity, volumetric flow rate, and mass flow rate.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ►
Pulse/Status out ► (see below)

PO2/SO2 ► Pulse select	Specify the output of the I/O4 terminal.[1]

BRAIN communication:

E32:P2 SELECT	Specify the output of the I/O4 terminal.[1]

[1]: From the table below, select the output of the I/O terminal.

Non-Connect	No output
Velocity	Sets the flow velocity to the output.
Volume flow	Sets the volumetric flow rate to the output.
Mass flow	Sets the mass flow rate to the output.

4.3.3 Pulse Width Setting

The pulse width can be selected to use the pulse output.
This setting can be configured with the following parameters.

Display menu path:

Device setup ► Detailed setup ►
Pulse/Status out ► (see below)

PO1/SO1 ► Fix width	Specify the pulse width of the I/O2 terminal.[1]
PO2/SO2 ► Fix width	Specify the pulse width of the I/O4 terminal.[1]

BRAIN communication:

E12:P1 WIDTH	Specify the pulse width of the I/O2 terminal.[1]
E34:P2 WIDTH	Specify the pulse width of the I/O4 terminal.[1]

[1]: From the table below, select the pulse width.

Pulse width [ms]	Pulse rate Max. [pps]	Pulse width [ms]	Pulse rate Max. [pps]
0.05	10000	100	5
0.1	5000	200	2.5
0.5	1000	330	1.5
1	500	500	1.0
20	25	1000	0.5
33	15	2000	0.25
50	10		

4.3.4 Active Direction Setting

Whether the pulse signal is set on or off to enable the active mode can be specified when the pulse output or status output is used.
This setting can be configured with the following parameters.

Display menu path:

Device setup ► Detailed setup ►
Pulse/Status out ► (see below)

PO1/SO1 ► Active mode	Specify the active direction for the pulse signal of the I/O2 terminal.[1]
PO2/SO2 ► Active mode	Specify the active direction for the pulse signal of the I/O4 terminal.[1]

BRAIN communication:

E11:P1 ACT MODE	Specify the active direction for the pulse signal of the I/O2 terminal.[1]
E33:P2 ACT MODE	Specify the active direction for the pulse signal of the I/O4 terminal.[1]

[1]: From the table below, specify the active direction of the pulse signal.

Active: ON/On active	Sets to Active when the pulse signal is set on.
Active: OFF/Off active	Sets to Active when the pulse signal is set off.

Example:

If the fixed pulse output is specified and the pulse width is set to "1 ms", Active is set as shown below.

Active：ON

Active：OFF
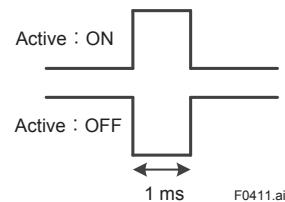
1 ms   F0411.ai

4.3.5 Pulse Rate Setting

The pulse rate per pulse and the pulse rate scaling can be specified to use the pulse output when this function is used.
When the I/O2 terminal is used for output, the unit of the pulse rate is set to that of the process value PV-mapped in Subsection 4.1.2.
In case of using the I/O4 terminal for output, the unit of the pulse rate is set to that of the process value mapped in Subsection 4.3.2.
This setting can be configured with the following parameters. If the pulse rate scaling is changed, the pulse rate value is also changed synchronously with the changed unit.

Display menu path:
Pulse rate value
Device setup ► Detailed setup ►
Pulse/Status out ► (see below)

PO1/SO1 ► Rate value	Specify the pulse rate value of the I/O2 terminal.
PO2/SO2 ► Rate value	Specify the pulse rate value of the I/O4 terminal.

Pulse rate scaling
Device setup ► Detailed setup ►
Pulse/Status out ► (see below)

PO1/SO1 ► Rate unit	Specify the pulse rate scaling of the I/O2 terminal.
PO2/SO2 ► Rate unit	Specify the pulse rate scaling of the I/O4 terminal.

BRAIN communication:
Pulse rate value

B31/E14:P1 RATE VAL	Specify the pulse rate value of the I/O2 terminal.
E36:P2 RATE VAL	Specify the pulse rate value of the I/O4 terminal.

Pulse rate scaling

B30/E13:P1 RATE UNIT	Specify the pulse rate scaling of the I/O2 terminal.
E35:P2 RATE UNIT	Specify the pulse rate scaling of the I/O4 terminal.

Note: From the table below, select the pulse rate scaling.

n Unit/P	10^{-9} × Unit per pulse
u Unit/P	10^{-6} × Unit per pulse
m Unit/P	10^{-3} × Unit per pulse
Unit/P	1 unit per pulse
k Unit/P	10^{3} × Unit per pulse
M Unit/P	10^{6} × Unit per pulse
n P/Unit	10^{-9} × Unit per pulse
u P/Unit	10^{-6} × Unit per pulse
m P/Unit	10^{-3} × Unit per pulse
P/Unit	1 pulse per unit
k P/Unit	10^{3} × Pulse per unit
M P/Unit	10^{6} × Pulse per unit

* Unit: Indicates the unit of the process value to be output as the pulse output.

NOTE

The maximum pulse rate and pulse width must be specified so that the following conditions are satisfied.
Maximum pulse rate value [pps]
= Flow rate span (Unit/s) x Pulse rate [P/Unit]
≤ 10 [k pps]
≤ 1 / (Pulse width × 2)

Example:
When the pulse width is set to "0.1 ms", the maximum pulse rate value is set to "1 / (0.0001 × 2) = 5000 [pps]". If the specified pulse rate exceeds this value, it causes a setting error, and an alarm is displayed.

4.3.6 Frequency Output Range Setting

When the frequency output is used, the frequency at 0% and 100% can be specified for the span of the process value. The frequency output range can be set by specifying the frequency.
When the I/O2 terminal is used for output, specify the output frequency for the span of the process value PV-mapped described in Subsection 4.1.2.
When the I/O4 terminal is used for output, specify the output frequency for the span of the process value mapped described in Subsection 4.3.2.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ►
Pulse/Status out ► (see below)

PO1/SO1► Frequency at 0%	Specify the frequency when 0% is set to the process value that is to be output with the frequency output through the I/O2 terminal.
PO1/SO1► Frequency at 100%	Specify the frequency when 100% is set to the process value that is to be output with the frequency output through the I/O2 terminal.
PO2/SO2► Frequency at 0%	Specify the frequency when 0% is set to the process value that is to be output with the frequency output through the I/O4 terminal.
PO2/SO2► Frequency at 100%	Specify the frequency when 100% is set to the process value that is to be output with the frequency output through the I/O4 terminal.

BRAIN communication:

B32/E17:F1 AT 0%	Specify the frequency when 0% is set to the process value that is to be output with the frequency output through the I/O2 terminal.
B33/E18:F1 AT 100%	Specify the frequency when 100% is set to the process value that is to be output with the frequency output through the I/O2 terminal.
E39:F2 AT 0%	Specify the frequency when 0% is set to the process value that is to be output with the frequency output through the I/O4 terminal.
E40:F2 AT 100%	Specify the frequency when 100% is set to the process value that is to be output with the frequency output through the I/O4 terminal.

4.3.7 Status Output Function Setting

The instrument status can be set as the contact output to use the status output.
This setting can be configured with the following parameters.

Display menu path:
Device setup ▶ Detailed setup ▶
Pulse/Status out ▶ (see below)

PO1/SO1 ▶ SO1 function	Specify the status output 1 function of the I/O2 terminal.*1
PO2/SO2 ▶ SO2 function	Specify the status output 2 function of the I/O4 terminal.*1

BRAIN communication:

E20:SO1 FUNCTION	Specify the status output 1 function of the I/O2 terminal.*1
E41:SO2 FUNCTION	Specify the status output 2 function of the I/O4 terminal.*1

*1:   From the table below, select the status output function.

No function	The status output is not available because the status output function is not enabled.
Alarm output	The status output becomes active when an alarm occurs.
Warning output	The status output becomes active when a warning occurs.
Total limit 1	The status output is active while the totalized value of totalizer 1 is out of the specified target value. For details about the totalization switch function, read Subsection 4.2.3.
Total limit 2	The status output is active while the totalized value of totalizer 2 is out of the specified target value. For details about the totalization switch function, read Subsection 4.2.3.
Total limit 3	The status output is active while the totalized value of totalizer 3 is out of the specified target value. For details about the totalization switch function, read Subsection 4.2.3.
H/L alarm	The status output is active while the PV-mapped process value is out of the specified low limit value (L) or high limit value (H). For details about the PV mapping for the process value and alarm information, read Subsection 4.1.2, Section 4.8, and Subsection 4.11.2.
HH/LL alarm	The status output is active while the PV-mapped process value is out of the specified low-low limit value (LL) or high-high limit value (HH). For details about the PV mapping for the process value and alarm information, read Subsection 4.1.2, Section 4.8, and Subsection 4.11.2.
Fwd/Rev range	The status output is active while the fluid is flowing in the reverse direction. Used in the forward/reverse range. For details about the forward/reverse range, read Subsection 4.6.4.
Auto2 range	The status output is active while operation is being performed in range 2. Used in the multi range. For details about the multi range function, read Subsection 4.6.3.
Ext2 answer	Sets the status input function to the external contact range. The status output becomes active depending on the in-use range. Used for answer-back (range check) of an external contact range. For details about the status output function and the external contact range, read Subsection 4.4.2 and 4.6.6.

4.4 Status Input

4.4.1 Active Direction Setting for Status Input

Whether the status input is set on or off to enable the active mode can be specified when the I/O3 terminal is used for the status input.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Status in ► (see below)

SI3 ► Active mode	Specify the active direction of the status input.*1

BRAIN communication:

F12:SI3 ACT MODE	Specify the active direction of the status input.*1

*1: From the table below, select the active direction of the status input.

Active: ON/Short(On) act	Sets to Active when the status input is short-circuited.
Active: OFF/Open(Off) act	Sets to Active when the status input is opened.

4.4.2 Status Input Function Setting

The status input function is available when the I/O3 terminal is used for the status input.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Status in ► (see below)

SI3 ► Function	Specify the status input function of the I/O3 terminal.*1

BRAIN communication:

F13:SI3 FUNCTION	Specify the status input function of the I/O3 terminal.*1

*1: From the table below, select the status input function.

No function	The status input is not available because the status input function is not enabled.
0% Signal Lock	When the status input becomes active, the current output1 of the I/O1 terminal is fixed to 4 mA.
Ext auto zero	When the status input becomes active, the zero adjustment function is performed automatically. Note that the zero adjustment cannot be stopped even if the status input is changed while the zero adjustment function is running.
Total preset 1	When the status input becomes active, the preset value specified in Subsection 4.2.7 is set to totalizer 1, and totalization starts with the value.
Total preset 2	When the status input becomes active, the preset value specified in Subsection 4.2.7 is set to totalizer 2, and totalization starts with the value.
Total preset 3	When the status input becomes active, the preset value specified in Subsection 4.2.7 is set to totalizer 3, and totalization starts with the value.
Ext2 ranges	While the status input is active, the range of current output 1 is switched from range 1 to range 2. Used in the external contact range. For details about the external contact range, read Subsection 4.6.6.

4.5 Current Output

4.5.1 Current Output High/Low Limit Function

The high/low limit function is available to use the current output. Using the high/low limit function restricts the high limit of 4 to 20 mA current output and the low limit of the 4 to 20 mA current output. This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Analog out/in ► (see below)

AO1 ► High limit	Specify the high limit value to use the I/O1 terminal for the current output.
AO1 ► Low limit	Specify the low limit value to use the I/O1 terminal for the current output.

BRAIN communication:

G02:AO1 HI LIMIT	Specify the high limit value to use the I/O1 terminal for the current output.
G03:AO1 LO LIMIT	Specify the low limit value to use the I/O1 terminal for the current output.

Example:

If the high limit value is set to 16 mA and the low limit value to 8 mA while the I/O1 terminal is used for the current output, the result is as shown below.

F0412.ai
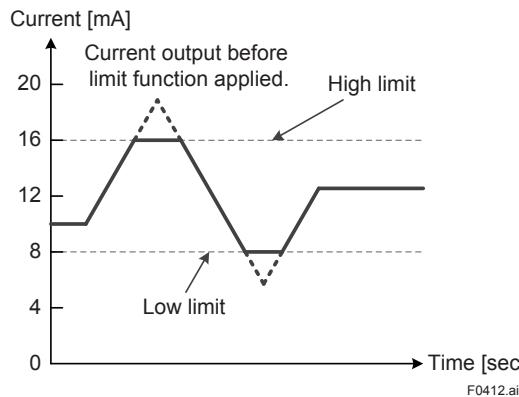
4.5.2 Absolute Range Function

The current output function is available to use the current output. The current signal can be output both forward flow and reverse flow simultaneously toward the span when this function is used. The current output can be performed by setting the flow rate of 0% to 12 mA, the reverse flow rate to 4 to 12 mA, and the forward flow rate to 12 to 20 mA. However, this function is available only when the I/O1 terminal is used for the current output. The absolute range function and low cut function can be used simultaneously. For low cut function, read Subsection 4.1.7.

This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Analog out/in ► (see below)

AO1 ► Range mode	Specifies the use of the absolute range function to use the I/O1 terminal for the current output.[1]

BRAIN communication:

G05:AO1 RNG MODE	Specifies the use of the absolute range function to use the I/O1 terminal for the current output.[1]

[1]: From the table below, select the use of the absolute range function.

Normal range	Does not use the absolute range function.
Abs range	Uses the absolute range function.

Example:
(1) Absolute range without low-cut

F0413.ai
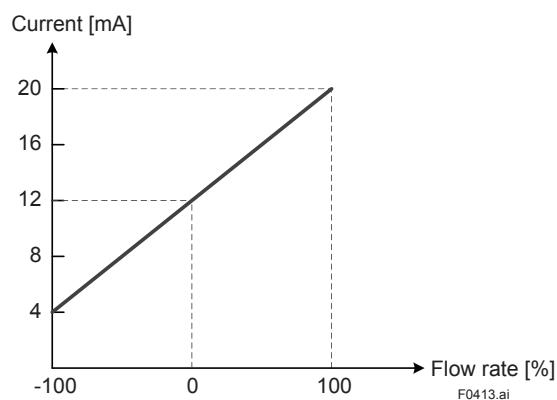
(2) Absolute range with low-cut

Current [mA]

F0414.ai
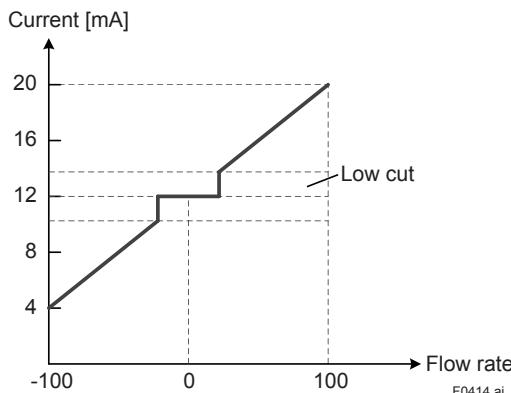
⚠ NOTE

The absolute range function and multi range function cannot be used simultaneously.

4.5.3 Alarm Output Function

The alarm output function is available to use the current output. The current signal can be output for an occurrence of alarm when this function is used. This setting can be configured with the following parameters.

Display menu path:

Device setup ► Detailed setup ► Analog out/in ► (see below)

AO1 ► Alarm out	Specify the alarm output function to use the I/O1 terminal for the current output.*1

BRAIN communication:

G04:AO1 ALM OUT	Specify the alarm output function to use the I/O1 terminal for the current output.*1

*1: From the table below, select the use of the alarm output function.

<2.4 mA	Outputs the lower current than 2.4 mA.
3.8 mA	Outputs the 3.8 mA current.
4 mA	Outputs the 4 mA current.
20.5 mA	Outputs the 20.5 mA current.
>21.6 mA	Outputs the higher current than 21.6 mA.
Measured value	Outputs the measured current (the current value is undefined due to an error).
Hold	Outputs the current that is applied when an alarm has occurred.

4.5.4 Current Output Priority

The priority of the current output functions varies depending on the setting of this instrument.
The current output is operated based on the following priority level.

Priority level	Output mode
High ↑ ↓ Low	Test mode (For details, read Section 4.12.)
	Status input function 0% signal lock output (For details, read Subsection 4.4.2.)
	Alarm output function (For details, read Subsection 4.5.3.)
	Verification function, Output during offline diagnosis (For details, read Subsection 4.11.6.)
	Normal output

4.5.5 Current Value Adjustment Function

The current value adjustment function is available to use the current input or current output. The current output is adjustable when 4.0 mA for the 0% current value is not indicated, or 20.0 mA for the 100% current value is not indicated.
This setting can be configured with the following parameters.

Display menu path:
Current output
Device setup ► Diag/Service ► AO/AI trim ► (see below)

AO1 trim 4 mA	Specify the adjustment value to use the I/O1 terminal for the 4 mA current output.
AO1 trim 20 mA	Specify the adjustment value to use the I/O1 terminal for the 20 mA current output.
AO1 trim clear	Clears the adjustment value to use the I/O1 terminal for the current output.

BRAIN communication:
Current output

G31:AO1 at 4 mA	Specify the adjustment value to use the I/O1 terminal for the 4 mA current output.
G32:AO1 at 20 mA	Specify the adjustment value to use the I/O1 terminal for the 20 mA current output.
G30:AO1 TRIM CLR	Clears the adjustment value to use the I/O1 terminal for the current output.

⚠ IMPORTANT

If the output does not match the specified current value when the current value adjustment function is used, readjust the current value.

4.6 Multi Range Function

4.6.1 Multi Range Types

The multi range function is available when the current output is performed through the I/O1 terminal using the status input and status output. This function can be performed to measure the flow rate by switching the span of the process value PV-mapped in Subsection 4.1.2 in multiple ranges. The multi range function can be selected from the multi range, forward/reverse range, and external contact range.

Each range has the following feature.

Multi range	Makes measurements while switching multiple ranges depending on the flow rate, and outputs the range status as the status output.
Forward/reverse range	Makes measurements while switching multiple ranges depending on the flow direction of the flow rate, and outputs the range status as the status output.
External contact range	Makes measurements while switching multiple ranges depending on the status input.

⚠ NOTE

The multi range function cannot be used simultaneously with the absolute range function.

4.6.2 Multi Range Setting

The setting for each range is required to use the multi range function. For information about the unit setting, read Subsection 4.1.4.

This setting can be configured with the following parameters. For details about how to specify the span (forward range 1) without using the multi range function, read Subsection 4.1.5.

Display menu path:
Device setup ► Detailed setup ► Multi range ► (see below)

Forward span 2	Specify forward range 2.
Reverse span 1	Specify reverse range 1.
Reverse span 2	Specify reverse range 2.

BRAIN communication:

F40:FWD SPAN2	Specify forward range 2.
F43:REV SPAN1	Specify reverse range 1.
F44:REV SPAN2	Specify reverse range 2.

4.6.3 Multi Range Operation

The multi range function performs to make measurements while automatically switching two ranges depending on the flow rate. If the measured flow rate is higher than the low-level range, it is automatically switched to the high-level range. If the measured flow rate is lower than the high-level range, it is automatically switched to the low-level range.

The in-use range can be output as the status output. The relationship between the ranges and status output is as follows.

Low-level range	The status output is not active.
High-level range	The status output is active.

When the range is switched from the high-level range to the low-level range, the hysteresis is set. The hysteresis specifies the ratio for the low-level range.

The multi range switching hysteresis can be specified with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Multi range ► (see below)

Auto range hyst	Specify the multi range switching hysteresis.

BRAIN communication:

F50:AUTO RNG HYS	Specify the multi range switching hysteresis.

The multi range can be configured by the following procedure.

(1) Specify the process value of the Primary Value, referring to Subsection 4.1.2.
(2) Specify the span (forward range 1), referring to Subsection 4.1.4 and 4.1.5.
(3) Specify the multi range switching hysteresis.
(4) Set the terminal output to "Status out", referring to Subsection 4.3.1.
(5) Set the status output function to multi range, referring to Subsection 4.3.7.
(6) Specify forward range 2, referring to Subsection 4.6.2.
   Note that the forward range 2 must be set which is larger value than the forward range 1.

Example:

Primary Value = Volumetric flow rate,

Flow rate span (range 1) = 50 m³/h,

Range 2 = 100 m³/h,

Hysteresis = 10%

In this case, the hysteresis value is obtained as shown below.

50 [m³/h] × 10 [%] = 5 [m³/h]

(1) When the range is switched from low-level range 1 to high-level range 2, the result is obtained as shown below.

F0415.ai
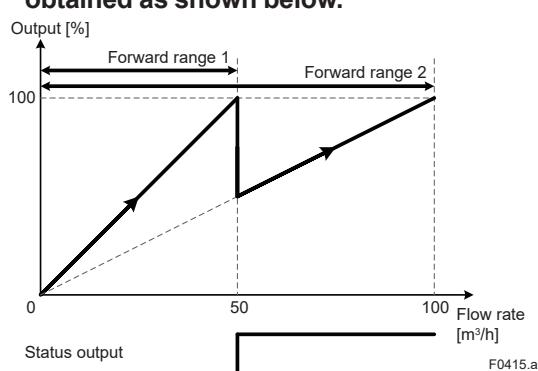
(2) When the range is switched from high-level range 2 to low-level range 1, the result is obtained as shown below (with the hysteresis).

F0416.ai
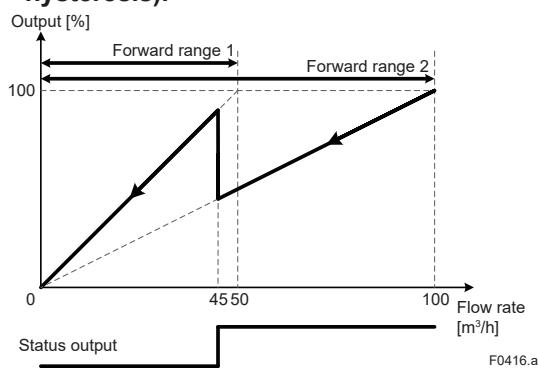
⚠ NOTE

Reconfigure the multi range setting when the process value of the Primary Value specified in Subsection 4.1.2 is changed.

4.6.4 Forward/Reverse Range

The forward/reverse range function can be performed to make measurements while automatically switching the forward and reverse ranges depending on the flow direction of the flow rate. The forward or reverse range can be specified for the range.

The in-use range can be output as the status output. The relationship between the ranges and status output is as follows.

Forward range	The status output is not active.
Reverse range	The status output is active.

When the range is switched between the forward and reverse ranges, the hysteresis is set. The hysteresis specifies the ratio for the forward or reverse range, <u>whichever is lower</u>.

This setting can be configured with the following parameters.

Display menu path:

Device setup ► Detailed setup ► Multi range ► (see below)

Bi direction hyst	Specify the forward/reverse range switching hysteresis.

BRAIN communication:

F51:BI DIREC HYS	Specify the forward/reverse range switching hysteresis.

The forward/reverse range can be specified by the following procedure.

(1) Specify the process value of the Primary Value, referring to Subsection 4.1.2.

(2) Specify the span (forward range 1), referring to Subsection 4.1.4 and 4.1.5.

(3) Specify the forward/reverse range switching hysteresis.

(4) Set the terminal output to "Status out", referring to Subsection 4.3.1.

(5) Set the status output function to the forward/reverse range, referring to Subsection 4.3.7.

(6) Specify reverse range 1, referring to Subsection 4.6.2.

Example:
Primary Value = Volumetric flow rate,
Flow rate span (forward range 1) = 50 m^3/h,
Reverse range 1 = 100 m^3/h,
Hysteresis = 5%
In this case, the forward range is smaller than the reverse range; therefore,
the hysteresis value is obtained as shown below.
50 [m^3/h] × 5 [%] = 2.5 [m^3/h]

(1) When the range is switched from the reverse range to the forward range, the result is obtained as shown below (with the hysteresis).

F0417.ai
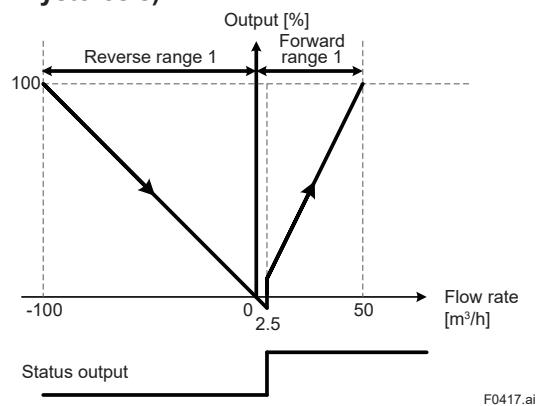
(2) When the range is switched from the forward range to the reverse range, the result is obtained as shown below (with the hysteresis).

F0418.ai
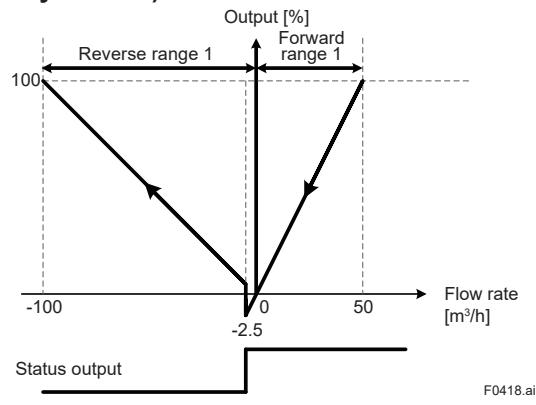
⚠ NOTE

Reconfigure the forward/reverse range setting when the process value of the Primary Value specified in Subsection 4.1.2 is changed.

4.6.5 Combination of Multi Range and Forward/Reverse Range

The multi range function can be combined with the forward/reverse range function when the status output 1 function of the I/O2 terminal and the status output 2 function of the I/O4 terminal are set to the multi range function and forward/reverse range function respectively. Two forward ranges and two reverse ranges, which are four ranges totally, can be assigned to each range.
The in-use range can be output as the status output. The relationship between the ranges and status output is as follows.

○: The status output is active.
×: The status output is not active.

	Multi range	**Forward/reverse range**
Forward range 1	×	×
Forward range 2	○	×
Reverse range 1	×	○
Reverse range 2	○	○

The multi range and forward/reverse range have the hysteresis respectively. For details about the hysteresis of the multi range and forward/reverse range, read Subsection 4.6.3 and 4.6.4.

The following steps are to combine the multi range with the forward/reverse range.
(1) Specify the process value of the Primary Value, referring to Subsection 4.1.2.
(2) Specify the span (forward range 1), referring to Subsection 4.1.4 and 4.1.5.
(3) Specify the hysteresis for the multi range and forward/reverse range, referring to Subsection 4.6.3 and 4.6.4.
(4) Set each terminal output to "Status out", referring to Subsection 4.3.1.
(5) Set the status output function to multi range or forward/reverse range, referring to Subsection 4.3.7.
(6) Specify the forward and reverse ranges, referring to Subsection 4.6.2.

4.6.6 External Contact Range

This instrument enables a use of an external contact range. This function can be measured while automatically switching two ranges depending on the status input.
The relationship between the ranges and status input is as follows.

The status input is not active.	Low-level range
The status input is active.	High-level range

The external contact range can be specified by the following procedure.
(1) Specify the process value of the Primary Value, referring to Subsection 4.1.2.
(2) Specify the span (forward range 1), referring to Subsection 4.1.4 and 4.1.5.
(3) Set the status input function to the external contact range, referring to Subsection 4.4.2.
(4) Set the status output function to the external contact range, referring to Subsection 4.3.7.
(5) Specify forward range 2, referring to Subsection 4.6.2.

Example:

Primary Value = Volumetric flow rate,
Flow rate span (forward range 1) = 50 m^3/h,
Forward range 2 = 100 m^3/h
In this case, the result is obtained as shown below.

F0419.ai
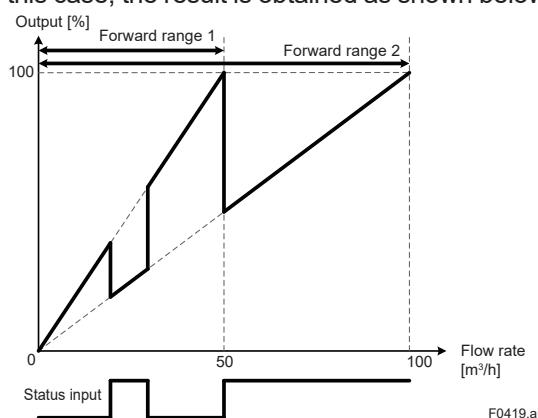
4.7 Auxiliary Calculation Function

4.7.1 Fluid Flow Direction Setting

The arrow shown on the surface of the sensor indicates the fluid flow direction. Upon shipment from the manufacturing plant, the flow rate is measured, assuming that the arrow direction is forward.
This instrument can be changed the parameter setting and measure the flow rate, assuming that the opposite direction of the arrow direction is forward.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ►
AUX calculation ► (see below)

Flow direct	Specify the fluid flow direction.*1

BRAIN communication:

H10:FLOW DIRECT	Specify the fluid flow direction.*1

*1 From the table below, select the fluid flow direction.

Forward	The arrow direction of the sensor is forward.
Reverse	The opposite direction of the arrow direction of the sensor is forward.

4.7.2 Rate Limit Function Setting

The rate limit function can perform to reduce noises that cannot be all cleared by only lengthening the damping time constant. When a step signal or a sudden signal due to a slurry fluid is input, this function judges whether the signal is a flow rate signal or a noise signal. This judgment is made based on the high/low limit value (rate limit value) and the rate limit function continuation time (dead time), causing the noise signal over the rate limit value to be cut off.

The rate limit value is specified with the percentage (%) for the span of the process value PV-mapped in Subsection 4.1.2. Set "0" to the dead time if this function is unnecessary to use.

This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ►
AUX calculation ► (see below)

Rate limit	Specify the rate limit value.
Dead time	Specify the dead time.
Noise filter	Specify the noise filter (rate limit value and dead time).[1]

BRAIN communication:

H11:RATE LIMIT	Specify the rate limit value.
H12:DEAD TIME	Specify the dead time.
H13:NOISE FILTER	Specify the noise filter (rate limit value and dead time).[1]

[1]: From the table below, select the noise filter (rate limit value and dead time).

	Rate limit value	Dead time
Manual	Optional	Optional
Level 1	0.5%	0.5s
Level 2	1.0%	1.0s
Level 3	5.0%	3.0s

⚠ NOTE

If either the rate limit value or the dead time is specified, the noise filter is set to "Manual".

⚠ NOTE

Determining the rate limit value and dead time

The Rage limit value:
Determine the level which should be cut the output fluctuation. For example, if its level is 2%, the noise of 2% or larger would be cut as shown in the following figure.
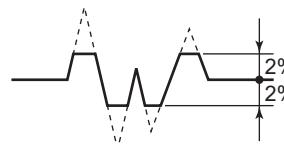
The Dead time (T_0):
Determine the value depending on the width of the output fluctuation. Choose the larger value when the noise which is over the dead time as shown in the following figure.

F0420.ai

⚠ NOTE
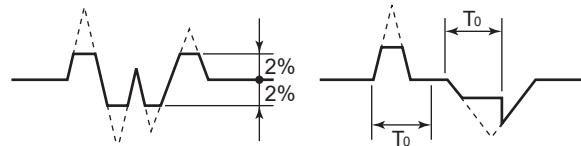
For the rate limit function, the dead time is set to "0" upon shipment from the manufacturing plant. Be sure to set the dead time when the rate limit function is used.

Signal processing for rate limit function
The instrument calculates to set the specific rate limit value to the primary delay response value of the previously sampled flow rate value. If the flow rate value sampled at this time exceeds the rate limit value above, its high or low limit value is set to the flow rate value at this time. Furthermore, if the sampling count occurs within the dead time while the signal over the high/low limit value is in the same direction, this signal is judged to be a flow rate signal.

Example:

(1) Input = 0 to 10%, Damping time constant = 5 seconds, Dead time = 3 seconds, Rate limit value = 1% In this case, the output for the step input is obtained as shown below.

Input: 0 to 10%
Damping time constant: 5 s
Dead time: 3 s
Rate limit value: 1%

F0421.ai
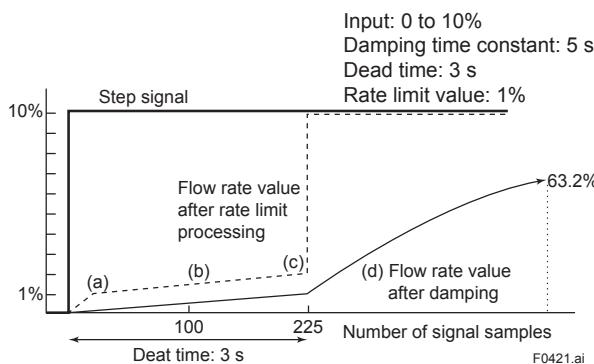
- In the condition above (a), the signal exceeds the rate limit value as compared with the previous value; therefore, the response is set to 1%.
  The actual output, which is damped, is processed as indicated by the solid line.
- Then, the flow rate value in the dead time is set to the "flow rate after damping calculation + signal of rate limit value (1%)".
- The input signal does not return to the rate limit value or less within the dead time; therefore, it is judged to be a flow rate signal at the time of (c).
- The output signal starts following the step signal along the damping curve.

The figure below shows an output example when a slurry noise has occurred.

(2) Input = 0 to 10%, Damping time constant = 1 second, Dead time = 1 seconds, Rate limit value = 1% In this case, the output for a slurry noise is obtained as shown below.

Input: 0 to 10%
Damping time constant: 1 s
Dead time: 1 s
Rate limit value: 1%

In the figure on the left, it is determined that the slurries noise signal is not a flow rate signal.

F0422.ai
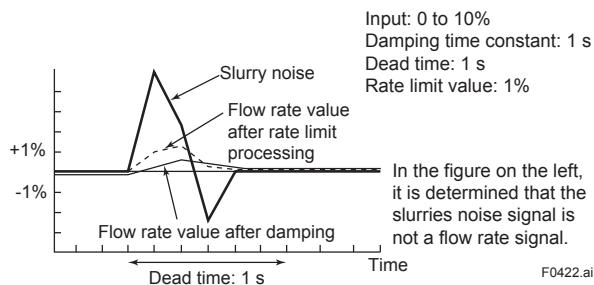
4.7.3 Pulsing Flow Support Function Setting

Using a pump, etc. may cause an error in the average of the flow rate due to the pulsing flow. If the pulsing flow support function is used, an error due to a pulsing flow can be reduced by following a flow change while controlling the flow rate calculation.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ►
AUX calculation ► (see below)

Pulsing flow	Specify the use of the pulsing flow support function.*1

BRAIN communication:

H14:PULSING FLOW	Specify the use of the pulsing flow support function.*1

*1:   Select the use of the pulsing flow support function from the table below.

