User's Manual

DPharp EJX™

EJX910A and EJX930A Multivariable Transmitter HART Communication Type

IM 01C25R02-01E

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DPharp FOR THE DIGITAL WORLD

YOKOGAWA
Yokogawa Electric Corporation

IM 01C25R02-01E
3rd Edition

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REVISION RECORD

1. INTRODUCTION

Thank you for purchasing the DPharp EJX Multivariable transmitter.

EJX multivariable transmitters are precisely calibrated at the factory before shipment.
To ensure both safety and efficiency, please read this manual carefully before operating the instrument.
This manual describes the HART protocol communication functions of the EJX multivariable transmitter and explains how to set the parameters for EJX multivariable transmitters using the 275 HART Communicator.
For information on the installation, wiring, and maintenance of EJX multivariable transmitters, please refer to the user's manual.
For information on the flow setup of EJX multivariable transmitters, please refer to the user's manual and EJXMVTool flow configuration software on-line manual.

Hardware version	IM 01C25R01-01E
Software version	IM 01C25R50-01E

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■ Regarding This 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, please 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.
- Please 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.
- The following safety symbols are used in this manual:

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

IMPORTANT

Indicates that operating the hardware or software in this manner may damage it or lead to system failure.

NOTE

Draws attention to information essential for understanding the operation and features.

1.1 Safe Use of This Product

For the safety of the operator and to protect the instrument and the system, please be sure to follow this manual's safety instructions when handling this instrument. If these instructions are not heeded, the protection provided by this instrument may be impaired. In this case, Yokogawa cannot guarantee that the instrument can be safely operated. Please pay special attention to the following points:

(a) Installation

- This instrument may only be installed by an engineer or technician who has an expert knowledge of this device. Operators are not allowed to carry out installation unless they meet this condition.
- With high process temperatures, care must be taken not to burn yourself by touching the instrument or its casing.
- Never loosen the process connector nuts when the instrument is installed in a process. This can lead to a sudden, explosive release of process fluids.
- When draining condensate from the pressure detector section, take appropriate precautions to prevent the inhalation of harmful vapors and the contact of toxic process fluids with the skin or eyes.
- When removing the instrument from a hazardous process, avoid contact with the process fluid and the interior of the meter.
- All installation shall comply with local installation requirements and the local electrical code.

(b) Wiring

- The instrument must be installed by an engineer or technician who has an expert knowledge of this instrument. Operators are not permitted to carry out wiring unless they meet this condition.
- Before connecting the power cables, please confirm that there is no current flowing through the cables and that the power supply to the instrument is switched off.

(c) Operation

- Wait 10 min. after the power is turned off before opening the covers.

(d) Maintenance

- Please carry out only the maintenance procedures described in this manual. If you require further assistance, please contact the nearest Yokogawa office.
- Care should be taken to prevent the build up of dust or other materials on the display glass and the name plate. To clean these surfaces, use a soft, dry cloth.

(e) Modification

- Yokogawa will not be liable for malfunctions or damage resulting from any modification made to this instrument by the customer.

1.2 Warranty

- The warranty shall cover the period noted on the quotation presented to the purchaser at the time of purchase. Problems occurring during the warranty period shall basically be repaired free of charge.
- If any problems are experienced with this instrument, the customer should contact the Yokogawa representative from which this 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.
- The party responsible for the cost of fixing the problem shall be determined by Yokogawa following an investigation conducted by Yokogawa.
- 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.
  - Malfunction or damage due to a failure to handle, use, or store the instrument in accordance with the design specifications.
  - 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.

1.3 ATEX Documentation

This is only applicable to the countries in European Union.

GB

All instruction manuals for ATEX Ex related products are available in English, German and French. Should you require Ex related instructions in your local language, you are to contact your nearest Yokogawa office or representative.

DK

Alle brugervejledninger for produkter relateret til ATEX Ex er tilgængelige på engelsk, tysk og fransk. Skulle De ønske yderligere oplysninger om håndtering af Ex produkter på eget sprog, kan De rette henvendelse herom til den nærmeste Yokogawa afdeling eller forhandler.

I

Tutti i manuali operativi di prodotti ATEX contrassegnati con Ex sono disponibili in inglese, tedesco e francese. Se si desidera ricevere i manuali operativi di prodotti Ex in lingua locale, mettersi in contatto con l'ufficio Yokogawa più vicino o con un rappresentante.

E

Todos los manuales de instrucciones para los productos antiexplosivos de ATEX están disponibles en inglés, alemán y francés. Si desea solicitar las instrucciones de estos artículos antiexplosivos en su idioma local, deberá ponerse en contacto con la oficina o el representante de Yokogawa más cercano.

NL

Alle handleidingen voor producten die te maken hebben met ATEX explosiebeveiliging (Ex) zijn verkrijgbaar in het Engels, Duits en Frans. Neem, indien u aanwijzingen op het gebied van explosiebeveiliging nodig hebt in uw eigen taal, contact op met de dichtstbijzijnde vestiging van Yokogawa of met een vertegenwoordiger.

SF

Kaikkien ATEX Ex -tyyppisten tuotteiden käyttöhjeet ovat saatavilla englannin-, saksan- ja ranskankielisinä. Mikäli tarvitsette Ex -tyyppisten tuotteiden ohjeita omalla paikallisella kielellännne, ottakaa yhteyttä lähimpään Yokogawa-toimistoon tai -edustajaan.

P

Todos os manuais de instruções referentes aos produtos Ex da ATEX estão disponíveis em Inglês, Alemão e Francês. Se necessitar de instruções na sua língua relacionadas com produtos Ex, deverá entrar em contacto com a delegação mais próxima ou com um representante da Yokogawa.

F

Tous les manuels d'instruction des produits ATEX Ex sont disponibles en langue anglaise, allemande et française. Si vous nécessitez des instructions relatives aux produits Ex dans votre langue, veuillez bien contacter votre représentant Yokogawa le plus proche.

D

Alle Betriebsanleitungen für ATEX Ex bezogene Produkte stehen in den Sprachen Englisch, Deutsch und Französisch zur Verfügung. Sollten Sie die Betriebsanleitungen für Ex-Produkte in Ihrer Landessprache benötigen, setzen Sie sich bitte mit Ihrem örtlichen Yokogawa-Vertreter in Verbindung.

S

Alla instruktionsböcker för ATEX Ex (explosionssäkra) produkter är tillgängliga på engelska, tyska och franska. Om Ni behöver instruktioner för dessa explosionssäkra produkter på annat språk, skall Ni kontakta närmaste Yokogawakontor eller representant.

GR

Όλα τα εγχειρίδια λειτονργίας των προϊόντων με ATEX Ex διατίθενται στα Αγγλικά, Γερμανικά και Γαλλικά. Σε περίπτωση που χρειάζεστε οδηγίες σχετικά με Ex στην τοπική γλώσσα παρακαλούμε επικοινωνήστε με το πλησιέστερο γραφείο της Yokogawa ή αντιπρόσωπο της.

SK

Všetky návody na obsluhu pre prístroje s ATEX Ex sú k dispozícii v jazyku anglickom, nemeckom a francúzskom. V prípade potreby návodu pre Ex-prístroje vo Vašom národnom jazyku, skontaktujte prosím miestnu kanceláriu firmy Yokogawa.

CZ

Všechny uživatelské příručky pro výrobky, na něž se vztahuje nevýbušné schválení ATEX Ex, jsou dostupné v angličtině, němčině a francouzštině. Požadujete-li pokyny týkající se výrobků s nevýbušným schválením ve vašem lokálním jazyku, kontaktujte prosím vaši nejbližší reprezentační kancelář Yokogawa.

LT

Visos gaminiø ATEX Ex kategorijos Eksploatavimo instrukcijos teikiami anglø, vokieèiø ir prancûzø kalbomis. Norëdami gauti prietaisø Ex dokumentacijà kitomis kalbomis susisiekite su artimiausiu bendrovës “Yokogawa” biuru arba atstovu.

LV

Visas ATEX Ex kategorijas izstrâdâjumu Lietoðanas instrukcijas tiek piegâdâtas angïu, vâcu un franèu valodâs. Ja vçlaties saòemt Ex ierîèu dokumentâciju citâ valodâ, Jums ir jâsazinâs ar firmas Jokogava (Yokogawa) tuvâko ofisu vai pârstâvi.

EST

Kõik ATEX Ex toodete kasutamisjuhendid on esitatud inglise, saksa ja prantsuse keeles. Ex seadmete muukeelse dokumentatsiooni saamiseks pöörduge lähima Iokagava (Yokogawa) kontori või esindaja poole.

PL

Wszystkie instrukcje obsługi dla urządzeń w wykonaniu przeciwwybuchowym Ex, zgodnych z wymaganiami ATEX, dostępne są w języku angielskim, niemieckim i francuskim. Jeżeli wymagana jest instrukcja obsługi w Państwa lokalnym ję zyku, prosimy o kontakt z najbliższym biurem Yokogawy.

SLO

Vsi predpisi in navodila za ATEX Ex sorodni pridelki so pri roki v angliščini, nemščini ter francoščini. Èe so Ex sorodna navodila potrebna v vašem tukejnjem jeziku, kontaktirajte vaš najbliši Yokogawa office ili predstaunika.

H

Az ATEX Ex mûszerek gépkönyveit angol, német és francia nyelven adjuk ki. Amennyiben helyi nyelven kérik az Ex eszközök leírásait, kérjük keressék fel a legközelebbi Yokogawa irodát, vagy képviseletet.

BG

Всички упътвания за продукти от серията ATEX Ex се предлагат на английски, немски и френски език. Ако се нуждаете от упътвания за продукти от серията Ex на родния ви език, се свържете с най-близкия офис или представителство на фирма Yokogawa.

RO

Toate manualele de instructiuni pentru produsele ATEX Ex sunt in limba engleza, germana si franceza. In cazul in care doriti instructiunile in limba locala, trebuie sa contactati cel mai apropiat birou sau reprezentant Yokogawa.

M

Il-manwali kollha ta’ l-istruzzjonijiet għal prodotti marbuta ma’ ATEX Ex huma disponibbli bl-Ingliż, bil-Ġermaniż u bil-Franċiż. Jekk tkun teħtieġ struzzjonijiet marbuta ma’ Ex fil-lingwa lokali tiegħek, għandek tikkuntattja lill-eqreb rappreżentan jew uffiċċju ta’ Yokogawa.

1.4 Matching of Communicator DD and Instrument DD

CAUTION

Before using the HART 275 Communicator, make sure that the device description (DD) installed in the communicator matches that of the instrument that is being set up. To check the DD of the instrument and the HART communicator, follow the steps below. If the correct DD is not installed in the communicator, you must upgrade the DD at an authorized facility. For communication tools other than the HART 275 Communicator, contact the vendor for upgrade information.

1. Checking the DD of the instrument
   1) Connect the communicator to the instrument that is being set up.
   2) Call **Device setup** and press [→].
   3) Call **Review** and press [→].
   4) Press [NEXT] or [PREV] to display **Fld dev rev** to show the DD of the instrument.

[Example]

The instrument DD version is 1.

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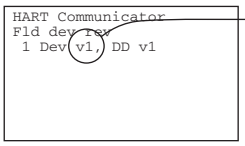
2. Checking the DD of the 275 HART Communicator
   1) Turn on only the communicator.
   2) Call **Utility** from the main menu and press [→].
   3) Call **Simulation** and press [→].
   4) Select **YOKOGAWA** from the list of manufacturers by pressing [↓] and press [→].
   5) Select the model name of the instrument(i.e. EJX-MV) by pressing [↓] and press [→] to show the DD of the communicator.