No	Do not use the pulsing flow support function.
Yes	Use the pulsing flow support function.

4.7.4 Power Frequency Synchronization Setting

This function can be specified whether the excitation frequency (internal signal processing frequency) and power frequency are synchronous or asynchronous.
When making the excitation frequency and power frequency asynchronous, the excitation frequency is determined by the set value of the power frequency.
The power frequency synchronous/asynchronous mode and the power frequency can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ►
AUX calculation ► (see below)

Power sync	Makes the excitation frequency and power frequency synchronous.*1
Set power freq	Sets the power frequency when the excitation frequency and power frequency are asynchronous.

BRAIN communication:

H20:POWER SYNCH	Makes the excitation frequency and power frequency synchronous.*1
H21:SET PWR FREQ	Sets the power frequency when the excitation frequency and power frequency are asynchronous.

*1:   From the table below, select the power frequency synchronous/asynchronous mode.

No	Makes the excitation frequency and power frequency asynchronous.
Yes	Makes the excitation frequency and power frequency synchronous.

✋ IMPORTANT

When using the DC power as the transmitter power, set the commercially available power frequency of the place where to use the transmitter.
Set "Power sync" to Off and specify "Set power freq".

The excitation frequency and power frequency can be checked with the following parameters.

Display menu path:
Device setup ► Detailed setup ► AUX calculation ► (see below)

Iex power frequency	Displays the power frequency (synchronous with the excitation frequency).
Meas power freq	Displays the measured power frequency.

BRAIN communication:

H22:IEX PWR FREQ	Displays the power frequency (synchronous with the excitation frequency).
H23:MES PWR FREQ	Displays the measured power frequency.

4.8 Alarm

4.8.1 Errors and Countermeasures

The error messages are following table. For AXFA11, read the applicable user's manual as listed in Table 1.1.

Alarm Item	Description
System Alarm	Device breaks down and causes abnormal measurement. Device replacement is needed.
Process Alarm	The device works normally and some issue of process causes abnormal measurement. Maintenance work is needed.
Setting Alarm	The device works normally but parameter setting error occurs. Parameter setting is needed.
Warning	The device works normally and measurement is also normal but warning occurs.
Information	The device works normally and measurement is also normal. Just reference information.

NE107 Status		Status of the Device
F	Failure	Device malfunction, Parts malfunction
C	Function Check	The output signal is temporarily invalid for the local operation or manual operation.
S	Out of Specification	The device works in out of specification. The output signal is uncertain for the process or the ambience.
M	Maintenance Required	The maintenance is required in the near future.
N	No Effect	Other issue

Alarm Item	NE107 Status	Error Message Display	Error Message BRAIN	Error Description	Countermeasure Message Display	Countermeasure	Output Alarm	Output Warning	Output Current	Output Pulse / Status	Output Total	Process Value	Display
System Alarm	F	010: Main CPU FAIL	10: Main CPU FAIL	CPU (Main board) failure was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Burnout	Stop	Stop	Stop	Not defined
	F	011: Rev calc FAIL	11: Rev cal FAIL	Failure of reverse calculation was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	F	012: Main EEP FAIL	12: Main EEP FAIL	Failure of EEPROM (Main board) was detected.	Contact Yokogawa service center.	Turn on the power again within the temperature range. If the problem does not improve, contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	F	013: Main EEP dflt	13: Main EEP dflt	EEPROM (Main board) was reseted to default values.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	F	014: Snsr bd FAIL	14: Snsr bd FAIL	Failure of sensor board was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Hold prior setting	Alarm
	F	015: Snsr comm ERR	15: Snsr comm ERR	Communication error of sensor was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Burnout	Alarm Out	Based on "FailOpts"	Hold prior setting	Alarm
	F	016: AD 1 FAIL[Sig]	16: A/D1 FAIL	Failure of A/D transmitter 1 [flow velocity signal] was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Hold prior setting	Alarm
	F	017: AD 2 FAIL[Excit]	17: A/D2 FAIL	Failure of A/D transmitter 2 [Exciting current] was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Hold prior setting	Alarm

Alarm Item	NE107 Status	Error Message Display	Error Message BRAIN	Error Description	Countermeasure Message Display	Countermeasure	Output Alarm	Output Warning	Output Current	Output Pulse / Status	Total	Process Value	Display
	F	018: Coil open	18: Coil open	Coil of sensor was disconnected.	Cut the power and check coil & EX cable.	Turn off the power, check coil of sensor and excitation cable.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Hold prior setting	Alarm
	F	019: Coil short	19: Coil short	Coil of sensor was shorted.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Hold prior setting	Alarm
	F	020: Exciter FAIL	20: Exciter FAIL	Failure of excitation circuit was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	F	021: PWM 1 stop	21-22: PWM stop	Error of pulse width modulation 1 was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	F	022: PWM 2 stop		Error of pulse width modulation 2 was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	F	023: Opt bd mismatch	23: Opt mismatch	Mismatch of option board was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	F	024: Opt bd EEP FAIL	24: Opt EEP FAIL	Failure of EEPROM (option board) was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	F	025: Opt bd A/D FAIL	25: Opt A/D FAIL	Failure of A/D (option board) was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	F	026: Opt bd SPI FAIL	26: Opt SPI FAIL	Failure of SPI (option board) was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
System Alarm	F	027: Restore FAIL	27: Restore FAIL	Restore of parameters was failed.	Retry parameter restoration.	Retry parameter restoration.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	F	028: Ind bd FAIL	28-32: Indct FAIL	Failure of indicator board was detected.	Contact Yokogawa service center.	Check the ambient temperature of display is within the range. If the problem does not improve, contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	F	029: Ind bd EEP FAIL		Failure of EEPROM (indicator board) was detected.	Contact Yokogawa service center.	Turn on the power again within the temperature range. If the problem does not improve, contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	F	030: LCD drv FAIL		Failure of LCD driver was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	F	031: Ind bd mismatch		Mismatch of Indicator board was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	F	032: Ind comm ERR		Communication error of indicator board was detected.	Check connection of Indicator & main board.	Check connection of Indicator & main board.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	F	033: microSD FAIL	33: microSD FAIL	Failure of microSD card was detected.	Change microSD card.	Change microSD card.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm

Alarm Item	NE107 Status	Error Message Display	Error Message BRAIN	Error Description	Countermeasure Message Display	Countermeasure	Alarm	Warning	Current	Pulse/Status	Total	Process Value	Display
Process Alarm	S	050: Signal overflow	50: Sig overflow	Failure of input signal was detected.	Check signal cable and grounding.	Check signal cable and grounding.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Hold prior setting	Alarm
	S	051: Empty detect	51: Empty detect	Empty inside of sensor was detected. (Empty pipe detection)	Fill flow tube with fluid.	Fill flow tube with fluid.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Hold prior setting	Alarm
	N	052: H/L HH/LL alm	52: H/L HH/LL alm	Flow rate exceeded upper limit or lower limit.	Check flow rate and setting value.	Check flow rate and setting value.	Active	Non-Active	Normal	Normal	Continue	Normal Operation	Alarm
	S	053: Adh over lv 4	53: Adh over lv4	The resistance value of the electrodes exceeded Level 4. (Adhesion detection of insulation to electrode)	Clean electrodes.	Clean electrodes.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	S	060: Span cfg ERR	60: Span cfg ERR	Setting error of flow span was detected. (fulfill "0.05 m/s < Span < 16 m/s")	Change span parameter setting.	Check or change span parameter setting.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	S	062: AO 1 4-20 lmt	62: AO1 4-20 lmt	Setting error of Current output 1 was detected. (fulfill "LRV < HRV")	Change Analog output 1 parameter setting.	Check or change Analog output 1 parameter setting.	Active	Non-Active	Normal	Normal	Continue	Normal Operation	Alarm
	S	064: AO 1 mlt rng	64: AO1 mlt rng	Setting error of Multi range function was detected. (fulfill "1st range <= 2nd range" and select "either multi range or absolute range".)	Change multi range parameter setting.	Check or change multi range parameter setting.	Active	Non-Active	Alarm Out	Normal	Based on "FailOpts"	Normal Operation	Alarm
Setting Alarm	N	065: H/L cfg ERR	65: AO H/L cfg	Setting error of ararm high/low limit function was detected. (fulfill "Hi Alarm - Lo Alarm > H/L Hys" and "HH Alarm - LL Alarm > HH/LL Hys")	Change H/L, HH/LL parameter setting.	Check and change H/L, HH/LL parameter setting.	Active	Non-Active	Alarm Out	Normal	Based on "FailOpts"	Normal Operation	Alarm
	S	066: Density cfg ERR	66: Dens cfg ERR	Setting error of density value was detected when PV was set to mass flow rate.	Change Density parameter setting.	Check and change Density parameter setting.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm
	S	067: Pls 1 cfg ERR	67: Pls1 cfg ERR	Setting error of Pulse output 1 was detected.	Change Pulse output 1 parameter setting.	Change Pulse output 1 parameter setting.	Active	Non-Active	Alarm Out	Alarm Out	Continue	Normal Operation	Alarm
	S	068: Pls 2 cfg ERR	68: Pls2 cfg ERR	Setting error of Pulse output 2 was detected.	Change Pulse output 2 parameter setting.	Check and change Pulse output 2 parameter setting.	Active	Non-Active	Alarm Out	Alarm Out	Continue	Normal Operation	Alarm
	C	069: Nomi size cfg	69: Nomi size cfg	Configuration error of nominal size was detected. (fulfill "0.99 mm < nominal size < 3000.10 mm (0.01 inch < nominal size < 120.10 inch)")	Change nominal parameter setting.	Check and change nominal paramter setting.	Active	Non-Active	Alarm Out	Alarm Out	Based on "FailOpts"	Normal Operation	Alarm

Alarm Item	NE107 Status	Error Message Display	Error Message BRAIN	Error Description	Countermeasure Message Display	Countermeasure	Alarm	Warning	Current	Pulse / Status	Total	Process Value	Display
Setting Alarm	C	070: Adh cfg ERR	70: Adh cfg ERR	Setting error of electrode adhesion detection function was detected. (fulfill "Level1 < Level2 < Level3 < Level4")	Change adhesion parameter setting.	Check and change adhesion parameter setting.	Active	Non-Active	Normal	Normal	Continue	Normal Operation	Alarm
	C	072: Log not start	72: Log not start	Data logging failed to start.	Insert microSD card.	Insert microSD card.	Active	Non-Active	Normal	Normal	Continue	Normal Operation	Alarm
Warning	S	080: AO 1 saturate	80-81: AO saturt	Saturation of Analog output 1 was detected.	Check process or parameter setting.	Check process value and current output 1 parameter setting.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
	S	082: Pls 1 saturate	82-83:Pls saturt	Saturation of Pulse output 1 was detected.	Check process or parameter setting.	Check process value and pulse output 1 parameter setting.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
	S	083: Pls 2 saturate		Saturation of Pulse output 2 was detected.	Check process or parameter setting.	Check process value and pulse output 2 parameter setting.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
	C	085: Cable miscon	85: Cable miscon	Misconnection of cable was detected.	Check the signal/ EX cable connection.	Check the signal cable and excitation cable connection.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
	C	086: Coil insulation	86: Coil insulate	Insulation deterioration of coil was detected.	Coil insulation is detected.	Contact Yokogawa service center.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
	M	087: Adhesion lv 3	87: Adh over lv3	The resistance value of electrode exceeded Level 3. (Adhesion detection of insulation to electrode)	Recommend cleaning electrode	Recommend cleaning electrode.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
	C	092: AZ warn	92: AZ warn	Result of Autozero adjustment |Mag Flow Zero| exceeded 10 cm/s.	Check environment.	Check fluid is stopped when executing auto-zero adjustment.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
	C	093: Verif warn	93: Verif warn	Interruption of verification function was detected.	Last Verification was interrupted.	Execute Verification again.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
	C	095: Simulate active	95: Sim active	Test mode was executed for any of Flow velocity, Volumetric flow rate, Mass flow rate, Current output, Pulse output, Status input, Status output.	Simulation running.	Release simulation or test mode.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
	S	096: AO 1 fix	96-97: AO fixed	It was detected that fixied value is set to Current output 1.	Please cancel the fixed output.	Check current output 1 is test mode or not.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning

Alarm Item	NE107 Status	Error Message Display	Error Message BRAIN	Error Description	Countermeasure Message Display	Countermeasure	Output Alarm	Output Warning	Output Current	Output Pulse/Status	Total	Process Value	Display
	S	098: Pls 1 fix	98-99: Pls fixed	It was detected that fixed value is set to Pulse output 1.	Please cancel the fixed output.	Check pulse output 1 is test mode or not.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
	S	099: Pls 2 fix		It was detected that fixed value is set to Pulse output 2.	Please cancel the fixed output.	Check pulse output 2 is test mode or not.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
	C	101: Param restore run	101: Prm restore	Restore function of parameter is running.	—	—	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Execute
	N	102: Disp over	102: Disp over	Number of digits available for display exceeded the limit.	Check Display format parameter.	Check Display format parameter.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
Warning	N	103: SD size warn	103: SD size warn	Free space of microSD card decreased to less than 10%.	microSD card may run out of memory space.	microSD card may run out of memory space.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
	M	104: Bkup incmplt	104: Bkup incmplt	Parameter backup failed.	Retry parameter backup.	Retry parameter backup.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
	S	105: SD mismatch	105: SD mismatch	Mismatch of microSD card was detected.	Change microSD card.	Change microSD card.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
	M	106: SD removal ERR	106: SD remov ERR	Removal of microSD card failed.	Remove microSD in appropriate procedure.	Remove microSD in appropriate rocedure.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Warning
	N	131: Trans mismatch	131: Trn mismatch	Mismatch of sensor and transmitter was detected.	Contact Yokogawa service center.	Contact Yokogawa service center.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Normal
	N	120: Watchdog	120: Watchdog	Error of Watchdoc timer was detected.	—	Contact Yokogawa service center.	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Normal
	N	121: Power off	121: Power off	Power-off was detected.	—	—	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Normal
Information	N	122: Inst power FAIL	122: Inst PW FAIL	Instantaneous power failure was detected.	—	—	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Normal
	N	123: Param bkup run	123: bkup run	Parameter backup is running.	—	—	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Execute
	N	124: Data log run	124: Data log run	Data log is running.	—	—	Non-Active	Active	Normal	Normal	Continue	Normal Operation	Icon

4.8.2 Alarm Display Setting

(1) Alarm display

If an error occurs on this instrument, an alarm appears on the display. The alarm display modes are classified into two types: mode to display the process value and alarm name, and mode to display the alarm name and action.

If multiple errors occur on this instrument, the corresponding alarms are displayed in sequence on the display.

This setting can be configured with the following parameters.

Display menu path:

Device setup ► Detailed setup ► Display set ► Optional config ► (see below)

Alarm display	Sets the alarm display.[1]

BRAIN communication:

J28:DISP ALARM	Sets the alarm display.[1]

[1]: From the table below, select the alarm display.

Normal	Displays the process value and alarm name.
	F0425.ai
Detail	Displays the alarm name and action.
	F0426.ai
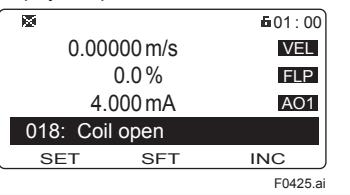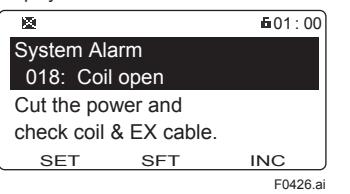
(2) Alarm display based on NAMUR NE107

A prefix can be assigned to the alarm name based on NAMUR NE107.

This setting can be configured with the following parameters.

Display menu path:

Device setup ► Detailed setup ► Display set ► Optional config ► (see below)

NE107 display	Sets the alarm display based on NAMUR NE107.[1]

BRAIN communication:

J27:DISP NE107	Sets the alarm display based on NAMUR NE107.[1]

[1]: From the table below, select alarm display.

Normal	Sets to the normal alarm display.
NE107	Sets the alarm display based on NAMUR NE107.

4.8.3 Alarm History Function

The alarm history function records the previously detected alarms as a history.

This setting can be configured with the following parameters.

Display menu path:

Device setup ► Diag/Service ► Sts/Self test ► Alarm ► Alarm record ► (see below)

Record alarm 1	Displays the name of new alarm 1.
Record time 1	Displays the operating time at which new alarm 1 has occurred.
Record alarm 2	Displays the name of new alarm 2.
Record time 2	Displays the operating time at which new alarm 2 has occurred.
Record alarm 3	Displays the name of new alarm 3.
Record time 3	Displays the operating time at which new alarm 3 has occurred.
Record alarm 4	Displays the name of new alarm 4.
Record time 4	Displays the operating time at which new alarm 4 has occurred.

BRAIN communication:

I50:ALM RECORD1	Displays the name of new alarm 1.
I51:ALM TIME1	Displays the operating time at which new alarm 1 has occurred.
I52:ALM RECORD2	Displays the name of new alarm 2.
I53:ALM TIME2	Displays the operating time at which new alarm 2 has occurred.
I54:ALM RECORD3	Displays the name of new alarm 3.
I55:ALM TIME3	Displays the operating time at which new alarm 3 has occurred.
I56:ALM RECORD4	Displays the name of new alarm 4.
I57:ALM TIME4	Displays the operating time at which new alarm 4 has occurred.

The operating time at alarm occurrence is displayed in format, "dddddD hh:mm". "dddddD" indicates the day, "hh" indicates the hour, and "mm" indicates the minute.

Example:

"00031D 12:34" is displayed.

This example shows that an alarm has occurred when the instrument has operated for 31 days, 12 hours, and 34 minutes.

4.8.4 Alarm Mask Function

The alarm mask function can mask the specified alarm, hide an alarm notification, and record no alarm history. This function can be set for each of the alarm notification and alarm history.
This setting can be configured with the following parameters.

■Alarm notification mask

If the alarm notification mask function is turned "On", it disables alarm notification.
Setting example for alarm "50:Sig overflow":
> To disable the alarm notification,
> > set "Sig overflow on" to I32 : OUT MSK SET2.
> To enable the alarm notification,
> > set "Sig overflow off" to I32 : OUT MSK SET2.

Display menu path:
Device setup ► Diag/Service ► Sts/Self test ► Alarm ► Alarm out mask ► (see below)

Mask 1-1	Specifies the mask function for alarm notification 1-1.
Mask 1-2	Specifies the mask function for alarm notification 1-2.
Mask 2-1	Specifies the mask function for alarm notification 2-1.
Mask 2-2	Specifies the mask function for alarm notification 2-2.
Mask 3-1	Specifies the mask function for alarm notification 3-1.
Mask 3-2	Specifies the mask function for alarm notification 3-2.

BRAIN communication:

I30:OUT MSK SET1	Specifies the mask function for alarm notification 1.
I31:OUT MSK STS1	Displays the masked alarm for alarm notification 1.
I32:OUT MSK SET2	Specifies the mask function for alarm notification 2.
I33:OUT MSK STS2	Displays the masked alarm for alarm notification 2.
I34:OUT MSK SET3	Specifies the mask function for alarm notification 3.
I35:OUT MSK STS3	Displays the masked alarm for alarm notification 3.

■Alarm record mask

If the alarm record mask function is turned "On", it disables the alarm record.
Setting example for alarm "51:Empty detect":
> To disable the alarm record,
> > set "Empty detect on" to I42 : REC MSK SET2.
> To enable the alarm record,
> > set "Empty detect off" to I42 : REC MSK SET2.

Display menu path:
Device setup ► Diag/Service ► Sts/Self test ► Alarm ► Alarm record mask ► (see below)

Mask 1-1	Specifies the mask function for alarm history 1-1.
Mask 1-2	Specifies the mask function for alarm history 1-2.
Mask 2-1	Specifies the mask function for alarm history 2-1.
Mask 2-2	Specifies the mask function for alarm history 2-2.

BRAIN communication:

I40:REC MSK SET1	Specifies the mask function for alarm history 1.
I41:REC MSK STS1	Displays the masked alarm for alarm history 1.
I42:REC MSK SET2	Specifies the mask function for alarm history 2.
I43:REC MSK STS2	Displays the masked alarm for alarm history 2.

Due to the characteristics of BRAIN communication, parameters for setting and checking are separate. Use the setting parameter when checking the present mask state and the setting parameter when changing the mask settings.

⚠ NOTE

Note that the alarm masked by the alarm notification mask function is not recorded in the alarm history.

The alarm mask function setting is as follows.

Parameter name	Indicates the name of the mask setting parameter.
Alarm name	Indicates the alarm name.
Default value	Indicates the default value (upon shipment from the manufacturing plant). (○: Masked, -: Not masked)
Attribute	Indicates whether the mask setting is enabled or disabled. (○: Enabled, -: Disabled)

(1) Alarm notification mask function

Display				BRAIN			
Parameter name	**Alarm name**	**Default value**	**Attribute**	**Parameter name**	**Alarm name**	**Default value**	**Attribute**
—	010: Main CPU FAIL	—	—	—	10: Main CPU FAIL	—	—
—	011: Rev calc FAIL	—	—	—	11: Rev cal FAIL	—	—
—	012: Main EEP FAIL	—	—	—	12: Main EEP FAIL	—	—
Mask 1-1	013: Main EEP dflt	—	○	I30: OUT MSK SET1	13: Main EEP dflt	—	○
—	014: Snsr bd FAIL	—	—	—	14: Snsr bd FAIL	—	—
—	015: Snsr comm ERR	—	—	—	15: Snsr comm ERR	—	—
—	016: AD 1 FAIL[Sig]	—	—	—	16: A/D1 FAIL	—	—
—	017: AD 2 FAIL[Excit]	—	—	—	17: A/D2 FAIL	—	—
—	018: Coil open	—	—	—	18: Coil open	—	—
—	019: Coil short	—	—	—	19: Coil short	—	—
—	020: Exciter FAIL	—	—	—	20: Exciter FAIL	—	—
Mask 1-2	021: PWM 1 stop	—	○	I30: OUT MSK SET1	21-22: PWM stop	—	○
Mask 1-2	022: PWM 2 stop	—	○				
Mask 1-2	023: Opt bd mismatch	—	○	I30: OUT MSK SET1	23: Opt mismatch	—	○
Mask 1-2	024: Opt bd EEP FAIL	—	○	I30: OUT MSK SET1	24: Opt EEP FAIL	—	○
Mask 1-2	025: Opt bd A/D FAIL	—	○	I30: OUT MSK SET1	25: Opt A/D FAIL	—	○
Mask 1-2	026: Opt bd SPI FAIL	—	○	I30: OUT MSK SET1	26: Opt SPI FAIL	—	○
—	027: Restore FAIL	—	—	—	27: Restore FAIL	—	—
Mask 1-2	028: Ind bd FAIL	○	○	I30: OUT MSK SET1	28-32: Indct FAIL	—	○
Mask 1-2	029: Ind bd EEP FAIL	—	○				
Mask 1-2	030: LCD drv FAIL	—	○				
Mask 1-2	031: Ind bd mismatch	—	○				
Mask 1-2	032: Ind comm ERR	—	○				
Mask 1-2	033: microSD FAIL	—	○	I30: OUT MSK SET1	33: microSD FAIL	—	○
Mask 2-1	050: Signal overflow	—	○	I32: OUT MSK SET2	50: Sig overflow	—	○
Mask 2-1	051: Empty detect	—	○	I32: OUT MSK SET2	51: Empty detect	—	○
Mask 2-1	052: H/L HH/LL alm	○	○	I32: OUT MSK SET2	52: H/L HH/LL alm	○	○
Mask 2-1	053: Adh over lv 4	○	○	I32: OUT MSK SET2	53: Adh over lv4	○	○
Mask 2-1	060: Span cfg ERR	—	○	I32: OUT MSK SET2	60: Span cfg ERR	—	○
Mask 2-1	062: AO 1 4-20 lmt	—	○	I32: OUT MSK SET2	62: AO1 4-20 lmt	—	○
Mask 2-1	064: AO 1 mlt rng	—	○	I32: OUT MSK SET2	64: AO1 mlt rng	—	○
Mask 2-1	065: H/L cfg ERR	—	○	I32: OUT MSK SET2	65: AO H/L cfg	—	○
Mask 2-1	066: Density cfg ERR	—	○	I32: OUT MSK SET2	66: Dens cfg ERR	—	○
Mask 2-2	067: Pls 1 cfg ERR	—	○	I32: OUT MSK SET2	67: Pls1 cfg ERR	—	○
Mask 2-2	068: Pls 2 cfg ERR	—	○	I32: OUT MSK SET2	68: Pls2 cfg ERR	—	○
Mask 2-2	069: Nomi size cfg	—	○	I32: OUT MSK SET2	69: Nomi size cfg	—	○
Mask 2-2	070: Adh cfg ERR	—	○	I32: OUT MSK SET2	70: Adh cfg ERR	—	○
Mask 2-2	072: Log not start	—	○	I32: OUT MSK SET2	72: Log not start	—	○
Mask 2-2	080: AO 1 saturate	○	○	I32: OUT MSK SET2	80-81: AO saturt	○	○
Mask 2-2	082: Pls 1 saturate	○	○	I32: OUT MSK SET2	82-83: Pls saturt	○	○
Mask 2-2	083: Pls 2 saturate	○	○				
Mask 2-2	085: Cable miscon	—	○	I32: OUT MSK SET2	85: Cable miscon	—	○
Mask 2-2	086: Coil insulation	○	○	I32: OUT MSK SET2	86: Coil insulate	○	○
Mask 2-2	131: Trans mismatch	—	○	I32: OUT MSK SET2	131: Trn mismatch	—	○
Mask 3-1	087: Adhesion lv 3	○	○	I34: OUT MSK SET3	87: Adh over lv3	○	○
Mask 3-1	092: AZ warn	○	○	I34: OUT MSK SET3	92: AZ warn	○	○
Mask 3-1	093: Verif warn	○	○	I34: OUT MSK SET3	93: Verif warn	○	○
Mask 3-1	095: Simulate active	—	○	I34: OUT MSK SET3	95: Sim active	—	○
Mask 3-1	096: AO 1 fix	—	○	I34: OUT MSK SET3	96-97: AO fixed	—	○
Mask 3-1	098: Pls 1 fix	—	○	I34: OUT MSK SET3	98-99: Pls fixed	—	○
Mask 3-1	099: Pls 2 fix	—	○				
Mask 3-2	101: Param restore run	○	○	I34: OUT MSK SET3	101: Prm restore	○	○
Mask 3-2	102: Disp over	○	○	I34: OUT MSK SET3	102: Disp over	○	○
Mask 3-2	103: SD size warn	○	○	I34: OUT MSK SET3	103: SD size warn	○	○
Mask 3-2	104: Bkup incmplt	○	○	I34: OUT MSK SET3	104: Bkup incmplt	○	○
Mask 3-2	105: SD mismatch	○	○	I34: OUT MSK SET3	105: SD mismatch	○	○
Mask 3-2	106: SD removal ERR	○	○	I34: OUT MSK SET3	106: SD remov ERR	○	○
Mask 3-2	120: Watchdog[1]	○	○	I34: OUT MSK SET3	120: Watchdog[1]	○	○
Mask 3-2	121: Power off[1]	○	○	I34: OUT MSK SET3	121: Power off[1]	○	○

Display				BRAIN			
Parameter name	Alarm name	Default value	Attribute	Parameter name	Alarm name	Default value	Attribute
Mask 3-2	122: Inst power FAIL*1	○	○	I34: OUT MSK SET3	122: Inst PW FAIL*1	○	○
Mask 3-2	123: Param bkup run	○	○	I34: OUT MSK SET3	123: bkup run	○	○
Mask 3-2	124: Data log run	○	○	I34: OUT MSK SET3	124: Data log run	○	○

*1: Recorded in the alarm history regardless of the setting of the alarm notification mask function.

(2) Alarm history mask function

Display				BRAIN			
Parameter name	Alarm name	Default value	Attribute	Parameter name	Alarm name	Default value	Attribute
—	010: Main CPU FAIL	—	—	—	10: Main CPU FAIL	—	—
—	011: Rev calc FAIL	—	—	—	11: Rev cal FAIL	—	—
—	012: Main EEP FAIL	—	—	—	12: Main EEP FAIL	—	—
Mask 1-1	013: Main EEP dflt	—	○	I40: REC MSK SET1	13: Main EEP dflt	—	○
—	014: Snsr bd FAIL	—	—	—	14: Snsr bd FAIL	—	—
—	015: Snsr comm ERR	—	—	—	15: Snsr comm ERR	—	—
—	016: AD 1 FAIL[Sig]	—	—	—	16: A/D1 FAIL	—	—
—	017: AD 2 FAIL[Excit]	—	—	—	17: A/D2 FAIL	—	—
—	018: Coil open	—	—	—	18: Coil open	—	—
—	019: Coil short	—	—	—	19: Coil short	—	—
Mask 1-1	020: Exciter FAIL	—	○	I40: REC MSK SET1	20: Exciter FAIL	—	○
Mask 1-2	021: PWM 1 stop	—	○	I40: REC MSK SET1	21-22: PWM stop	—	○
Mask 1-2	022: PWM 2 stop	—	○				
Mask 1-2	023: Opt bd mismatch	—	○	I40: REC MSK SET1	23: Opt mismatch	—	○
Mask 1-2	024: Opt bd EEP FAIL	—	○	I40: REC MSK SET1	24: Opt EEP FAIL	—	○
Mask 1-2	025: Opt bd A/D FAIL	—	○	I40: REC MSK SET1	25: Opt A/D FAIL	—	○
Mask 1-2	026: Opt bd SPI FAIL	—	○	I40: REC MSK SET1	26: Opt SPI FAIL	—	○
—	027: Restore FAIL	—	—	—	27: Restore FAIL	—	—
Mask 1-2	028: Ind bd FAIL	—	○	I40: REC MSK SET1	28-32: Indct FAIL	—	○
Mask 1-2	029: Ind bd EEP FAIL	—	○				
Mask 1-2	030: LCD drv FAIL	—	○				
Mask 1-2	031: Ind bd mismatch	—	○				
Mask 1-2	032: Ind comm ERR	—	○				
Mask 1-2	033: microSD FAIL	—	○	I40: REC MSK SET1	33: microSD FAIL	—	○
Mask 2-1	050: Signal overflow	—	○	I42: REC MSK SET2	50: Sig overflow	—	○
Mask 2-1	051: Empty detect	—	○	I42: REC MSK SET2	51: Empty detect	—	○
Mask 2-1	052: H/L HH/LL alm	—	○	I42: REC MSK SET2	52: H/L HH/LL alm	—	○
Mask 2-1	053: Adh over lv 4	—	○	I42: REC MSK SET2	53: Adh over lv4	—	○
—	060: Span cfg ERR	○	—	—	60: Span cfg ERR	○	—
—	062: AO 1 4-20 lmt	○	—	—	62: AO1 4-20 lmt	○	—
—	064: AO 1 mlt rng	○	—	—	64: AO1 mlt rng	○	—
—	065: H/L cfg ERR	○	—	—	65: AO H/L cfg	○	—
—	066: Density cfg ERR	○	—	—	66: Dens cfg ERR	○	—
—	067: Pls 1 cfg ERR	○	—	—	67: Pls1 cfg ERR	○	—
—	068: Pls 2 cfg ERR	○	—	—	68: Pls2 cfg ERR	○	—
—	069: Nomi size cfg	○	—	—	69: Nomi size cfg	○	—
—	070: Adh cfg ERR	○	—	—	70: Adh cfg ERR	○	—
—	072: Log not start	○	—	—	72: Log not start	○	—
—	080: AO 1 saturate	○	—	—	80-81: AO saturt	○	—
—	082: Pls 1 saturate	○	—	—	82-83: Pls saturt	○	—
—	083: Pls 2 saturate	○	—				
Mask 2-2	085: Cable miscon	—	○	I42: REC MSK SET2	85: Cable miscon	—	○
—	086: Coil insulation	○	—	—	86: Coil insulate	○	—
—	131: Trans mismatch	○	—	—	131: Trn mismatch	○	—
—	087: Adhesion lv 3	○	—	—	87: Adh over lv3	○	—
—	092: AZ warn	○	—	—	92: AZ warn	○	—
—	093: Verif warn	○	—	—	93: Verif warn	○	—
—	095: Simulate active	○	—	—	95: Sim active	○	—
—	096: AO 1 fix	○	—	—	96-97: AO fixed	○	—
—	098: Pls 1 fix	○	—	—	98-99: Pls fixed	○	—
—	099: Pls 2 fix	○	—				
—	101: Param restore run	○	—	—	101: Prm restore	○	—
—	102: Disp over	○	—	—	102: Disp over	○	—
—	103: SD size warn	○	—	—	103: SD size warn	○	—
—	104: Bkup incmplt	○	—	—	104: Bkup incmplt	○	—
—	105: SD mismatch	○	—	—	105: SD mismatch	○	—
—	106: SD removal ERR	○	—	—	106: SD remov ERR	○	—

Display				BRAIN			
Parameter name	**Alarm name**	**Default value**	**Attribute**	**Parameter name**	**Alarm name**	**Default value**	**Attribute**
—	120: Watchdog[1]	—	—	—	120: Watchdog[1]	—	—
—	121: Power off[1]	—	—	—	121: Power off[1]	—	—
—	122: Inst power FAIL[1]	—	—	—	122: Inst PW FAIL[1]	—	—
—	123: Param bkup run	○	—	—	123: bkup run	○	—
—	124: Data log run	○	—	—	124: Data log run	○	—

[1]: Recorded in the alarm history regardless of the setting of the alarm notification mask function.

4.9 Display

4.9.1 Language Setting

The language to be used on the display can be selected from nine types.
Select the desired display language from the languages that are included in the language package specified at the time of ordering.
This setting can be configured with the following parameters.

Display menu path:
Language selection:
Device setup ► (see below)

Language	Specify the language to be used on the display.*1

Display of language package:
Device setup ► Detailed setup ► Display set ► Optional config ► (see below)

Language package	Indicates the language package for the display.

BRAIN communication:

B10/ J32:LANGUAGE	Specify the language to be used on the display.*1
J52:LANG PACKAGE	Indicates the language package for the display.

The following languages are included in the language package.

Pack 1	Japanese, English, French, German, Italian, Spanish, Portuguese, and Russian
Pack 2	English and Chinese

*1:   From the table below, select the language to be used on the display.

English	Displays parameters in English.
French	Displays parameters in French.
German	Displays parameters in German.
Italian	Displays parameters in Italian.
Spanish	Displays parameters in Spanish.
Portuguese	Displays parameters in Portuguese.
Russian	Displays parameters in Russian.
Chinese	Displays parameters in Chinese.
Japanese	Displays parameters in Japanese.