[Example]



Version 1.

The communicator DD supports Version 1.

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2. CONDITIONS OF COMMUNICATION LINE

The HART communication signal is superimposed onto the 4 to 20 mA DC analog signal. Since the modulated wave is a communication signal, superimposing it on the normal signal will, from basic principles, cause no error in the DC component of the analog signal. Thus, monitoring can be performed via the 275 HART Communicator while the transmitter is on-line.

2.1 Interconnection Between DPharp and the HART Communicator

The HART communicator can interface with the transmitter from the control room, the transmitter site, or any other wiring termination point in the loop, provided there is a minimum of 250 Ω between the connection and the power supply. To communicate, it must be connected in parallel with the transmitter; the connections are non-polarized. Figure 2.1 illustrates the wiring connections for direct interface at the transmitter site for the DPharp. The HART communicator can be used for remote access from any terminal strip as well.

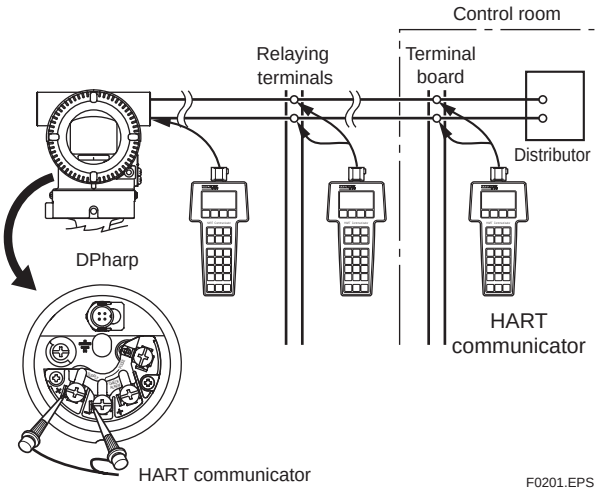

Figure 2.1 Connecting the HART Communicator

2.2 Power Supply Voltage and Load Resistance

When configuring the loop, make sure that the external load resistance is within the range in the figure below.

(Note) With an intrinsically safe transmitter, external load resistance includes safety barrier resistance.

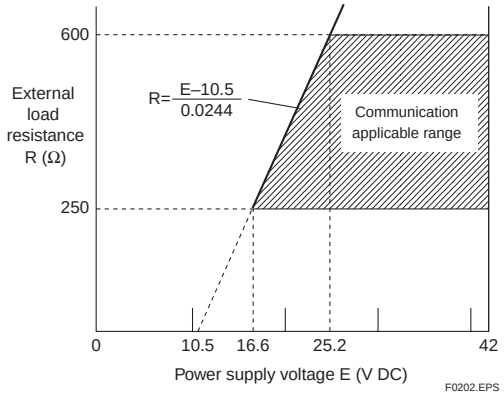

Figure 2.2 Relationship between Power Supply Voltage and External Load Resistance

3. OPERATION

3.1 Basic Operation of the 275 HART Communicator

3.1.1 Keys and Functions

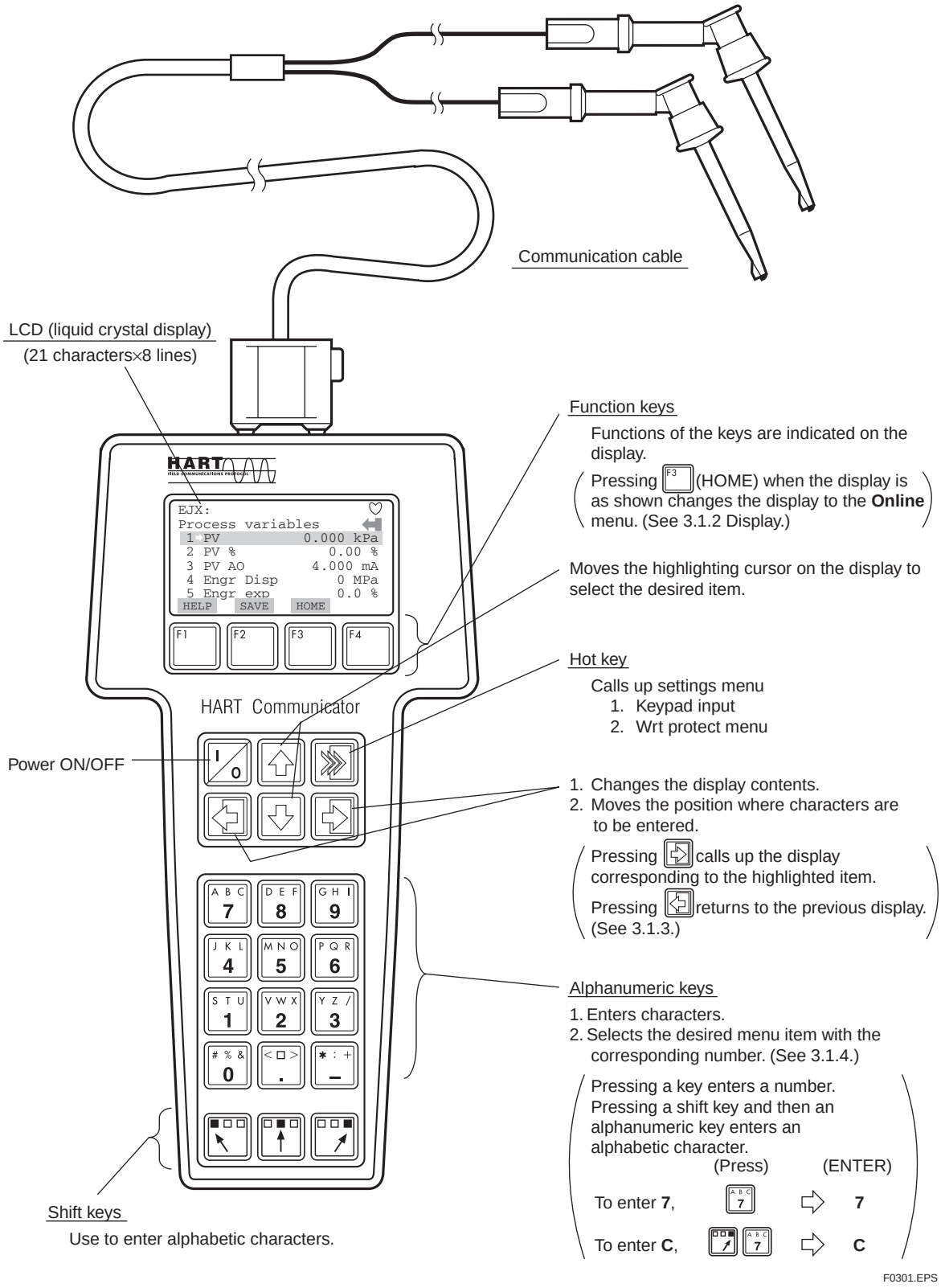

Figure 3.1 HART Communicator

3.1.2 Display

The HART communicator searches for a transmitter on the 4 to 20mA loop when it is turned on. When the HART communicator is connected to the transmitter, the **Online** menu (Top menu) is started automatically and the following display appears. If no transmitter is found, select the **Online** menu.

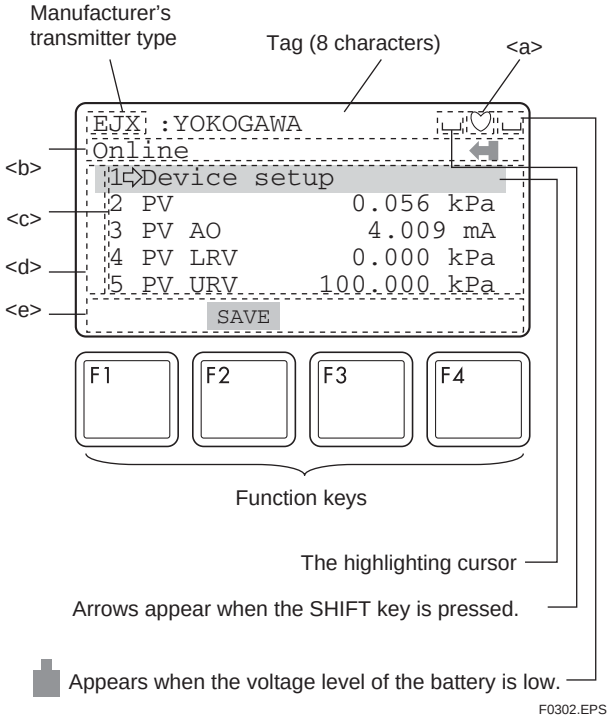

Figure 3.2 Display

<a> ♡ appears and flashes during communication between the HART communicator and the transmitter. At Burst mode, ♥ appears.
<b> The item selected from the previous menu.
<c> The available items in the menu of <b>.
<d> ↑ or ↓ appears when the item is scrolled out of the display.
<e> Function labels corresponding to specific function keys are displayed. These labels indicate the currently available choices.

Function Key Labels

F1	F2	F3	F4
HELP access on-line help	**ON/OFF** activates or deactivates a binary variable	**ABORT** terminate current task	**OK** acknowledge information on screen
RETRY try to re-establish communication	**DEL** delete current character or Hot Key Menu item	**ESC** leave value unchanged	**ENTER** accept user-entered data
EXIT leave the current menu	**SEND** send data to device, or mark data to send	**QUIT** terminate session because of a comunication error	**NEXT** leave the current menu
YES answer to yes/no question	**PGUP** move up one help screen	**PGDN** move down one help screen	**NO** answer to yes/no question
ALL include current Hot Key item on Hot Key Menu for all devices	**PREV** go to previous message in a list of messages	**NEXT** go to next message in the list of messages	**SKIP** do not mark variable to be sent in off-line configuration
	SAVE save information to communicator	**HOME** go to the top menu in the device description	**ONE** include Hot Key item for one device
	SEND send data to device, or mark data to send	**BACK** go back to menu from which HOME was pressed	
		EDIT edit a variable value	
		ADD add current item to Hot Key Menu	

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3.1.3 Calling Up Menu Addresses

Subsection 3.3 Menu Tree shows the configuration of all menu items available with the HART communicator. The desired item can be displayed with ease by understanding the menu configuration.

When the HART communicator is connected to the transmitter, the **Online** menu will be displayed after the power is turned on. Call up the desired item as follows:

Key operation

There are two choices to select the desired menu item.

1. Use the ⇩ or ⇧ key to select the desired item, and then press the ⇨ key.
2. Press the number displayed for the desired item.

To return to the previous display, press the ⇦ key. If ABORT, ESC and EXIT are displayed, press the desired function key.

Example: Call up the **Tag** to change the tag number.

Check to see where **Tag** is located in the menu configuration. Then, call up the **Tag** on the display according to the menu tree (See section 3.3 Menu Tree).

Display **Operation**

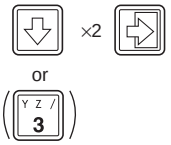
1

```
EJX-MV:YOKOGAWA
Online
 1 Device setup
 2 PV
 3 PV AO
 4 PV LRV
 5 PV URV
```

Display 1 appears when the HART Communicator is turned on. Select **Device setup**.

2

```
EJX-MV:YOKOGAWA
Device setup
 1 Process Varlables
 2 Diag/Service
 3 Basic Setup
 4 Detailed Setup
 5 Review
          HOME
```



Select **Basic setup**.

3

```
EJX-MV:YOKOGAWA
Basic Setup
 1 Tag              YOKOGAWA
 2 Unit                  kPa
 3 Keypad input
 4 Device information
 5 Others           Linear
HELP  SAVE  HOME
```

Select **Tag**.

4

```
EJX-MV:YOKOGAWA
Tag
 YOKOGAWA
 YOKOGAWA

HELP  DEL  ESC  ENTER
```

The display for the Tag setting appears.

See 3.1.4 for data entry.

5

```
EJX-MV:YOKOGAWA
Tag
 YOKOGAWA
 FI1-1A

HELP  DEL  ESC  ENTER
```

(ENTER)

After entering the data, set the HART communicator with the data entered by pressing **ENTER (F4)**.

6

```
EJX-MV:YOKOGAWA
Basic setup
 1 Tag
 2 Unit
 3 Keypad input
 4 Device information
 5 Others
HELP  SEND  HOME
```

(SEND)

Send the data to the transmitter by pressing **SEND (F2)**.

7

```
EJX-MV:FI1-1A
Basic Setup
 1 Tag
 2 Unit
 3 Keypad input
 4 Device information
 5 Others
HELP          HOME
```

* ♡ flashes during communication.
When SEND disappears, the transmission is complete.

F0304.EPS

3.1.4 Entering, Setting, and Sending Data

Data entered using the keys is set in the HART communicator by pressing **ENTER (F4)**. Then, by pressing **SEND (F2)**, the data is sent to the transmitter. Note that the data is not set in the transmitter if **SEND (F2)** is not pressed. As all the data that has been set in the HART communicator is held in memory unless the power is turned off, all the data can be sent to the transmitter at once.

Operation

Entering data on the **Tag** setting display.

Example: To change from Tag **YOKOGAWA** to **FI1-1A**.

Call up the **Tag** setting display.

1. Device setup
3. Basic setup
1. Tag

```
EJX-MV:YOKOGAWA
Tag
 YOKOGAWA
 YOKOGAWA
HELP  DEL  ESC  ENTER
```

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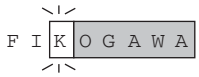
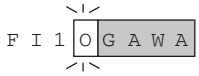
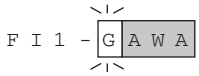
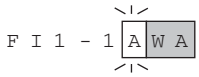
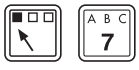
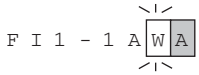
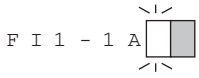
When the setting display shown above appears, enter the data as follows:

Character to be entered	Operation	Display
F		
I		
1		
-		
1		
A		
Deletes characters.	 (DEL)	

F0306.EPS

3.2 Parameter Usage and Selection

Before setting a parameter, please see the following table for a summary of how and when each parameter is used.

IMPORTANT

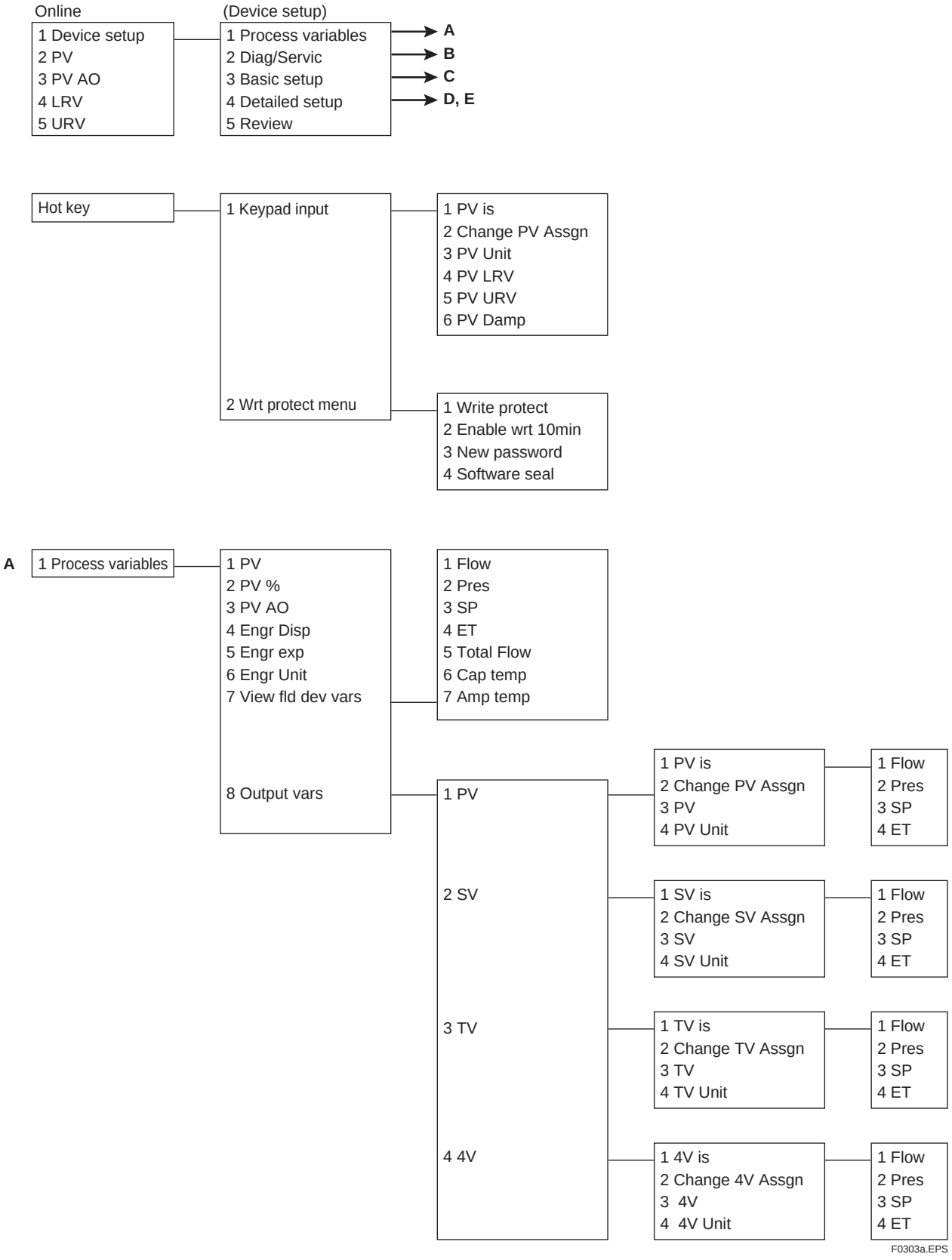
After setting and sending data with the HART communicator, wait 30 seconds before turning off the transmitter. If it is turned off too soon, the settings will not be stored in the transmitter.

Table 3.1 Parameter Usage and Selection

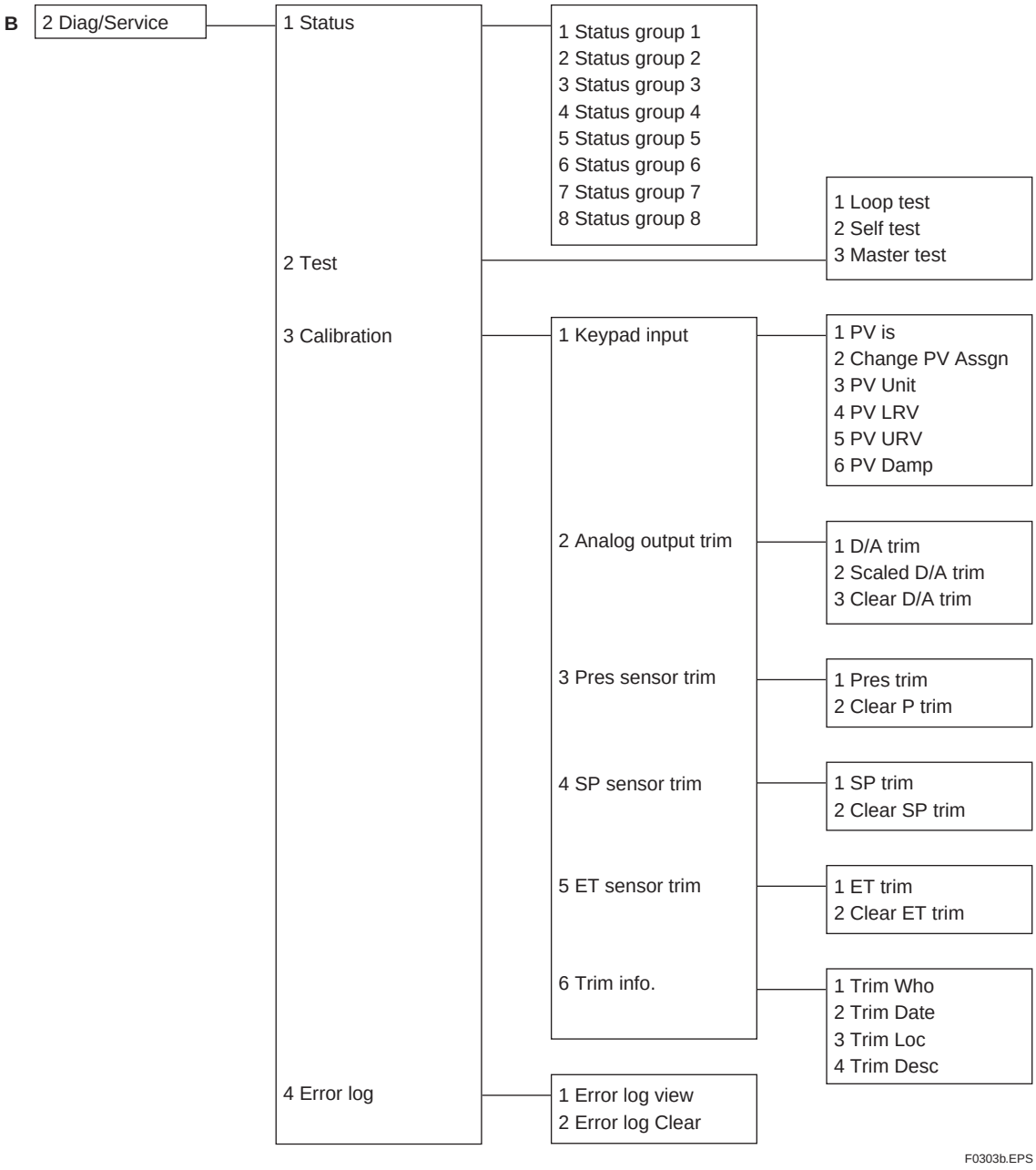
ITEM		HART communicator	Description	Page
Memory		Tag	Tag number, up to 8 characters	P. 3-10
		Descriptor	Up to 16 characters	
		Message	Up to 32 characters	
		Date	xx/yy/zz	
Transmitter	Unit	PV Unit	Sets a PV unit for the measured pressure displayed on HART communicator	P. 3-12
		Pres Unit	Sets a differential pressure unit for the measured pressure displayed on HART communicator	
		SP Unit	Sets a static pressure unit for the measured pressure displayed on HART communicator	P. 3-13
		ET Unit	Sets a external temperature unit for the measured pressure displayed on HART communicator	
		Flow Unit	Sets a flow unit for the measured pressure displayed on HART communicator	P. 3-14
		Total Flow Unit	Sets a total flow unit for the measured pressure displayed on HART communicator	
	Range	PV LRV/URV	Sets the calibration range by the keypad	P. 3-11
	Damping time constant	PV Damp	Adjusts the output response speed for the input pressure of differential pressure	P. 3-15
	Output signal low cut mode	Low Cut	Used mainly to stabilize output near 0. Two modes are available: forcing output to 0% for input below a specific value, or changing to proportional output for input below a specific value	
		Low cut mode	Off or On	
	Impulse line connection orientation	H/L Swap	Used where installation conditions make it imperative to connect high pressure side impulse line to low pressure side of transmitter	
Display	Integral indicator display mode	Disp select	Sets the following 7 types of integral indicator scale ranges and unit: % of PV range, flow, input differential pressure, input static pressure, input ext. temp, user set scaled PV, and total flow, and alternating among any four of the above	P. 3-18
	Integral indicator scale	Engr disp range	Sets Engr Unit/Modify Engr Unit/Engr LRV/Engr URV/Engr point/Engr exp	
	Process alarm	Process Alerts	Used for alarm generation on the integral indicator	P. 3-28
HART output	Burst mode	Burst option	Selection of the data to be sent continuously (PV, % range/current, Process vars/crnt, or Xmtr Variables)	P. 3-19
		Burst mode	ON/OFF switching of burst mode	
	Multidrop mode	Poll addr	Sets the polling address (1 to 15)	P. 3-20
		Polling	ON/OFF switching of multidrop mode	
Monitoring		PV and PV %	Primary variable and % output variable	—
		PV AO	4 to 20 mA output variable	
		Flow	Flowing quantity calculated from differential pressure, static pressure, and external temperature	
		Pres	Differential Pressure variable	
		SP	Static pressure variable	
		ET	External temperature	
		Total Flow	Integrated value of flowing quantity	
		Engr Disp/exp/Unit	Displays the output of user setting engineering information	
Maintenance	Test output	Loop test	Used for loop checks. Output can be set freely from -2.5% to 110% in 1% steps	P. 3-31
	Self-diagnostics	Self test and Status	Check using the self-test and status command. If an error is detected, the corresponding message is displayed	P. 4-1
	Output when CPU error has occurred	AO Alm typ	Displays the status of 4 to 20 mA DC output when a failure occurs	P. 3-21
	External volume protect/permit	Ext SW	Displays/sets the external volume protect/permit for LRV (URV) setting	
	Software Write Protect	Write protect	Displays the permit/protection status of setting changes depending on communications	P. 3-26
		Enable wrt 10min	Write protection status is released for 10 minutes when the password is entered	
		New password	Sets a new password	
Adjustment	Sensor trim	Pres, SP, and ET trim	Adjusts the measured differential pressure, static pressure, and external temperature variables	P. 3-31
	Analog output trim	D/A trim, Scaled D/A trim	Adjusts the output value at the points of 4 mA and 20 mA	P. 3-33
Special	Flow Base Density	Flow Base Density	Sets volume flow base density	P. 3-16
	Ext. Temp Fixation	Fixed ET	ON/OFF switching of external temperature fixation mode	
	User unit for total flow	Config user unit	Configures user unit for total flow	P. 3-17
	Simulation Mode	Simimulation	Flow calculation by pseudo DP, SP, and ET value	P. 3-21
	Basic Flow Mode	Basic Flow Calc	For manual setting of flow factor parameters. (The flow factor is a constant value)	P. 3-24