4.9.2 Display Item Setting

This instrument can be shown up to eight items on the display while scrolling the screen. Specify a display item in each of eight display lines.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Display set ► Line select ► (see below)

Line 1	Specify item 1 to be shown on the display.
Line 2	Specify item 2 to be shown on the display.
Line 3	Specify item 3 to be shown on the display.
Line 4	Specify item 4 to be shown on the display.
Line 5	Specify item 5 to be shown on the display.
Line 6	Specify item 6 to be shown on the display.
Line 7	Specify item 7 to be shown on the display.
Line 8	Specify item 8 to be shown on the display.

BRAIN communication:

J10:LINE1 SEL	Specify item 1 to be shown on the display.
J11:LINE2 SEL	Specify item 2 to be shown on the display.
J12:LINE3 SEL	Specify item 3 to be shown on the display.
J13:LINE4 SEL	Specify item 4 to be shown on the display.
J14:LINE5 SEL	Specify item 5 to be shown on the display.
J15:LINE6 SEL	Specify item 6 to be shown on the display.
J16:LINE7 SEL	Specify item 7 to be shown on the display.
J17:LINE8 SEL	Specify item 8 to be shown on the display.

*1:   From the table below, select the items to be shown on the display.

None	Does not display items (item 1 is not selectable).
Flow rate(%)	Displays the flow rate for the span of the process value that is PV-mapped in Subsection 4.1.2.
PV	Displays the process value that is PV-mapped in Subsection 4.1.2.
Velocity	Displays the flow velocity.
Volume flow	Displays the volumetric flow rate.
Mass flow	Displays the mass flow rate.
Flow rate(%Bar)	Displays the flow rate for the span of the process value that is PV-mapped in Subsection 4.1.2, using a bar graph.
Totalizer 1*1	Displays the totalized value of totalizer 1.
Totalizer 2*1	Displays the totalized value of totalizer 2.
Totalizer 3*1	Displays the totalized value of totalizer 3.
Tag number	Displays the tag number.
Commun protocol	Displays the communication protocol.
Adhesion	Displays the adhesion level of the electrode adhesion detecting function.
Analog out 1	Specify the current value of current output 1 for the I/O1 terminal.

*1:   The upper/lower limits on the display are limited by the number of digits that can be displayed according to the settings of the decimal point. For example, if the decimal point position of Totalizer 3 is set to decimal point 2, the upper and lower limits of Totalizer 3 are +999999.99 and -999999.99.
If the totalized value exceeds the upper and lower limits, it is reset to 0.
For details about decimal-point position setting, refer to Subsection 4.9.3.
If the totalized value is reset to 0, the totalized value on the display may be different from the totalized value in Subsection 4.2.2. This is because the number of digits that can be displayed is different for both values. When re-totalizing, use the reset/preset function for the totalized value.

NOTE

When Main soft rev (K50:MAIN B REV/Main soft rev) is R1.01.07 or earlier, or Ind soft rev (K52:IND B REV/Ind soft rev) is R2.01.01 or earlier, the upper/lower limits on the display are limited by the number of digits that can be displayed according to the settings of the decimal point. For example, if the decimal point position of Totalizer 3 is set to decimal point 2, the upper and lower limits of Totalizer 3 are +999999.99 and -999999.99. For details about decimal-point position setting, refer to Subsection 4.9.3.

If the totalized value exceed these upper and lower limits, they are held at the upper limit or lower limit.

For details about how to check the device revision (Main soft rev and Ind soft rev), refer to Subsection 4.10.2.

4.9.3 Decimal-Point Position Setting

The number of decimal places can be set to the automatic adjustment or fix mode for the totalized value or process value PV-mapped in Subsection 4.1.2.

This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Display set ► Disp format ► (see below)

Format PV	Specify the decimal-point position for the process value that is PV-mapped in Subsection 4.1.2.[1]
Format total 1	Specify the decimal-point position for the totalized value of totalizer 1.[1]
Format total 2	Specify the decimal-point position for the totalized value of totalizer 2.[1]
Format total 3	Specify the decimal-point position for the totalized value of totalizer 3.[1]

BRAIN communication:

J20:FORMAT FR	Specify the decimal-point position for the process value that is PV-mapped in Subsection 4.1.2.[1]
J21:FORMAT TOT1	Specify the decimal-point position for the totalized value of totalizer 1.[1]
J22:FORMAT TOT2	Specify the decimal-point position for the totalized value of totalizer 2.[1]
J23:FORMAT TOT3	Specify the decimal-point position for the totalized value of totalizer 3.[1]

[1]: From the table below, select the position of the decimal point.
Process value

Auto	Automatically adjusts the number of decimal places.
0 digit	Fixes the number of decimal places to "0".
1 digit	Fixes the number of decimal places to "1".
2 digit	Fixes the number of decimal places to "2".
3 digit	Fixes the number of decimal places to "3".
4 digit	Fixes the number of decimal places to "4".
5 digit	Fixes the number of decimal places to "5".

Totalized value

Auto	Automatically adjusts the number of decimal places.
0 digit	Fixes the number of decimal places to "0".
0 digit	Fixes the number of decimal places to "1".
2 digit	Fixes the number of decimal places to "2".
3 digit	Fixes the number of decimal places to "3".
4 digit	Fixes the number of decimal places to "4".
5 digit	Fixes the number of decimal places to "5".
6 digit	Fixes the number of decimal places to "6".
7 digit	Fixes the number of decimal places to "7".

4.9.4 Display Line Count and Scroll Settings

This instrument can be shown up to four lines on the display while scrolling up to eight items. The scroll method can be selected from the automatic display switching and the display switching using the IR switch.

These settings can be configured with the following parameters.

Display menu path:

Device setup ► Detailed setup ► Display set ► Optional config ►

Line mode	Specify the number of lines to be shown on the display.*1
Scroll mode	Specify the display scroll method.*2

BRAIN communication:

J25:DISP LINE	Specify the number of lines to be shown on the display.*1
J29:DISP SCROLL	Specify the display scroll method.*2

*1: From the table below, select the number of display lines from the table below.
     The font size is automatically adjusted depending on the number of display lines.

---

1 Line(Big) (1-line display without unit. The numeric value is displayed largely.)

🔒 01 : 00
TL1

12345.678

SET   SFT   INC

F0427.ai

---

1 Line (1-line display with an unit)

🔒 01 : 00
PRV

12345.6

kg/h

SET   SFT   INC

F0428.ai

---

2 Line (2-line display with units)

🔒 01 : 00
VFL

12.3456 m³/h

VEL

1.23456 m/s

SET   SFT   INC

F0429.ai

---

3 Line (3-line display with units)

🔒 01 : 00
PRV

12345.6 kg/h

12345.678 kg   TL1
12.345678 m³   TL2

SET   SFT   INC

F0430.ai

---

4 Line (4-line display with units)

🔒 01 : 00

12345.6 kg/h   MFL
12345.6 MJ/h   CAL
12345.6 kg/h   PRV
12345.678 kg   TL1

SET   SFT   INC

F0431.ai

---

*2: From the table below, select the scroll method.

Off	Does not scroll.
Manual	Sets to the scroll using the IR switch.
Auto(2 s)	Sets to the automatic scroll at 2-second intervals.
Auto(4 s)	Sets to the automatic scroll at 4-second intervals.
Auto(8 s)	Sets to the automatic scroll at 8-second intervals.

✋ NOTE

The default value of the scroll method (J29:DISP SCROLL/Scroll mode) is "Off".
If the value of the scroll method is set to "Off", the 5th line and beyond cannot be checked on the display.
To display the 5th line and beyond, set an option other than "Off".

✋ NOTE

When Main soft rev (K50:MAIN B REV/Main soft rev) is R1.01.07 or earlier, the default value of the scroll method (J29:DISP SCROLL/Scroll mode) is "Manual".
If the value of the scroll method is set to "Manual", the display line is scrolled each time the infrared switch [INC] reacts.

4.9.5 Trend Graph Setting

The trend graph display function displays a time change of the selected item as a trend graph. Up to four items can be shown in a trend graph. A trend graph is scaled automatically, and the time axis flows from the left to the right.

F0432.ai
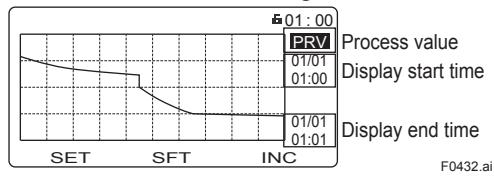
(1) Trend graph display setting

The table below shows the process values, low limit values, and high limit values that can be shown in a trend graph.

Process value	Display	Low limit value	High limit value
Flow rate (%)	FLP	0%	100%
PV	PRV	0	Span value specified in Subsection 4.1.5
Flow velocity	VEL		
Volumetric flow rate	VFL		
Mass flow rate	MFL		
Current output 1	AO1	4 mA	20 mA
Totalization 1	TL1	Preset value specified in Subsection 4.2.7	Target value of the totalizer specified in Subsection 4.2.3
Totalization 2	TL2		
Totalization 3	TL3		

This setting can be configured with the following parameters.

Display menu path:

Device setup ► Detailed setup ► Display set ► Optional config ► (see below)

Display mode	Specifies the display of a trend graph.*1

BRAIN communication:

J40:DISP MODE	Specifies the display of a trend graph.*1

*1: From the table below, select the trend graph display.

Normal	Does not display a trend graph (normal display).
Trend	Displays a trend graph.

⚠ **NOTE**

The trend graph display function is not synchronized with the multi range and forward/reverse range functions.

(2) Trend graph display item setting

This setting can be configured with the following parameters.

Display menu path:

Device setup ► Detailed setup ► Display set ► Trend select ► (see below)

Trend 1	Specify item 1 to be shown in a trend graph.*1
Trend 2	Specify item 2 to be shown in a trend graph. *1
Trend 3	Specify item 3 to be shown in a trend graph. *1
Trend 4	Specify item 4 to be shown in a trend graph. *1

BRAIN communication:

J43:TREND1 SEL	Specify item 1 to be shown in a trend graph. *1
J44:TREND2 SEL	Specify item 2 to be shown in a trend graph. *1
J45:TREND3 SEL	Specify item 3 to be shown in a trend graph. *1
J46:TREND4 SEL	Specify item 4 to be shown in a trend graph. *1

*1: From the table below, select the display item of trend graph.

None	Does not set any items (item 1 is not selectable).
Flow rate (%)	Specify the flow rate for the span of the process value that is PV-mapped in Subsection 4.1.2.
PV	Specify the process value that is PV-mapped in Subsection 4.1.2.
Velocity	Specify the flow velocity.
Volume flow	Specify the volumetric flow rate.
Mass flow	Specify the mass flow rate.
Analog out1	Specify the current value of current output 1 for the I/O1 terminal.
Totalizer1	Specify the totalized value of totalizer 1.
Totalizer2	Specify the totalized value of totalizer 2.
Totalizer3	Specify the totalized value of totalizer 3.

(3) Update period setting

This setting can be configured with the following parameters.

Display menu path:

Device setup ► Detailed setup ► Display set ► Optional config ► (see below)

Period	Specify the trend graph update period on the display.*1

BRAIN communication:

J26:DISP PERIOD	Specify the trend graph update period on the display.*1

*1: From the table below, select the trend graph update period.

0.2s	Sets the update period to 0.2 sec.
0.4s	Sets the update period to 0.4 sec.
1.0s	Sets the update period to 1 sec.
2.0s	Sets the update period to 2 sec.
4.0s	Sets the update period to 4 sec.
8.0s	Sets the update period to 8 sec.

4.9.6 Other Setting

(1) Display contrast setting

The display can be adjusted the contrast in 11 levels (+5 to -5). This setting can be configured with the following parameters.

Display menu path:

Device setup ► Detailed setup ► Display set ► Optional config ► (see below)

Contrast	Specify the contrast of the display.

BRAIN communication:

J24:DISP CONTR	Specify the contrast of the display.

```
 +5  +4  +3  +2  +1   0  -1  -2  -3  -4  -5
High ◄─────────────────────────────► Low
```
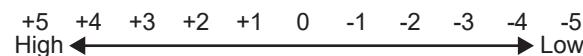
(2) Display damping time constant setting

This function enables to specify the damping time constant for the display independently of that specified in Subsection 4.1.6.
This setting can be configured with the following parameters.

Display menu path:

Device setup ► Detailed setup ► Display set ► Optional config ► (see below)

Damp	Specify the damping time constant of the display.

BRAIN communication:

J30:DISP DAMPING	Specify the damping time constant of the display.

✋ NOTE

The damping time constant of the display is available only for the display. To specify the damping time constant for the output of the physical quantity, read Subsection 4.1.6.

(3) Date display format setting

The date display format can be specified.
This setting can be configured with the following parameters.

Display menu path:

Device setup ► Detailed setup ► Display set ► Optional config ► (see below)

Format date	Specify the date display format.[1]

BRAIN communication:

J31:FORMAT DATE	Specify the date display format.[1]

[1]: From the table below, specify the date display format.

MM/DD/YYYY	Displays the date in "month/day/year".
DD/MM/YYYY	Displays the date in "day/month/year".
YYYY/MM/DD	Displays the date in "year/month/day".

(4) Display black/white inverse setting

The black/white inverse function is available for the display.
This setting can be configured with the following parameters.

Display menu path:

Device setup ► Detailed setup ► Display set ► Optional config ► (see below)

Inversion	Specify the display black/white inverse mode.[1]

BRAIN communication:

J47:DISP INVERSE	Specify the display black/white inverse mode.[1]

[1]: From the table below, select the display black/white inverse mode.

Normal	Does not set the display to the black/white inverse mode. (Character color: Black, Background color: White)
Invert	Sets the display to the black/white inverse mode. (Character color: White, Background color: Black)

(5) Display squawk setting

The backlight of the display can be squawked at 4-second intervals to identify the communicating instrument where are installed a number of same models.
This setting can be configured with the following parameters.

Display menu path:

Device setup ► Diag/Service ► Disp indicator ► (see below)

Squawk	Squawks the display.[1]

BRAIN communication:

J51:DISP SQUAWK	Squawks the display.[1]

[1]: From the table below, select whether to squawk the display.

Off	Does not squawk the display.
On	Squawks the display (continuous).
Squawk once	Squawks the display (once only).

4.9.7   microSD Card Setting

The dedicated microSD card performs to use the backup parameters and logging data by inserting into the display if the optional code MC is selected. For details about backing up parameters and logging data, read Section 4.13.

(1)   Removing the microSD card

✋ IMPORTANT

If the microSD card is removed without executing "Unmount" on software, it may cause the stored data to be erased or the device to operate abnormally.

The microSD card can be removed with the following parameters.

Display menu path:
Device setup ► microSD ► (see below)

Unmount	Specifies the removal of the microSD card.*1

*1:   From the table below, select whether to remove the microSD card.

Cancel	Cancels the removal of the microSD card.
Execute	Applicable to remove the microSD card in safety.

(2)   microSD card format

✋ IMPORTANT

If the format function of this instrument is not used to format the microSD card, it may cause a device operation failure.

Formatting is possible with the following parameters.

Display menu path:
Device setup ► microSD ► (see below)

Format	Specify the format of the microSD card.*1

*1:   From the table below, select whether to format the microSD card.

Cancel	Cancels formatting.
Execute	Executes formatting.

4.10 Device Information

4.10.1 Order Information

Order information can be specified for this instrument. If the dedicated parameters are specified at the time of ordering, this instrument is shipped with the parameters configured. Parameters unspecified at the time of ordering must be configured by the user.
The model and suffix code are indicated in the following format.

Sensor:
AXW□□□ - □□□□□□□□□□□□ - □□□□□ /□
　　(1)　　　　　　　　(2)　　　　　　　(3)

Transmitter:
AXW□A - □□□□□□□□□□ /□
　　(1)　　　　　　(2)　　　　(3)

(1) Model code, (2) Suffix code, (3) Optional code

This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Device info ► Order info ► (see below)

Tag No	Specify the tag number. BRAIN communication: Max. 16 characters
MS code►Model code	Specify the model code of the integral flowmeter or remote transmitter.
MS code►Suffix config 1	Specify the suffix code of the integral flowmeter or remote transmitter.
MS code►Suffix config 2	
MS code ► Option 1	Specify the optional code of the integral flowmeter or remote transmitter.
MS code ► Option 2	
MS code ► Option 3	
MS code ► Option 4	
RS MS code►Model code	Specify the model code of the remote sensor.
RS MS code►Suffix config 1	Specify the suffix code of the remote sensor.
RS MS code►Suffix config 2	
RS MS code►Option 1	Specify the optional code of the remote sensor.
RS MS code►Option 2	
RS MS code►Option 3	
RS MS code►Option 4	

Device setup ► Detailed setup ► Device info ►
Ver/Num info ► (see below)

Trans serial No	Displays the serial number (instrument number) of the transmitter.
Sensor serial No	Displays the serial number (instrument number) of the sensor.

BRAIN communication:

K01:TAG NO	Specify the tag number. BRAIN communication: Max. 16 characters
K20:MODEL CODE	Specify the model code of the integral flowmeter or remote transmitter.
K21:SUFFIX CONF1 K22:SUFFIX CONF2	Specify the suffix code of the integral flowmeter or remote transmitter.
K23:OPTION1 K24:OPTION2 K25:OPTION3 K26:OPTION4	Specify the optional code of the integral flowmeter or remote transmitter.
K27:RS MDL CD	Specify the model code of the remote sensor.
K28:RS SUF CONF1 K29:RS SUF CONF2	Specify the suffix code of the remote sensor.
K30:RS OPT1 K31:RS OPT2 K32:RS OPT3 K33:RS OPT4	Specify the optional code of the remote sensor.
K34:TRNS SR NO	Displays the serial number (instrument number) of the transmitter.
K35:FT SR NO	Displays the serial number (instrument number) of the sensor.

⚠ **NOTE**

Be careful of changing any parameters related to order information defined upon shipment from the manufacturing plant because it cannot be referred.
Recommended to make a backup referring to Section 4.13 for storing the order information defined upon shipment from the manufacturing plant.

4.10.2 Device Revision

The device revision such as software which is used for this instrument can be checked.
This information can be viewed with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Device info ►
Ver/Num info ► (see below)

Transmitter type	Displays the type of the transmitter.
Option board ID	Displays the type of the option board.
Main soft rev	Displays the software revision of the main board.
Snsr soft rev	Displays the software revision of the sensor board.
Ind soft rev	Displays the software revision of the display board.

BRAIN communication:

K11:TRNS TYPE	Displays the type of the transmitter.
K12:OPT BOARD ID	Displays the type of the option board.
K50:MAIN B REV	Displays the software revision of the main board.
K51:SENSOR B REV	Displays the software revision of the sensor board.
K52:IND B REV	Displays the software revision of the display board.

4.10.3 Memo Function

Three parameters can be used as a memo function. The memo function can be set to up to 16 characters.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Detailed setup ► Device info ►
Memo ►

Memo 1	Specifies memo 1.
Memo 2	Specifies memo 2.
Memo 3	Specifies memo 3.

BRAIN communication:

K40:MEMO1	Specifies memo 1.
K41:MEMO2	Specifies memo 2.
K42:MEMO3	Specifies memo 3.

4.11 Self-diagnostic Function

4.11.1 Types of Diagnosis Functions

This instrument has the self-diagnostic functions to diagnose a device failure or process status. Followings are its diagnosis functions.

Alarm high/low limit function	Displays an alarm when the specified value is exceeded, and outputs it as the status output.
Electrode adhesion detection	Diagnoses an electrode adhesion from the resistance value of the electrode, and displays a warning or alarm if an adhesion is detected.
Sensor empty check	Checks whether the sensor is in the empty pipe state, and displays an alarm if the empty pipe state is detected.
Misconnection detection	Checks whether the transmitter signal line and the excitation line are correctly connected, and displays a warning if a misconnection is detected.
Verification (device health diagnosis) function	Diagnoses the health of the instrument, and displays its result.

4.11.2 Alarm High/Low Limit Function

The alarm high/low limit function displays an alarm when the physical quantity PV-mapped in Subsection 4.1.2 exceeds the specified value. This function also outputs an alarm occurrence as the status output.
For details about the status output, read Subsection 4.3.7.
The alarm judgment value can be specified using 4 types of values: high limit value, high-high limit value, low-limit value, and low-low limit value.
This setting can be configured with the following parameters.

Display menu path:
Device setup ► Diag/Service ► H/L alarm cfg ► (see below)

High alarm	Specify the high limit value to judge an alarm.
Low alarm	Specify the low limit value to judge an alarm.
HH alarm	Specify the high-high limit value to judge an alarm.
LL alarm	Specify the low-low limit value to judge an alarm.

BRAIN communication:

I10:HIGH ALARM	Specify the high limit value to judge an alarm.
I11:LOW ALARM	Specify the low limit value to judge an alarm.
I12:HI HI ALARM	Specify the high-high limit value to judge an alarm.
I13:LO LO ALARM	Specify the low-low limit value to judge an alarm.

When the high and low limit value alarms are reset, the hysteresis is set for each alarm. Specify the hysteresis width with the percentage (%) for the span of the physical quantity PV-mapped in Subsection 4.1.2. When using the multi range function, specify the hysteresis width with the percentage (%) for the maximum range specified in the multi range parameter. The hysteresis in each case can be specified by the following procedure. For details about the multi range function, read Section 4.6.

Display menu path:
Device setup ► Diag/Service ► H/L alarm cfg ► (see below)

H/L alarm hyst	Specify the hysteresis width for the alarm occurrence and resetting.

BRAIN communication:

I14:H/L ALM HYS	Specify the hysteresis width for the alarm occurrence and resetting.

(1) Hysteresis value
= Span or max. range x Hysteresis width [%]
(2) Value that causes a high limit or high-high limit alarm to be reset
= Specified high limit or high-high limit value - Hysteresis value
(3) Value that causes a low limit or low-low limit alarm to be reset
= Specified low limit or low-low limit value + Hysteresis value

Example:

Span of volumetric flow rate = 300 m³/h,
High limit value = 250 m³/h, Low limit value = 50 m³/h,
High-high limit value = 300 m³/h, Low-low limit value
= 25 m³/h,
Hysteresis width = 5 %
In this case, each value is obtained as shown below.

(1) Hysteresis value = 300 [m³/h] × 5 [%]
    = 15 [m³/h]
(2-1) Value that causes a high-high limit alarm to be reset
    = 300 [m³/h] – 15 [m³/h]
    = 285 [m³/h]
(2-2) Value that causes a high limit alarm to be reset
    = 250 [m³/h] – 15 [m³/h]
    = 235 [m³/h]
(3-1) Value that causes a low limit alarm to be reset
    = 50 [m³/h] + 15 [m³/h]
    = 65 [m³/h]
(3-2) Value that causes a low-low limit alarm to be reset
    = 25 [m³/h] + 15 [m³/h]
    = 40 [m³/h]

F0433.ai
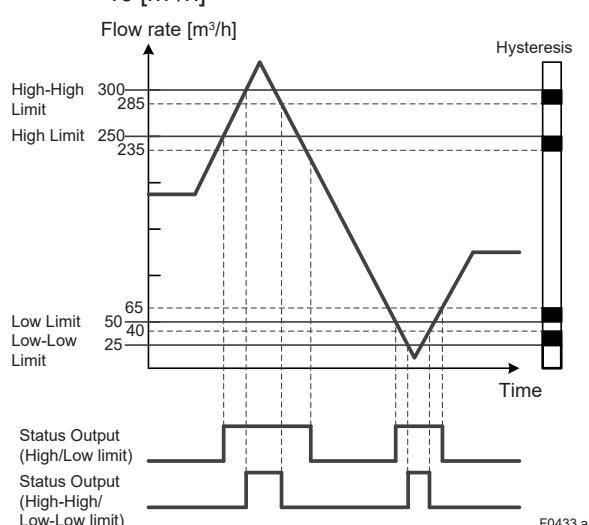
⚠ NOTE

When the physical quantity to be output is changed, respecify the alarm judgment value.

4.11.3 Electrode Adhesion Detection

The electrode adhesion detecting function diagnoses an electrode adhesion from the resistance value of the electrode, and displays a warning or alarm if an adhesion is detected.
The electrode adhesion detection is displayed on the display in four levels: level 1 to level 4. Each level judgment value can be specified individually.
If the level 3 value is exceeded, a warning is displayed. If the level 4 value is exceeded, an alarm is displayed.
For details about alarms and warnings, read Subsection 4.8.1.
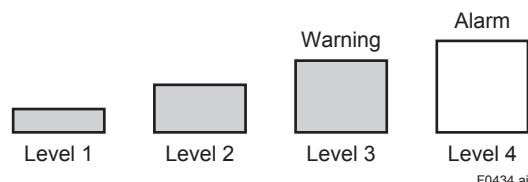
F0434.ai

This setting can be configured with the following parameters.

Display menu path:
Device setup ► Diag/Service ► Diagnosis ► Adhesion ► (see below)

Function	Specifies the use of the electrode adhesion detecting function.*1
Threshold level 1	Specify the value to judge level 1.
Threshold level 2	Specify the value to judge level 2.
Threshold level 3	Specify the value to judge level 3.
Threshold level 4	Specify the value to judge level 4.
Result►Value	Displays the resistance value of the electrode.
Result►Status	Displays the electrode adhesion detection level.
Check cycle	Specify the data update cycle for electrode adhesion detection.

BRAIN communication:

L10:ADHESION CHK	Specifies the use of the electrode adhesion detecting function.*1
L11:ADH LEVEL1	Specify the value to judge level 1.
L12:ADH LEVEL2	Specify the value to judge level 2.
L13:ADH LEVEL3	Specify the value to judge level 3.
L14:ADH LEVEL4	Specify the value to judge level 4.
L16:ADH MEAS VAL	Displays the resistance value of the electrode.
L17:ADH STATUS	Displays the electrode adhesion detection level.
L18:ADH CHK CYC	Specify the data update cycle for electrode adhesion detection.

*1:   From the table below, select the use of the electrode adhesion detection function.

Disable	Does not use the electrode adhesion detecting function.
Enable	Uses the electrode adhesion detecting function.

⚠ NOTE

If the electrode adhesion detecting function is not used, the electrode resistance value and level are cleared.

⚠ NOTE

Before using the electrode adhesion detecting function, always make sure that the sensor is in the full pipe state. If the sensor is in the empty pipe state, this function may not run normally.

⚠ NOTE

The electrode adhesion detecting function has the fluid conductivity restricted. The recommended conductivity is as follows.

Meter size	Conductivity
25 to 400 mm (1 to 16 in.)	10 µS/cm or larger
500 mm (20 in.) or more	20 µS/cm or larger

⚠ NOTE

As the data update cycle for adhesion detection is shorter, an error of the electrode resistance value increases. Do not change the default value unless especially specified.

4.11.4 Sensor Empty Check

The sensor empty check function checks whether the sensor is in the empty pipe state, and displays an alarm if the empty pipe state is detected.
For details about alarms and warnings, read Subsection 4.8.1.
This information can be viewed with the following parameters.

Display menu path:
Device setup ► Diag/Service ► Diagnosis ► (see below)

Empty status	Displays the result of the sensor empty check function.[1]

BRAIN communication:

L44:EMPTY STS	Displays the result of the sensor empty check function.[1]

[1]: From the table below, check the result of the sensor empty check function.

Full	Indicates that the sensor is in the full pipe state.
Empty	Indicates that the sensor is in the empty pipe state.

⚠ IMPORTANT

- If the sensor is in the empty pipe state, output fluctuation or empty check alarm may occur. Be sure to use the magnetic flowmeter being filled with liquid fully.
- The empty check is determined by measuring the resistance between the electrode and the ground.For that reason, the empty pipe state may not be detected due to the piping condition, electrode condition, and environmental noise. In particular, note that the empty check function may not operate properly for high-viscosity fluids and adhesive fluids.
- It takes 10 to 15 minutes to diagnose the empty pipe state.Other process alarms may occur before the empty check alarm occurs after the pipe is in the empty pipe state.

4.11.5 Wiring Connection Diagnosis

The wiring connection diagnostic function performs to diagnose whether the signal line and the excitation line between remote type sensor and transmitter are correctly connected, and displays a warning if a misconnection is detected.

For example, if there are 2 sets of remote type sensors and transmitters, this function performs to check whether the signal line of a transmitter A is misconnected to the signal terminal of a sensor B, or the excitation line of a transmitter A is misconnected to the excitation terminal of a sensor B.

It takes approximately 10 seconds to finish this function.

For details about alarms and warnings, read Subsection 4.8.1.

This setting can be configured with the following parameters.

Display menu path:

Device setup ► Diag/Service ► Diagnosis ► (see below)

Diagnostic execute	Specifies the use of the wiring connection diagnostic function.*1
Diagnostic output	Specifies the output to use the wiring connection diagnostic function.*2

BRAIN communication:

L33:DIAG EXE	Specifies the use of the wiring connection diagnostic function.*1
L49:DIAG OUTPUT	Specifies the output to use the wiring connection diagnostic function.*2

*1: From the table below, select the use of the wiring connection diagnostic function.

Display:

Connect check exe	Starts the wiring connection diagnostic function.

BRAIN communication:

Conn Chk exe	Starts the wiring connection diagnostic function.

*2: From the table below, select the output required to execute the wiring connection diagnostic function.

	Current output	Totalization	Pulse output	Frequency output
Zero	0% output	Input 0 (Output fixed)	0 pps	0% output
Measured value	Output of calculated value (Undefined)	Totalization of calculated value (Undefined)	Output of calculated value (Undefined)	Output of calculated value (Undefined)
Hold	Fixes the last valid value before the diagnosis starts.	Totalizes the last valid value before the diagnosis starts.	Fixes the last valid value before the diagnosis starts.	Fixes the last valid value before the diagnosis starts.

✋ IMPORTANT

- Before using the wiring connection diagnostic function, be sure to disconnect this instrument from the control loop.
- While this function is used, the current output and pulse output are invalid.

✋ NOTE

When using the wiring connection diagnostic function, the following conditions must be satisfied.

If the conditions are not satisfied, the magnetic flowmeter may not correctly diagnose the wiring connection status.

- The sensor is in the full pipe state.
- No influence of noise.
- The magnetic flowmeter transmitter and AM012 (calibrator) are not connected.

4.11.6 Verification (Device Health Diagnosis) Function

The verification function diagnoses the health of the instrument, and displays the diagnosis result. It takes approximately 15 minutes for the verification function to complete. The progress of the verification function can be monitored via the bar graph and the remaining time on the display.

F0435.ai
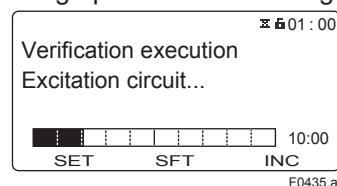
This function can perform to inspect each condition of the circuit, and acts the device health diagnosis of the instrument by detecting its internal alarms history along with its wiring misconnection. And this function evaluates their diagnosis result depending on the condition of the instrument by showing "Passed" as no problem or "Failed" as problems on the display.

The executing results are shown below.
- **"Passed" with no problem (as an example)**
L53:VF CHK RES	Passed
L54:VF OPE TIME	00001D 10:01
L55:VF MAG RES	Passed
L56:VF EXCIT RES	Passed
L57:VF CALC RES	Passed
L58:VF DEV RES	Passed
L59:VF CONN RES	Passed

- **"Failed" with problems (as an example)**
L53:VF CHK RES	Failed
L54:VF OPE TIME	00001D 10:01
L55:VF MAG RES	Passed
L56:VF EXCIT RES	Passed
L57:VF CALC RES	Failed
L58:VF DEV RES	Passed
L59:VF CONN RES	Passed

Contact Yokogawa service center when the "Failed" massage appears from L55 to L58.

Confirm the wiring misconnection between sensor and transmitter (read Subsection 4.11.5 for detail), or whether its signal cable and excitation cable have no damage when the "Failed" massage appears at L59.

The verification function can be selected depending on whether or not the fluid is flowing.

The two diagnosis results (current and previous) are stored in the device memory, and they can be checked later.

The following results will be displayed after the verification function is used.

Total judgment result	Calculation circuit diagnosis result
Operating time of verification function	Device alarm diagnosis result
Magnetic circuit diagnosis result	Wiring connection diagnosis result
Excitation circuit diagnosis result	

This setting can be configured with the following parameters.

Display menu path:
Device setup ► Diag/Service ► Diagnosis ► (see below)

Diagnostic output	Specifies the output to execute the verification function.*1

Device setup ► Diag/Service ► Verification ► (see below)

Mode	Specifies the fluid status to execute the verification function.*2
Execute	Specifies the execution of the verification function. *3
VF No	Specify the diagnosis result display time.*4
Result	Displays the diagnosis result.*5

BRAIN communication:

L49:DIAG OUTPUT	Specifies the output to use the verification function.*1
L50:VF MODE	Specifies the fluid status to use the verification function.*2
L51:VF EXE	Specifies the use of the verification function.*3
L52:VF NO	Specify the diagnosis result display time.*4
L53:VF CHK RES	Displays the diagnosis result.*5

*1: From the table below, select the output to execute the verification function.

	Current output	Totalization	Pulse output	Frequency output
Zero	0% output	Input 0 (Output fixed)	0 pps	0% output
Measured value	Output of calculated value (Undefined)	Totalization of calculated value (Undefined)	Output of calculated value (Undefined)	Output of calculated value (Undefined)
Hold	Fixes the last valid value before the diagnosis starts.	Totalizes the last valid value before the diagnosis starts.	Fixes the last valid value before the diagnosis starts.	Fixes the last valid value before the diagnosis starts.

*2: From the table below, select the fluid status required to execute the verification function.

No flow	Executes the verification function with the fluid not flowing.
Flow	Executes the verification function with the fluid flowing.

*3: From the table below, select whether to execute the verification function.

Not execute	Does not execute the verification function.
Execute	Executes the verification function.

*4: From the table below, select the execution result of the verification function.

Factory	Displays the result obtained upon shipment from the manufacturing plant.
Previous	Displays the previous result.
Present	Displays the result at this time.

*5: The diagnosis result is displayed as shown below.

Display menu path:
Device setup ► Diag/Service ► Result ► (see below)

Failed/Passed	Execution result
VF operate time	Operating time of verification function when started
Magnetic circuit	Magnetic circuit diagnosis result
Excite circuit	Excitation circuit diagnosis result
Calc circuit	Calculation circuit diagnosis result
Device status	Device alarm diagnosis result
Connect status	Wiring misconnection check result

BRAIN communication:

L53:VF CHK RES	Execution result
L54:VF OPE TIME	Operating time of verification function when started
L55:VF MAG RES	Magnetic circuit diagnosis result
L56:VF EXCIT RES	Excitation circuit diagnosis result
L57:VF CALC RES	Calculation circuit diagnosis result
L58:VF DEV RES	Device alarm diagnosis result
L59:VF CONN RES	Wiring misconnection check result

The diagnosis result is judged as shown below.

Passed	There are no problems concerning the diagnosis result.
Failed	There is a problem concerning the diagnosis result.
Canceled	Cancels the diagnosis.
No Data	No diagnosis result data (The verification function is not used.)
Unknown	Cannot perform a diagnosis.