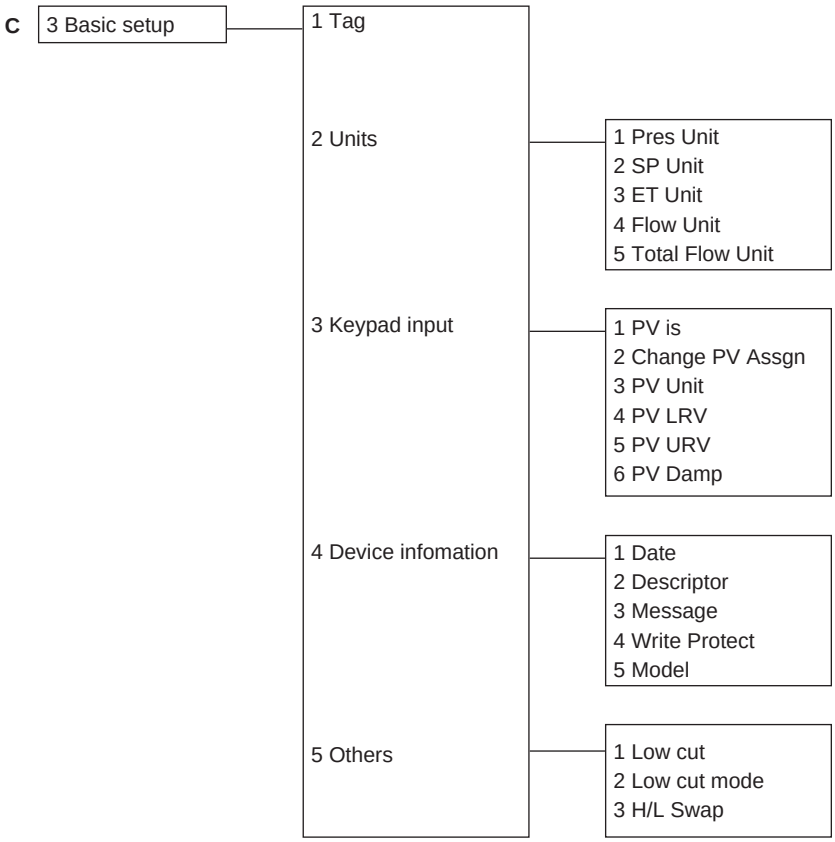
T0301.EPS

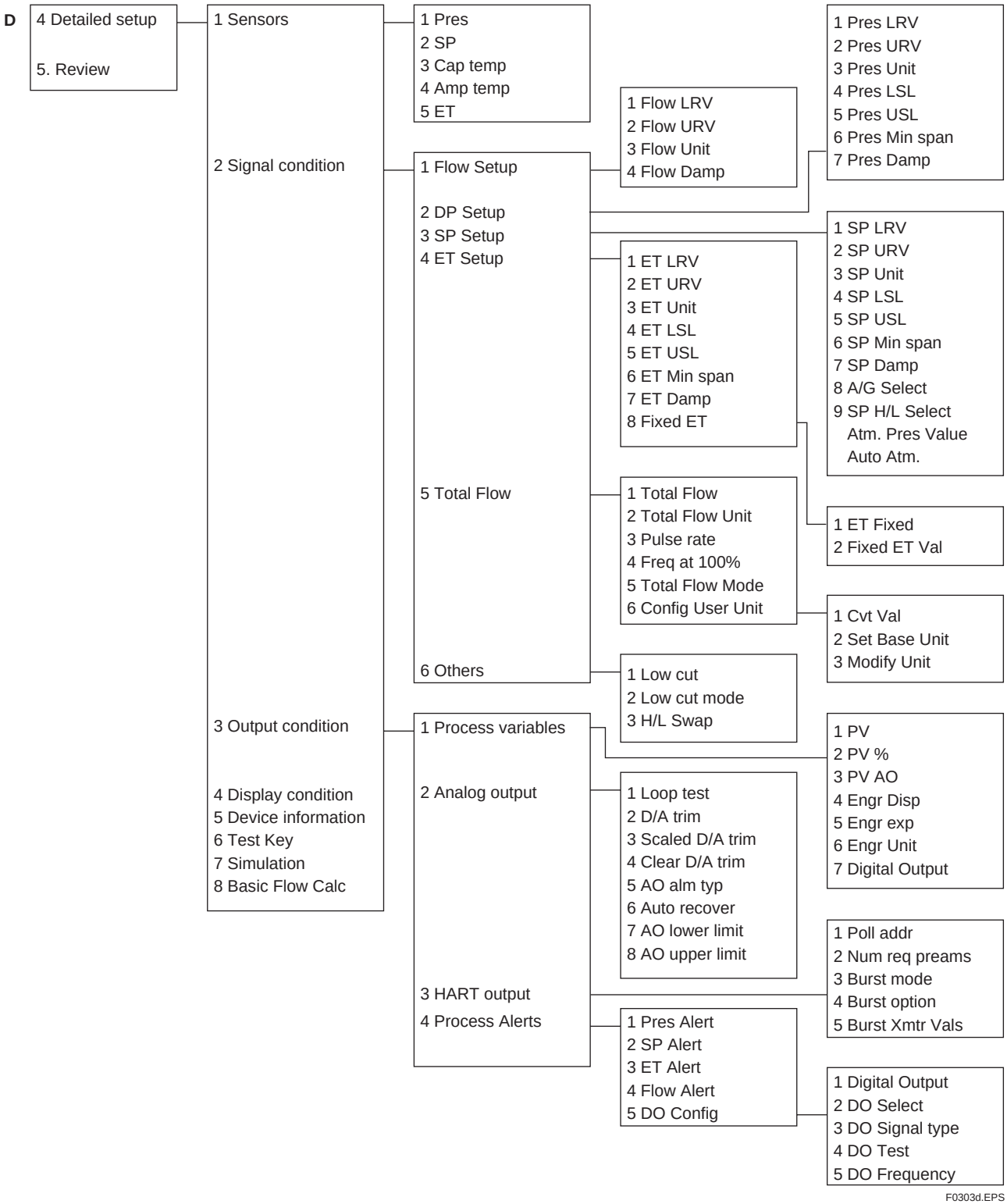
3.3 Menu Tree



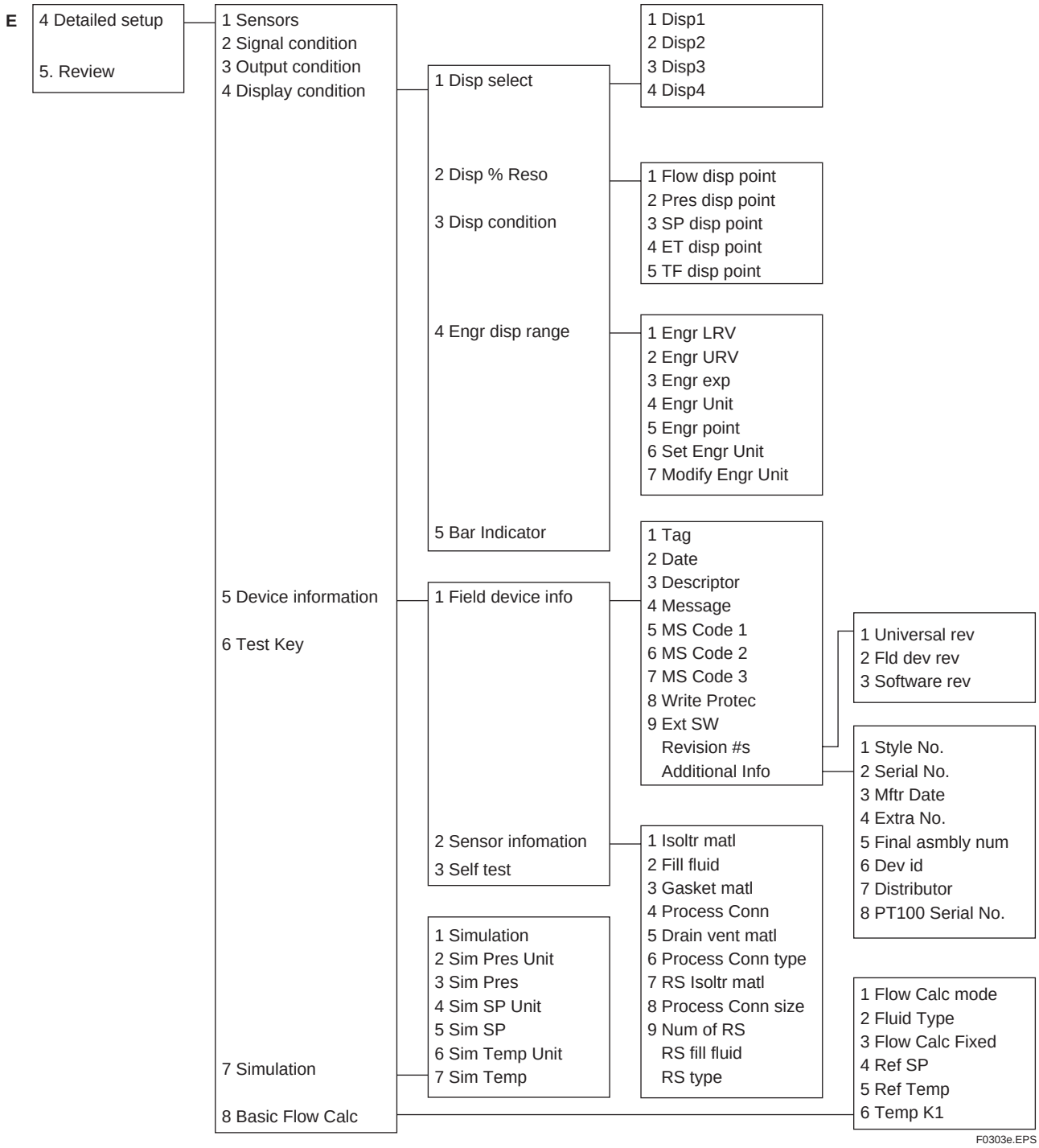
F0303a.EPS


B
2 Diag/Service
1 Status
1 Status group 1
2 Status group 2
3 Status group 3
4 Status group 4
5 Status group 5
6 Status group 6
7 Status group 7
8 Status group 8
2 Test
1 Loop test
2 Self test
3 Master test
3 Calibration
1 Keypad input
1 PV is
2 Change PV Assgn
3 PV Unit
4 PV LRV
5 PV URV
6 PV Damp
2 Analog output trim
1 D/A trim
2 Scaled D/A trim
3 Clear D/A trim
3 Pres sensor trim
1 Pres trim
2 Clear P trim
4 SP sensor trim
1 SP trim
2 Clear SP trim
5 ET sensor trim
1 ET trim
2 Clear ET trim
6 Trim info.
1 Trim Who
2 Trim Date
3 Trim Loc
4 Trim Desc
4 Error log
1 Error log view
2 Error log Clear
F0303b.EPS


C
3 Basic setup
1 Tag
2 Units
1 Pres Unit
2 SP Unit
3 ET Unit
4 Flow Unit
5 Total Flow Unit
3 Keypad input
1 PV is
2 Change PV Assgn
3 PV Unit
4 PV LRV
5 PV URV
6 PV Damp
4 Device infomation
1 Date
2 Descriptor
3 Message
4 Write Protect
5 Model
5 Others
1 Low cut
2 Low cut mode
3 H/L Swap
F0303c.EPS


D
4 Detailed setup
5. Review
1 Sensors
2 Signal condition
3 Output condition
4 Display condition
5 Device information
6 Test Key
7 Simulation
8 Basic Flow Calc
1 Pres
2 SP
3 Cap temp
4 Amp temp
5 ET
1 Flow Setup
2 DP Setup
3 SP Setup
4 ET Setup
5 Total Flow
6 Others
1 Process variables
2 Analog output
3 HART output
4 Process Alerts
1 Flow LRV
2 Flow URV
3 Flow Unit
4 Flow Damp
1 ET LRV
2 ET URV
3 ET Unit
4 ET LSL
5 ET USL
6 ET Min span
7 ET Damp
8 Fixed ET
1 Total Flow
2 Total Flow Unit
3 Pulse rate
4 Freq at 100%
5 Total Flow Mode
6 Config User Unit
1 Low cut
2 Low cut mode
3 H/L Swap
1 Loop test
2 D/A trim
3 Scaled D/A trim
4 Clear D/A trim
5 AO alm typ
6 Auto recover
7 AO lower limit
8 AO upper limit
1 Pres Alert
2 SP Alert
3 ET Alert
4 Flow Alert
5 DO Config
1 Pres LRV
2 Pres URV
3 Pres Unit
4 Pres LSL
5 Pres USL
6 Pres Min span
7 Pres Damp
1 SP LRV
2 SP URV
3 SP Unit
4 SP LSL
5 SP USL
6 SP Min span
7 SP Damp
8 A/G Select
9 SP H/L Select
Atm. Pres Value
Auto Atm.
1 ET Fixed
2 Fixed ET Val
1 Cvt Val
2 Set Base Unit
3 Modify Unit
1 PV
2 PV %
3 PV AO
4 Engr Disp
5 Engr exp
6 Engr Unit
7 Digital Output
1 Poll addr
2 Num req preams
3 Burst mode
4 Burst option
5 Burst Xmtr Vals
1 Digital Output
2 DO Select
3 DO Signal type
4 DO Test
5 DO Frequency

F0303d.EPS


E
4 Detailed setup
5. Review
1 Sensors
2 Signal condition
3 Output condition
4 Display condition
5 Device information
6 Test Key
7 Simulation
8 Basic Flow Calc
1 Disp select
2 Disp % Reso
3 Disp condition
4 Engr disp range
5 Bar Indicator
1 Field device info
2 Sensor infomation
3 Self test
1 Simulation
2 Sim Pres Unit
3 Sim Pres
4 Sim SP Unit
5 Sim SP
6 Sim Temp Unit
7 Sim Temp
1 Disp1
2 Disp2
3 Disp3
4 Disp4
1 Flow disp point
2 Pres disp point
3 SP disp point
4 ET disp point
5 TF disp point
1 Engr LRV
2 Engr URV
3 Engr exp
4 Engr Unit
5 Engr point
6 Set Engr Unit
7 Modify Engr Unit
1 Tag
2 Date
3 Descriptor
4 Message
5 MS Code 1
6 MS Code 2
7 MS Code 3
8 Write Protec
9 Ext SW
Revision #s
Additional Info
1 Isoltr matl
2 Fill fluid
3 Gasket matl
4 Process Conn
5 Drain vent matl
6 Process Conn type
7 RS Isoltr matl
8 Process Conn size
9 Num of RS
RS fill fluid
RS type
1 Universal rev
2 Fld dev rev
3 Software rev
1 Style No.
2 Serial No.
3 Mftr Date
4 Extra No.
5 Final asmbly num
6 Dev id
7 Distributor
8 PT100 Serial No.
1 Flow Calc mode
2 Fluid Type
3 Flow Calc Fixed
4 Ref SP
5 Ref Temp
6 Temp K1
F0303e.EPS

3.4 Basic Setup

3.4.1 Tag and Device Information

To change the Tag No., see section 3.1.4 Entering, Setting, and Sending Data.

Up to 8 characters can be set with **Tag**. The maximum number of characters to be set for other items is as shown below.

Item	Number of characters
Tag	8
Descriptor	16
Message	32
Date	2/2/2

T0302.EPS

(1) Tag

1. Device setup
3. Basic setup
1. Tag

```
EJX:YOKOGAWA
Tag
 YOKOGAWA
 YOKOGAWA

HELP  DEL  ESC  ENTER
```

(2) Descriptor

1. Device setup
3. Basic setup
4. Device information
2. Descriptor

```
EJX:YOKOGAWA
Descriptor

HELP  DEL  ESC  ENTER
```

(3) Message

1. Device setup
3. Basic setup
4. Device information
3. Message

```
EJX:YOKOGAWA
Message

HELP  DEL  ESC  ENTER
```

(4) Date

1. Device setup
3. Basic setup
4. Device information
4. Date

```
EJX:YOKOGAWA
Date
   **/**/**
 **/**/**

HELP       ESC  ENTER
```

F0308.EPS

3.4.2 Process Variable Setup

(1) Changing the allocation to PV

See 3.4.3(1) Changing the allocation to PV.

(2) Changing the allocation to SV

Example: To set SV to **Pres.**

Call up the **Change SV assgn** display.

1. Device setup
1. Process variables
8. Output vars
2. SV
2. Change SV assgn

1

```
EJX-MV:YOKOGAWA
Current SV is Pres
Select new SV
1 Flow
2 Pres
3 SP
4 ET
                ABORT ENTER
```

F4 (ENTER)

Select **Pres** and press **ENTER (F4).**

F0308a.EPS

(3) Changing the allocation to TV

Example: To set TV to **SP.**

Call up the **Change TV assgn** display.

1. Device setup
1. Process variables
8. Output vars
2. TV
2. Change TV assgn

1

```
EJX-MV:YOKOGAWA
Current TV is Pres
Select new TV
1 Flow
2 Pres
3 SP
4 ET
                ABORT ENTER
```

F4 (ENTER)

Select **SP** and press **ENTER (F4).**

F0308b.EPS

(4) Changing the allocation to 4V

Example: To set 4V to **ET**.

Call up the **Change 4V assgn** display.

1. Device setup
1. Process variables
8. Output vars
2. 4V
2. Change 4V assgn

1

```
EJX-MV:YOKOGAWA
Current 4v is SP
Select new 4v
1 Flow
2 Pres
3 SP
4 ET
                ABORT ENTER
```

F4 (ENTER)

Select **ET** and press **ENTER (F4).**

F0308c.EPS

3.4.3 Keypad input

When the PV's value is changed, the value of the variable selected by PV at that time is changed. For example, when PV LRV is changed in the state whose PV is Pres, Pres LRV is changed too.

(1) Changing the allocation to PV

Example: To set PV to **Pres.**

Call up the **Change PV assgn** display.

1. Device setup
↓
3. Basic Setup
↓
3. Keypad input
↓
2. Change PV assgn

1

```
EJX-MV:YOKOGAWA
Current PV is Pres
Select new PV
1 Flow
2 Pres
3 SP
4 ET
          ABORT  ENTER
```

F4 (ENTER)

Select **Pres** and press **ENTER (F4).**

F0308d.EPS

(2) Changing the PV Range

The range values are factory-set as specified by the customer. To change the range, follow the steps below.

The measurement span is determined by the upper and lower range values. In this method, the upper and lower range values can be set independently, and the span changes according to the range limit values sent to the transmitter.

Example: To change the range from **0 to 2500 mmH_2O** to **500 to 3500 mmH_2O.**

Call up the **Keypad input** display.

1. Device setup
↓
3. Basic setup
↓
3. Keypad input

1

```
EJX-MV:YOKOGAWA
Keypad input
 1 PV LRV      0.0 mmH2O
 2 PV URV   2500.0 mmH2O
 3 PV Unit         mmH2O
 4 PV LSL -10197.2 mmH2O
 5 PV USL  10197.2 mmH2O
HELP  SAVE  HOME
```

To change the Lower Range Value, select the **LRV** item.

2

```
EJX-MV:YOKOGAWA
LRV
          0.0 mmH2O
          0.0
HELP  DEL  ESC  ENTER
```

'5 0 0' F4 (ENTER)

Enter **500**, and press **ENTER (F4)**.