✋ IMPORTANT

- Before using the verification function, be sure to disconnect this instrument from the control loop.
- While this function is used, the current output and pulse output are invalid.
- Note that parameters cannot be changed when the verification function is executed.

✋ NOTE

- Before using the verification function, always make sure that the sensor is in the full pipe state. If the sensor is in the empty pipe state, this function may not run normally.
- When using the verification function, correctly specify the fluid status with the parameter.
- If there is a problem with the verification result, read the maintenance manual as listed in Table 1.1.

4.12 Test Mode

4.12.1 Test Mode Setting

The test mode can be executed to arbitrarily specify the process value or the value to be output from a connection terminal and test a response from the device.
However, a warning is displayed to indicate that the test mode is in use while this test mode is used.
The use of the test mode can be specified with the following parameters.

Display menu path:
Device setup ► Diag/Service ► Test ►
(see below)

Input test►Test mode	Specifies the use of the test mode (input).*1
Output test►Test mode	Specifies the use of the test mode (output).*1

BRAIN communication:

M02:TEST MODE	Specifies the use of the test mode (input/output).*1
M03:TEST STATUS	Check the status of the test mode.

*1: From the table below, select the test terminal and process value.

Display:

Velocity	Starts testing the flow velocity.
Volume	Starts testing the volumetric flow rate.
Mass	Starts testing the mass flow rate.
SI3	Starts testing the current input of the I/O3 terminal.
AO1	Starts testing current output 1 of the I/O1 terminal.
PO1	Starts testing pulse output or frequency output 1 of the I/O2 terminal.
PO2	Starts testing pulse output or frequency output 2 of the I/O4 terminal.
SO1	Starts testing status output 1 of the I/O2 terminal.
SO2	Starts testing current output 2 of the I/O4 terminal.

BRAIN communication:

Velo test on	Starts testing the flow velocity.
Vol F test on	Starts testing the volumetric flow rate.
Mass F test on	Starts testing the mass flow rate.
SI3 test on	Starts testing the current input of the I/O3 terminal.
AO1 test on	Starts testing current output 1 of the I/O1 terminal.
P1 test on	Starts testing pulse output or frequency output 1 of the I/O2 terminal.
P2 test on	Starts testing pulse output or frequency output 2 of the I/O4 terminal.
SO1 test on	Starts testing status output 1 of the I/O2 terminal.
SO2 test on	Starts testing current output 2 of the I/O4 terminal.
Test all on	Starts all tests.
Test all off	Ends all tests.

The value on the test mode is executed by turns of Flow velocity, Volumetric flow rate, and Mass flow rate. For example, the test values of Mass flow rate is decided based on the test value of the volumetric flow rate, when the volumetric flow rate is set as the test value. In this case, the test value of flow velocity is executed with the normal measurement value.

⚠ NOTE

To specify each terminal output, read Subsection 4.3.1. If the specified output is different from the test starting output, the test mode cannot be used.

For example, if the I/O2 terminal is assigned to the frequency output to start the status output test, the test cannot be started.

4.12.2 Test Terminal and Value Setting

Specify the test input value for the terminal and process value to be tested.

This setting can be configured with the following parameters.

However, the unit of the process value to be tested conforms to that specified in Subsection 4.1.4. If the unit is changed, the process value to be tested is also changed synchronously with the changed unit.

Display menu path:
Device setup ► Diag/Service ► Test ►
(see below)

Input test ► Velocity	Specify the flow velocity.
Input test ► Volume	Specify the volumetric flow rate.
Input test ► Mass	Specify the mass flow rate.
Input test ► SI3	Specify the status of the status input for the I/O3 terminal.
Output test ► AO1	Specify the current value of current output 1 for the I/O1 terminal.
Output test ► PO1	Specify the frequency of pulse output or frequency output 1 for the I/O2 terminal.
Output test ► PO2	Specify the frequency of pulse output or frequency output 2 for the I/O4 terminal.
Output test ► SO1	Specify the status of status output 1 for the I/O2 terminal.
Output test ► SO2	Specify the status of status output 2 of the I/O4 terminal.

BRAIN communication:

M10:VELO T VAL	Specify the flow velocity.
M11:VOLUM T VAL	Specify the volumetric flow rate.
M12:MASS T VAL	Specify the mass flow rate.
M32:SI3 TEST VAL	Specify the status of the status input for the I/O3 terminal.
M14:AO1 TEST VAL	Specify the current value of current output 1 for the I/O1 terminal.
M15:P1 TEST VAL	Specify the frequency of pulse output or frequency output 1 for the I/O2 terminal.
M21:P2 TEST VAL	Specify the frequency of pulse output or frequency output 2 for the I/O4 terminal.
M16:SO1 TEST VAL	Specify the status of status output 1 for the I/O2 terminal.
M22:SO2 TEST VAL	Specify the status of status output 2 of the I/O4 terminal.

4.12.3 Test Mode Auto Reset

If the specified time lapses with no parameters changed while the test mode is enabled, the test mode is reset automatically. When any test mode parameter is changed, the test mode reset time is extended.

This setting can be configured with the following parameters.

Display menu path:
Device setup ► Diag/Service ► Test ►
(see below)

Release time	Specify the time to automatically reset the test mode.[1]

BRAIN communication:

M01:TEST REL TIM	Specify the time to automatically reset the test mode.[1]

[1]:   From the table below, select the test mode auto reset time.

10 min	Sets the reset time to 10 min.
30 min	Sets the reset time to 30 min.
1 h	Sets the reset time to 1 hour.
3 h	Sets the reset time to 3 hours.
12 h	Sets the reset time to 12 hours.

4.13 Event Management Function

4.13.1 Backup Function

The backup function enables to back up parameter settings in the display built-in memory or microSD card (with the optional code MC selected). Restorating backup data can be used to duplicate parameter settings to another device. The display built-in memory can store backup data for three times and the microSD depends on available free space. There are three backup methods available: backup from the main board of this instrument to the memory on the display board, backup from the main board of the instrument to the microSD card, and backup from the memory on the display board to the microSD card. The file name, backup name, and date can be specified to use the backup function.
The data backed up in the microSD card is stored in the "YOKOGAWA" folder as a ".PAR" file.

The backup function can be configured with the following parameters.
For details about the backup parameters, read Subsection 4.13.3.

Display menu path:
Device setup ► Diag/Service ►
Param bkup/restore ► (see below)

F backup name	Displays the backup name defined upon shipment from the manufacturing plant.
F backup date	Displays the backup date upon shipment from the manufacturing plant.
SD backup name	Specify the name of the file to be backed up to the microSD card.
Backup name 1	Specify backup name 1. Up to 16 characters
Backup date 1	Specify date 1.
Backup name 2	Specify backup name 2. Up to 16 characters
Backup date 2	Specify date 2.
Backup name 3	Specify backup name 3. Up to 16 characters
Backup date 3	Specify date 3.
Backup execute	Specifies the use of the backup function.*1

BRAIN communication:

N10:F BCKUP NAME	Displays the backup name defined upon shipment from the manufacturing plant.
N11:F BCKUP DATE	Displays the backup date upon shipment from the manufacturing plant.
N12:SD BCK NAME	Specify the name of the file to be backed up to the microSD card.
N13:BCK NAME1	Specify backup name 1. Up to 16 characters
N14:BCK DATE1	Specify date 1.
N15:BCK NAME2	Specify backup name 2. Up to 16 characters
N16:BCK DATE2	Specify date 2.
N17:BCK NAME3	Specify backup name 3. Up to 16 characters
N18:BCK DATE3	Specify date 3.
N19:BACKUP EXEC	Specifies the use of the backup function.*1

*1:   From the table below, select how the backup function is to be used.

Not Execute	Does not execute the backup function.
Store Main to 1	Backs up parameter settings from the main board to memory 1 in the display built-in memory.
Store Main to 2	Backs up parameter settings from the main board to memory 2 in the display built-in memory.
Store Main to 3	Backs up parameter settings from the main board to memory 3 in the display built-in memory.
Store Main to SD	Backs up parameter settings from the main board to the microSD card.
Store EEP1 to SD	Backs up parameter settings from memory 1 in the display built-in memory to the microSD card.
Store EEP2 to SD	Backs up parameter settings from memory 2 in the display built-in memory to the microSD card.
Store EEP3 to SD	Backs up parameter settings from memory 3 in the display built-in memory to the microSD card.

There are some parameters which are not able to back up depending on the occurrence of the alarm. The table below shows the parameters that can be backed up when an alarm occurs.

○: Executable when alarm occurs.
—: Not executable when alarm occurs.

Alarm name		Backup
Display	**BRAIN communication**	
010:Main CPU FAIL	10:Main CPU FAIL	—
011:Rev calc FAIL	11:Rev cal FAIL	—
012:Main EEP FAIL	12:Main EEP FAIL	—
013:Main EEP dflt	13:Main EEP dflt	—
014:Snsr bd FAIL	14:Snsr bd FAIL	○
015:Snsr comm ERR	15:Snsr comm ERR	○
016:AD 1 FAIL[Sig]	16:A/D1 FAIL	○
017:AD 2 FAIL[Excit]	17:A/D2 FAIL	○
018:Coil open	18:Coil open	○
019:Coil short	19:Coil short	○
020:Exciter FAIL	20:Exciter FAIL	○
021:PWM 1 stop	21-22:PWM stop	—
022:PWM 2 stop		—
023:Opt bd mismatch	23:Opt mismatch	—
024:Opt bd EEP FAIL	24:Opt EEP FAIL	—
025:Opt bd A/D FAIL	25:Opt A/D FAIL	—
026:Opt bd SPI FAIL	26:Opt SPI FAIL	—
027:Restore FAIL	27:Restore FAIL	○

Alarm name		Backup
Display	**BRAIN communication**	
028:Ind bd FAIL	28-32:Indct FAIL	—
029:Ind bd EEP FAIL		—
030:LCD drv FAIL		—
031:Ind bd mismatch		—
032:Ind comm ERR		—
033:microSD FAIL	33:microSD FAIL	—
050:Signal overflow	50:Sig overflow	○
051:Empty detect	51:Empty detect	○
052:H/L HH/LL alm	52:H/L HH/LL alm	○
053:Adh over lv 4	53:Adh over lv4	○
060:Span cfg ERR	60:Span cfg ERR	—
062:AO 1 4-20 lmt	62:AO1 4-20 lmt	—
064:AO 1 mlt rng	64:AO1 mlt rng	—
065:H/L cfg ERR	65:AO H/L cfg	—
066:Density cfg ERR	66:Dens cfg ERR	—
067:Pls 1 cfg ERR	67:Pls1 cfg ERR	—
068:Pls 2 cfg ERR	68:Pls2 cfg ERR	—
069:Nomi size cfg	69:Nomi size cfg	—
070:Adh cfg ERR	70:Adh cfg ERR	—
072:Log not start	72:Log not start	—
080:AO 1 saturate	80-81:AO saturt	○
082:Pls 1 saturate	82-83:Pls saturt	○
083:Pls 2 saturate		○
085:Cable miscon	85:Cable miscon	○
086:Coil insulation	86:Coil insulate	○
087:Adhesion lv 3	87:Adh over lv3	○
092:AZ warn	92:AZ warn	○
093:Verif warn	93:Verif warn	○
095:Simulate active	95:Sim active	○
096:AO 1 fix	96-97:AO fixed	○
098:Pls 1 fix	98-99:Pls fixed	○
099:Pls 2 fix		○
101:Param restore run	101:Prm restore	—
102:Disp over	102:Disp over	—
103:SD size warn	103:SD size warn	—
104:Bkup incmplt	104:Bkup incmplt	○
105:SD mismatch	105:SD mismatch	—
106:SD removal ERR	106:SD remov ERR	—
131:Trans mismatch	131:Trn mismatch	—
120:Watchdog	120:Watchdog	○
121:Power off	121:Power off	○
122:Inst power FAIL	122:Inst PW FAIL	○
123:Param bkup run	123:bkup run	—
124:Data log run	124:Data log run	○

✋ IMPORTANT

- Note that parameters cannot be changed when the backup function is executed. It takes approximately 20 seconds to complete backup processing.
- Take care not to duplicate the file name when backing up data to the microSD card.
- Note that, if the microSD card runs out of free space, the subsequent data will not be stored.

✋ NOTE

The backup name and date do not affect the backup function. Use this as the memo column when performing the backup function.

4.13.2 Restore / Duplicate Function

The restore function can be restore parameter settings, which are backed up in the display built-in memory or microSD card (with the optional code MC selected), to the instrument. In addition, this function enables to return parameters to the default values defined upon shipment from the manufacturing plant. Also, it is possible to duplicate the backed-up parameters to other device based on the same specifications.

✋ IMPORTANT

- For the remote type, it is necessary to set the device information of the remote sensor to the parameters of the remote transmitter.
- Before using the restore function, be sure to remove this product from piping line or stop the line.
- After executing the restore function, check that backup data is set for the target parameter.

The restore method can be selected from the following four types.

Duplicate Data	Restores the target parameter (excluding the service parameters related to the transmitter adjustment) from the instrument in which the parameter is backed up. Restore is also executable for other instrument.
Restore Data	Restores the target parameter (including the service parameters related to the transmitter adjustment) from the instrument in which the parameter is backed up. Restore is not executable for other instrument.
Compulsion Data	Restores the target parameter (specified upon shipment from the manufacturing plant) from the instrument in which the parameter is backed up. Restore is also executable for other instrument.
Restore Factory	Restores all the parameters (specified upon shipment from the manufacturing plant).

When using the restore function, always make sure that the backed-up device information matches the device information to be restored.
The table below shows the consistency of device information.

M:Items to be Matched.

Device Information	Duplicate Data	Restore Data	Compulsion Data
Option Board ID	M	M	
Transmitter Serial No		M	
Sensor Serial No		M	
Main Board Software Rev.	M	M	
Sensor Board Software Rev.	M	M	
Display Board Software Rev.	M	M	
Model (Note)	M	M	
Communication and I/O Code	M	M	

Note: Only between AXW type and AXW type can be duplicated or restored the data.

The restore function can be configured with the following parameters.
For details about the restorable parameters, read Subsection 4.13.3.

Display menu path:

Device setup ► Diag/Service ►
Param bkup/restore ► (see below)

Restore execute	Specifies the execution of the restore function.*1
Restore result	Displays the restore result.*2

BRAIN communication:

N20:RESTORE EXEC	Specifies the execution of the restore function.*1
N21:RESTORE RSLT	Displays the restore result.*2

*1: From the table below, select the execution of the restore function.

Not execute	Does not restore data.
Duplicate Data1	Restores the parameter (Duplicate Data) setting from memory 1 on the display board to the main board of the instrument.
Duplicate Data2	Restores the parameter (Duplicate Data) setting from memory 2 on the display board to the main board of the instrument.
Duplicate Data3	Restores the parameter (Duplicate Data) setting from memory 3 on the display board to the main board of the instrument.
Duplicate SD	Restores the parameter (Duplicate Data) setting from the microSD card to the main board of the instrument.
Restore Data1	Restores the parameter (Restore Data) setting from memory 1 on the display board to the main board of the instrument.
Restore Data2	Restores the parameter (Restore Data) setting from memory 2 on the display board to the main board of the instrument.
Restore Data3	Restores the parameter (Restore Data) setting from memory 3 on the display board to the main board of the instrument.
Restore SD	Restores the parameter (Restore Data) setting from the microSD card to the main board of the instrument.
Compulsion Data1	Restores the parameter (Compulsion Data) setting from memory 1 on the display board to the main board of the instrument.
Compulsion Data2	Restores the parameter (Compulsion Data) setting from memory 2 on the display board to the main board of the instrument.
Compulsion Data3	Restores the parameter (Compulsion Data) setting from memory 3 on the display board to the main board of the instrument.
Compulsion SD	Restores the parameter (Compulsion Data) setting from the microSD card to the main board of the instrument.
Restore Factory	Restores to the status that is set upon shipment from the manufacturing plant.

*2: The result of the restore function is displayed as shown below.

Unexecuted	Does not restore data.
Success	Succeeded in restoration.
Failure	Failed in restoration.
Running	Parameter restore running

There are some parameters which are not able to back up depending on the occurrence of the alarm. The table below shows the parameters that can be backed up when an alarm occurs.

○: Executable when alarm occurs.
—: Not executable when alarm occurs.

Alarm name		Restore
Display	BRAIN communication	
010:Main CPU FAIL	10:Main CPU FAIL	—
011:Rev calc FAIL	11:Rev cal FAIL	—
012:Main EEP FAIL	12:Main EEP FAIL	—
013:Main EEP dflt	13:Main EEP dflt	—
014:Snsr bd FAIL	14:Snsr bd FAIL	○
015:Snsr comm ERR	15:Snsr comm ERR	○
016:AD 1 FAIL[Sig]	16:A/D1 FAIL	○
017:AD 2 FAIL[Excit]	17:A/D2 FAIL	○
018:Coil open	18:Coil open	○
019:Coil short	19:Coil short	○
020:Exciter FAIL	20:Exciter FAIL	○
021:PWM 1 stop	21-22:PWM stop	—
022:PWM 2 stop		—
023:Opt bd mismatch	23:Opt mismatch	—
024:Opt bd EEP FAIL	24:Opt EEP FAIL	—

Alarm name		Restore
Display	**BRAIN communication**	
025:Opt bd A/D FAIL	25:Opt A/D FAIL	—
026:Opt bd SPI FAIL	26:Opt SPI FAIL	—
027:Restore FAIL	27:Restore FAIL	○
028:Ind bd FAIL	28-32:Indct FAIL	—
029:Ind bd EEP FAIL		—
030:LCD drv FAIL		—
031:Ind bd mismatch		—
032:Ind comm ERR		—
033:microSD FAIL	33:microSD FAIL	—
050:Signal overflow	50:Sig overflow	○
051:Empty detect	51:Empty detect	○
052:H/L HH/LL alm	52:H/L HH/LL alm	○
053:Adh over lv 4	53:Adh over lv4	○
060:Span cfg ERR	60:Span cfg ERR	—
062:AO 1 4-20 lmt	62:AO1 4-20 lmt	—
064:AO 1 mlt rng	64:AO1 mlt rng	—
065:H/L cfg ERR	65:AO H/L cfg	—
066:Density cfg ERR	66:Dens cfg ERR	—
067:Pls 1 cfg ERR	67:Pls1 cfg ERR	—
068:Pls 2 cfg ERR	68:Pls2 cfg ERR	—
069:Nomi size cfg	69:Nomi size cfg	—
070:Adh cfg ERR	70:Adh cfg ERR	—
072:Log not start	72:Log not start	—
080:AO 1 saturate	80-81:AO saturt	○
082:Pls 1 saturate	82-83:Pls saturt	○
083:Pls 2 saturate		○
085:Cable miscon	85:Cable miscon	○
086:Coil insulation	86:Coil insulate	○
087:Adhesion lv 3	87:Adh over lv3	○
092:AZ warn	92:AZ warn	○
093:Verif warn	93:Verif warn	○
095:Simulate active	95:Sim active	○
096:AO 1 fix	96-97:AO fixed	○
098:Pls 1 fix	98-99:Pls fixed	○
099:Pls 2 fix		○
101:Param restore run	101:Prm restore	—
102:Disp over	102:Disp over	—
103:SD size warn	103:SD size warn	—
104:Bkup incmplt	104:Bkup incmplt	○
105:SD mismatch	105:SD mismatch	—
106:SD removal ERR	106:SD remov ERR	—
131:Trans mismatch	131:Trn mismatch	—
120:Watchdog	120:Watchdog	○
121:Power off	121:Power off	○
122:Inst power FAIL	122:Inst PW FAIL	○
123:Param bkup run	123:bkup run	—
124:Data log run	124:Data log run	○

✋ IMPORTANT

When using the restore function, be sure to prepare the backup file in memory or a microSD card. Note that the restore function is not executable if the backup file is not provided.

4.13.3 Backup and Restore Parameters

The list below shows the parameters that can be backed up or restored.

Alarm name		Backup	Restore			
BRAIN communication	**Display**		**Duplicate Data**	**Restore Data**	**Compulsion Data**	**Restore Factory**
C10:VELO DMP A/F	Device setup ► Detailed setup ► Pro var ► Velocity ► Damp AO/F	○	○	○	—	○
C11:VELO DMP P/T	Device setup ► Detailed setup ► Pro var ► Velocity ► Damp pls/ttl	○	○	○	—	○
C12:VOL DMP A/F	Device setup ► Detailed setup ► Pro var ► Volume ► Damp AO/F	○	○	○	—	○
C13:VOL DMP P/T	Device setup ► Detailed setup ► Pro var ► Volume ► Damp pls/ttl	○	○	○	—	○
C14:MASS DMP A/F	Device setup ► Detailed setup ► Pro var ► Mass ► Damp AO/F	○	○	○	—	○
C15:MASS DMP P/T	Device setup ► Detailed setup ► Pro var ► Mass ► Damp pls/ttl	○	○	○	—	○
C20:LOW MF	Device setup ► Detailed setup ► Sensor ► Low MF	○	○	○	○	○
C21:HIGH MF	Device setup ► Detailed setup ► Sensor ► High MF	○	○	○	○	○
C24:FLOW SENSOR	Device setup ► Detailed setup ► Sensor ► Flow sensor sel	○	○	○	—	○
C26:SIZE UNIT	Device setup ► Detailed setup ► Sensor ► Nominal size unit	○	○	○	○	○
C27:NOMINAL SIZE	Device setup ► Detailed setup ► Sensor ► Nominal size	○	○	○	○	○
C30:PV FLOW SEL	Device setup ► Detailed setup ► Pro var ► PV flow select	○	○	○	○	○
C31:VELO F UNIT	Device setup ► Detailed setup ► Pro var ► Velocity ► Unit	○	—	—	○	○
C32:VOL F UNIT	Device setup ► Detailed setup ► Pro var ► Volume ► Unit	○	—	—	○	○
C33:MASS F UNIT	Device setup ► Detailed setup ► Pro var ► Mass ► Unit	○	—	—	○	○
C35:TIME UNIT	Device setup ► Detailed setup ► Pro var ► Volume ► Time unit or Device setup ► Detailed setup ► Pro var ► Mass ► Time unit	○	—	—	○	○
C36:VELO F SPAN	Device setup ► Detailed setup ► Pro var ► Velocity ► Span	○	○	○	○	○
C37:VOL F SPAN	Device setup ► Detailed setup ► Pro var ► Volume ► Span	○	○	○	○	○
C38:MASS F SPAN	Device setup ► Detailed setup ► Pro var ► Mass ► Span	○	○	○	○	○
C52:ZERO	Device setup ► Diag/Service ► Autozero ► Result ► Zero value	○	○	○	—	○
D11:TOT1 CONV FC	Device setup ► Detailed setup ► Totalizer ► Totalizer 1 ► Conv factor	○	—	—	○	○
D12:TOT1 LOWCUT	Device setup ► Detailed setup ► Totalizer ► Totalizer 1 ► Low cut	○	○	○	—	○
D13:TOT1 F OPTS	Device setup ► Detailed setup ► Totalizer ► Totalizer 1 ► Failure opts	○	○	○	—	○
D14:TOT1 OPTS	Device setup ► Detailed setup ► Totalizer ► Totalizer 1 ► Options	○	○	○	—	○
D15:TOT1 EXEC	Device setup ► Detailed setup ► Totalizer ► Totalizer 1 ► Start/Stop	○	○	○	—	○
D16:TOT1 PRESET	Device setup ► Detailed setup ► Totalizer ► Totalizer 1 ► Reset/Preset	○	○	○	—	○
D17:TOT1 PRE VAL	Device setup ► Detailed setup ► Totalizer ► Totalizer 1 ► Preset value	○	○	○	—	○
D18:TOT1 SETPNT	Device setup ► Detailed setup ► Totalizer ► Totalizer 1 ► Set point	○	○	○	—	○
D22:TOT2 LOWCUT	Device setup ► Detailed setup ► Totalizer ► Totalizer 2 ► Low cut	○	○	○	—	○
D23:TOT2 F OPTS	Device setup ► Detailed setup ► Totalizer ► Totalizer 2 ► Failure opts	○	○	○	—	○

Alarm name		Backup	Restore			
BRAIN communication	Display		Duplicate Data	Restore Data	Compulsion Data	Restore Factory
D24:TOT2 OPTS	Device setup ► Detailed setup ► Totalizer ► Totalizer 2 ► Options	○	○	○	—	○
D25:TOT2 EXEC	Device setup ► Detailed setup ► Totalizer ► Totalizer 2 ► Start/Stop	○	○	○	—	○
D26:TOT2 PRESET	Device setup ► Detailed setup ► Totalizer ► Totalizer 2 ► Reset/Preset	○	○	○	—	○
D27:TOT2 PRE VAL	Device setup ► Detailed setup ► Totalizer ► Totalizer 2 ► Preset value	○	○	○	—	○
D28:TOT2 SETPNT	Device setup ► Detailed setup ► Totalizer ► Totalizer 2 ► Set point	○	○	○	—	○
D32:TOT3 LOWCUT	Device setup ► Detailed setup ► Totalizer ► Totalizer 3 ► Low cut	○	○	○	—	○
D33:TOT3 F OPTS	Device setup ► Detailed setup ► Totalizer ► Totalizer 3 ► Failure opts	○	○	○	—	○
D34:TOT3 OPTS	Device setup ► Detailed setup ► Totalizer ► Totalizer 3 ► Options	○	○	○	—	○
D35:TOT3 EXEC	Device setup ► Detailed setup ► Totalizer ► Totalizer 3 ► Start/Stop	○	○	○	—	○
D36:TOT3 PRESET	Device setup ► Detailed setup ► Totalizer ► Totalizer 3 ► Reset/Preset	○	○	○	—	○
D37:TOT3 PRE VAL	Device setup ► Detailed setup ► Totalizer ► Totalizer 3 ► Preset value	○	○	○	—	○
D38:TOT3 SETPNT	Device setup ► Detailed setup ► Totalizer ► Totalizer 3 ► Set point	○	○	○	—	○
E10:P1 OUT MODE	Device setup ► Detailed setup ► Pulse/Status out ► PO1/SO1 ► Output mode	○	○	○	○	○
E11:P1 ACT MODE	Device setup ► Detailed setup ► Pulse/Status out ► PO1/SO1 ► Active mode	○	○	○	—	○
E12:P1 WIDTH	Device setup ► Detailed setup ► Pulse/Status out ► PO1/SO1 ► Fix width	○	○	○	—	○
E13:P1 RATE UNIT	Device setup ► Detailed setup ► Pulse/Status out ► PO1/SO1 ► Rate unit	○	—	—	○	○
E14:P1 RATE VAL	Device setup ► Detailed setup ► Pulse/Status out ► PO1/SO1 ► Rate value	○	○	○	○	○
E15:P1 LOW CUT	Device setup ► Detailed setup ► Pulse/Status out ► PO1/SO1 ► Low cut	○	○	○	—	○
E16:P1 ALM OUT	Device setup ► Detailed setup ► Pulse/Status out ► PO1/SO1 ► Alarm out	○	○	○	—	○
E17:F1 AT 0%	Device setup ► Detailed setup ► Pulse/Status out ► PO1/SO1 ► Frequency at 0%	○	○	○	○	○
E18:F1 AT 100%	Device setup ► Detailed setup ► Pulse/Status out ► PO1/SO1 ► Frequency at 100%	○	○	○	○	○
E20:SO1 FUNCTION	Device setup ► Detailed setup ► Pulse/Status out ► PO1/SO1 ► SO1 function	○	○	○	—	○
E30:P2 ACT PULSE	Device setup ► Detailed setup ► Pulse/Status out ► PO2/SO2 ► Active pulse	○	○	○	—	○
E31:P2 OUT MODE	Device setup ► Detailed setup ► Pulse/Status out ► PO2/SO2 ► Output mode	○	○	○	—	○
E32:P2 SELECT	Device setup ► Detailed setup ► Pulse/Status out ► PO2/SO2 ► Pulse select	○	○	○	—	○
E33:P2 ACT MODE	Device setup ► Detailed setup ► Pulse/Status out ► PO2/SO2 ► Active mode	○	○	○	—	○
E34:P2 WIDTH	Device setup ► Detailed setup ► Pulse/Status out ► PO2/SO2 ► Fix width	○	○	○	—	○
E36:P2 RATE VAL	Device setup ► Detailed setup ► Pulse/Status out ► PO2/SO2 ► Rate value	○	○	○	—	○
E37:P2 LOW CUT	Device setup ► Detailed setup ► Pulse/Status out ► PO2/SO2 ► Low cut	○	○	○	—	○
E38:P2 ALM OUT	Device setup ► Detailed setup ► Pulse/Status out ► PO2/SO2 ► Alarm out	○	○	○	—	○
E39:F2 AT 0%	Device setup ► Detailed setup ► Pulse/Status out ► PO2/SO2 ► Frequency at 0%	○	○	○	—	○

Alarm name		Backup	Restore			
BRAIN communication	**Display**	**Backup**	**Duplicate Data**	**Restore Data**	**Compulsion Data**	**Restore Factory**
E40:F2 AT 100%	Device setup ► Detailed setup ► Pulse/Status out ► PO2/SO2 ► Frequency at 100%	○	○	○	—	○
E41:SO2 FUNCTION	Device setup ► Detailed setup ► Pulse/Status out ► PO2/SO2 ► SO2 function	○	○	○	—	○
F12:SI3 ACT MODE	Device setup ► Detailed setup ► Status in ► SI3 ► Active mode	○	○	○	—	○
F13:SI3 FUNCTION	Device setup ► Detailed setup ► Status in ► SI3 ► Function	○	○	○	—	○
F40:FWD SPAN2	Device setup ► Detailed setup ► Multi range ► Forward span 2	○	○	○	—	○
F43:REV SPAN1	Device setup ► Detailed setup ► Multi range ► Reverse span 1	○	○	○	—	○
F44:REV SPAN2	Device setup ► Detailed setup ► Multi range ► Reverse span 2	○	○	○	—	○
F50:AUTO RNG HYS	Device setup ► Detailed setup ► Multi range ► Auto range hyst	○	○	○	—	○
F51:BI DIREC HYS	Device setup ► Detailed setup ► Multi range ► Bi direction hyst	○	○	○	—	○
G01:AO1 LOW CUT	Device setup ► Detailed setup ► Analog out/in ► AO1 ► Low cut	○	○	○	—	○
G02:AO1 HI LIMIT	Device setup ► Detailed setup ► Analog out/in ► AO1 ► High limit	○	○	○	—	○
G03:AO1 LO LIMIT	Device setup ► Detailed setup ► Analog out/in ► AO1 ► Low limit	○	○	○	—	○
G04:AO1 ALM OUT	Device setup ► Detailed setup ► Analog out/in ► AO1 ► Alarm out	○	○	○	○	○
G05:AO1 RNG MODE	Device setup ► Detailed setup ► Analog out/in ► AO1 ► Range mode	○	○	○	—	○
G31:AO1 at 4 mA	Device setup ► Diag/Service ► AO/AI trim ► AO trim ► AO1 trim 4 mA	○	○	○	—	○
G32:AO1 at 20 mA	Device setup ► Diag/Service ► AO/AI trim ► AO trim ► AO1 trim 20 mA	○	○	○	—	○
H10:FLOW DIRECT	Device setup ► Detailed setup ► AUX calculation ► Flow direct	○	○	○	—	○
H11:RATE LIMIT	Device setup ► Detailed setup ► AUX calculation ► Rate limit	○	○	○	—	○
H12:DEAD TIME	Device setup ► Detailed setup ► AUX calculation ► Dead time	○	○	○	—	○
H13:NOISE FILTER	Device setup ► Detailed setup ► AUX calculation ► Noise filter	○	○	○	—	○
H14:PULSING FLOW	Device setup ► Detailed setup ► AUX calculation ► Pulsing flow	○	○	○	—	○
H20:POWER SYNCH	Device setup ► Detailed setup ► AUX calculation ► Power sync	○	○	○	○	○
H21:SET PWR FREQ	Device setup ► Detailed setup ► AUX calculation ► Set power freq	○	○	○	○	○
H32:FIXED DENS	Device setup ► Detailed setup ► Pro var ► Density ► Fixed density	○	○	○	○	○
I10:HIGH ALARM	Device setup ► Diag/Service ► H/L alarm cfg ► High alarm	○	○	○	—	○
I11:LOW ALARM	Device setup ► Diag/Service ► H/L alarm cfg ► Low alarm	○	○	○	—	○
I12:HI HI ALARM	Device setup ► Diag/Service ► H/L alarm cfg ► HH alarm	○	○	○	—	○
I13:LO LO ALARM	Device setup ► Diag/Service ► H/L alarm cfg ► LL alarm	○	○	○	—	○
I14:H/L ALM HYS	Device setup ► Diag/Service ► H/L alarm cfg ► H/L alarm hyst	○	○	○	—	○
J10:LINE1 SEL	Device setup ► Detailed setup ► Display set ► Line select ► Line 1	○	—	—	○	○
J11:LINE2 SEL	Device setup ► Detailed setup ► Display set ► Line select ► Line 2	○	—	—	○	○
J12:LINE3 SEL	Device setup ► Detailed setup ► Display set ► Line select ► Line 3	○	—	—	○	○
J13:LINE4 SEL	Device setup ► Detailed setup ► Display set ► Line select ► Line 4	○	—	—	○	○

Alarm name		Backup	Restore			
BRAIN communication	**Display**	**Backup**	**Duplicate Data**	**Restore Data**	**Compulsion Data**	**Restore Factory**
J14:LINE5 SEL	Device setup ► Detailed setup ► Display set ► Line select ► Line 5	○	—	—	○	○
J15:LINE6 SEL	Device setup ► Detailed setup ► Display set ► Line select ► Line 6	○	—	—	○	○
J16:LINE7 SEL	Device setup ► Detailed setup ► Display set ► Line select ► Line 7	○	—	—	○	○
J17:LINE8 SEL	Device setup ► Detailed setup ► Display set ► Line select ► Line 8	○	—	—	○	○
J20:FORMAT FR	Device setup ► Detailed setup ► Display set ► Disp format ► Format PV	○	—	—	○	○
J25:DISP LINE	Device setup ► Detailed setup ► Display set ► Optional config ► Line mode	○	—	—	○	○
J53:DISP INSTALL	Device setup ► Detailed setup ► Device info ► Order info ► Disp install	○	—	—	○	○
K01:TAG NO	Device setup ► Detailed setup ► Device info ► Order info ► Tag No	○	—	—	○	○
K15:EL SIZE	Device setup ► Detailed setup ► Device info ► Order info ► Electrode size	○	○	○	—	○
K20:MODEL CODE	Device setup ► Detailed setup ► Device info ► Order info ► MS code ► Model code	○	○	○	—	○
K21:SUFFIX CONF1	Device setup ► Detailed setup ► Device info ► Order info ► MS code ► Suffix config 1	○	○	○	—	○
K22:SUFFIX CONF2	Device setup ► Detailed setup ► Device info ► Order info ► MS code ► Suffix config 2	○	○	○	—	○
K23:OPTION1	Device setup ► Detailed setup ► Device info ► Order info ► MS code ► Option 1	○	○	○	—	○
K24:OPTION2	Device setup ► Detailed setup ► Device info ► Order info ► MS code ► Option 2	○	○	○	—	○
K25:OPTION3	Device setup ► Detailed setup ► Device info ► Order info ► MS code ► Option 3	○	○	○	—	○
K26:OPTION4	Device setup ► Detailed setup ► Device info ► Order info ► MS code ► Option 4	○	○	○	—	○
K27:RS MDL CD	Device setup ► Detailed setup ► Device info ► Order info ► RS MS code ► Model code	○	○	○	—	○
K28:RS SUF CONF1	Device setup ► Detailed setup ► Device info ► Order info ► RS MS code ► Suffix config 1	○	○	○	—	○
K29:RS SUF CONF2	Device setup ► Detailed setup ► Device info ► Order info ► RS MS code ► Suffix config 2	○	○	○	—	○
K30:RS OPT1	Device setup ► Detailed setup ► Device info ► Order info ► RS MS code ► Option 1	○	○	○	—	○
K31:RS OPT2	Device setup ► Detailed setup ► Device info ► Order info ► RS MS code ► Option 2	○	○	○	—	○
K32:RS OPT3	Device setup ► Detailed setup ► Device info ► Order info ► RS MS code ► Option 3	○	○	○	—	○
K33:RS OPT4	Device setup ► Detailed setup ► Device info ► Order info ► RS MS code ► Option 4	○	○	○	—	○
K34:TRNS SR NO	Device setup ► Detailed setup ► Device info ► Ver/Num info ► Trans serial No	○	○	○	—	○
K35:FT SR NO	Device setup ► Detailed setup ► Device info ► Ver/Num info ► Sensor serial No	○	○	○	—	○
L10:ADHESION CHK	Device setup ► Diag/Service ► Diagnosis ► Adhesion ► Function	○	○	○	○	○
L11:ADH LEVEL1	Device setup ► Diag/Service ► Diagnosis ► Adhesion ► Threshold level 1	○	○	○	—	○

Alarm name		Backup	Restore			
BRAIN communication	**Display**		**Duplicate Data**	**Restore Data**	**Compulsion Data**	**Restore Factory**
L12:ADH LEVEL2	Device setup ► Diag/Service ► Diagnosis ► Adhesion ► Threshold level 2	○	○	○	—	○
L13:ADH LEVEL3	Device setup ► Diag/Service ► Diagnosis ► Adhesion ► Threshold level 3	○	○	○	—	○
L14:ADH LEVEL4	Device setup ► Diag/Service ► Diagnosis ► Adhesion ► Threshold level 4	○	○	○	—	○
L18:ADH CHK CYC	Device setup ► Diag/Service ► Diagnosis ► Adhesion ► Check cycle	○	○	○	—	○
L37:COIL INS TH	Device setup ► Diag/Service ► Diagnosis ► Coil insul threshold	○	○	○	—	○
L38:IEX COMP	Device setup ► Diag/Service ► Diagnosis ► IEX compare	○	○	○	—	○
L49:DIAG OUTPUT	Device setup ► Diag/Service ► Diagnosis ► Diagnostic output	○	○	○	—	○
L50:VF MODE	Device setup ► Diag/Service ► Verification ► Mode	○	○	○	—	○
L52:VF NO	Device setup ► Diag/Service ► Verification ► VF No	○	○	○	—	○
M01:TEST REL TIM	Device setup ► Diag/Service ► Test ► Release time	○	○	○	—	○

4.13.4 Data Logging Function

The data logging function can be stored up to four process values to the microSD card when the optional code MC (microSD card) is selected. When using this function, it is possible to specify the file name, data storage interval, and data logging function ending time.
The stored data is saved in the "YOKOGAWA" folder as a ".TRD" file.
The data logging function can be configured with the following parameters.