3

```
EJX-MV:YOKOGAWA
Keypad input
 1 PV LRV    500.0 mmH2O
 2 PV URV   2500.0 mmH2O
 3 PV Unit         mmH2O
 4 PV LSL -10197.2 mmH2O
 5 PV USL  10197.2 mmH2O
HELP  SEND  HOME
```

To change the Upper Range Value, select the **URV** item.

4

```
EJX-MV:YOKOGAWA
URV
       2500.0 mmH2O
       2500.0
HELP  DEL  ESC  ENTER
```

'3 5 0 0' F4 (ENTER)

Enter **3500**, and press **ENTER (F4)**.

5

```
EJX-MV:YOKOGAWA
Keypad input
 1 PV LRV    500.0 mmH2O
 2 PV URV   3500.0 mmH2O
 3 PV Unit         mmH2O
 4 PV LSL -10197.2 mmH2O
 5 PV USL  10197.2 mmH2O
HELP  SEND  HOME
```

F2 (SEND)

Press **SEND (F2)** to send the changed data to the transmitter. Check that SEND disappears.

F0310.EPS

NOTE

The calibration range can be set as PV LRV > PV URV under the following conditions, reversing the 4 to 20 mA output signal.

PV LSL −10% of USL ≦ PV LRV ≦ PV USL +10% of USL
PV LSL −10% of USL ≦ PV URV ≦ PV USL + 10% of USL
|PV URV − PV LRV| ≧ PV Min. Span

If PV is flow, PV LRV and PV URV must be the following conditions.

0 ≦ PV LRV
0 ≦ PV URV
PV LRV < PV URV

The flow range is set to LRV=0 and URV=100 when the Flow calc mode is changed to Basic mode or Full Auto mode.

If PV is ET, PV LRV and PV URV must be the following conditions.

−210°C ≦ PV LRV ≦ 860°C (−346°F ≦ PV LRV ≦ 1580°F)
−210°C ≦ PV URV ≦ 860°C (−346°F ≦ PV URV ≦ 1580°F)
|PV URV - PV LRV| ≧ PV Min. Span

(3) PV Unit

The “PV unit” parameter is set at the factory before shipment if specified at the time of order. Follow the procedure below to change the unit parameter.

Depending on the current setting for PV, changing this parameter also changes the unit for either differential pressure, static pressure, external temperature or flow display.

(4) PV Damp

The damping time constant is set as specified in the order when the instrument is shipped. Follow the procedure below to change the damping time constant. The damping time constant for the amplifier assembly can be set here. The damping time constant for the entire transmitter is the sum of the values for the amplifier assembly and the capsule assembly.

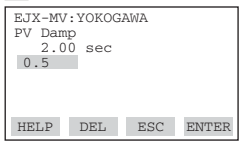
Any number from 0.00 to 100.00 can be set for the damping time constant.

Example: To change from **2.0** seconds to **0.5** seconds.

Call up the **PV Damp** display.

1. Device setup
↓
3. Basic setup
↓
3. Keypad Input
↓
6. PV Damp

1

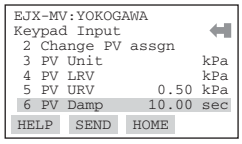


‘0 . 5’

(ENTER)

Enter **0.5** and press **ENTER (F4)**.

2



Press **SEND (F2)** to send the data to the transmitter.

F0313.EPS

3.4.4 Units

(1) Pres Unit

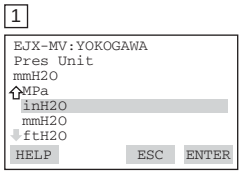
The “Pres Unit” parameter is set at the factory before shipment if specified at the time of order. Follow the procedure below to change the unit parameter.

Changing this parameter also changes the unit for the differential pressure display.

Example: To change the unit from **mmH_2O** to **inH_2O**

1. Device setup
↓
3. Basic setup
↓
2. Units
↓
1. Pres Unit

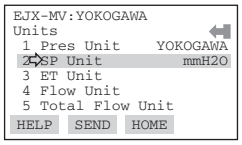
1



(ENTER)

Select the desired unit and press **ENTER (F4)**.

2



(SEND)

Press **SEND (F2)** to send the data to the transmitter, then check to confirm that SEND disappears.

F0309.EPS

Note that the Yokogawa default setting for the standard temperature is 4°C (39.2°F). For the units of mmH_2O, inH_2O, and ftH_2O, the pressure varies according to the standard temperature definition. Select the appropriate unit with @68degF when a standard temperature of 20°C (68°F) is required.

Available pressure units are shown below.

inH_2O@68degF	mbar	MPa
inHg	g/cm2	inH2O
ftH2O@68degF	kg/cm2	mmH2O
mmH2O@68degF	Pa	ftH2O
mmHg	kPa	hPa
psi	torr	
bar	atm	

T0303.EPS

(2) SP Unit

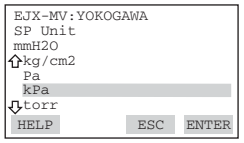
Follow the procedure to change the static pressure unit.

Changing this parameter also changes the unit for the static pressure display.

Example: Change the static pressure unit from **mmH$_2$O** to **kPa**.

1. Device setup
↓
3. Basic setup
↓
2. Units
↓
3. SP Unit

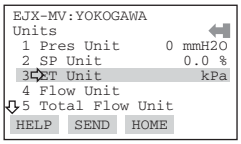
1



(ENTER)

Select **kPa** and Press **ENTER (F4)**.

2



(SEND)

Press **SEND (F2)** to send the data to the transmitter, then check to confirm that SEND disappears.

F0324.EPS

Available pressure units are shown below.

inH$_2$O@68degF	mbar	MPa
inHg	g/cm2	inH2O
ftH2O@68degF	kg/cm2	mmH2O
mmH2O@68degF	Pa	ftH2O
mmHg	kPa	hPa
psi	torr	
bar	atm	

T0303.EPS

(3) ET Unit

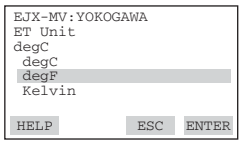
When the instrument is shipped, the **ET** (external temperature) units are set to **degC**. Follow the procedure below to change this setting.

When this parameter is set, it also changes the temperature unit for **ET**, **Cap temp**, and **Amp temp** at **Process variables**.

Example: Change the unit for the temperature display from **degC** to **degF**.

1. Device setup
↓
3. Basic setup
↓
2. Units
↓
3. ET Unit

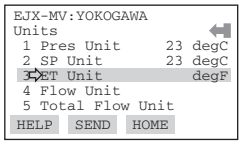
1



(ENTER)

Select **degF** (Fahrenheit), and Press **ENTER (F4)**.

2



(SEND)

Press **SEND (F2)** to send the data to the transmitter, then check to confirm that SEND disappears.

F0323.EPS

Available temperature units are **degC**, **degF**, and **Kelvin**.

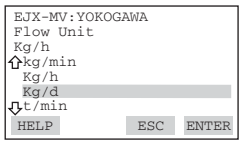
(4) Flow Unit

When the instrument is shipped, the flow units are set to **kg/h**. Follow the procedure below to change this setting.

Example: Change the unit for the flow display from **kg/h** to **kg/d**.

1. Device setup
↓
3. Basic setup
↓
2. Units
↓
4. Flow Unit

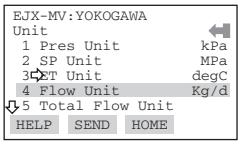
1



(ENTER)

Select **kg/d** and Press **ENTER (F4)**.

2



(SEND)

Press **SEND (F2)** to send the data to the transmitter, then check to confirm that SEND disappears.

F0323a.EPS

Available flow units are shown below.

Mass Flow

g/s	t/min	STon/min
g/min	t/h	STon/h
g/h	t/d	STon/d
kg/s	lb/s	LTon/h
kg/min	lb/min	LTon/d
kg/h	lb/h	
kg/d	lb/d	

Volume Flow

CFM	ft3/d	bbl/s
GPM	m3/s	bbl/min
L/min	m3/d	bbl/h
ImpGal/min	ImpGal/h	bbl/d
m3/h	ImpGal/d	gal/h
gal/s	Nm3/h	ImpGal/s
Mgal/d	NL/h	L/h
L/s	SCFM	gal/d
ML/d	CFH	
CFS	m3/min	

T0304.EPS

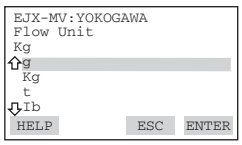
(5) Total Flow Unit

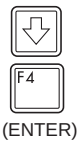
When the instrument is shipped, the total flow units are set to **kg**. Follow the procedure below to change this setting.

Example: Change the unit for the total flow display from kg to g.

1. Device setup
↓
3. Basic setup
↓
2. Units
↓
5. Total Flow Unit

1

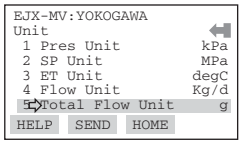




(ENTER)

Select **g** and Press **ENTER (F4)**.

2



(SEND)

Press **SEND (F2)** to send the data to the transmitter, then check to confirm that SEND disappears.

F0323b.EPS

Available flow units are shown below.

g	gal	in3
kg	L	Nm3
t	ImpGal	NL
lb	m3	SCF
STon	bbl	Spcl *
LTon	yd3	
oz	ft3	

T0305.EPS

*The user unit is displayed on LCD.
To configure the user unit, refer to 3.5.3.

3.4.5 Output Signal Low Cut Mode Setup

Low cut mode can be used to stabilize the output signal near the zero point.

The low cut point in set with differential pressure range. The range can be set from 0 to 20 %. (Hysteresis for the cut point: ±10% of the cut point)

Either **ON** or **OFF** can be selected as the low cut mode. Unless otherwise specified, the cut mode is set to OFF at the factory.

Example: To set the low cut range to 20% and the cut mode to ZERO in the **Pres output**, proceed as follows.

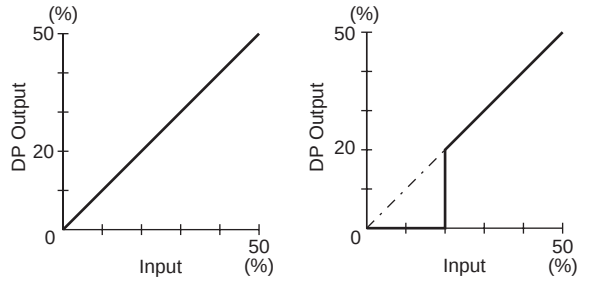
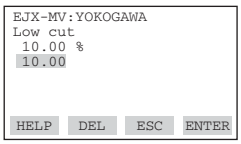


Figure 3.3 Low Cut Mode

1. Device setup
3. Basic setup
5. Others
1. Low Cut and 2. Low cut mode

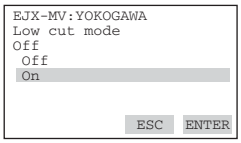
1



'2 0'
F4
(ENTER)

Call up **Low cut**, and set to 20%.

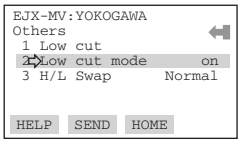
2



F4
(ENTER)

Select the **Low cut mode**, and set to **on**.