Display menu path:
Device setup ► Diag/Service ► Data log ►
(see below)

File name	Specify the name of the file to be stored.
Interval time	Specify the data storage interval.*1
Start date	Displays the date to start the data logging function.
Start time	Displays the time to start the data logging function.
End time	Specify the time to end the data logging function.*2
Log 1	Specify process value 1 to be stored.*3
Log 2	Specify process value 2 to be stored.*3
Log 3	Specify process value 3 to be stored.*3
Log 4	Specify process value 4 to be stored.*3
Execute	Specifies the execution of the data logging function.*4

BRAIN communication:

N30:LOGGING FILE	Specify the name of the file to be stored.
N31:LOG INTR TIM	Specify the data storage interval.*1
N32:L START DATE	Displays the date to start the data logging function.
N33:L START TIME	Displays the time to start the data logging function.
N34:LOG END TIME	Specify the time to end the data logging function.*2
N35:LOG1 SELECT	Specify process value 1 to be stored.*3
N36:LOG2 SELECT	Specify process value 2 to be stored.*3
N37:LOG3 SELECT	Specify process value 3 to be stored.*3
N38:LOG4 SELECT	Specify process value 4 to be stored.*3
N39:LOGGING EXEC	Specifies the execution of the data logging function.*4

*1:   From the table below, select the data storage interval.

1 s	Sets the storage interval to 1 sec.
10 s	Sets the storage interval to 10 sec.
30 s	Sets the storage interval to 30 sec.
1 min	Sets the storage interval to 1 min.
5 min	Sets the storage interval to 5 min.
30 min	Sets the storage interval to 30 min.
1 h	Sets the storage interval to 1 hour.

*2:   From the table below, select the data logging function ending time.

10 min	Sets the ending time to 10 minutes later.
30 min	Sets the ending time to 30 minutes later.
1 h	Sets the ending time to 1 hour later.
3 h	Sets the ending time to 3 hours later.
12 h	Sets the ending time to 12 hours later.
24 h	Sets the ending time to 24 hours (1 day) later.
72 h	Sets the ending time to 72 hours (3 days) later.
240 h	Sets the ending time to 240 hours (10 days) later.

*3:   From the table below, select the process value to be stored.

PV	Stores the process value that is PV-mapped in Subsection 4.1.2.
Velocity	Stores the flow velocity.
Volume flow	Stores the volumetric flow rate.
Mass flow	Stores the mass flow rate.
Adhesion	Stores the resistance value of the electrode adhesion detection.

*4:   From the table below, select the use of the data logging function.

Not Execute	Does not execute the data logging function.
Execute	Executes the data logging function.

Data is stored in the microSD card at the specified storage interval during the period from the start of the data logging function to the end. The file stored by the data logging function can be opened as a text file.
Example: If the storage interval is set to "1 min", data is stored as shown below.

| Date and time | Process value 1 | Process value 2 | Process value 3 | Process value 4 |

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The access ongoing to the microSD card can be confirmed by the icon on the display. For example, the icons of "microSD card ready" and "Access to microSD card" are displayed alternately repeatedly while the instrument accesses to the microSD card periodically during its data logging.
The icon of "Error accessing microSD card" is displayed when the micorSD card cannot be accessed in such a case of removing it.
Insert the microSD card again when it is necessary to use this function again. And an alarm of "microSD failure" occurs when the microSD card has any problems.

	Ready for microSD card		Accessing microSD card
	Disable to access microSD card		

⚠️ IMPORTANT

- When using the data logging function, be sure to specify the date and time information.
- Before using the data logging function, make sure that the microSD card is prepared. Approximately 1 minute is required until the insturment is ready to store data after it has been turned on.
- Note that the date and time information are reset if this instrument is turned off.
- Note that, if the microSD card runs out of free space, the subsequent data will not be stored.

4.14 Software Write Protection Function

The write protection can be changed by the hardware write protection switch or the parameter setting of the software write protection. When the write protection is enabled by any of them, data writing is forbidden. For details about the hardware write protection, see the Installation Manual as listed in Table 1.1.

To enable the software write protection function, specify "New password" (eight alphanumeric characters without lowercase letter) as a password to disable the write protection function. By entering the password in the menu of "Enable write", it is possible to disable the write protection and change the parameters only for 10 minutes. The write protection is completely disabled if eight spaces are entered to "New password" in the state that the protection is disabled temporarily.

The write protection function can be configured by the following procedure.

Display menu path:
Device setup ► Detailed setup ► Protection ► (see below)

Write protect sts	Indicates the use of the write protection function.*1
Enable write	Cancels the write protection function only for 10 minutes.
New password	Specify a new password for the write protection function.

BRAIN communication:

P20:WRT PROTECT	Indicates the use of the write protection function.*1
P21:ENABLE WRITE	Cancels the write protection function only for 10 minutes.
P22:NEW PASSWORD	Specify a new password for the write protection function.

*1: Display of the use status of the write protection function

| No | The write protection function is disabled. (Parameters can be changed.) |
| Yes | The write protection function is enabled. (Parameters cannot be changed.) |

⚠️ NOTE

The use status of the write protection function can be viewed using the parameters or the icons shown on the display.
The following icons are displayed.

Icon	Contents
🔓	Write protect Invalid (Parameter change is possible)
🔒	Write protect Valid (Parameter change is impossible)

⚠️ NOTE

When the write protection switch on the amplifier board is turned on, any parameter cannot be changed.
To change a parameter, cancel the write protection function using the pre-specified password, and specify a new password.

If the password had been forgotten, it is possible to use the Joker password to temporarily disable the software write protection function.
When the write protection function is disabled using the Joker password, "Break" is displayed as the parameter. Re-set a new password to use this function. When this function is disabled using a new password, the parameter returns to "Keep".
The use of the Joker password seal can be checked by the following procedure.

Display menu path:
Device setup ► Detailed setup ► Protection ► (see below)

| Soft seal status | Check the use of the Joker password. |

BRAIN communication:

| P23:SOFT SEAL | Check the use of the Joker password. |

Check the use of the Joker password depending on the following parameters.

| Keep | Normal |
| Break | Disable the write protection function using the Joker password. |

⚠️ NOTE

If it is necessary to use the Joker password, contact Yokogawa sales office or representative.

5. Parameters of Magnetic Flowmeter

This chapter describes the display parameters, BRAIN communication parameters.

The dedicated parameters are configured as specified at the time of ordering. Other parameters are set to default values; therefore, when changing any one of them, always read this chapter.

✋ IMPORTANT

If the instrument is turned off within 30 seconds after parameter settings have been completed, the settings are reset. After settings, be sure to keep the power on for 30 seconds or more.

✋ NOTE

To obtain the correct flow rate signal, specify the nominal size of the sensor, flow rate span, and meter factor. This instrument has the nominal size of the sensor and the meter factor specified upon shipment from the manufacturing plant, which does not require user's settings.
The dedicated parameters are configured before shipment only when they are specified at the time of ordering. Parameters that are not specified at the time of ordering must be configured by the user.

✋ NOTE

The available functions and the displayed parameters vary depending on the connection terminal type selected at the time of ordering.

○: Parameter displayed

Terminal function	Description	Communication and I/O code		
		DA	DE	DG
		-D	-H	-K
Current output1	Parameters related to the Current output1 are displayed regardless of the code selection.	○	○	○
Pulse/Status output1	Parameters related to the Pulse/Status output1 are displayed regardless of the code selection.	○	○	○
Pulse/Status output2	Parameters related to the Pulse/Status output2 may not be displayed depending on the code selection. **No.5-11 to 22, and 13-10 to 13-11**		○	○
Status input	Parameters related to the Status input may not be displayed depending on the code selection. **No.6-3 to 6-5, and 13-14**		○	○

5.1 Parameter Lists for Display and BRAIN Communication

Each parameter list consists of the following items.

No.	Indicates the parameter number.
Name	Indicates the parameter name.
Setting	Indicates the parameter that can be displayed and/or specified. R: Displayed only. RW: Displayed and specified. However, when changing a parameter on the display, note that the specifiable parameters vary depending on the operation level. Operator: Can only specify the language to be displayed on the display and the configuration parameters. Maintenance: Can only specify the "Operator" operation level and the zero-adjustment parameters. Specialist: Can specify all the parameters.
Range	For selection-type data, the range indicates options. For numeric-type data, the range indicates the setting range and the number of decimal places. For alphanumeric-type data, the range indicates the limited number of characters.
Default value	Indicates the default value upon shipment from the manufacturing plant. Symbol (*) indicates a parameter with the model and suffix code specified, or a parameter specified at the time of ordering.
Unit	Indicates the unit of the data range.
Description	Describes the contents of the parameter.

⚠ NOTE

When numeric-type data is set via BRAIN communication, the configurable maximum value is "32000" and the minimum value is "-32000", regardless of the position of the decimal point.

When the maximum value exceeding "32000" is input, "32000" is set to the instrument. For the minimum value exceeding "-32000", "-32000" is set as well. Be careful of this point.

Considering the position of the decimal point, set data within the following ranges.

Number of decimal places	Range
0	0 to 32000
1	0.0 to 3200.0
2	0.00 to 320.00
3	0.000 to 32.000
4	0.0000 to 3.2000
5	0.00000 to 0.32000

Example

When 333.33 is set to numerical-type data, the numeric string "33333" excluding the decimal point exceeds "32000" and cannot be set. Considering the decimal point position, "333.3" needs to be set.

(1) Display parameters (A: DISPLAY)

This list shows the display parameters such as the flow rate and totalized value.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
1-1	A10: FLOW RATE(%)	Device setup▶ Process variables▶ Flow rate %	R	-999.9 to +999.9 Number of decimal places: 1	-99999.9 to +99999.9 Number of decimal places: 1	-	%	Indicates the range rate for the process value that is PV-mapped in No. 3-14.
1-2	A20: FLOW RATE	Device setup▶ Process variables▶ Flow rate	R	-999999 to +999999 Number of decimal places: 0 to 5	-999999 to +999999 Number of decimal places: 0 to 5	-	Flow velocity: Specified in No. 3-15. Volumetric flow rate: Specified in No. 3-16 and No. 3-19. Mass flow rate: Specified in No. 3-17 and No. 3-19.	Indicates the process value that is PV-mapped in No. 3-14.
1-3	A21: FLW RATE(mA)	Device setup▶ Process variables▶ Analog out 1	R	0.000 to +99.999 Number of decimal places: 3	0.000 to +99.999 Number of decimal places: 3	-	mA	Used for I/O1 terminal. Indicates the current value of the current output.
1-4	A30: TOTAL1	Device setup▶ Process variables▶ Totalizer▶ Totalizer 1	R	-999999 to +999999 Number of decimal places: 0 to 5	-99999999 to +99999999 Number of decimal places: 0 to 5	-	Specified in No. 4-1.	Indicates the totalized value of totalizer 1.
1-5	A31: TOTAL2	Device setup▶ Process variables▶ Totalizer▶ Totalizer 2	R	-999999 to +999999 Number of decimal places: 0 to 5	-99999999 to +99999999 Number of decimal places: 0 to 5	-	Specified in No. 4-10.	Indicates the totalized value of totalizer 2.
1-6	A32: TOTAL3	Device setup▶ Process variables▶ Totalizer▶ Totalizer 3	R	-999999 to +999999 Number of decimal places: 0 to 5	-99999999 to +99999999 Number of decimal places: 0 to 5	-	Specified in No. 4-19.	Indicates the totalized value of totalizer 3.
1-7	A33: TOTAL1 CNT	Device setup▶ Process variables▶ Totalizer▶ Totalizer 1 count	R	-99999999 to +99999999 Number of decimal places: 0	-99999999 to +99999999 Number of decimal places: 0	-	-	Indicates the totalized value (totalizer value) scaled by totalizer 1.
1-8	A34: TOTAL2 CNT	Device setup▶ Process variables▶ Totalizer▶ Totalizer 2 count	R	-99999999 to +99999999 Number of decimal places: 0	-99999999 to +99999999 Number of decimal places: 0	-	-	Indicates the totalized value (totalizer value) scaled by totalizer 2.
1-9	A35: TOTAL3 CNT	Device setup▶ Process variables▶ Totalizer▶ Totalizer 3 count	R	-99999999 to +99999999 Number of decimal places: 0	-99999999 to +99999999 Number of decimal places: 0	-	-	Indicates the totalized value (totalizer value) scaled by totalizer 3.
1-10	-	Device setup▶ Process variables▶ Velocity	R	-999999 to +999999 Number of decimal places: 0 to 5	-999999 to +999999 Number of decimal places: 0 to 5	-	Specified in No. 3-15.	Indicates the flow velocity.
1-11	-	Device setup▶ Process variables▶ Volume	R	-999999 to +999999 Number of decimal places: 0 to 5	-999999 to +999999 Number of decimal places: 0 to 5	-	Specified in No. 3-16 and No. 3-19.	Indicates the volumetric flow rate.
1-12	-	Device setup▶ Process variables▶ Mass	R	-999999 to +999999 Number of decimal places: 0 to 5	-999999 to +999999 Number of decimal places: 0 to 5	-	Specified in No. 3-17 and No. 3-19.	Indicates the mass flow rate.
1-14	A60: SELF CHECK	-	R	GOOD ERROR	-	-	-	Indicates the result of the self-diagnostic function.

(2) Easy configuration parameters (B: EASY SETUP)

This list shows the parameters for the frequently-used general functions.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
2-1	B10: LANGUAGE	Device setup▶ Language	RW	English French German Italian Spanish Portuguese Russian Chinese Japanese	English French German Italian Spanish Portuguese Russian Chinese Japanese	English	-	Specify the language to be used on the display. Synchronized with No. 10-21.
2-2	B20: VOL DMP A/F	Device setup▶ Easy setup wizard▶ Volume▶ Damp AO/F	RW	+0.1 to +200.0 Number of decimal places: 1	+0.1 to +200.0 Number of decimal places: 1	3.0	s	Used for current output or frequency output. Specify the damping time constant of the volumetric flow rate. Synchronized with No. 3-12.
2-3	B21: VOL DMP P/T	Device setup▶ Easy setup wizard▶ Volume▶ Damp pls/ttl	RW	+0.1 to +200.0 Number of decimal places: 1	+0.1 to +200.0 Number of decimal places: 1	3.0	s	Used for pulse output or totalization. Specify the damping time constant of the volumetric flow rate. Synchronized with No. 3-13.
2-4	B22: VOL F UNIT	Device setup▶ Easy setup wizard▶ Volume▶ Unit	RW	Ml(Megaliter) m3 kl(kiloliter) l(liter) cm3 kcf cf mcf Mgal(US) kgal(US) gal(US) mgal(US) kbbl(US Oil) bbl(US Oil) mbbl(US Oil) ubbl(US Oil) kbbl(US Beer) bbl(US Beer) mbbl(US Beer) ubbl(US Beer)	Ml(Megaliter) m^3 kl(kiloliter) l(liter) cm^3 kcf cf mcf Mgal(US) kgal(US) gal(US) mgal(US) kbbl(US Oil) bbl(US Oil) mbbl(US Oil) ubbl(US Oil) kbbl(US Beer) bbl(US Beer) mbbl(US Beer) ubbl(US Beer)	m^3 (*)	-	Specify the unit of the volumetric flow rate. Synchronized with No. 3-16.
2-5	B23: TIME UNIT	Device setup▶ Easy setup wizard▶ Volume▶ Time unit	RW	/s /min /h /d	/s /min /h /d	/h (*)	-	Specify the time unit of the volumetric flow rate, and mass flow rate. Synchronized with No. 3-19.
2-6	B24: VOL F SPAN	Device setup▶ Easy setup wizard▶ Volume▶ Span	RW	+0.00001 to +32000.0 Number of decimal places: 1 to 5	+0.00001 to +999999 Number of decimal places: 0 to 5	1.00 (*)	Specified in No. 3-16 and No. 3-19.	Specify the span of the volumetric flow rate. Synchronized with No. 3-21.
2-7	B30: P1 RATE UNIT	Device setup▶ Easy setup wizard▶ Pulse/Status out▶ P1 unit	RW	n unit/P u unit/P m unit/P Unit/P k unit/P M unit/P n P/unit u P/unit m P/unit P/unit k P/unit M P/unit	n unit/P u unit/P m unit/P Unit/P k unit/P M unit/P n P/unit u P/unit m P/unit P/unit k P/unit M P/unit	Unit/P (*)	-	Used for pulse output of the I/O2 terminal. Specify the pulse rate scaling. Synchronized with No. 5-4.
2-8	B31: P1 RATE VAL	Device setup▶ Easy setup wizard▶ Pulse/Status out▶ P1 val	RW	0.00000 to +32000.0 Number of decimal places: 1 to 5	0.00000 to +999999 Number of decimal places: 0 to 5	0.0	Specified in No.5-4	Used for pulse output of the I/O2 terminal. Specify the pulse rate value. Synchronized with No. 5-5.
2-9	B32: F1 AT 0%	Device setup▶ Easy setup wizard▶ Pulse/Status out▶ F1 at 0%	RW	0 to 12500 Number of decimal places: 0	0 to 12500 Number of decimal places: 0	0	Hz	Used for frequency output of the I/O2 terminal. Specify the frequency that is available when 0% is set to the process value PV-mapped in 3-14. Synchronized with No. 5-8.
2-10	B33: F1 AT 100%	Device setup▶ Easy setup wizard▶ Pulse/Status out▶ F1 at 100%	RW	0 to 12500 Number of decimal places: 0	0 to 12500 Number of decimal places: 0	0	Hz	Used for frequency output of the I/O2 terminal. Specify the frequency that is available when 100% is set to the process value PV-mapped in No. 3-14. Synchronized with No. 5-9.

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.

No.	Name		Setting	Range		Default value	Unit	Description
	BRAIN communication	Display		BRAIN communication	Display			
2-11	B40: LINE1 SEL	Device setup▶ Easy setup wizard▶ Display set▶ Line 1	RW	Flow rate(%) PV Velocity Volume flow Mass flow Flow rate(%Bar) Totalizer1 Totalizer2 Totalizer3 Tag number Commun Protocol Adhesion Analog out1	Flow rate(%) PV Velocity Volume flow Mass flow Flow rate(%Bar) Totalizer1 Totalizer2 Totalizer3 Tag number Commun Protocol Adhesion Analog out1	PV	-	Specify item 1 to be shown on the display. Synchronized with No. 10-1.
2-12	B41: LINE2 SEL	Device setup▶ Easy setup wizard▶ Display set▶ Line 2	RW	None Flow rate(%) PV Velocity Volume flow Mass flow Flow rate(%Bar)	None Flow rate(%) PV Velocity Volume flow Mass flow Flow rate(%Bar)	Flow rate(%)	-	Specify item 2 to be shown on the display. Synchronized with No. 10-2.
2-13	B42: LINE3 SEL	Device setup▶ Easy setup wizard▶ Display set▶ Line 3	RW	Totalizer1 Totalizer2 Totalizer3 Tag number Commun Protocol Adhesion Analog out1	Totalizer1 Totalizer2 Totalizer3 Tag number Commun Protocol Adhesion Analog out1	Analog out1	-	Specify item 3 to be shown on the display. Synchronized with No. 10-3.
2-14	B50: AUTOZERO EXE	Device setup▶ Easy setup wizard▶ Autozero exe	RW	Not execute Execute	Not execute Execute	Not execute	-	Specify whether to execute the zero adjustment function. Synchronized with No. 3-31.
2-15	B60: SELF CHECK	-	R	GOOD ERROR	-	-	-	Indicates the result of the self-diagnostic function.

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.

(3) Basic configuration parameters (C: BASIC SETUP)

This list shows the parameters related to the basic settings for the sensor and other devices.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
3-1	C10: VELO DMP A/F	Device setup▶ Detailed setup▶ Pro var▶ Velocity▶ Damp AO/F	RW	+0.1 to +200.0 Number of decimal places: 1	+0.1 to +200.0 Number of decimal places: 1	3.0	s	Used for current output or frequency output. Specify the damping time constant of the flow velocity.
3-2	C11: VELO DMP P/T	Device setup▶ Detailed setup▶ Pro var▶ Velocity▶ Damp pls/ttl	RW	+0.1 to +200.0 Number of decimal places: 1	+0.1 to +200.0 Number of decimal places: 1	3.0	s	Used for pulse output or totalization. Specify the damping time constant of the flow velocity.
3-3	C12: VOL DMP A/F	Device setup▶ Detailed setup▶ Pro var▶ Volume▶ Damp AO/F	RW	+0.1 to +200.0 Number of decimal places: 1	+0.1 to +200.0 Number of decimal places: 1	3.0	s	Used for current output or frequency output. Specify the damping time constant of the volumetric flow rate. Synchronized with No. 2-2.
3-4	C13: VOL DMP P/T	Device setup▶ Detailed setup▶ Pro var▶ Volume▶ Damp pls/ttl	RW	+0.1 to +200.0 Number of decimal places: 1	+0.1 to +200.0 Number of decimal places: 1	3.0	s	Used for pulse output or totalization. Specify the damping time constant of the volumetric flow rate. Synchronized with No. 2-3.
3-5	C14: MASS DMP A/F	Device setup▶ Detailed setup▶ Pro var▶ Mass▶ Damp AO/F	RW	+0.1 to +200.0 Number of decimal places: 1	+0.1 to +200.0 Number of decimal places: 1	3.0	s	Used for current output or frequency output. Specify the damping time constant of the mass flow rate.
3-6	C15: MASS DMP P/T	Device setup▶ Detailed setup▶ Pro var▶ Mass▶ Damp pls/ttl	RW	+0.1 to +200.0 Number of decimal places: 1	+0.1 to +200.0 Number of decimal places: 1	3.0	s	Used for pulse output or totalization. Specify the damping time constant of the mass flow rate.
3-9	C20: LOW MF	Device setup▶ Detailed setup▶ Sensor▶ Low MF	RW	+0.0100 to +3.0000 Number of decimal places: 4	+0.0100 to +3.0000 Number of decimal places: 4	1.0000 (*)	-	Specify the low side frequency meter factor.
3-10	C21: HIGH MF	Device setup▶ Detailed setup▶ Sensor▶ High MF	RW	+0.0100 to +3.0000 Number of decimal places: 4	+0.0100 to +3.0000 Number of decimal places: 4	1.0000 (*)	-	Specify the high side frequency meter factor.
3-11	C24: FLOW SENSOR	Device setup▶ Detailed setup▶ Sensor▶ Flow sensor sel	RW	ADMAG AXW Calibrator Other1 Other2	ADMAG AXW Calibrator Other1 Other2	ADMAG AXW (*)	-	Specify the sensor type.
3-12	C26: SIZE UNIT	Device setup▶ Detailed setup▶ Sensor▶ Nominal size unit	RW	mm inch	mm inch	mm	-	Specify the unit of the nominal size for the sensor.
3-13	C27: NOMINAL SIZE	Device setup▶ Detailed setup▶ Sensor▶ Nominal size	RW	+0.01000 to +3000.0 Number of decimal places: 1 to 5	+0.01000 to +3000.0 Number of decimal places: 0 to 5	100 (*)	Specified in No. 3-12.	Specify the nominal size of the sensor.
3-14	C30: PV FLOW SEL	Device setup▶ Detailed setup▶ Pro var▶ PV flow select	RW	Velocity Volume Mass	Velocity Volume Mass	Volume (*)	-	Specify the process value to be PV-mapped. Velocity: Flow velocity Volume: Volumetric flow rate Mass: Mass flow rate
3-15	C31: VELO F UNIT	Device setup▶ Detailed setup▶ Pro var▶ Velocity▶ Unit	RW	m/s ft/s	m/s ft/s	m/s (*)	-	Specify the unit of the flow velocity.
3-16	C32: VOL F UNIT	Device setup▶ Detailed setup▶ Pro var▶ Volume▶ Unit	RW	Ml(Megaliter) m3 kl(kiloliter) l(liter) cm3 kcf cf mcf Mgal(US) kgal(US) gal(US) mgal(US) kbbl(US Oil) bbl(US Oil) mbbl(US Oil) ubbl(US Oil) kbbl(US Beer) bbl(US Beer) mbbl(US Beer) ubbl(US Beer)	Ml(Megaliter) m³ kl(kiloliter) l(liter) cm³ kcf cf mcf Mgal(US) kgal(US) gal(US) mgal(US) kbbl(US Oil) bbl(US Oil) mbbl(US Oil) ubbl(US Oil) kbbl(US Beer) bbl(US Beer) mbbl(US Beer) ubbl(US Beer)	m³ (*)	-	Specify the unit of the volumetric flow rate. Synchronized with No. 2-4.

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.

No.	Name		Setting	Range		Default value	Unit	Description
	BRAIN communication	Display		BRAIN communication	Display			
3-17	C33: MASS F UNIT	Device setup▶ Detailed setup▶ Pro var▶ Mass▶ Unit	RW	T kg g klb lb	t kg g klb lb	kg (*)	-	Specify the unit of the mass flow rate.
3-19	C35: TIME UNIT	Device setup▶ Detailed setup▶ Pro var▶ Volume▶ Time unit or Device setup▶ Detailed setup▶ Pro var▶ Mass▶ Time unit	RW	/s /min /h /d	/s /min /h /d	/h (*)	-	Specify the time unit of the volumetric flow rate, and mass flow rate. Synchronized with No. 2-5.
3-20	C36: VELO F SPAN	Device setup▶ Detailed setup▶ Pro var▶ Velocity▶ Span	RW	+0.00001 to +32000.0 Number of decimal places: 1 to 5	+0.00001 to +999999 Number of decimal places: 0 to 5	1.00000 (*)	Specified in No. 3-15.	Specify the span of the flow velocity.
3-21	C37: VOL F SPAN	Device setup▶ Detailed setup▶ Pro var▶ Volume▶ Span	RW	+0.00001 to +32000.0 Number of decimal places: 1 to 5	+0.00001 to +999999 Number of decimal places: 0 to 5	1.00000 (*)	Specified in No. 3-16 and No. 3-19.	Specify the span of the volumetric flow rate. Synchronized with No. 2-6. Specify the value equivalent to 1 m/s in case of no ordering information by user.
3-22	C38: MASS F SPAN	Device setup▶ Detailed setup▶ Pro var▶ Mass▶ Span	RW	+0.00001 to +32000.0 Number of decimal places: 1 to 5	+0.00001 to +999999 Number of decimal places: 0 to 5	1.00000 (*)	Specified in No. 3-17 and No. 3-19. [kg/h]	Specify the span of the mass flow rate.
3-24	C40: VELOCITY CHK	Device setup▶ Detailed setup▶ Pro var▶ Velocity check	R	-99.999 to +99.999 Number of decimal places: 3	-99.999 to +99.999 Number of decimal places: 3	-	m/s	Converts the process value PV-mapped in No. 3-14 to the span of the flow velocity, and displays the converted value.
3-25	C41: USR SPN SEL1	Device setup▶ Detailed setup▶ User Span▶ User span AO1▶ Select	RW	No Yes	No Yes	No	-	Used for current output of the I/O1 terminal. Specify whether the special unit can be set to the process value.
3-26	C42: USR UNIT1	Device setup▶ Detailed setup▶ User Span▶ User span AO1▶ Unit	RW	ASCII 8 characters	ASCII 8 characters	All Space	-	Used for current output of the I/O1 terminal. Specify the special unit for the process value.
3-27	C43: USR SPAN1	Device setup▶ Detailed setup▶ User Span▶ User span AO1▶ Span	RW	+0.00001 to +32000.0 Number of decimal places: 1 to 5	+0.00001 to +999999 Number of decimal places: 0 to 5	100.000	-	Used for current output of the I/O1 terminal. Specify the special unit span for the process value.
3-31	C51: AUTOZERO EXE	Device setup▶ Diag/Service▶ Autozero▶ Execute	RW	Not execute Execute	Not execute Execute	Not execute	-	Specify whether to execute the zero adjustment function. Synchronized with No. 2-14.
3-32	C52: ZERO	Device setup▶ Diag/Service▶ Autozero▶ Result▶ Zero value	RW	-99.999 to +99.999 Number of decimal places: 3	-99.999 to +99.999 Number of decimal places: 3	0.000	cm/s	Indicates the result of executing the zero adjustment function. Manual input is possible.
3-33	C60: SELF CHECK	-	R	GOOD ERROR	-	-	-	Indicates the result of the self-diagnostic function.

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.

(4) Totalization configuration parameters (D: TOTAL SET)

This list shows the parameters related to the totalization function.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
4-1	D10: TOT1 UNIT	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 1▶ Unit	R	Ml(Megaliter) m3 kl(kiloliter) l(liter) cm3 t kg g kcf cf mcf Mgal(US) kgal(US) gal(US) mgal(US) kbbl(US Oil) bbl(US Oil) mbbl(US Oil) ubbl(US Oil) kbbl(US Beer) bbl(US Beer) mbbl(US Beer) ubbl(US Beer) klb(US) lb(US)	Ml(Megaliter) m³ kl(kiloliter) l(liter) cm³ t kg g kcf cf mcf Mgal(US) kgal(US) gal(US) mgal(US) kbbl(US Oil) bbl(US Oil) mbbl(US Oil) ubbl(US Oil) kbbl(US Beer) bbl(US Beer) mbbl(US Beer) ubbl(US Beer) klb(US) lb(US)	-	-	Indicates the unit of totalizer 1 (process value PV-mapped in No. 3-14).
4-2	D11: TOT1 CONV FC	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 1▶ Conv factor	RW	0.00000 to +32000.0 Number of decimal places: 1 to 5	0.00000 to +999999 Number of decimal places: 0 to 5	1.00000 (*)	Synchronized with No. 4-1.	Specify the conversion factor for scaling totalizer 1.
4-3	D12: TOT1 LOWCUT	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 1▶ Low cut	RW	0.00000 to +32000.0 Number of decimal places: 1 to 5	0.00000 to +999999 Number of decimal places: 0 to 5	0.00000 (*)	Volumetric flow rate: Specified in No. 3-16 and No. 3-19. Mass flow rate: Specified in No. 3-17 and No. 3-19.	Specify the low-cut value of totalizer 1.
4-4	D13: TOT1 F OPTS	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 1▶ Failure opts	RW	Run Hold Last valid	Run Hold Last valid	Run	-	Specify the totalizer 1 operation to be performed when an alarm has activated. Run: Continues the totalization function after an alarm has activated. Hold: Stops the totalization function after an alarm has activated. Last valid: Continues the totalization function with the last valid value before an alarm activates.
4-5	D14: TOT1 OPTS	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 1▶ Options	RW	Balanced Absolute Only positive Only negative Hold	Balanced Absolute Only positive Only negative Hold	Only positive	-	Specify the totalization direction of totalizer 1. Balanced: Totalizes the differential flow rate between the forward and reverse directions. Absolute: Totalizes the absolute value of the flow rate. Only positive: Totalizes only the flow rate in the forward direction. Only negative: Totalizes only the flow rate in the reverse direction. Hold: Stops totalization processing (holds the current totalized-value).
4-6	D15: TOT1 EXEC	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 1▶ Start/Stop	RW	Stop Start	Stop Start	Stop	-	Specify whether to execute the totalization function of totalizer 1.
4-7	D16: TOT1 PRESET	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 1▶ Reset/Preset	RW	Not execute Reset Preset	Not execute Reset Preset	Not execute	-	Specify whether to execute the reset or preset function of totalizer 1.
4-8	D17: TOT1 PRE VAL	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 1▶ Preset value	RW	-32000.0 to +32000.0 Number of decimal places: 1 to 5	-999999 to +999999 Number of decimal places: 0 to 5	0.00000	Volumetric flow rate: Specified in No. 3-16. Mass flow rate: Specified in No. 3-17.	Specify the preset value of totalizer 1.
4-9	D18: TOT1 SETPNT	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 1▶ Set point	RW	0.00000 to +32000.0 Number of decimal places: 1 to 5	0.00000 to +999999 Number of decimal places: 0 to 5	0.00000	Volumetric flow rate: Specified in No. 3-16. Mass flow rate: Specified in No. 3-17.	Specify the target value at which the status output of totalizer 1 becomes active.

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
4-10	D20: TOT2 UNIT	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 2▶ Unit	RW	Ml(Megaliter) m3 kl(kiloliter) l(liter) cm3 t kg g kcf cf mcf Mgal(US) kgal(US) gal(US) mgal(US) kbbl(US Oil) bbl(US Oil) mbbl(US Oil) ubbl(US Oil) kbbl(US Beer) bbl(US Beer) mbbl(US Beer) ubbl(US Beer) klb(US) lb(US)	Ml(Megaliter) m³ kl(kiloliter) l(liter) cm³ t kg g kcf cf mcf Mgal(US) kgal(US) gal(US) mgal(US) kbbl(US Oil) bbl(US Oil) mbbl(US Oil) ubbl(US Oil) kbbl(US Beer) bbl(US Beer) mbbl(US Beer) ubbl(US Beer) klb(US) lb(US)	m³	-	Specify the unit of totalizer 2.
4-11	D21: TOT2 CONV FC	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 2▶ Conv factor	RW	-32000.0 to +32000.0 Number of decimal places: 1 to 5	-999999 to +999999 Number of decimal places: 0 to 5	1.00000	Specified in No. 4-10.	Specify the conversion factor for scaling totalizer 2.
4-12	D22: TOT2 LOWCUT	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 2▶ Low cut	RW	0.00000 to +32000.0 Number of decimal places: 1 to 5	0.00000 to +999999 Number of decimal places: 0 to 5	0.00000	Specified in No. 4-10 and No.3-19.	Specify the low-cut value of totalizer 2.
4-13	D23: TOT2 F OPTS	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 2▶ Failure opts	RW	Run Hold Last valid	Run Hold Last valid	Run	-	Specify the totalizer 2 operation to be performed when an alarm has activated. Run: Continues the totalization function after an alarm has activated. Hold: Stops the totalization function after an alarm has activated. Last valid: Continues the totalization function with the last valid value before an alarm activates.
4-14	D24: TOT2 OPTS	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 2▶ Options	RW	Balanced Absolute Only positive Only negative Hold	Balanced Absolute Only positive Only negative Hold	Only negative	-	Specify the totalization direction of totalizer 2. Balanced: Totalizes the differential flow rate between the forward and reverse directions. Absolute: Totalizes the absolute value of the flow rate. Only positive: Totalizes only the flow rate in the forward direction. Only negative: Totalizes only the flow rate in the reverse direction. Hold: Stops totalization processing (holds the current totalized-value).
4-15	D25: TOT2 EXEC	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 2▶ Start/Stop	RW	Stop Start	Stop Start	Stop	-	Specify whether to execute the totalization function of totalizer 2.
4-16	D26: TOT2 PRESET	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 2▶ Reset/Preset	RW	Not execute Reset Preset	Not execute Reset Preset	Not execute	-	Specify whether to execute the reset or preset function of totalizer 2.
4-17	D27: TOT2 PRE VAL	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 2▶ Preset value	RW	-32000.0 to +32000.0 Number of decimal places: 1 to 5	-999999 to +999999 Number of decimal places: 0 to 5	0.00000	Specified in No. 4-10.	Specify the preset value of totalizer 2.
4-18	D28: TOT2 SETPNT	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 2▶ Set point	RW	0.00000 to +32000.0 Number of decimal places: 1 to 5	0.00000 to +999999 Number of decimal places: 0 to 5	0.00000	Specified in No. 4-10.	Specify the target value at which the status output of totalizer 2 becomes active.

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.

No.	Name		Setting	Range		Default value	Unit	Description
	BRAIN communication	Display		BRAIN communication	Display			
4-19	D30: TOT3 UNIT	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 3▶ Unit	RW	Ml(Megaliter) m3 kl(kiloliter) l(liter) cm3 t kg g kcf cf mcf Mgal(US) kgal(US) gal(US) mgal(US) kbbl(US Oil) bbl(US Oil) mbbl(US Oil) ubbl(US Oil) kbbl(US Beer) bbl(US Beer) mbbl(US Beer) ubbl(US Beer) klb(US) lb(US)	Ml(Megaliter) m³ kl(kiloliter) l(liter) cm³ t kg g kcf cf mcf Mgal(US) kgal(US) gal(US) mgal(US) kbbl(US Oil) bbl(US Oil) mbbl(US Oil) ubbl(US Oil) kbbl(US Beer) bbl(US Beer) mbbl(US Beer) ubbl(US Beer) klb(US) lb(US)	m³	-	Specify the unit of totalizer 3.
4-20	D31: TOT3 CONV FC	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 3▶ Conv factor	RW	-32000.0 to +32000.0 Number of decimal places: 1 to 5	-999999 to +999999 Number of decimal places: 0 to 5	1.00000	Specified in No. 4-19.	Specify the conversion factor for scaling totalizer 3.
4-21	D32: TOT3 LOWCUT	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 3▶ Low cut	RW	0.00000 to +32000.0 Number of decimal places: 1 to 5	0.00000 to +999999 Number of decimal places: 0 to 5	0.00000	Specified in No. 4-19 and No.3-19.	Specify the low-cut value of totalizer 3.
4-22	D33: TOT3 F OPTS	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 3▶ Failure opts	RW	Run Hold Last valid	Run Hold Last valid	Run	-	Specify the totalizer 3 operation to be performed when an alarm has activated. Run: Continues the totalization function after an alarm has activated. Hold: Stops the totalization function after an alarm has activated. Last valid: Continues the totalization function with the last valid value before an alarm activates.
4-23	D34: TOT3 OPTS	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 3▶ Options	RW	Balanced Absolute Only positive Only negative Hold	Balanced Absolute Only positive Only negative Hold	Balanced	-	Specify the totalization direction of totalizer 3. Balanced: Totalizes the differential flow rate between the forward and reverse directions. Absolute: Totalizes the absolute value of the flow rate. Only positive: Totalizes only the flow rate in the forward direction. Only negative: Totalizes only the flow rate in the reverse direction. Hold: Stops totalization processing (holds the current totalized-value).
4-24	D35: TOT3 EXEC	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 3▶ Start/Stop	RW	Stop Start	Stop Start	Stop	-	Specify whether to execute the totalization function of totalizer 3.
4-25	D36: TOT3 PRESET	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 3▶ Reset/Preset	RW	Not execute Reset Preset	Not execute Reset Preset	Not execute	-	Specify whether to execute the reset or preset function of totalizer 3.
4-26	D37: TOT3 PRE VAL	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 3▶ Preset value	RW	-32000.0 to +32000.0 Number of decimal places: 1 to 5	-999999 to +999999 Number of decimal places: 0 to 5	0.00000	Specified in No. 4-19.	Specify the preset value of totalizer 3.
4-27	D38: TOT3 SETPNT	Device setup▶ Detailed setup▶ Totalizer▶ Totalizer 3▶ Set point	RW	0.00000 to +32000.0 Number of decimal places: 1 to 5	0.00000 to +999999 Number of decimal places: 0 to 5	0.00000	Specified in No. 4-19.	Specify the target value at which the status output of totalizer 3 becomes active.
4-28	D60: SELF CHECK	-	R	GOOD ERROR	-	-	-	Indicates the result of the self-diagnostic function.

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.

(5) Pulse output configuration parameters (E: PULSE OUT)

This list shows the parameters related to the frequency output or pulse output of the I/O2 terminal, and I/O4 terminal.

No.	Name		Setting	Range		Default value	Unit	Description
	BRAIN communication	Display		BRAIN communication	Display			
5-1	E10: P1 OUT MODE	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO1/SO1▶ Output mode	RW	No function Fixed pulse Frequency output Status output	No function Fixed pulse output Frequency output Status output	Fixed pulse	-	Specify the output of the I/O2 terminal. No function: No output Fixed pulse: Fixed pulse output Frequency output: Frequency output (Duty 50%) Status output: Status output
5-2	E11: P1 ACT MODE	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO1/SO1▶ Active mode	RW	On active Off active	On active Off active	On active	-	Used for pulse output of the I/O2 terminal. Specify the active direction of the pulse signal.
5-3	E12: P1 WIDTH	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO1/SO1▶ Fix width	RW	0.05 ms 0.1 ms 0.5 ms 1 ms 20 ms 33 ms 50 ms 100 ms 200 ms 330 ms 500 ms 1000 ms 2000 ms	0.05 ms 0.1 ms 0.5 ms 1 ms 20 ms 33 ms 50 ms 100 ms 200 ms 330 ms 500 ms 1000 ms 2000 ms	0.05 ms	-	Used for pulse output of the I/O2 terminal. Specify the pulse width.
5-4	E13: P1 RATE UNIT	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO1/SO1▶ Rate unit	RW	n unit/P u unit/P m unit/P Unit/P k unit/P M unit/P n P/unit u P/unit m P/unit P/unit k P/unit M P/unit	n unit/P u unit/P m unit/P Unit/P k unit/P M unit/P n P/unit u P/unit m P/unit P/unit k P/unit M P/unit	Unit/P (*)	-	Used for pulse output of the I/O2 terminal. Specify the pulse rate scaling. Synchronized with No. 2-7.
5-5	E14: P1 RATE VAL	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO1/SO1▶ Rate value	RW	0.00000 to +32000.0 Number of decimal places: 1 to 5	0.00000 to +999999 Number of decimal places: 0 to 5	0.0 (*)	Specified in No. 5-4.	Used for pulse output of the I/O2 terminal. Specify the pulse rate value. Synchronized with No. 2-8.
5-6	E15: P1 LOW CUT	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO1/SO1▶ Low cut	RW	0.00000 to +32000.0 Number of decimal places: 1 to 5	0.00000 to +999999 Number of decimal places: 0 to 5	0.0 (*)	Flow velocity: Specified in No. 3-15. Volumetric flow rate: Specified in No. 3-16 and No. 3-19. Mass flow rate: Specified in No. 3-17 and No. 3-19.	Used for frequency output or pulse output of the I/O2 terminal. Specify the low-cut value.
5-7	E16: P1 ALM OUT	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO1/SO1▶ Alarm out	RW	0 pps Measured value Hold Max pps	0 pps Measured value Hold Max pps	0 pps	-	Used for frequency output or pulse output of the I/O2 terminal. Specify the output operation to be performed when an alarm has activated. 0 pps: No output Measured value: Outputs the frequency or pulse with the measured value. Hold: Outputs the frequency or pulse with the last valid value before an alarm activates. Max pps: Outputs the frequency or pulse at 12500 pps.
5-8	E17: F1 AT 0%	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO1/SO1▶ Frequency at0%	RW	0 to 12500 Number of decimal places: 0	0 to 12500 Number of decimal places: 0	0	Hz	Used for frequency output of the I/O2 terminal. Specify the frequency that is available when 0% is set to the process value PV-mapped in No. 3-14. Synchronized with No. 2-9.
5-9	E18: F1 AT 100%	Device setup▶ Detailed setup▶ Pulse/Statusout▶PO1/SO1▶ Frequency at 100%	RW	0 to 12500 Number of decimal places: 0	0 to 12500 Number of decimal places: 0	0	Hz	Used for frequency output of the I/O2 terminal. Specify the frequency that is available when 100% is set to the process value PV-mapped in No. 3-14. Synchronized with No. 2-10.

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.

No.	Name		Setting	Range		Default value	Unit	Description
	BRAIN communication	Display		BRAIN communication	Display			
5-10	E20: SO1 FUNCTION	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO1/SO1▶ SO1 function	RW	No function Alarm output Warning output Total limit 1 Total limit 2 Total limit 3 H/L alarm HH/LL alarm Fwd/Rev range Auto2 range Ext2 answer	No function Alarm output Warning output Total limit 1 Total limit 2 Total limit 3 H/L alarm HH/LL alarm Fwd/Rev range Auto2 range Ext2 answer	No function	-	Specify the status output function of the I/O2 terminal. No function: No output Alarm output: The status output becomes active when an alarm activates. Warning output: The status output becomes active when a warning occurs. Total limit 1: The status output is active while the totalized value of totalizer 1 is exceeding the target value. Total limit 2: The status output is active while the totalized value of totalizer 2 is exceeding the target value. Total limit 3: The status output is active while the totalized value of totalizer 3 is exceeding the target value. H/L alarm: The status output is active while the process value PV-mapped in No. 3-14 is out of the low limit value or high limit value. HH/LL alarm: The status output is active while the process value PV-mapped in No. 3-14 is out of the low-low limit value or high-high limit value. Fwd/Rev range: The status output is active while the fluid is flowing in the reverse direction. Auto2 range: The status output is active while operation is being performed in range 2. Ext2 answer: The status output becomes active depending on the range used for the status input.
5-11	E30: P2 ACT PULSE	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO2/SO2▶ Active pulse	RW	Normal Magnetic counter	Normal For magnetic counter	Normal	-	Used for pulse output of the I/O4 terminal. Specify whether to enable or disable the output for the magnetic counter. Normal: Normal output Magnetic counter: Output for magnetic counter
5-12	E31: P2 OUT MODE	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO2/SO2▶ Output mode	RW	No function Fixed pulse Frequency output Status output	No function Fixed pulse output Frequency output Status output	No function	-	Specify the output of the I/O4 terminal. No function: No output Fixed pulse: Fixed pulse output Frequency output: Frequency output (Duty 50%) Status output: Status output
5-13	E32: P2 SELECT	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO2/SO2▶ Pulse select	RW	Non-Connect Velocity Volume flow Mass flow	Non-Connect Velocity Volume flow Mass flow	Non-Connect	-	Specify the process value to be output through the I/O4 terminal. Non-Connect: No output Velocity: Sets the flow velocity to the output. Volume flow: Sets the volumetric flow rate to the output. Mass flow: Sets the mass flow rate to the output.
5-14	E33: P2 ACT MODE	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO2/SO2▶ Active mode	RW	On active Off active	On active Off active	On active	-	Used for pulse output of the I/O4 terminal. Specify the active direction of the pulse signal.
5-15	E34: P2 WIDTH	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO2/SO2▶ Fix width	RW	0.05 ms 0.1 ms 0.5 ms 1 ms 20 ms 33 ms 50 ms 100 ms 200 ms 330 ms 500 ms 1000 ms 2000 ms	0.05 ms 0.1 ms 0.5 ms 1 ms 20 ms 33 ms 50 ms 100 ms 200 ms 330 ms 500 ms 1000 ms 2000 ms	0.05 ms	-	Used for pulse output of the I/O4 terminal. Specify the pulse width.
5-16	E35: P2 RATE UNIT	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO2/SO2▶ Rate unit	RW	n unit/P u unit/P m unit/P Unit/P k unit/P M unit/P n P/unit u P/unit m P/unit P/unit k P/unit M P/unit	n unit/P u unit/P m unit/P Unit/P k unit/P M unit/P n P/unit u P/unit m P/unit P/unit k P/unit M P/unit	Unit/P	-	Used for pulse output of the I/O4 terminal. Specify the pulse rate scaling.
5-17	E36: P2 RATE VAL	Device setup▶ Detailed setup▶ Pulse/Status out▶ PO2/SO2▶ Rate value	RW	0.00000 to +32000.0 Number of decimal places: 1 to 5	0.00000 to +999999 Number of decimal places: 0 to 5	0.0	Specified in No. 5-16.	Used for pulse output of the I/O4 terminal. Specify the pulse rate value.

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.

No.	Name		Setting	Range		Default value	Unit	Description
	BRAIN communication	**Display**		**BRAIN communication**	**Display**			
5-18	E37: P2 LOW CUT	Device setup► Detailed setup► Pulse/Status out► PO2/SO2► Low cut	RW	0.00000 to +32000.0 Number of decimal places: 1 to 5	0.00000 to +999999 Number of decimal places: 0 to 5	0.0	Flow velocity: Specified in No. 3-15. Volumetric flow rate: Specified in No. 3-16 and No. 3-19. Mass flow rate: Specified in No. 3-17 and No. 3-19.	Used for frequency output and pulse output of the I/O4 terminal. Specify the low-cut value.
5-19	E38: P2 ALM OUT	Device setup► Detailed setup► Pulse/Status out► PO2/SO2► Alarm out	RW	0 pps Measured value Hold Max pps	0 pps Measured value Hold Max pps	0 pps	-	Used for frequency output and pulse output of the I/O4 terminal. Specify the output operation to be performed when an alarm has activated. 0 pps: No output Measured value: Outputs the frequency or pulse with the measured value. Hold: Outputs the frequency or pulse with the last valid value before an alarm activates. Max pps: Outputs the frequency or pulse at 12500 pps.
5-20	E39: F2 AT 0%	Device setup► Detailed setup► Pulse/Status out► PO2/SO2► Frequency at 0%	RW	0 to 12500 Number of decimal places: 0	0 to 12500 Number of decimal places: 0	0	Hz	Used for frequency output of the I/O4 terminal. Specify the frequency that is available when 0% is set to the process value mapped in No. 5-13.
5-21	E40: F2 AT 100%	Device setup► Detailed setup► Pulse/Status out► PO2/SO2► Frequency at 100%	RW	0 to 12500 Number of decimal places: 0	0 to 12500 Number of decimal places: 0	0	Hz	Used for frequency output of the I/O4 terminal. Specify the frequency that is available when 100% is set to the process value mapped in No. 5-13.
5-22	E41: SO2 FUNCTION	Device setup► Detailed setup► Pulse/Status out► PO2/SO2► SO2 function	RW	No function Alarm output Warning output Total limit 1 Total limit 2 Total limit 3 H/L alarm HH/LL alarm Fwd/Rev range Auto2 range Ext2 answer	No function Alarm output Warning output Total limit 1 Total limit 2 Total limit 3 H/L alarm HH/LL alarm Fwd/Rev range Auto2 range Ext2 answer	No function	-	Specify the status output function of the I/O4 terminal. No function: No output Alarm output: The status output becomes active when an alarm activates. Warning output: The status output becomes active when a warning occurs. Total limit 1: The status output is active while the totalized value of totalizer 1 is exceeding the target value. Total limit 2: The status output is active while the totalized value of totalizer 2 is exceeding the target value. Total limit 3: The status output is active while the totalized value of totalizer 3 is exceeding the target value. H/L alarm: The status output is active while the process value PV-mapped in No. 3-14 is out of the low limit value or high limit value. HH/LL alarm: The status output is active while the process value PV-mapped in No. 3-14 is out of the low-low limit value or high-high limit value. Fwd/Rev range: The status output is active while the fluid is flowing in the reverse direction. Auto2 range: The status output is active while operation is being performed in range 2. Ext2 answer: The status output becomes active depending on the range used for the status input.
5-23	E60: SELF CHECK	-	R	GOOD ERROR	-	-	-	Indicates the result of the self-diagnostic function.

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.

(6) Status input configuration parameters (F: STATUS I/O)

This list shows the parameters related to the status input of the I/O3 terminal, and multi range.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
6-3	F12: SI3 ACT MODE	Device setup▶ Detailed setup▶ Status in▶ SI3▶ Active mode	RW	Short(On) act Open(Off) act	Short(On) act Open(Off) act	Open(Off) act	-	Used for status input of the I/O3 terminal. Specify the active direction of the target signal. Short(On) act: Active when short-circuited. Open(Off) act: Active when opened.
6-4	F13: SI3 FUNCTION	Device setup▶ Detailed setup▶ Status in▶ SI3▶ Function	RW	No function 0% Signal Lock Ext auto zero Total preset 1 Total preset 2 Total preset 3 Ext2 ranges	No function 0% Signal Lock Ext auto zero Total preset 1 Total preset 2 Total preset 3 Ext2 ranges	No function	-	Select the status input function of the I/O3 terminal. No function: No input 0% Signal Lock: When the status input becomes active, the current output of the I/O1 terminal is fixed to 4 mA. Ext auto zero: When the status input becomes active, the zero-adjustment function is performed. Total preset 1: When the status input becomes active, the preset value is set to totalizer 1, and totalization starts based on the value. Total preset 2: When the status input becomes active, the preset value is set to totalizer 2, and totalization starts based on the value. Total preset 3: When the status input becomes active, the preset value is set to totalizer 3, and totalization starts based on the value. Ext2 ranges: When the status input becomes active, the current output range is switched from range 1 to range 2.
6-5	F14: SI3 STATE	Device setup▶ Detailed setup▶ Status in▶ SI3▶ Status	R	Open Short	Open Short	-	-	Used for status input of the I/O3 terminal. Indicates the terminal status.
6-6	F40: FWD SPAN2	Device setup▶ Detailed setup▶ Multi range▶ Forward span 2	RW	0.00001 to +32000.0 Number of decimal places: 1 to 5	0.00001 to +999999 Number of decimal places: 0 to 5	1.0	Flow velocity: Specified in No. 3-15. Volumetric flow rate: Specified in No. 3-16 and No. 3-19. Mass flow rate: Specified in No. 3-17 and No. 3-19.	Used for multi range. Specify the value of forward range 2.
6-7	F43: REV SPAN1	Device setup▶ Detailed setup▶ Multi range▶ Reverse span 1	RW	0.00001 to +32000.0 Number of decimal places: 1 to 5	0.00001 to +999999 Number of decimal places: 0 to 5	1.0	Flow velocity: Specified in No. 3-15. Volumetric flow rate: Specified in No. 3-16 and No. 3-19. Mass flow rate: Specified in No. 3-17 and No. 3-19.	Used for multi range. Specify the value of reverse range 1.
6-8	F44: REV SPAN2	Device setup▶ Detailed setup▶ Multi range▶ Reverse span 2	RW	0.00001 to +32000.0 Number of decimal places: 1 to 5	0.00001 to +999999 Number of decimal places: 0 to 5	1.0	Flow velocity: Specified in No. 3-15. Volumetric flow rate: Specified in No. 3-16 and No. 3-19. Mass flow rate: Specified in No. 3-17 and No. 3-19.	Used for multi range. Specify the value of reverse range 2.
6-9	F50: AUTO RNG HYS	Device setup▶ Detailed setup▶ Multi range▶ Auto range hyst	RW	0 to 15 Number of decimal places: 0	0 to 15 Number of decimal places: 0	10	%	Used for multi range. Specify the range switching hysteresis.
6-10	F51: BI DIREC HYS	Device setup▶ Detailed setup▶ Multi range▶ Bi direction hyst	RW	0 to 8 Number of decimal places: 0	0 to 8 Number of decimal places: 0	2	%	Used for forward and reverse ranges. Specify the range switching hysteresis.
6-11	F60: SELF CHECK	-	R	GOOD ERROR	-	-	-	Indicates the result of the self-diagnostic function.

(7) Display parameters (G: ANALOG I/O)

This list shows the parameters related to the current output of the I/O1 terminal.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
7-1	G01: AO1 LOW CUT	Device setup► Detailed setup► Analog out/in► AO1► Low cut	RW	0.00000 to +32000.0 Number of decimal places: 1 to 5	0.00000 to +999999 Number of decimal places: 0 to 5	0.0	Flow velocity: Specified in No. 3-15. Volumetric flow rate: Specified in No. 3-16 and No. 3-19. Mass flow rate: Specified in No. 3-17 and No. 3-19.	Used for current output of the I/O1 terminal. Specify the low-cut value.
7-2	G02: AO1 HI LIMIT	Device setup► Detailed setup► Analog out/in► AO1► High limit	RW	+4.0 to +21.6 Number of decimal places: 1	+4.000 to +21.600 Number of decimal places: 3	20.500	mA	Used for current output of the I/O1 terminal. Specify the high limit value of the current.
7-3	G03: AO1 LO LIMIT	Device setup► Detailed setup► Analog out/in► AO1► Low limit	RW	+2.4 to +20.0 Number of decimal places: 1	+2.400 to +20.000 Number of decimal places: 3	3.800	mA	Used for current output of the I/O1 terminal. Specify the low limit value of the current.
7-4	G04: AO1 ALM OUT	Device setup► Detailed setup► Analog out/in► AO1► Alarm out	RW	< 2.4 mA 3.8 mA 4 mA 20.5 mA > 21.6 mA Measured value Hold	< 2.4 mA 3.8 mA 4 mA 20.5 mA > 21.6 mA Measured value Hold	> 21.6 mA	-	Used for current output of the I/O1 terminal. Specify the current output that is available when an alarm has activated. < 2.4 mA: Outputs the lower current than 2.4 mA. 3.8 mA: Outputs the current of 3.8 mA. 4 mA: Outputs the current of 4 mA. 20.5 mA: Outputs the current of 20.5 mA. > 21.6 mA: Outputs the higher current than 21.6 mA. Measured value: Outputs the measured current value (indefinite). Hold: Outputs the current that is applied when an alarm has activated.
7-5	G05: AO1 RNG MODE	Device setup► Detailed setup► Analog out/in► AO1► Range mode	RW	Normal range Abs range	Normal range Abs range	Normal range	-	Specify whether to execute the absolute range function. Normal range: Normal range Abs range: Absolute range
7-18	G30: AO1 TRIM CLR	Device setup► Diag/Service► AO/AI trim► AO trim► AO1 trim clear	RW	Not execute Execute	Not execute Execute	Not execute	-	Used for current output of the I/O1 terminal. Clears the adjustment value to output the current.
7-19	G31: AO1 at 4 mA	Device setup► Diag/Service► AO/AI trim► AO trim► AO1 trim 4 mA	RW	3.200 to 5.600 Number of decimal places: 3	3.200 to 5.600 Number of decimal places: 3	4.000	mA	Used for current output of the I/O1 terminal. Specify the adjustment value to output the current with 4 mA.
7-20	G32: AO1 at 20 mA	Device setup► Diag/Service► AO/AI trim► AO trim► AO1 trim 20 mA	RW	18.400 to 21.600 Number of decimal places: 3	18.400 to 21.600 Number of decimal places: 3	20.000	mA	Used for current output of the I/O1 terminal. Specify the adjustment value to output the current with 20 mA.
7-27	G60: SELF CHECK	-	R	GOOD ERROR	-	-	-	Indicates the result of the self-diagnostic function.

(8) Auxiliary function configuration parameters (H: AUX CALC)

This list shows the parameters related to the flow rate direction, rate limit, and low-cut value.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
8-1	H10: FLOW DIRECT	Device setup▶ Detailed setup▶ AUX calculation▶ Flow direct	RW	Forward Reverse	Forward Reverse	Forward	-	Specify the fluid flow direction.
8-2	H11: RATE LIMIT	Device setup▶ Detailed setup▶ AUX calculation▶ Rate limit	RW	0.0 to 10.0 Number of decimal places: 1	0.0 to 10.0 Number of decimal places: 1	5.0	%	Specify the rate limit value.
8-3	H12: DEAD TIME	Device setup▶ Detailed setup▶ AUX calculation▶ Dead time	RW	0.0 to 15.0 Number of decimal places: 1	0.0 to 15.0 Number of decimal places: 1	0.0	s	Specify the dead time.
8-4	H13: NOISE FILTER	Device setup▶ Detailed setup▶ AUX calculation▶ Noise filter	RW	Manual Level1 Level2 Level3	Manual Level1 Level2 Level3	Manual	-	Specify the noise filter (rate limit value and dead time).
8-5	H14: PULSING FLOW	Device setup▶ Detailed setup▶ AUX calculation▶ Pulsing flow	RW	No Yes	No Yes	No	-	Specify whether to execute the pulsing flow support function.
8-6	H20: POWER SYNCH	Device setup▶ Detailed setup▶ AUX calculation▶ Power sync	RW	No Yes	No Yes	Yes	-	Specify whether the excitation frequency and power frequency are synchronous or asynchronous.
8-7	H21: SET PWR FREQ	Device setup▶ Detailed setup▶ AUX calculation▶ Set power freq	RW	47.00 to 63.00 Number of decimal places: 2	47.00 to 63.00 Number of decimal places: 2	50.00	Hz	When the excitation frequency and power frequency are asynchronous, specify the power frequency that synchronizes with the excitation frequency. (The default value is set as 49.00 for 500 mm (16 in.) or larger sizes.)
8-8	H22: IEX PWR FREQ	Device setup▶ Detailed setup▶ AUX calculation▶ Iex power frequency	R	0.00 to 99.99 Number of decimal places: 2	0.00 to 99.99 Number of decimal places: 2	-	Hz	Indicates the power frequency that synchronizes with the excitation frequency.
8-9	H23: MES PWR FREQ	Device setup▶ Detailed setup▶ AUX calculation▶ Meas power freq	R	0.00 to 99.99 Number of decimal places: 2	0.00 to 99.99 Number of decimal places: 2	-	Hz	Indicates the measured value of the power frequency. For the DC power, this parameter indicates "0.00 Hz".
8-11	H31: DENSITY UNIT	Device setup▶ Detailed setup▶ Pro var▶ Density▶ Unit	RW	kg/m3 lb/gal lb/cf	kg/m³ lb/gal lb/cf	kg/m³	-	Specify the unit of the density.
8-12	H32: FIXED DENS	Device setup▶ Detailed setup▶ Pro var▶ Density▶ Fixed density	RW	0.00000 to 32000.0 Number of decimal places: 1 to 5	0.00000 to 999999 Number of decimal places: 0 to 5	0 (*)	Specified in No. 8-11.	Specify the density value.
8-22	H50: SET SIL	Device setup▶ Detailed setup▶ AUX calculation▶ Set SIL	RW	No Yes	No Yes	No	-	Specify the current output for Safety Instrumented System application. Synchronized with No. 7-4.
8-23	H60: SELF CHECK	-	R	GOOD ERROR	-	-	-	Indicates the result of the self-diagnostic function.

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.

(9) Alarm configuration parameters (I: ALARM)

This list shows the parameters related to alarm output, burnout, and history.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
9-1	I10: HIGH ALARM	Device setup▶ Diag/Service▶ H/L alarm cfg▶ High alarm	RW	-32000.0 to +32000.0 Number of decimal places: 1 to 5	-999999 to +999999 Number of decimal places: 0 to 5	300.000	Flow velocity: Specified in No. 3-15. Volumetric flow rate: Specified in No. 3-16 and No. 3-19. Mass flow rate: Specified in No. 3-17 and No. 3-19.	Specify the high limit value to judge an alarm.
9-2	I11: LOW ALARM	Device setup▶ Diag/Service▶ H/L alarm cfg▶ Low alarm	RW	-32000.0 to +32000.0 Number of decimal places: 1 to 5	-999999 to +999999 Number of decimal places: 0 to 5	-300.000	Flow velocity: Specified in No. 3-15. Volumetric flow rate: Specified in No. 3-16 and No. 3-19. Mass flow rate: Specified in No. 3-17 and No. 3-19.	Specify the low limit value to judge an alarm.
9-3	I12: HI HI ALARM	Device setup▶ Diag/Service▶ H/L alarm cfg▶ HH alarm	RW	-32000.0 to +32000.0 Number of decimal places: 1 to 5	-999999 to +999999 Number of decimal places: 0 to 5	300.000	Flow velocity: Specified in No. 3-15. Volumetric flow rate: Specified in No. 3-16 and No. 3-19. Mass flow rate: Specified in No. 3-17 and No. 3-19.	Specify the high-high limit value to judge an alarm.
9-4	I13: LO LO ALARM	Device setup▶ Diag/Service▶ H/L alarm cfg▶ LL alarm	RW	-32000.0 to +32000.0 Number of decimal places: 1 to 5	-999999 to +999999 Number of decimal places: 0 to 5	-300.000	Flow velocity: Specified in No. 3-15. Volumetric flow rate: Specified in No. 3-16 and No. 3-19. Mass flow rate: Specified in No. 3-17 and No. 3-19.	Specify the low-low limit value to judge an alarm.
9-5	I14: H/L ALM HYS	Device setup▶ Diag/Service▶ H/L alarm cfg▶ H/L alarm hyst	RW	0 to 10 Number of decimal places: 0	0 to 10 Number of decimal places: 0	5	%	Specify the hysteresis width between the alarm occurrence and resetting.
9-6	I20: 4-20 BURNOUT	Device setup▶ Diag/Service▶ H/L alarm cfg▶ 4-20 burnout	R	High Low	High Low	-	-	Indicates the current output direction when burnout occurs.

No.	Name		Setting	Range		Default value	Unit	Description
	BRAIN communication	**Display**		**BRAIN communication**	**Display**			
9-7	I30: OUT MSK SET1	-	RW	Mask all off Mask all on M/B EEP dflt off M/B EEP dflt on PWM1 stop off PWM1 stop on PWM2 stop off PWM2 stop on Opt mismatch off Opt mismatch on Opt EEP FAIL off Opt EEP FAIL on Opt A/D FAIL off Opt A/D FAIL on Opt SPI FAIL off Opt SPI FAIL on Ind bd FAIL off Ind bd FAIL on Ind EEP FAIL off Ind EEP FAIL on LCD drv FAIL off LCD drv FAIL on Ind mismatch off Ind mismatch on Ind comm ERR off Ind comm ERR on SD FAIL off SD FAIL on	-	Mask all off	-	Specify the mask function for alarm notification 1.
	I31: OUT MSK STS1	-	R	Main EEP dflt on PWM1 stop on PWM2 stop on Opt mismatch on Opt EEP FAIL on Opt A/D FAIL on Opt SPI FAIL on Ind bd FAIL on Ind EEP FAIL on LCD drv FAIL on Ind mismatch on Ind comm ERR on SD FAIL on	-	Ind bd FAIL on	-	Indicates the masked alarm for alarm notification 1.