3



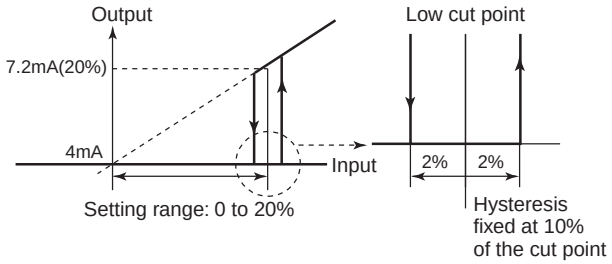
F2
(SEND)

Press **SEND (F2)** to send the date, then check to confirm that SEND disappears.

F0315.EPS

The low cut point has hysterisis so that the output around the point is behaved as below figure.

<Example>
Output mode: Linear
Low cut mode: Zero
Low cut: 20.00%



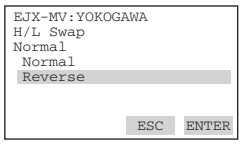
3.4.6 Impulse Line Connection Orientation Setup

This function reverses the impulse line orientation. Follow the procedure below to make this change.

Example: Assign the high pressure impulse line connection to the L side of the transmitter.

1. Device setup
3. Basic setup
5. Others
3. H/L Swap

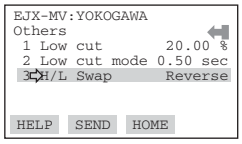
1



F4
(ENTER)

Call up the **H/L Swap** Display Select **Reverse**, and press **ENTER (F4)**.

2



F2
(SEND)

Press **SEND (F2)** to send the data to the transmitter, then check to confirm that SEND disappears.

F0316.EPS

3.5 Detailed Setup

Flow and total flow can be displayed as a calculated value. Pressure, static pressure, and external temperature can be displayed as a measured input. Selected one value can be output by the 4-20 mA signal for measured PV.

3.5.1 Signal Condition

a. Flow Setup

The **Flow Setup** parameters allow the setting of the range, unit, and damping time constant for the flow.

b. DP Setup

The **DP Setup** parameters allow the setting of the range, unit, and damping time constant for the differential pressure.

c. SP Setup

The **SP Setup** parameters allow the setting of the range, unit, and damping time constant for the static pressure.

Note either the high or low pressure side of the capsule can be selected to monitor the static pressure by **SP H/L Select** parameter.

d. ET Setup

The **ET Setup** parameters allow the setting of the range, unit, and damping time constant for the external temperature.

You can set **Fixed ET** and **Fixed ET val.** See 3.5.2 External. Temperature Fixation Mode.

e. Total Flow

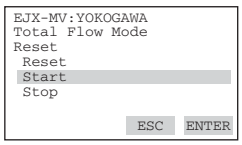
The **Total Flow** parameters allow the setting of the unit for the total flow, the scaled pulse rate, and total flow measuring mode.

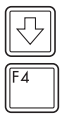
You can set and modify special unit for total flow.

Example: To start total flow measuring.

1. Device setup
↓
4. Detailed setup
↓
2. Signal condition
↓
5. Total Flow
↓
5. Total Flow Mode

1

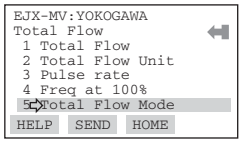




(ENTER)

Select **Start**, and press **ENTER (F4)**.

2



(SEND)

Press **SEND (F2)** to send the changed data to the transmitter. Check that SEND disappears.

F0316a.EPS

To stop total flow measuring, call up the **Total Flow Mode** display and set **Stop**.

To reset total flow value, call up the **Total Flow Mode** display and set **Reset.**

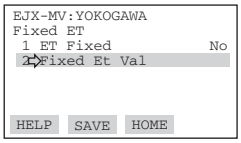
3.5.2 External Temperature Fixation Mode

The external temperature can be fixed with this mode.

Example: The external temperature is fixed at 15°C.

1. Device setup
4. Detailed setup
2. Signal condition
4. ET Setup
8. Fixed ET

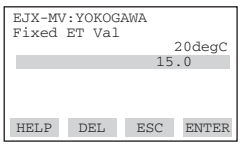
1



or 2

To adjust external temperature fixation value to 15°C, select the **Fixed ET Val** item.

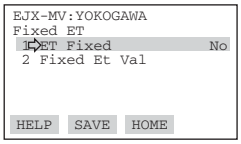
2



F4 (ENTER)

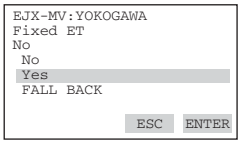
Enter 15.0, and press **ENTER (F4)**.

3



To enable fixation mode, select the **ET Fixed** item.

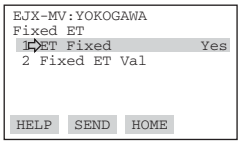
4



F4 (ENTER)

Select **Yes** and press **ENTER (F4)**.

5



F2 (SEND)

Press **SEND (F2)** to send the changed data to the transmitter. Check that SEND disappears.

F0323b-2.EPS

To release fixation mode, call up the **ET Fixed** display and set **No**.

3.5.3 User unit configuration for total flow

Config User Unit parameters allow the special unit for total flow and scale to be displayed. At **Set Base Unit**, the following special units can be selected from a list.

Alternately, up to eight alphanumeric characters, spaces or slashes (/) can be input on the keypad at **Modify Unit**; only the first six are displayed on the integral indicator.

Select the unit from the **Set Base Unit** list.

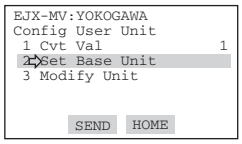
g	oz	yd3
kg	gal	ft3
t	L	In3
lb	Impgal	Nm3
STon	m3	NL
LTon	bbl	SCF

T0306.EPS

Example: Set the special total flow unit as KLB(= 1000 lb) based kg. (1 kg = 2.2046E-03 KLB)

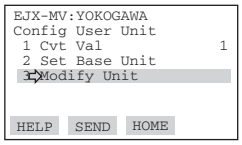
1. Device setup
4. Detailed setup
2. Signal condition
5. Total Flow
6. Config User Unit

1



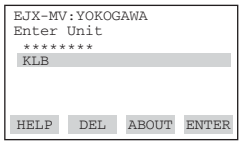
Call up the **Set Base Unit**, select **kg**, and press **ENTER (F4)**. This method ends automatically.

2



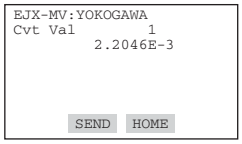
Call up the **Modify Unit**.

3



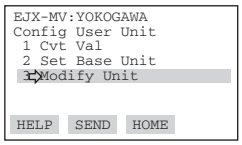
Set KLB, and press **ENTER (F4)**.

4



Call up the **Cvt Val**.
Set the conversion value of a special unit to a base unit.

5



F2 (SEND)

Press **SEND (F2)** to send the changed data to the transmitter. Check that SEND disappears.

F0323c.EPS

Typical Unit Conversion Factor

Use “kg” in case of mass flow
Use “m3” in case of volume flow
Use “Nm3” in case of normal or standard volume flow

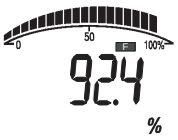
T0322.EPS

Set Base Unit	User Unit	Convert val
kg	g	1.0000E+03
	kg	1.0000E+00
	t	1.0000E-03
	lb	2.2046E+00
	STon	1.1023E-03
	LTon	9.8421E-04
	oz	3.5274E+01
m3	gal	2.6417E+02
	L	1.0000E+03
	ImpGal	2.1997E+02
	m3	1.0000E+00
	bbl	6.2898E+00
	bushel	2.8378E+01
	yd3	1.3080E+00
	ft3	3.5315E+01
	in3	6.1024E+04
	bbl	6.2898E+00
	hl	1.0000E+01
Nm3	Nm3	1.0000E+00
	NL	1.0000E+03
	SCF	3.5315E+01

T0321.EPS

3.5.4 Integral Indicator Scale Setup

The following seven displays are available for integral indicators: % of PV range, flow, input differential pressure, input static pressure, input ext. temp, user set scaled PV, and total flow. A cycle of up to four displays can be shown by assigning variables to the parameters at **Disp select.**

Available displays	Description and related parameters
% of PV range (PV %) 	Indicates input value depending on the set PV range (**PV LRV** and **PV URV**). `PV %  92.4 %`
Flow 	Indicates values of calculated flow with the indication limits –99999 to 99999. `Flow  26.0 kg/h`
Input differential pressure (Pres) 	Indicates values of input differential pressure with the indication limits –99999 to 99999. `PRES  45.6 kPa`
Input static pressure (SP) 	Indicates values of input static pressure with the indication limits –99999 to 99999. `SP  6.178 MPa`
Input ext. temperature (EXT. TEMP) 	Indicates values of input external temperature with the indication limits –99999 to 99999. `ET  22.95 degC`

User set scaled PV (ENGR.PV) 	Indicates values depending on the engineering range (**Engr LRV** and **Engr URV**) with the unit (**Engr Unit**).
	`Engr  LRV 0.0`
	`Engr  URV 45.0`
	`Engr  exp x100`
	`Engr  Unit m3/min`
	`Engr  point 1`

Total flow (TOTAL FLOW) 	Indicates values of calculated total flow with the indication limits –999999 to 999999. `Total Flow 123.45 kg`

T0306-2.EPS

See (a.) through (d.) for the setting procedures.

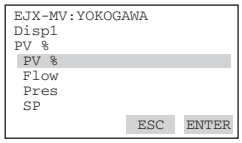
a. Display Selection

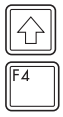
At **Disp select**, select the variable that the parameter **Disp1** will display on the integral indicator.

Example: Change from **PV %** to **Pres** for the display.

1. Device setup
↓
4. Detailed setup
↓
4. Display condition
↓
1. Disp select
↓
1. Disp1

1

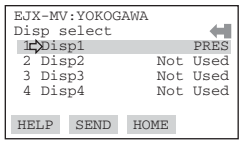




(ENTER)

Call up the **Disp Out 1** display. Select **PRES**, and press **ENTER (F4)**.

2



(SEND)

Press **SEND (F2)** to send the data to the transmitter, then check to confirm that SEND disappears.

F0320.EPS

b. Cyclic Display

In addition to the display set at **Disp1**, displays can be set at **Disp2**, **Disp3**, and **Disp4** for cyclic display in the order of the parameter number.

c. Display Resolution

You can set the number of digits below the decimal point when the value is displayed with integral indicator.

(1) Disp % reso
Use for the number of decimals of **PV %**.

(2) Flow disp point
Use for the number of decimals of **Flow**.

(3) DP disp point
Use for the number of decimals of **Pres**.

(4) SP disp point
Use for the number of decimals of **SP**.

(5) ET disp point
Use for the number of decimals of **EXT. TEMP**.

(6) Engr point
Use for the number of decimals of **ENGR.PV**.

(7) TF disp point
Use for the number of decimals of **Total Flow**.

d. User Setting of Engineering Unit and Scale

Enter disp range parameters allow the engineering unit and scale to be displayed. At **Set Engr Unit**, the following engineering units can be selected from a list. Alternately, up to eight alphanumeric characters, spaces or slashes (/) can be input on the keypad at **Modify Engr Unit**; only the first six are displayed on the integral indicator.