No.	Name		Setting	Range		Default value	Unit	Description
	BRAIN communication	Display		BRAIN communication	Display			
9-7	I32: OUT MSK SET2	-	RW	Mask all off Mask all on Sig overflow off Sig overflow on Empty detect off Empty detect on H/L alm off H/L alm on Ins over lv4 off Ins over lv4 on Span cfg ERR off Span cfg ERR on AO1 4-20 lmt off AO1 4-20 lmt on AO1 mlt rng off AO1 mlt rng on AO H/L cfg off AO H/L cfg on Dens cfg ERR off Dens cfg ERR on Pls1 cfg ERR off Pls1 cfg ERR on Pls2 cfg ERR off Pls2 cfg ERR on Nom size cfg off Nom size cfg on Adh cfg ERR off Adh cfg ERR on Log not strt off Log not start on AO1 saturate off AO1 saturate on Pls1 saturat off Pls1 saturat on Pls2 saturat off Pls2 saturat on Cable miscon off Cable miscon on Coil insu off Coil insu on Trn mismatch off Trn mismatch on	-	Mask all off	-	Specify the mask function for alarm notification 2.
	I33: OUT MSK STS2	-	R	Sig overflow on Empty detect on H/L HH/LL alm on Adh over lv4 on Span cfg ERR on AO1 4-20 lmt on AO1 mlt rng on AO H/L cfg on Dens cfg ERR on Pls1 cfg ERR on Pls2 cfg ERR on Nomi size cfg on Adh cfg ERR on Log not start on AO1 saturate on Pls1 saturte on Pls2 saturte on Cable miscon on Coil insu on Trn mismatch on	-	H/L HH/LL alm on Adh over lv4 on AO1 saturate on Pls1 saturte on Pls2 saturte on Coil insu on	-	Indicates the masked alarm for alarm notification 2.

No.	Name		Setting	Range		Default value	Unit	Description
	BRAIN communication	Display		BRAIN communication	Display			
9-7	I34: OUT MSK SET3	-	RW	Mask all off Mask all on Adh over lv3 off Adh over lv3 on AZ warn off AZ warn on Verif warn off Verif warn on Sim active off Sim active on AO1 fix off AO1 fix on Pls1 fix off Pls1 fix on Pls2 fix off Pls2 fix on Restore run off Restore run on Disp over off Disp over on SD size wng off SD size wng on Bkup incmplt off Bkup incmplt on SD mismatch off SD mismatch on SD remov ERR off SD remov ERR on Watchdog off Watchdog on Power off off Power off on Inst PW Fail off Inst PW Fail on Prm bkup run off Prm bkup run on Data log run off Data log run on	-	Mask all off	-	Specify the mask function for alarm notification 3.
	I35: OUT MSK STS3	-	R	Adh over lv3 on AZ warn on Verif warn on Sim active on AO1 fix on Pls1 fix on Pls2 fix on Restore run on Disp over on SD size warn on Bkup incmplt on SD mismatch on SD remov ERR on Watchdog on Power off on Inst PW Fail on Prm bkup run on Data log run on	-	Adh over lv3 on AZ warn on Verif warn on Restore run on Disp over on SD size warn on Bkup incmplt on SD mismatch on SD remov ERR on Watchdog on Power off on Inst PW Fail on Prm bkup run on Data log run on	-	Indicates the masked alarm for alarm notification 3.
	-	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm out mask▶ Mask 1-1	RW	-	013: Main EEP dflt	All Off	-	Specify the mask function for alarm notification 1-1.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
9-7	-	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm out mask▶ Mask 1-2	RW	-	021: PWM 1 stop 022: PWM 2 stop 023: Opt bd mismatch 024: Opt bd EEP FAIL 025: Opt bd A/D FAIL 026: Opt bd SPI FAIL 028: Ind bd FAIL 029: Ind bd EEP FAIL 030: LCD drv FAIL 031: Ind bd mismatch 032: Ind comm ERR 033: microSD FAIL	028: Ind bd FAIL	-	Specify the mask function for alarm notification 1-2.
	-	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm out mask▶ Mask 2-1	RW	-	050: Signal overflow 051: Empty detect 052: H/L HH/LL alm 053: Adh over lv 4 060: Span cfg ERR 062: AO 1 4-20 lmt 064: AO 1 mlt rng 065: H/L cfg ERR 066: Density cfg ERR	052: H/L HH/ LL alm 053: Adh over lv 4	-	Specify the mask function for alarm notification 2-1.
	-	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm out mask▶ Mask 2-2	RW	-	067: Pls 1 cfg ERR 068: Pls 2 cfg ERR 069: Nomi size cfg 070: Adh cfg ERR 072: Log not start 080: AO 1 saturate 082: Pls 1 saturate 083: Pls 2 saturate 085: Cable miscon 086: Coil insulation 131: Trans mismatch	080: AO 1 saturate 082: Pls 1 saturate 083: Pls 2 saturate 086: Coil insulation	-	Specify the mask function for alarm notification 2-2.
	-	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm out mask▶ Mask 3-1	RW	-	087: Adhesion lv 3 092: AZ warn 093: Verif warn 095: Simulate active 096: AO 1 fix 098: Pls 1 fix 099: Pls 2 fix	087: Adhesion lv 3 093: Verif warn	-	Specify the mask function for alarm notification 3-1.
	-	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm out mask▶ Mask 3-2	RW		101: Param restore run 102: Disp over 103: SD size warn 104: Bkup incmplt 105: SD mismatch 106: SD removal ERR 120: Watchdog 121: Power off 122: Inst power FAIL 123: Param bkup run 124: Data log run	101: Param restore run 102: Disp over 103: SD size warn 104: Bkup incmplt 105: SD mismatch 106: SD removal ERR 120: Watchdog 121: Power off 122: Inst power FAIL 123: Param bkup run 124: Data log run	-	Specify the mask function for alarm notification 3-2.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
9-8	I40: REC MSK SET1	-	RW	Mask all off Mask all on Main EEP dflt off Main EEP dflt on Exciter FAIL off Exciter FAIL on PWM1 stop off PWM1 stop on PWM2 stop off PWM2 stop on Opt mismatch off Opt mismatch on Opt EEP FAIL off Opt EEP FAIL on Opt A/D FAIL off Opt A/D FAIL on Opt SPI FAIL off Opt SPI FAIL on Ind bd FAIL off Ind bd FAIL on Ind EEP FAIL off Ind EEP FAIL on LCD drv FAIL off LCD drv FAIL on Ind mismatch off Ind mismatch on Ind comm ERR off Ind comm ERR on SD FAIL off SD FAIL on	-	Mask all off	-	Specify the mask function for alarm history 1.
	I41: REC MSK STS1	-	R	Main EEP dflt on Exciter FAIL on PWM1 stop on PWM2 stop on Opt mismatch on Opt EEP FAIL on Opt A/D FAIL on Opt SPI FAIL on Ind bd FAIL on Ind EEP FAIL on LCD drv FAIL on Ind mismatch on Ind comm ERR on SD FAIL on	-	-	-	Indicates the masked alarm for alarm history 1.
	I42: REC MSK SET2	-	RW	Mask all off Mask all on Sig overflow off Sig overflow on Empty detect off Empty detect on H/L alm off H/L alm on Adh over lv4 off Adh over lv4 on Cable miscon off Cable miscon on	-	Mask all off	-	Specify the mask function for alarm history 2.
	I43: REC MSK STS2	-	R	Main EEP dflt on Exciter FAIL on PWM1 stop on PWM2 stop on Opt mismatch on Opt EEP FAIL on Opt A/D FAIL on Opt SPI FAIL on Ind bd FAIL on Ind EEP FAIL on LCD drv FAIL on Ind mismatch on Ind comm ERR on SD FAIL on	-	-	-	Indicates the masked alarm for alarm history 2.
	-	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm record mask▶ Mask 1-1	RW	-	013: Main EEP dflt 020: Exciter FAIL	All Off	-	Specify the mask function for alarm history 1-1.

No.	Name — BRAIN communication	Name — Display	Setting	Range — BRAIN communication	Range — Display	Default value	Unit	Description
9-8	-	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm record mask▶ Mask 1-2	RW	-	021: PWM 1 stop 022: PWM 2 stop 023: Opt bd mismatch 024: Opt bd EEP FAIL 025: Opt bd A/D FAIL 026: Opt bd SPI FAIL 028: Ind bd FAIL 029: Ind bd EEP FAIL 030: LCD drv FAIL 031: Ind bd mismatch 032: Ind comm ERR 033: microSD FAIL	All Space	-	Specify the mask function for alarm history 1-2.
	-	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm record mask▶ Mask 2-1	RW	-	050: Signal overflow 051: Empty detect 052: H/L HH/LL alm 053: Adh over lv 4	All Space	-	Specify the mask function for alarm history 2-1.
	-	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm record mask▶ Mask 2-2	RW		085: Cable miscon	All Space	-	Specify the mask function for alarm history 2-2.
9-9	I50: ALM RECORD1	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm record▶ Record alarm 1	R	All Space 10: Main CPU FAIL 11: Rev cal FAIL 12: Main EEP FAIL 13: Main EEP dflt 14: Snsr bd FAIL 15: Snsr comm ERR 16: A/D1 FAIL 17: A/D2 FAIL 18: Coil open 19: Coil short 20: Exciter FAIL 21-22: PWM stop 23: Opt mismatch 24: Opt EEP FAIL 25: Opt A/D FAIL 26: Opt SPI FAIL 27: Restore FAIL 28-32: Indct FAIL 33: microSD FAIL 50: Sig overflow 51: Empty detect 52: H/L HH/LL alm 53: Adh over lv4 85: Cable miscon	All space 010: Main CPU FAIL 011: Rev calc FAIL 012: Main EEP FAIL 013: Main EEP dflt 014: Snsr bd FAIL 015: Snsr comm ERR 016: AD 1 FAIL[Sig] 017: AD 2 FAIL[Excit] 018: Coil open 019: Coil short 020: Exciter FAIL 021: PWM 1 stop 022: PWM 2 stop 023: Opt bd mismatch 024: Opt bd EEP FAIL 025: Opt bd A/D FAIL 026: Opt bd SPI FAIL 027: Restore FAIL 028: Ind bd FAIL 029: Ind bd EEP FAIL 030: LCD drv FAIL 031: Ind bd mismatch 032: Ind comm ERR 033: microSD FAIL 050: Signal overflow 051: Empty detect 052: H/L HH/LL alm 053: Adh over lv 4 085: Cable miscon	All Space	-	Indicates the name of new alarm 1.
9-10	I51: ALM TIME1	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm record▶ Record time 1	R	00000D 00: 00 to 99999D 23: 59	00000D 00: 00 to 99999D 23: 59	00000D 00: 00	-	Indicates the operating time at which new alarm 1 has occurred.

No.	Name		Setting	Range		Default value	Unit	Description
	BRAIN communication	Display		BRAIN communication	Display			
9-11	I52: ALM RECORD2	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm record▶ Record alarm 2	R	All Space 10: Main CPU FAIL 11: Rev cal FAIL 12: Main EEP FAIL 13: Main EEP dflt 14: Snsr bd FAIL 15: Snsr comm ERR 16: A/D1 FAIL 17: A/D2 FAIL 18: Coil open 19: Coil short 20: Exciter FAIL 21-22: PWM stop 23: Opt mismatch 24: Opt EEP FAIL 25: Opt A/D FAIL 26: Opt SPI FAIL 27: Restore FAIL 28-32: Indct FAIL 33: microSD FAIL 50: Sig overflow 51: Empty detect 52: H/L HH/LL alm 53: Adh over lv4 85: Cable miscon	All space 010: Main CPU FAIL 011: Rev calc FAIL 012: Main EEP FAIL 013: Main EEP dflt 014: Snsr bd FAIL 015: Snsr comm ERR 016: AD 1 FAIL[Sig] 017: AD 2 FAIL[Excit] 018: Coil open 019: Coil short 020: Exciter FAIL 021: PWM 1 stop 022: PWM 2 stop 023: Opt bd mismatch 024: Opt bd EEP FAIL 025: Opt bd A/D FAIL 026: Opt bd SPI FAIL 027: Restore FAIL 028: Ind bd FAIL 029: Ind bd EEP FAIL 030: LCD drv FAIL 031: Ind bd mismatch 032: Ind comm ERR 033: microSD FAIL 050: Signal overflow 051: Empty detect 052: H/L HH/LL alm 053: Adh over lv 4 085: Cable miscon	All Space	-	Indicates the name of new alarm 2.
9-12	I53: ALM TIME2	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm record▶ Record time 2	R	00000D 00: 00 to 99999D 23: 59	00000D 00: 00 to 99999D 23: 59	00000D 00: 00	-	Indicates the operating time at which new alarm 2 has occurred.
9-13	I54: ALM RECORD3	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm record▶ Record alarm 3	R	All Space 10: Main CPU FAIL 11: Rev cal FAIL 12: Main EEP FAIL 13: Main EEP dflt 14: Snsr bd FAIL 15: Snsr comm ERR 16: A/D1 FAIL 17: A/D2 FAIL 18: Coil open 19: Coil short 20: Exciter FAIL 21-22: PWM stop 23: Opt mismatch 24: Opt EEP FAIL 25: Opt A/D FAIL 26: Opt SPI FAIL 27: Restore FAIL 28-32: Indct FAIL 33: microSD FAIL 50: Sig overflow 51: Empty detect 52: H/L HH/LL alm 53: Adh over lv4 85: Cable miscon	All space 010: Main CPU FAIL 011: Rev calc FAIL 012: Main EEP FAIL 013: Main EEP dflt 014: Snsr bd FAIL 015: Snsr comm ERR 016: AD 1 FAIL[Sig] 017: AD 2 FAIL[Excit] 018: Coil open 019: Coil short 020: Exciter FAIL 021: PWM 1 stop 022: PWM 2 stop 023: Opt bd mismatch 024: Opt bd EEP FAIL 025: Opt bd A/D FAIL 026: Opt bd SPI FAIL 027: Restore FAIL 028: Ind bd FAIL 029: Ind bd EEP FAIL 030: LCD drv FAIL 031: Ind bd mismatch 032: Ind comm ERR 033: microSD FAIL 050: Signal overflow 051: Empty detect 052: H/L HH/LL alm 053: Adh over lv 4 085: Cable miscon	All Space	-	Indicates the name of new alarm 3.
9-14	I55: ALM TIME3	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm record▶ Record time 3	R	00000D 00: 00 to 99999D 23: 59	00000D 00: 00 to 99999D 23: 59	00000D 00: 00	-	Indicates the operating time at which new alarm 3 has occurred.

No.	Name		Setting	Range		Default value	Unit	Description
	BRAIN communication	**Display**		**BRAIN communication**	**Display**			
9-15	I56: ALM RECORD4	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm record▶ Record alarm 4	R	All Space 10: Main CPU FAIL 11: Rev cal FAIL 12: Main EEP FAIL 13: Main EEP dflt 14: Snsr bd FAIL 15: Snsr comm ERR 16: A/D1 FAIL 17: A/D2 FAIL 18: Coil open 19: Coil short 20: Exciter FAIL 21-22: PWM stop 23: Opt mismatch 24: Opt EEP FAIL 25: Opt A/D FAIL 26: Opt SPI FAIL 27: Restore FAIL 28-32: Indct FAIL 33: microSD FAIL 50: Sig overflow 51: Empty detect 52: H/L HH/LL alm 53: Adh over lv4 85: Cable miscon	All space 010: Main CPU FAIL 011: Rev calc FAIL 012: Main EEP FAIL 013: Main EEP dflt 014: Snsr bd FAIL 015: Snsr comm ERR 016: AD 1 FAIL[Sig] 017: AD 2 FAIL[Excit] 018: Coil open 019: Coil short 020: Exciter FAIL 021: PWM 1 stop 022: PWM 2 stop 023: Opt bd mismatch 024: Opt bd EEP FAIL 025: Opt bd A/D FAIL 026: Opt bd SPI FAIL 027: Restore FAIL 028: Ind bd FAIL 029: Ind bd EEP FAIL 030: LCD drv FAIL 031: Ind bd mismatch 032: Ind comm ERR 033: microSD FAIL 050: Signal overflow 051: Empty detect 052: H/L HH/LL alm 053: Adh over lv 4 085: Cable miscon	All Space	-	Indicates the name of new alarm 4.
9-16	I57: ALM TIME4	Device setup▶ Diag/Service▶ Sts/Self test▶ Alarm▶ Alarm record▶ Record time 4	R	00000D 00: 00 to 99999D 23: 59	00000D 00: 00 to 99999D 23: 59	00000D 00: 00	-	Indicates the operating time at which new alarm 4 has occurred.
9-17	I60: SELF CHECK	-	R	GOOD ERROR	-	-	-	Indicates the result of the self-diagnostic function.

(10)Display configuration parameters (J: DISPLAY SET)

This list shows the parameters related to display settings.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
10-1	J10: LINE1 SEL	Device setup▶ Detailed setup▶ Display set▶ Line select▶ Line 1	RW	Flow rate(%) PV Velocity Volume flow Mass flow Flow rate(%Bar) Totalizer1 Totalizer2 Totalizer3 Tag number Commun protocol Adhesion Analog out1	Flow rate(%) PV Velocity Volume flow Mass flow Flow rate(%Bar) Totalizer1 Totalizer2 Totalizer3 Tag number Commun protocol Adhesion Analog out1	PV	-	Specify item 1 to be shown on the display. Synchronized with No. 2-11.
10-2	J11: LINE2 SEL	Device setup▶ Detailed setup▶ Display set▶ Line select▶ Line 2	RW	None Flow rate(%) PV Velocity	None Flow rate(%) PV Velocity	Flow rate(%)	-	Specify item 2 to be shown on the display. Synchronized with No. 2-12.
10-3	J12: LINE3 SEL	Device setup▶ Detailed setup▶ Display set▶ Line select▶ Line 3	RW	Volume flow Mass flow Flow rate(%Bar)	Volume flow Mass flow Flow rate(%Bar)	Analog out1	-	Specify item 3 to be shown on the display. Synchronized with No. 2-13.
10-4	J13: LINE4 SEL	Device setup▶ Detailed setup▶ Display set▶ Line select▶ Line 4	RW	Totalizer1 Totalizer2 Totalizer3 Tag number	Totalizer1 Totalizer2 Totalizer3 Tag number	None	-	Specify item 4 to be shown on the display.
10-5	J14: LINE5 SEL	Device setup▶ Detailed setup▶ Display set▶ Line select▶ Line 5	RW	Commun protocol Adhesion Analog out1	Commun protocol Adhesion Analog out1	None	-	Specify item 5 to be shown on the display.
10-6	J15: LINE6 SEL	Device setup▶ Detailed setup▶ Display set▶ Line select▶ Line 6	RW			None	-	Specify item 6 to be shown on the display.
10-7	J16: LINE7 SEL	Device setup▶ Detailed setup▶ Display set▶ Line select▶ Line 7	RW			None	-	Specify item 7 to be shown on the display.
10-8	J17: LINE8 SEL	Device setup▶ Detailed setup▶ Display set▶ Line select▶ Line 8	RW			None	-	Specify item 8 to be shown on the display.
10-9	J20: FORMAT FR	Device setup▶ Detailed setup▶ Display set▶ Disp format▶ Format PV	RW	Auto 0 digit 1 digit 2 digit 3 digit 4 digit 5 digit	Auto 0 digit 1 digit 2 digit 3 digit 4 digit 5 digit	Auto	-	Specify the number of decimal places. Auto: Automatically adjusts the number of decimal places. 0 digit: Fixes the number of decimal places to "0". 1 digit: Fixes the number of decimal places to "1". 2 digit: Fixes the number of decimal places to "2". 3 digit: Fixes the number of decimal places to "3". 4 digit: Fixes the number of decimal places to "4". 5 digit: Fixes the number of decimal places to "5".
10-10	J21: FORMAT TOT1	Device setup▶ Detailed setup▶ Display set▶ Disp format▶ Format total 1	RW	Auto 0 digit 1 digit 2 digit	Auto 0 digit 1 digit 2 digit	Auto	-	Specify the decimal-point position of the totalized value. Auto: Automatically adjusts the number of decimal places. 0 digit: Fixes the number of decimal places to "0". 1 digit: Fixes the number of decimal places to "1". 2 digit: Fixes the number of decimal places to "2". 3 digit: Fixes the number of decimal places to "3". 4 digit: Fixes the number of decimal places to "4". 5 digit: Fixes the number of decimal places to "5". 6 digit: Fixes the number of decimal places to "6". 7 digit: Fixes the number of decimal places to "7".
10-11	J22: FORMAT TOT2	Device setup▶ Detailed setup▶ Display set▶ Disp format▶ Format total 2	RW	3 digit 4 digit 5 digit 6 digit	3 digit 4 digit 5 digit 6 digit			
10-12	J23: FORMAT TOT3	Device setup▶ Detailed setup▶ Display set▶ Disp format▶ Format total 3	RW	7 digit	7 digit			
10-13	J24: DISP CONTR	Device setup▶ Detailedsetup▶ Displayset▶ Optional config▶ Contrast	RW	-5 -4 -3 -2 -1 0 1 2 3 4 5	-5 -4 -3 -2 -1 0 1 2 3 4 5	0	-	Specify the contrast of the display. -: Light, +: Dark

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.
(**): When Main soft rev (K50:MAIN B REV / Main soft rev) is R1.01.07 or earlier, the default value is Manual.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
10-14	J25: DISP LINE	Device setup▶ Detailedsetup▶ Displayset▶ Optional config▶ Line mode	RW	1 Line(Big) 1 Line 2 Line 3 Line 4 Line	1 Line(Big) 1 Line 2 Line 3 Line 4 Line	3 Line	-	Specify the number of lines to be shown on the display. 1 Line(Big): 1-line display without unit. The numeric value is displayed in large text. 1 Line: 1-line display with unit 2 Line: 2-line display with unit 3 Line: 3-line display with unit 4 Line: 4-line display with unit
10-15	J26: DISP PERIOD	Device setup▶ Detailedsetup▶ Displayset▶ Optional config▶ Period	RW	0.2 s 0.4 s 1.0 s 2.0 s 4.0 s 8.0 s	0.2 s 0.4 s 1.0 s 2.0 s 4.0 s 8.0 s	0.4 s	-	Specify the process value update period for the display.
10-16	J27: DISP NE107	Device setup▶ Detailed setup▶ Displayset▶ Optionalconfig▶ NE107 display	RW	Normal NE107	Normal NE107	Normal	-	Specify whether to show or hide an alarm based on NAMUR NE107. Normal: Normal alarm display NE107: Alarm display based on NAMUR NE107
10-17	J28: DISP ALARM	Device setup▶ Detailed setup▶ Displayset▶ Optionalconfig▶ Alarm display	RW	Normal Detail	Normal Detail	Normal	-	Specify the alarm display format. Normal: Normal alarm display (Process value and alarm name) Detail: Detailed alarm display (Alarm name and action)
10-18	J29: DISP SCROLL	Device setup▶ Detailed setup▶ Displayset▶ Optionalconfig▶ Scroll mode	RW	Off Manual Auto(2 s) Auto(4 s) Auto(8 s)	Off Manual Auto(2 s) Auto(4 s) Auto(8 s)	Off (**)	-	Specify the display scroll method. Off: Does not scroll. Manual: Scroll by infrared switch Auto(2 s): Automatic scroll (2-second cycle) Auto(4 s): Automatic scroll (4-second cycle) Auto(8 s): Automatic scroll (8-second cycle)
10-19	J30: DISP DAMPING	Device setup▶ Detailedsetup▶ Displayset▶ Optional config▶ Damp	RW	0.0 to 200.0 Number of decimal places: 1	0.0 to 200.0 Number of decimal places: 1	0.0	s	Specify the damping time constant of the display.
10-20	J31: FORMAT DATE	Device setup▶ Detailed setup▶ Displayset▶ Optionalconfig▶ Format date	RW	MM/DD/YYYY DD/MM/YYYY YYYY/MM/DD	MM/DD/YYYY DD/MM/YYYY YYYY/MM/DD	MM/DD/YYYY	-	Specify the date display format. YYYY: Year, MM: Month, DD: Day
10-21	J32: LANGUAGE	Device setup▶ Language	RW	English French German Italian Spanish Portuguese Russian Chinese Japanese	English French German Italian Spanish Portuguese Russian Chinese Japanese	English	-	Specify the language to be used on the display. Synchronized with No. 2-1.
10-22	J40: DISP MODE	Device setup▶ Detailed setup▶ Displayset▶ Optionalconfig▶ Display mode	RW	Normal Trend	Normal Trend	Normal	-	Specify whether to execute the trend graph display function. Normal: Normal display (Displays no trend graph.) Trend: Displays a trend graph.
10-23	J41: OFFTREND LRV	Device setup▶ Detailed setup▶ Displayset▶ Optionalconfig▶ Trend offln LRV	RW	-32000.0 to +32000.0 Number of decimal places: 1 to 5	-999999 to +999999 Number of decimal places: 0 to 5	0.0	-	Specify the low limit value to display a trend graph.
10-24	J42: OFFTREND URV	Device setup▶ Detailed setup▶ Displayset▶ Optionalconfig▶ Trend offln URV	RW	-32000.0 to +32000.0 Number of decimal places: 1 to 5	-999999 to +999999 Number of decimal places: 0 to 5	10.0	-	Specify the high limit value to display a trend graph.
10-25	J43: TREND1 SEL	Device setup▶ Detailed setup▶ Display set▶ Trend select▶ Trend 1	RW	Flow rate(%) PV Velocity Volume flow Mass flow Analog out1 Totalizer1 Totalizer2 Totalizer3	Flow rate(%) PV Velocity Volume flow Mass flow Analog out1 Totalizer1 Totalizer2 Totalizer3	PV	-	Specify item 1 to be shown in a trend graph.
10-26	J44: TREND2 SEL	Device setup▶ Detailed setup▶ Display set▶ Trend select▶ Trend 2	RW	None Flow rate(%) PV Velocity	None Flow rate(%) PV Velocity	None	-	Specify item 2 to be shown in a trend graph.
10-27	J45: TREND3 SEL	Device setup▶ Detailed setup▶ Display set▶ Trend select▶ Trend 3	RW	Volume flow Mass flow Analog out1 Totalizer1	Volume flow Mass flow Analog out1 Totalizer1	None	-	Specify item 3 to be shown in a trend graph.
10-28	J46: TREND4 SEL	Device setup▶ Detailed setup▶ Display set▶ Trend select▶ Trend 4	RW	Totalizer2 Totalizer3	Totalizer2 Totalizer3	None	-	Specify item 4 to be shown in a trend graph.

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.
(**): When Main soft rev (K50:MAIN B REV / Main soft rev) is R1.01.07 or earlier, the default value is Manual.

No.	Name		Setting	Range		Default value	Unit	Description
	BRAIN communication	**Display**		**BRAIN communication**	**Display**			
10-29	J47: DISP INVERSE	Device setup▶ Detailedsetup▶ Displayset▶ Optional config▶ Inversion	RW	Normal Invert	Normal Invert	Normal	-	Specify whether to execute the black/white inverse function of the display. Normal: Normal display (Character color: Black, Background color: White) Invert: Black/white inverse display (Character color: White, Background color: Black)
10-30	J50: LCD TEST	Devicesetup▶ Diag/Service▶ Disp indicator▶ LCD test	RW	Not execute Execute Show Pattern1 Show Pattern2 Show Pattern3 Show Pattern4	Not execute Execute Show Pattern1 Show Pattern2 Show Pattern3 Show Pattern4	Not execute	-	Specify the test display function of the display. Not execute: No test display Execute: Test display (All LED ON -> All LED OFF -> Hound's tooth check -> Hound's tooth check (inversion) Show Pattern1: Test display (All LED ON) Show Pattern2: Test display (All LED OFF) Show Pattern3: Test display (Hound's tooth check) Show Pattern4: Test display (Hound's tooth check (inversion))
10-31	J51: DISP SQUAWK	Devicesetup▶ Diag/Service▶ Disp indicator▶ Squawk	RW	Off On Squawk once	Off On Squawk once	Off	-	Specify whether to execute the display squawk function (backlight squawk on the display). Off: Disables the squawk display. On: Enables the squawk display (Continuous) Squawk once: Enables the squawk display (once only).
10-32	J52: LANG PACKAGE	Device setup▶ Detailed setup▶ Displayset▶ Optionalconfig▶ Language package	R	Pack 1 Pack 2	Pack 1 Pack 2	- (*)	-	Indicates the language package.
10-33	J53: DISP INSTALL	Device setup▶ Detailed setup▶ Device info▶ Order info▶ Disp install	RW	No disp With disp	No disp With disp	With disp (*)	-	Specify whether the display is provided or not.
10-34	J60: SELF CHECK	-	R	GOOD ERROR	-	-	-	Indicates the result of the self-diagnostic function.

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.
(**): When Main soft rev (K50:MAIN B REV / Main soft rev) is R1.01.07 or earlier, the default value is Manual.

(11) Device information configuration parameters (K: DEVICE INFO)

This list shows the parameters related to device information settings.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
11-1	K01: TAG NO	Device setup► Detailed setup► Device info► Order info► Tag No	RW	ASCII 16 characters	ASCII 8 characters	All Space (*)	-	Specify the tag number.
11-2	K02: OPERATE TIME	Device setup► Detailed setup► Device info► Date/Time► Operation time	R	00000D 00: 00 to 99999D 23: 59	00000D 00: 00 to 99999D 23: 59	00000D 00: 00	-	Indicates the operating time of the device.
11-3	K03: CUR DATE	Device setup► Detailed setup► Device info► Date/Time► Current date	R	1900/01/01 to 2155/12/31	1900/01/01 to 2155/12/31	1900/01/01	-	Indicates the current date (month, day, and year).
11-4	K04: CUR TIME	Device setup► Detailed setup► Device info► Date/Time► Current time	R	00: 00: 00 to 23: 59: 59	00: 00: 00 to 23: 59: 59	00: 00: 00	-	Indicates the current time (hour, minute, and second).
11-5	K05: SET CUR DAY	-	RW	01 to 31	01 to 31	01	-	Specify the current date (day).
	K06: SETCUR MONTH	-	RW	01 to 12	01 to 12	01	-	Specify the current date (month).
	K07: SET CUR YEAR	-	RW	2016 to 2155	2016 to 2155	2016	-	Specify the current date (year).
	K08: SET CUR HR	-	RW	00 to 23	00 to 23	00	-	Specify the current time (hour).
	K09: SET CUR MIN	-	RW	00 to 59	00 to 59	00	-	Specify the current time (minute).
	K10: SET CUR SEC	-	RW	00 to 59	00 to 59	00	-	Specify the current time (second).
	-	Device setup► Detailed setup► Device info► Date/Time► Set date	RW	01/01/1900 to 12/31/2155	01/01/1900 to 12/31/2155	01/01/1900	-	Specify the current date (month, day, and year).
	-	Device setup► Detailed setup► Device info► Date/Time► Set time	RW	00: 00: 00 to 23: 59: 59	00: 00: 00 to 23: 59: 59	00: 00: 00	-	Specify the current time (hour, minute, and second).
11-6	K11: TRNS TYPE	Device setup► Detailed setup► Device info► Ver/Num info► Transmitter type	R	Non 4A Type	Non 4A Type	-	-	Indicates the types of transmitters to be combined.
11-7	K12: OPT BOARD ID	Device setup► Detailed setup► Device info► Ver/Num info► Option board ID	R	Non Multi	Non Multi	-	-	Indicates the type of the option board.
11-8	K15: EL SIZE	Device setup► Detailed setup► Device info► Order info► Electrode size	RW	1 mm 3 mm 8 mm 10 mm	1 mm 3 mm 8 mm 10 mm	3 mm	-	Specify the electrode size.
11-9	K20: MODEL CODE	Device setup► Detailed setup► Device info► Order info► MS code► Model code	RW	ASCII 16 characters	ASCII 16 characters	All Space (*)	-	Specify the model name.
11-10	K21: SUFFIX CONF1	Device setup► Detailed setup► Device info► Order info► MS code► Suffix config 1	RW	ASCII 16 characters	ASCII 16 characters	All Space (*)	-	Specify suffix code 1.
	K22: SUFFIX CONF2	Device setup► Detailed setup► Device info► Order info► MS code► Suffix config 2	RW	ASCII 16 characters	ASCII 16 characters	All Space (*)	-	Specify suffix code 2.
11-11	K23: OPTION1	Device setup► Detailed setup► Device info► Order info► MS code► Option 1	RW	ASCII 16 characters	ASCII 16 characters	All Space (*)	-	Specify optional code 1.
	K24: OPTION2	Device setup► Detailed setup► Device info► Order info► MS code► Option 2	RW	ASCII 16 characters	ASCII 16 characters	All Space (*)	-	Specify optional code 2.
	K25: OPTION3	Device setup► Detailed setup► Device info► Order info► MS code► Option 3	RW	ASCII 16 characters	ASCII 16 characters	All Space (*)	-	Specify optional code 3.
	K26: OPTION4	Device setup► Detailed setup► Device info► Order info► MS code► Option 4	RW	ASCII 16 characters	ASCII 16 characters	All Space (*)	-	Specify optional code 4.
11-12	K27: RS MDL CD	Device setup► Detailed setup► Device info► Order info► RS MS code► Model code	RW	ASCII 16 characters	ASCII 16 characters	All Space (*)	-	Specify the model name.

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.
(**): Set at the factory before shipment.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
11-13	K28: RS SUF CONF1	Device setup▶ Detailed setup▶ Device info▶ Order info▶ RS MS code▶ Suffix config 1	RW	ASCII 16 characters	ASCII 16 characters	All Space (*)	-	Specify suffix code 1.
	K29: RS SUF CONF2	Device setup▶ Detailed setup▶ Device info▶ Order info▶ RS MS code▶ Suffix config 2	RW	ASCII 16 characters	ASCII 16 characters	All Space (*)	-	Specify suffix code 2.
11-14	K30: RS OPT1	Device setup▶ Detailed setup▶ Device info▶ Order info▶ RS MS code▶ Option 1	RW	ASCII 16 characters	ASCII 16 characters	All Space (*)	-	Specify optional code 1.
	K31: RS OPT2	Device setup▶ Detailed setup▶ Device info▶ Order info▶ RS MS code▶ Option 2	RW	ASCII 16 characters	ASCII 16 characters	All Space (*)	-	Specify optional code 2.
	K32: RS OPT3	Device setup▶ Detailed setup▶ Device info▶ Order info▶ RS MS code▶ Option 3	RW	ASCII 16 characters	ASCII 16 characters	All Space (*)	-	Specify optional code 3.
	K33: RS OPT4	Device setup▶ Detailed setup▶ Device info▶ Order info▶ RS MS code▶ Option 4	RW	ASCII 16 characters	ASCII 16 characters	All Space (*)	-	Specify optional code 4.
11-15	K34: TRNS SR NO	Device setup▶ Detailed setup▶ Device info▶ Ver/Num info▶ Trans serial No	RW	ASCII 16 characters	ASCII 16 characters	All Space	-	Specify the transmitter's serial number.
11-16	K35: FT SR NO	Device setup▶ Detailed setup▶ Device info▶ Ver/Num info▶ Sensor serial No	RW	ASCII 16 characters	ASCII 16 characters	All Space	-	Specify the sensor's serial number.
11-17	K40: MEMO1	Device setup▶ Detailed setup▶ Device info▶ Memo▶ Memo 1	RW	ASCII 16 characters	ASCII 16 characters	All Space	-	Specify memo 1.
	K41: MEMO2	Device setup▶ Detailed setup▶ Device info▶ Memo▶ Memo 2	RW	ASCII 16 characters	ASCII 16 characters	All Space	-	Specify memo 2.
	K42: MEMO3	Device setup▶ Detailed setup▶ Device info▶ Memo▶ Memo 3	RW	ASCII 16 characters	ASCII 16 characters	All Space	-	Specify memo 3.
11-18	K50: MAIN B REV	Device setup▶ Detailed setup▶ Device info▶ Ver/Num info▶ Main soft rev	R	R1.01.01(**)	R1.01.01(**)	-	-	Indicates the firmware revision of the main board.
11-19	K51: SENSOR B REV	Device setup▶ Detailed setup▶ Device info▶ Ver/Num info▶ Snsr soft rev	R	R1.01.01(**)	R1.01.01(**)	-	-	Indicates the firmware revision of the sensor board.
11-20	K52: IND B REV	Device setup▶ Detailed setup▶ Device info▶ Ver/Num info▶ Ind soft rev	R	R1.01.01(**)	R1.01.01(**)	-	-	Indicates the firmware revision of the display board.
11-21	SELF CHECK	-	R	GOOD ERROR	-	-	-	Indicates the result of the self-diagnostic function.

(*): Determined based on the information about specified items at the time of ordering and the sensor to be combined with.
(**): Set at the factory before shipment.

(12) Diagnosis function configuration parameters (L: DIAGNOSIS)

This list shows the parameters related to the electrode adhesion detection, and verification function settings.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
12-1	L10: ADHESION CHK	Device setup▶ Diag/Service▶ Diagnosis▶ Adhesion▶ Function	RW	Disable Enable	Disable Enable	Enable	-	Specify whether to enable or disable the electrode adhesion detecting function.
12-2	L11: ADH LEVEL1	Device setup▶ Diag/Service▶ Diagnosis▶ Adhesion▶ Threshold level 1	RW	0.00 to +100.00 Number of decimal places: 2	0.00 to +100.00 Number of decimal places: 2	0.10	M ohm	Specify the level 1 value used to judge the electrode adhesion detection.
12-3	L12: ADH LEVEL2	Device setup▶ Diag/Service▶ Diagnosis▶ Adhesion▶ Threshold level 2	RW	0.00 to +100.00 Number of decimal places: 2	0.00 to +100.00 Number of decimal places: 2	0.50	M ohm	Specify the level 2 value used to judge the electrode adhesion detection.
12-4	L13: ADH LEVEL3	Device setup▶ Diag/Service▶ Diagnosis▶ Adhesion▶ Threshold level 3	RW	0.00 to +100.00 Number of decimal places: 2	0.00 to +100.00 Number of decimal places: 2	4.00	M ohm	Specify the level 3 value used to judge the electrode adhesion detection.
12-5	L14: ADH LEVEL4	Device setup▶ Diag/Service▶ Diagnosis▶ Adhesion▶ Threshold level 4	RW	0.00 to +100.00 Number of decimal places: 2	0.00 to +100.00 Number of decimal places: 2	12.00	M ohm	Specify the level 4 value used to judge the electrode adhesion detection.
12-6	L16: ADH MEAS VAL	Device setup▶ Diag/Service▶ Diagnosis▶ Adhesion▶ Result▶ Value	R	0.00000 to +1000.0 Number of decimal places: 0 to 5	0.00000 to +1000.0 Number of decimal places: 0 to 5	-	M ohm	Indicates the resistance value used to judge the electrode adhesion detection.
12-7	L17: ADH STATUS	Device setup▶ Diag/Service▶ Diagnosis▶ Adhesion▶ Result▶ Status	R	Level0 Level1 Level2 Level3 Level4	Level0 Level1 Level2 Level3 Level4	-	-	Indicates the electrode adhesion detection level.
12-8	L18: ADH CHK CYC	Device setup▶ Diag/Service▶ Diagnosis▶ Adhesion▶ Check cycle	RW	0.5 min 1 min 2 min 10 min	0.5 min 1 min 2 min 10 min	2 min	-	Specify the update cycle for electrode adhesion detection.
12-21	L33: DIAG EXE	Device setup▶ Diag/Service▶ Diagnosis▶ Diagnostic execute	RW	Not execute Conn chk exe	Not execute Conn chk exe	Not execute	-	Specify whether to execute the misconnection detecting function. Not execute: Does not execute the functions. Conn chk exe: Executes the misconnection detecting function.
12-22	L37: COIL INS TH	Device setup▶ Diag/Service▶ Diagnosis▶ Coil insul threshold	RW	0.0 to 100.0 Number of decimal places: 1	0.0 to 100.0 Number of decimal places: 1	25.0	%	Specify the value used to judge the deterioration of coil insulation.
12-23	L38: IEX COMP	Device setup▶ Diag/Service▶ Diagnosis▶ IEX compare	R	0.0 to 999.9 Number of decimal places: 1	0.0 to 999.9 Number of decimal places: 1	260.0	mA	Indicates the reference excitation current value used to judge the deterioration of coil insulation.
12-25	L41: IEX COIL R	Device setup▶ Diag/Service▶ Diagnosis▶ IEX resistance	R	0 to +9999.9 Number of decimal places: 1	0 to +9999.9 Number of decimal places: 1	-	ohm	Indicates the coil resistance value when the excitation current is applied.
12-26	L42: ELEC VOL A	Device setup▶ Diag/Service▶ Diagnosis▶ Empty check▶ Electrode voltage A	R	-3.00 to 3.00 Number of decimal places: 2	-3.00 to 3.00 Number of decimal places: 2	-	V	Indicates the voltage between electrode A and electrode C.
12-27	L43: ELEC VOL B	Device setup▶ Diag/Service▶ Diagnosis▶ Empty check▶ Electrode voltage B	R	-3.00 to +3.00 Number of decimal places: 2	-3.00 to +3.00 Number of decimal places: 2	-	V	Indicates the voltage between electrode B and electrode C.
12-28	L44: EMPTY STS	Device setup▶ Diag/Service▶ Diagnosis▶ Empty check▶ Empty status	R	Full Empty	Full Empty	-	-	Indicates the result of the sensor empty pipe state function.
12-29	L49: DIAG OUTPUT	Device setup▶ Diag/Service▶ Diagnosis▶ Diagnostic output	RW	Zero Measured value Hold	Zero Measured value Hold	Zero	-	Specify the output to use the verification function.
12-30	L50: VF MODE	Device setup▶ Diag/Service▶ Verification▶ Mode	RW	No flow Flow	No flow Flow	No flow	-	Specify the fluid status to which the verification function is to be applied. No flow: No fluid flows. Flow: Fluid flows.
12-31	L51: VF EXE	Device setup▶ Diag/Service▶ Verification▶ Execute	RW	Not execute Execute	Not execute Execute	Not execute	-	Specify whether to execute the verification function.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
12-32	L52: VF NO	Device setup▶ Diag/Service▶ Verification▶ VF No	RW	Factory Previous Present	Factory Previous Present	Factory	-	Specify the timing to display the diagnosis result of the verification function.
12-33	L53: VF CHK RES	Device setup▶ Diag/Service▶ Verification▶ Result▶ Failed/Passed	R	Passed Failed Canceled No Data Unknown	Passed Failed Canceled No Data Unknown	No Data	-	Indicates the result of executing the verification function.
12-34	L54: VF OPE TIME	Device setup▶ Diag/Service▶ Verification▶ Result▶ VF operate time	R	00000D 00: 00 to 99999D 23: 59	00000D 00: 00 to 99999D 23: 59	00000D 00: 00	-	Indicates the operating time of the verification function.
12-35	L55: VF MAG RES	Device setup▶ Diag/Service▶ Verification▶ Result▶ Magnetic circuit	R	Passed Failed Canceled No Data Unknown	Passed Failed Canceled No Data Unknown	No Data	-	Indicates the result of executing the verification function (the diagnosis result of the magnetic circuit).
12-36	L56: VF EXCIT RES	Device setup▶ Diag/Service▶ Verification▶ Result▶ Excite circuit	R	Passed Failed Canceled No Data Unknown	Passed Failed Canceled No Data Unknown	No Data	-	Indicates the result of executing the verification function (the diagnosis result of the excitation circuit).
12-37	L57: VF CALC RES	Device setup▶ Diag/Service▶ Verification▶ Result▶ Calc circuit	R	Passed Failed Canceled No Data Unknown	Passed Failed Canceled No Data Unknown	No Data	-	Indicates the result of executing the verification function (the diagnosis result of the calculation circuit).
12-38	L58: VF DEV RES	Device setup▶ Diag/Service▶ Verification▶ Result▶ Device status	R	Passed Failed Canceled No Data Unknown	Passed Failed Canceled No Data Unknown	No Data	-	Indicates the result of executing the verification function (the diagnosis result of the device alarm).
12-39	L59: VF CONN RES	Device setup▶ Diag/Service▶ Verification▶ Result▶ Connect status	R	Passed Failed Canceled No Data Unknown	Passed Failed Canceled No Data Unknown	No Data	-	Indicates the result of executing the verification function (wiring misconnection check result).
12-40	L60: SELF CHECK	-	R	GOOD ERROR	-	-	-	Indicates the result of the self-diagnostic function.

(13) Test mode configuration parameters (M: TEST)

This list shows the parameters related to the test mode setting.

No.	Name (BRAIN communication)	Name (Display)	Setting	Range (BRAIN communication)	Range (Display)	Default value	Unit	Description
13-1	M01: TEST REL TIM	Device setup▶ Diag/Service▶ Test▶ Release time	RW	10 min 30 min 1 h 3 h 12 h	10 min 30 min 1 h 3 h 12 h	10 min	-	Specify the time to automatically reset the test mode.
13-2	M02: TEST MODE	-	RW	Test all off Velo test on Vol F test on Mass F test on AO1 test on P1 test on SO1 test on P2 test on SO2 test on SI3 test on Test all on	-	Test all off	-	Specify whether to set the test mode on or off.
	M03: TEST STATUS	-	R	Test off Test on Velo test on Vol F test on Mass F test on AO1 test on P1 test on SO1 test on P2 test on SO2 test on SI3 test on	-	-	-	Specify the test mode execution status.
	-	Device setup▶ Diag/Service▶ Test▶ Input test▶ Test mode	RW	-	Velocity test Volume test Mass test SI3 test	-	-	Specify whether to set the test mode (input) on off.
	-	Device setup▶ Diag/Service▶ Test▶ Output test▶ Test mode	RW	-	AO1 test PO1 test SO1 test PO2 test SO2 test	-	-	Specify whether to set the test mode (output) on or off.
13-3	M10: VELO T VAL	Device setup▶ Diag/Service▶ Test▶ Input test▶ Velocity	RW	-32000.0 to +32000.0 Number of decimal places: 1 to 5	-999999 to +999999 Number of decimal places: 0 to 5	0.0	Specified in No. 3-15.	Specify the test value of the flow velocity.
13-3	M11: VOLUM T VAL	Device setup▶ Diag/Service▶ Test▶ Input test▶ Volume	RW	-32000.0 to +32000.0 Number of decimal places: 1 to 5	-999999 to +999999 Number of decimal places: 0 to 5	0.0	Specified in No. 3-16 and No. 3-19.	Specify the test value of the volumetric flow rate.
13-4	M12: MASS T VAL	Device setup▶ Diag/Service▶ Test▶ Input test▶ Mass	RW	-32000.0 to +32000.0 Number of decimal places: 1 to 5	-999999 to +999999 Number of decimal places: 0 to 5	0.0	Specified in No. 3-17 and No. 3-19.	Specify the test value of the mass flow rate.
13-6	M14: AO1 TEST VAL	Device setup▶ Diag/Service▶ Test▶ Output test▶ AO1	RW	2.400 to 21.600 Number of decimal places: 3	2.400 to 21.600 Number of decimal places: 3	4.000	mA	Specify the test value of the current output for the I/O1 terminal.
13-7	M15: P1 TEST VAL	Device setup▶ Diag/Service▶ Test▶ Output test▶ PO1	RW	0 to 12500 Number of decimal places: 0	0 to 12500 Number of decimal places: 0	0	pps (pulse/s)	Specify the test value of the pulse output for the I/O2 terminal.
13-8	M16: SO1 TEST VAL	Device setup▶ Diag/Service▶ Test▶ Output test▶ SO1	RW	Open Close	Open Close	Open	-	Specify the test value of the status output for the I/O2 terminal.
13-10	M21: P2 TEST VAL	Device setup▶ Diag/Service▶ Test▶ Output test▶ PO2	RW	0 to 12500 Number of decimal places: 0	0 to 12500 Number of decimal places: 0	0	pps (pulse/s)	Specify the test value of the pulse output for the I/O3 or I/O4 terminal.
13-11	M22: SO2 TEST VAL	Device setup▶ Diag/Service▶ Test▶ Output test▶ SO2	RW	Open Close	Open Close	Open	-	Specify the test value of the status output for the I/O3 or I/O4 terminal.
13-13	M31: SO3 TEST VAL	Device setup▶ Diag/Service▶ Test▶ Output test▶ SO3	RW	Open Close	Open Close	Open	-	Specify the test value of the status output for the I/O3 or I/O4 terminal.
13-14	M32: SI3 TEST VAL	Device setup▶ Diag/Service▶ Test▶ Input test▶ SI3	RW	Open Short	Open Short	Open	-	Specify the test value of the status input for the I/O3 terminal.
13-15	M60: SELF CHECK	-	R	GOOD ERROR	-	-	-	Indicates the result of the self-diagnostic function.

(14)Backup, restore, and data log configuration parameters (N: EVENT MANAGE)

This list shows the parameters related to the parameter backup function, restore function, and data logging function.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
14-1	N10: F BCKUP NAME	Devicesetup▶Diag/Service▶ Param bkup/restore▶ F backup name	R	ASCII 16 characters	ASCII 16 characters	Factory Delivery	-	Indicates the name of the file that is backed up (for factory).
14-2	N11: F BCKUP DATE	Devicesetup▶Diag/Service▶ Param bkup/restore▶ F backup date	R	ASCII 16 characters	ASCII 16 characters	06/30/2017(**)	-	Indicates the date when backup has been made (for factory).
14-3	N12: SD BCK NAME	Devicesetup▶Diag/Service▶ Param bkup/restore▶ SD backup name	RW	ASCII 8 characters	ASCII 8 characters	SD_FILE	-	Specify the name of the file to be backed up onto a microSD card or restored from a microSD card.
14-4	N13: BCK NAME1	Devicesetup▶Diag/Service▶ Param bkup/restore▶ Backup name 1	RW	ASCII 16 characters	ASCII 16 characters	Backup 1	-	Specify the name of the file to be backed up (1 for user).
14-5	N14: BCK DATE1	Devicesetup▶Diag/Service▶ Param bkup/restore▶ Backup date 1	RW	ASCII 16 characters	ASCII 16 characters	01/01/2016	-	Specify the date when backup has been made (1 for user).
14-6	N15: BCK NAME2	Devicesetup▶Diag/Service▶ Param bkup/restore▶ Backup name 2	RW	ASCII 16 characters	ASCII 16 characters	Backup 2	-	Specify the name of the file to be backed up (2 for user).
14-7	N16: BCK DATE2	Devicesetup▶Diag/Service▶ Param bkup/restore▶ Backup date 2	RW	ASCII 16 characters	ASCII 16 characters	01/01/2016	-	Specify the date when backup has been made (2 for user).
14-8	N17: BCK NAME3	Devicesetup▶Diag/Service▶ Param bkup/restore▶ Backup name 3	RW	ASCII 16 characters	ASCII 16 characters	Backup 3	-	Specify the name of the file to be backed up (3 for user).
14-9	N18: BCK DATE3	Devicesetup▶Diag/Service▶ Param bkup/restore▶ Backup date 3	RW	ASCII 16 characters	ASCII 16 characters	01/01/2016	-	Specify the date when backup has been made (3 for user).
14-10	N19: BACKUP EXEC	Devicesetup▶Diag/Service▶ Param bkup/restore▶ Backup execute	RW	Not execute Store Main to 1 Store Main to 2 Store Main to 3 Store Main to SD Store EEP1 to SD Store EEP2 to SD Store EEP3 to SD	Not execute Store main to 1 Store main to 2 Store main to 3 Store main to SD Store EEP1 to SD Store EEP2 to SD Store EEP3 to SD	Not execute	-	Specify whether to execute the backup function as well as the backup location. Not execute: No backup Store Main to 1: Makes a backup from the main board of the instrument to memory 1 on the display board. Store Main to 2: Makes a backup from the main board of the instrument to memory 2 on the display board. Store Main to 3: Makes a backup from the main board of the insturment to memory 3 on the display board. Store Main to SD: Makes a backup from the main board of the instrument to a microSD card. Store EEP1 to SD: Makes a backup from memory 1 on the display board onto a microSD card. Store EEP2 to SD: Makes a backup from memory 2 on the display board onto a microSD card. Store EEP3 to SD: Makes a backup from memory 3 on the display board onto a microSD card.

(**): Set at the factory before shipment.

No.	Name BRAIN communication	Name Display	Setting	Range BRAIN communication	Range Display	Default value	Unit	Description
14-11	N20: RESTORE EXEC	Devicesetup▶Diag/Service▶ Param bkup/restore▶ Restore execute	RW	Not execute Duplicate Data1 Duplicate Data2 Duplicate Data3 Duplicate SD Restore Data1 Restore Data2 Restore Data3 Restore SD Compulsion Data1 Compulsion Data2 Compulsion Data3 Compulsion SD Restore Factory	Not execute Duplicate data 1 Duplicate data 2 Duplicate data 3 Duplicate SD Restore data 1 Restore data 2 Restore data 3 Restore SD Compulsion data 1 Compulsion data 2 Compulsion data 3 Compulsion SD Restore factory	Not execute	-	Specify whether to execute the restore function, the restoration location, and data to be restored. Not execute: Does not restore data. Duplicate Data1: Restores Duplicate Data from memory 1 on the indicator board to the main board of the instrument. Duplicate Data2: Restores Duplicate Data from memory 2 on the display board to the main board of the instrument. Duplicate Data3: Restores Duplicate Data from memory 3 on the display board to the main board of the instrument. Duplicate SD: Restores Duplicate Data from a microSD card to the main board of the instrument. Restore Data1: Restores Restore Data from memory 1 on the display board to the main board of the instrument. Restore Data2: Restores Restore Data from memory 2 on the display board to the main board of the insturment. Restore Data3: Restores Restore Data from memory 3 on the display board to the main board of the instrument. Restore SD: Restores Restore Data from a microSD card to the main board of the insturment. Compulsion Data1: Restores Compulsion Data from memory 1 on the display board to the main board of the instrument. Compulsion Data2: Restores Compulsion Data from memory 2 on the display board to the main board of the insturment. Compulsion Data3: Restores Compulsion Data from memory 3 on the display board to the main board of the insturment. Compulsion SD: Restores Compulsion Data from a microSD card to the main board of the insturment. Restore Factory: Restores to the status that is set upon shipment from the manufacturing plant.
14-12	N21: RESTORE RSLT	Devicesetup▶Diag/Service▶ Param bkup/restore▶ Restore result	R	Unexecuted Success Failure Running	Unexecuted Success Failure Running	Unexecuted	-	Indicates the result of executing the restore function. Unexecuted: Does not restore data. Success: Succeeded in restoration. Failure: Failed in restoration. Running: Parameter restore running
14-13	N30: LOGGING FILE	Device setup▶ Diag/Service▶ Data log▶ File name	RW	ASCII 8 characters	ASCII 8 characters	LOG_FILE	-	Specify the name of the file to be stored by data log.
14-14	N31: LOG INTR TIM	Device setup▶ Diag/Service▶ Data log▶ Interval time	RW	1 s 10 s 30 s 1 min 5 min 30 min 1 h	1 s 10 s 30 s 1 min 5 min 30 min 1 h	1 min	-	Specify the data log storage interval.
14-15	N32: L START DATE	Device setup▶ Diag/Service▶ Data log▶ Start date	R	2016/01/01 to 2155/12/31	2016/01/01 to 2155/12/31	-	-	Indicates the date to start the data logging function.
14-16	N33: L START TIME	Device setup▶ Diag/Service▶ Data log▶ Start time	R	00: 00: 00 to 23: 59: 59	00: 00: 00 to 23: 59: 59	-	-	Indicates the time to start the data logging function.
14-17	N34: LOG END TIME	Device setup▶ Diag/Service▶ Data log▶ End time	RW	10 min 30 min 1 h 3 h 12 h 24 h 72 h 240 h	10 min 30 min 1 h 3 h 12 h 24 h 72 h 240 h	12 h	-	Specify the time to end the data logging function.
14-18	N35: LOG1 SELECT	Device setup▶ Diag/Service▶ Data log▶ Log 1	RW	Velocity Volume flow Mass flow PV Adhesion	Velocity Volume flow Mass flow PV Adhesion	PV	-	Specify process value 1 to be stored by data log.
14-19	N36: LOG2 SELECT	Device setup▶ Diag/Service▶ Data log▶ Log 2	RW			Velocity	-	Specify process value 2 to be stored by data log.
14-20	N37: LOG3 SELECT	Device setup▶ Diag/Service▶ Data log▶ Log 3	RW			Volume flow	-	Specify process value 3 to be stored by data log.
14-21	N38: LOG4 SELECT	Device setup▶ Diag/Service▶ Data log▶ Log 4	RW			Mass flow	-	Specify process value 4 to be stored by data log.

(**): Set at the factory before shipment.

No.	Name		Setting	Range		Default value	Unit	Description
	BRAIN communication	Display		BRAIN communication	Display			
14-22	N39: LOGGING EXEC	Device setup▶ Diag/Service▶ Data log▶ Execute	RW	Not Execute Execute	Not execute Execute	Not Execute	-	Specify whether to execute the data logging function.
14-23	N60: SELF CHECK	-	R	GOOD ERROR	-	-	-	Indicates the result of the self-diagnostic function.

(**): Set at the factory before shipment.

(15)Parameter protection parameters (P: PROTECT)

This list shows the parameters related to the write protection function.

No.	Name		Setting	Range		Default value	Unit	Description
	BRAIN communication	**Display**		**BRAIN communication**	**Display**			
15-1	P10: KEY CODE	Device setup▶ Detailed setup▶ Protection▶ Key code	RW	0000 to 9999 Number of decimal places: 0	0000 to 9999 Number of decimal places: 0	0000	-	Display-limited parameter (for service)
15-2	P20: WRT PROTECT	Device setup▶ Detailed setup▶ Protection▶ Write protect sts	R	No Yes	No Yes	No	-	Indicates whether to use the write protection function.
15-3	P21: ENABLE WRITE	Device setup▶ Detailed setup▶ Protection▶ Enable write	RW	ASCII 8 characters	ASCII 8 characters	All Space	-	Enter the password to cancel the write protection function for 10 minutes.
15-4	P22: NEW PASSWORD	Device setup▶ Detailed setup▶ Protection▶ New password	RW	ASCII 8 characters	ASCII 8 characters	All Space	-	Specify a new password to use the write protection function.
15-5	P23: SOFT SEAL	Device setup▶ Detailed setup▶ Protection▶ Soft seal status	R	Keep Break	Keep Break	Keep	-	Indicates whether to use the Joker password.
15-6	P60: SELF CHECK	-	R	GOOD ERROR	-	-	-	Indicates the result of the self-diagnostic function.

5.2 Menu Tree of Display

Operation level

| Exit |
| Operator |
| Maintenance |
| Specialist |

| Device setup |

Device setup

| Current alarm |
| Language |

| Process variables |

| Diag/Service |

Current alarm

| Setting upload |
| Status 0 |
| Status 1 |
| Status 2 |
| Status 3 |
| Status 4 |
| Status 5 |
| Status 14 |
| Status 15 |
| Status 16 |
| Status 17 |
| Status 18 |
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Process variables

| Flow rate(%) |
| Flow rate |
| Velocity |
| Volume |
| Mass |
| Analog out 1 |
| Totalizer |

Totalizer

| Totalizer 1 |
| Totalizer 2 |
| Totalizer 3 |
| Totalizer 1 count |
| Totalizer 2 count |
| Totalizer 3 count |

Diag/Service

| Sts/Self test |

| Time stamp |

Sts/Self test

| Current alarm |

| Alarm |

Time stamp

| Date |
| Time |
| Op time |

Current alarm

| Status 0 |
| Status 1 |
| Status 2 |
| Status 3 |
| Status 4 |
| Status 5 |
| Status 14 |
| Status 15 |
| Status 16 |
| Status 17 |
| Status 18 |
| Status 19 |

Alarm

| Alarm record mask |

| Alarm record |

| Alarm out mask |

Alarm record mask

| Mask 1-1 |
| Mask 1-2 |
| Mask 2-1 |
| Mask 2-2 |

Alarm record

| Record alarm 1 |
| Record time 1 |
| Record alarm 2 |
| Record time 2 |
| Record alarm 3 |
| Record time 3 |
| Record alarm 4 |
| Record time 4 |

Alarm out mask

| Mask 1-1 |
| Mask 1-2 |
| Mask 2-1 |
| Mask 2-2 |
| Mask 3-1 |
| Mask 3-2 |

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Operation level

| Exit |
| Operator |
| Maintenance |
| Specialist |

| Device setup |

Device setup
(Continued)

Diag/Service
(Continued)

Diagnosis

Diagnosis

| Adhesion |
| Diagnostic execute |
| Coil insul threshold |
| IEX compare |
| Diagnostic output |
| IEX resistance |

Adhesion

| Function |
| Threshold level 1 |
| Threshold level 2 |
| Threshold level 3 |
| Threshold level 4 |
| Result |
| Check cycle |

Result

| Value |
| Status |

| Empty check |

Empty check

| Electrode voltage A |
| Electrode voltage B |
| Empty status |

Verification

Verification

| Mode |
| Execute |
| VF No |
| Result |

Result

| Failed/Passed |
| VF operate time |
| Magnetic circuit |
| Excite circuit |
| Calc circuit |
| Device status |
| Connect status |

Autozero

Autozero

| Execute |
| Result |

Result

| Zero value |

AO/AI trim

AO/AI trim

| AO trim |

AO trim

| AO1 trim clear |
| AO1 trim 4 mA |
| AO1 trim 20 mA |

H/L alarm cfg

H/L alarm cfg

| High alarm |
| Low alarm |
| HH alarm |
| LL alarm |
| H/L alarm hyst |
| 4-20 burnout |

Test

Test

| Release time |
| Input test |

Input test

| Test mode |
| Velocity |
| Volume |
| Mass |
| SI3 |

| Output test |

Output test

| Test mode |
| AO1 |
| PO1 |
| SO1 |
| SO2 |

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Operation level
Exit
Operator
Maintenance
Specialist

Device setup

Device setup
(Continued)

Diag/Service
(Continued)

Param bkup/restore
Param bkup/restore

Param bkup/restore
F backup name
F backup date
SD backup name
Backup execute
Restore execute
Restore result
Backup name 1
Backup date 1
Backup name 2
Backup date 2
Backup name 3
Backup date 3

Data log

Data log
File name
Interval time
Start date
Start time
End time
Execute
Log 1
Log 2
Log 3
Log 4

Disp indicator

Disp indicator
LCD test
Squawk

Easy setup wizard

Easy setup wizard
Volume

Volume
Setting upload
Damp AO/F
Damp pls/ttl
Unit
Time unit
Span
Setting download

Pulse/Status out

Pulse/Status out
Setting upload
P1 unit
P1 val
F1 at 0%
F1 at 100%
Setting download

Display set
Autozero exe

Display set
Setting upload
Line 1
Line 2
Line 3
Setting download

Detailed setup

Detailed setup
Pro var

Pro var
PV flow select
Velocity

Velocity
Damp AO/F
Damp pls/ttl
Unit
Span

Volume

Volume
Damp AO/F
Damp pls/ttl
Unit
Time unit
Span

Mass

Mass
Damp AO/F
Damp pls/ttl
Unit
Time unit
Span

Density
Velocity check

Density
Unit
Fixed density

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Operation level
- Exit
- Operator
- Maintenance
- Specialist

Device setup

Device setup
(Continued)

Detailed setup
(Continued)

Sensor → **Sensor**
- Low MF
- High MF
- Flow sensor sel
- Nominal size unit
- Nominal size

User Span → **User Span**
- User span AO1 → **User span AO1**
  - Select
  - Span
  - Unit

Totalizer → **Totalizer**
- Totalizer 1 → **Totalizer 1**
  - Unit
  - Conv factor
  - Low cut
  - Failure opts
  - Options
  - Start/Stop
  - Reset/Preset
  - Preset value
  - Set point
- Totalizer 2 → **Totalizer 2**
  - Unit
  - Conv factor
  - Low cut
  - Failure opts
  - Options
  - Start/Stop
  - Reset/Preset
  - Preset value
  - Set point
- Totalizer 3 → **Totalizer 3**
  - Unit
  - Conv factor
  - Low cut
  - Failure opts
  - Options
  - Start/Stop
  - Reset/Preset
  - Preset value
  - Set point

Pulse/Status out → **Pulse/Status out**
- PO1/SO1 → **PO1/SO1**
  - Output mode
  - Active mode
  - Fix width
  - Rate unit
  - Rate value
  - Low cut
  - Alarm out
  - Frequency at 0%
  - Frequency at 100%
  - SO1 function
- PO2/SO2 → **PO2/SO2**
  - Active pulse
  - Output mode
  - Pulse select
  - Active mode
  - Fix width
  - Rate unit
  - Rate value
  - Low cut
  - Alarm out
  - Frequency at 0%
  - Frequency at 100%
  - SO2 function

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Operation level
Exit
Operator
Maintenance
Specialist

Device setup

Device setup
(Continued)

Detailed setup
(Continued)

	Status in	**SI3**
Status in	SI3	Active mode
		Function
		State

	Analog out/in	**AO1**
Analog out/in	AO1	Low cut
	Multi range	High limit
Multi range	Forward span 2	Low limit
	Reverse span 1	Alarm out
	Reverse span 2	Range mode
	Auto range hyst	
	Bi direction hyst	

	AUX calculation
AUX calculation	Flow direct
	Rate limit
	Dead time
	Noise filter
	Pulsing flow
	Power sync
	Set power freq
	Iex power frequency
	Meas power freq
	Set SIL

	Display set	**Line select**
Display set	Line select	Line 1
		Line 2
		Line 3
		Line 4
		Line 5
		Line 6
		Line 7
		Line 8
		Trend select
	Trend select	Trend 1
		Trend 2
		Trend 3
		Trend 4
		Disp format
	Disp format	Format PV
		Format total 1
		Format total 2
		Format total 3
		Optional config
	Optional config	Contrast
	Access cfg	Line mode
Access cfg	User role	Period
	Chg mainte	NE107 display
	Chg special	Alarm display
		Scroll mode
		Damp
		Format date
		Inversion
		Language package
		Display mode
		Trend offln LRV
		Trend offln URV

	Device info	**Date/Time**
Device info	Date/Time	Current date
		Current time
		Operation time
		Set date
		Set time

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Operation level
Exit
Operator
Maintenance
Specialist

Device setup

Device setup (Continued)

Detailed setup (Continued)

Device info (Continued)

Order info

Order info
Tag No
MS code

RS MS code
Disp install

Ver/Num info
Transmitter type
Option board ID
Trans serial No
Sensor serial No
Main soft rev
Snsr soft rev
Ind soft rev

MS code
Model code
Suffix config 1
Suffix config 2
Option 1
Option 2
Option 3
Option 4

RS MS code
Model code
Suffix config 1
Suffix config 2
Option 1
Option 2
Option 3
Option 4

Ver/Num info

Memo

Memo
Memo 1
Memo 2
Memo 3

Protection

Protection
Key code
Write protect sts
Enable write
New password
Soft seal status

microSD

microSD
Contents
Unmount
Format
Property

Property
Total space
Available space
File system

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Status 0
010:Main CPU FAIL
011:Rev calc FAIL
012:Main EEP FAIL
013:Main EEP dflt

Status 1
014:Snsr bd FAIL
015:Snsr comm ERR
016:AD 1 FAIL[Sig]
017:AD 2 FAIL[Excit]
018:Coil open
019:Coil short
020:Exciter FAIL

Status 2
021:PWM 1 stop
022:PWM 2 stop
023:Opt bd mismatch
024:Opt bd EEP FAIL
025:Opt bd A/D FAIL
026:Opt bd SPI FAIL

Status 3
027:Restore FAIL
028:Ind bd FAIL
029:Ind bd EEP FAIL
030:LCD drv FAIL
031:Ind bd mismatch
032:Ind comm ERR
033:microSD FAIL

Status 4
050:Signal overflow
051:Empty detect
052:H/L HH/LL alm
053:Adh over lv 4

Status 5
060:Span cfg ERR
062:AO 1 4-20 lmt
064:AO 1 mlt rng
065:H/L cfg ERR
066:Density cfg ERR

Status 14
067:Pls 1 cfg ERR
068:Pls 2 cfg ERR
069:Nomi size cfg
070:Adh cfg ERR
072:Log not start

Status 15
080:AO 1 saturate
082:Pls 1 saturate
083:Pls 2 saturate
085:Cable miscon
086:Coil insulation
131:Trans mismatch

Status 16
087:Adhesion lv 3
092:AZ warn
093:Verif warn

Status 17
095:Simulate active
096:AO 1 fix
098:Pls 1 fix
099:Pls 2 fix

Status 18
101:Param restore run
102:Disp over
103:SD size warn
104:Bkup incmplt
105:SD mismatch
106:SD removal ERR

Status 19
120:Watchdog
121:Power off
122:Inst power FAIL
123:Param bkup run
124:Data log run

Revision Information

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● Manual No. : IM 01E24A02-01EN

Edition	Data	Page	Revised Item
1st	June 2017	—	New publication
2nd	Oct. 2017	24 31 62 63 80 101	4.1.7 Change the units in the example. 4.3.4 Delete NOTE about pulse output. 4.11.5 Change NOTE about wiring connection diagnostic function. 4.11.6 Add NOTE about verification function. 5.1 (2) Change the default value of No.2-11. 5.1 (10) Change the default value of No.10-1.
3rd	Mar. 2018	74 110	4.13.4 Change the choices of process values stored by data logging function. 5.1 (14) Change the range of No.14-18 to No.14-21.
4th	Mar. 2020	— 9 22 50 56 63	Incorporate the manual change 19-0017-E. Correction of errors. 2.2.1 Add NOTE. 4.1.2 Add the setting example. 4.8.4 Add the setting example. 4.9.4 Add NOTE. 4.11.4 Add IMPORTANT.