Select the unit from the **Set Engr Unit** list.

kPa	ftH2O	Nl/min
MPa	gf/cm2	Nm3/h
mbar	kgf/cm2	Nm3/min
bar	kg/cm2G	ACFH
psi	kg/cm2A	ACFM
psia	atm	SCFH
mmH2O	kg/h	SCFM
mmHg	t/h	GPH
mmHgA	m3/h	GPM
mmAq	m3/min	m
mmWG	l/h	mm
Torr	l/min	in
inH2O	kl/h	ft
inHg	kl/min	kg/m3
inHgA	Nl/h	g/cm3

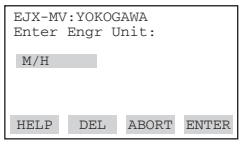
T0307.EPS

Follow the procedure below to set your own unit.

Example: Set the engineering unit as **M/h**.

1. Device setup
↓
4. Detailed setup
↓
4. Display condition
↓
4. Engr disp range
↓
7. Modify Engr Unit

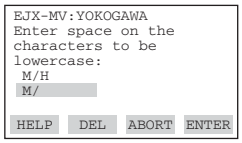
1

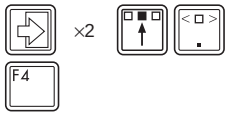


(ENTER)

Call up the **Modify Engr Unit**. Set **M/H**, and press **ENTER (F4)**.

2





(ENTER)

Enter a space instead of a character to display the character in lowercase, and press **ENTER (F4)**.

F0321.EPS

Note that following symbols are not available:

% & < > . * : + -

The integral indicator shows "-- -- -- -- -- --" when these are entered.

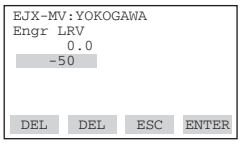
Only one slash (/) can be included in engineering unit. When two or more slashes are included, the integral indicator shows.

Engr LRV and **Engr URV** are used to set the lower and upper range values for the engineering unit display. When the insrument is shipped, these are set as specified in the order.

Example: Set lower range value (LRV) to **–50** and upper range value (URV) to **50**.

1. Device setup
↓
4. Detailed setup
↓
4. Display condition
↓
4. Engr disp range
↓
1. Engr LRV and **2. Engr URV**

1

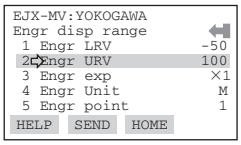


'– 5 0'

(ENTER)

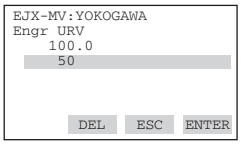
Call up the **Engr LRV** Display.Set **–50**, and press **ENTER (F4)**.

2



Press  to select engr disp URV.

3



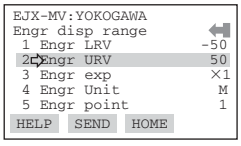
'5 0'

(ENTER)

(SEND)

Set **50**, and press **ENTER (F4)**.

4



(SEND)

Press **SEND (F2)** to send the data to the transmitter, then check to confirm that SEND disappears.

F0322.EPS

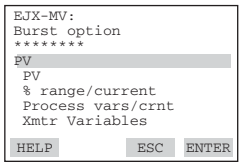
3.5.5 Burst Mode

When the burst mode is set on, the transmitter continuously sends stored data. Either the pressure value, % range/current value, current/process, or Xmtr Variables variables can be selected and sent. The data is sent approximately three times per second as a digital signal when the transmitter is set in burst mode. When data is being sent in burst mode, other operations can be performed with the HART communicator.

Setting of Burst Mode

1. Device setup
↓
4. Detailed setup
↓
3. Output condition
↓
3. HART output
↓
3. Burst mode and **4. Burst option**

1

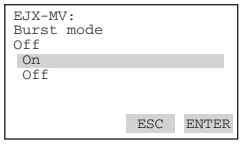


(ENTER)

Call up the **Burst option**, and set the data to be sent.

- PV: Primary variable (Pressure value)
- % range/current: Output in % and mA
- Process vars/crnt: Output in mA and process variables (pressure value, static pressure value, and sensor temp value)
- Xmtr Variables: Output up to 4 transmitter variables.

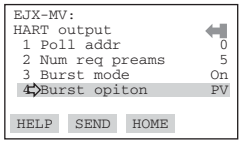
2



(ENTER)

Call up the **Burst mode** and set to **On**.

3



(SEND)

Press **SEND (F2)** to send the data to the transmitter, then check to confirm that SEND disappears.

F0334.EPS

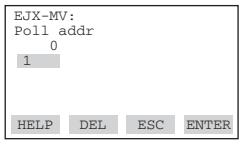
To release Burst Mode, call up the **Burst mode** display and set it to **Off**.

3.5.6 Multidrop Mode

”Multidropping” transmitters refers to the connection of several transmitters to a single communications transmission line. Up to 15 transmitters can be connected when set in the multidrop mode. To activate multidrop communication, the transmitter address must be changed to a number from 1 to 15. This change deactivates the 4 to 20 mA analog output, sending it to 4 mA. The alarm current is also disabled.

Setting of Multidrop Mode

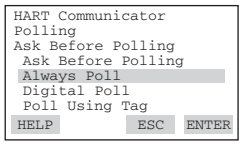
1. Device setup
↓
4. Detailed Setup
↓
3. Output condition
↓
3. HART Output
↓
1. Poll addr



Call up the **Poll addr** and set the polling address. (a number from 1 to 15)
And press **SEND (F2)** to send the data.

• Then make sure the communicator setting is as follows.

2. Online
↓
4. Utility
↓
1. Configure Communication
↓
1. Polling



(ENTER)

Confirm that **Always Poll**, **Ask Before Polling**, or **Digital Poll** is specified, and press **ENTER (F4)**.

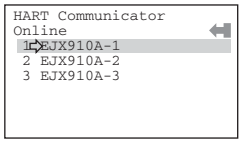
F0335.EPS

NOTE

1. When the polling option is set as **Never Poll** or **Poll Using Tag**, the online menus cannot be called up and displayed. Be sure to select a polling option such as **Ask Before Polling**.
2. When the same polling address is set for two or more transmitters in multidrop mode, communication with these transmitters is disabled.

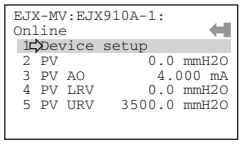
Example: Communication when set in multidrop mode.

1



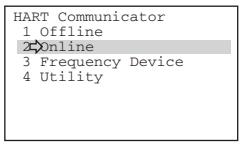
(1) The HART communicator searches for a transmitter that is set in multidrop mode when it is turned on.
When the HART communicator is connected to the transmitter, the polling address and the tag will be displayed (display 1).

2



(2) Select the desired transmitter. After that, normal communication to the selected transmitter is possible. However, the communication speed will be slow (display 2).

3



(3) To communicate with another transmitter, turn off the power once and then turn on it again, or call up display 3 and select **Online**.
(4) Display 1 will appear. Select the desired transmitter.

F0336.EPS

To release multidrop mode, follow the procedure below.

1. Call up the **Poll addr** display and set the address to 0.
2. Call up the **Polling** display and set **Ask Before Polling**.

3.5.7 External Switch Mode

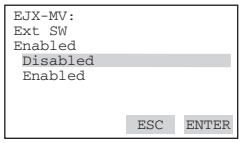
Follow the procedure below to enable or inhibit zero point adjustment by means of the zero-adjustment screw on the transmitter.

This is set to **Enabled** when the instrument is shipped.

Example: Set the mode to inhibit zero adjustment by means of the external zero-adjustment screw.

1. Device setup
↓
4. Detailed setup
↓
5. Device information
↓
1. Field device info
↓
9. Ext SW

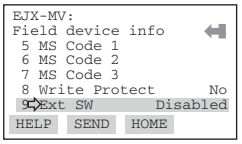
1



(ENTER)

Select **Disabled** and press **ENTER (F4)**.

2



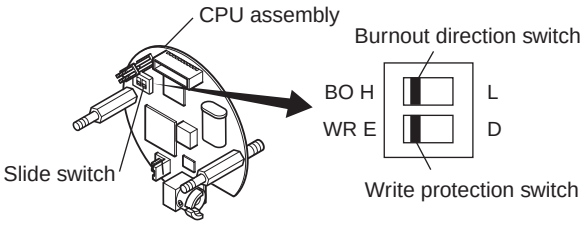
(SEND)

Press **SEND (F2)** to send the data to the transmitter, then check to confirm that SEND disappears.

F0337.EPS

3.5.8 CPU Failure Burnout Direction and Hardware Write Protect

There are two slide switches on the CPU assembly board. One sets the burnout direction at CPU failure, and the other sets a write protection function which disables parameter changes through the use of a handheld terminal or some other communication method.



Burnout direction switch (BO)		
Burnout Direction Switch Position	H E L D	H E L D
Burnout Direction	HIGH	LOW

Hardware write protection switch (WR)		
Write Protection Switch Position	H E L D	H E L D
Write Protection	NO (Write enabled)	YES (Write disabled)

F0340.EPS

The parameter of **AO alm typ** parameter displays the status of 4-20 mA DC output if a CPU failure occurs. In case of a failure, communication is disabled.

Standard specifications

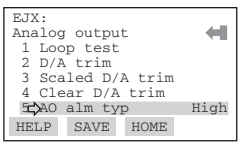
The burnout direction switch is set to HIGH. If a failure occurs, the transmitter outputs a 110% or higher signal.

Burnout Low

The burnout direction switch is set to LOW. If a failure occurs, a –2.5% or lower output is generated.

Example: Confirming the burnout direction at the CPU failure.

1. Device setup
4. Detailed setup
3. Output condition
2. Analog output
5. AO alm typ



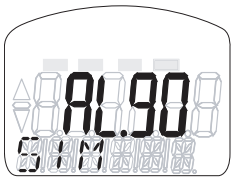
F0341.EPS

3.5.9 Simulation Mode

The flow value can be calculated by using pseudo values instead of using actual measurements of differential pressure, static pressure, and external temperature.

This is called ”flow simulation mode.”

The output current value becomes the simulation value and the LCD continuously displays the simulation value and alarm (AL.90 SIM) in alternating sequence.



Simulation continues for 10 minutes, then is released automaticaly.
The output value of current, LCD, and communication is as follows.

Process value	Contents
DP	Simulation value
SP	Simulation value
ET	Simulation value
Flow Rate Total Flow	The operation value which used the simulation value of DP, SP, ET

T0308.EPS

Function Which Can be Checked by Simulation

DP Simulation value	H/L Reversal Scaling DP LIMIT Output Filter DP(%)Range upper minimum Check HI/ LO ALARM Judgment Low cut
SP Simulation value	Scaling SP LIMIT Output Filter SP(%)Range upper minimum Check HI/ LO ALARM Judgment A/G Select H/L Select
ET Simulation value	Output Filter HI/ LO ALARM Judgment Scaling SP(%)Range upper minimum Check HI/ LO ALARM Judgment ET(%)Range upper minimum Check

T0309.EPS

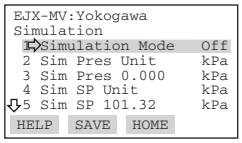
If one of following alarm occurs, all the output data is hold to the value before alarm occurs.

AL.01 (CAP. ERR)
AL.02 (AMP. ERR)
AL.03 (ET. ERR)

Example: Set the simulation mode to (DP, SP, ET) = (ON, ON, ON).

1. Device setup
4. Detailed setup
7. Simulation

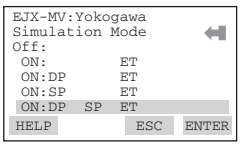
1



or 1

To set the simulation mode, select the Simulation **Mode** item.

2



×7

(ENTER)

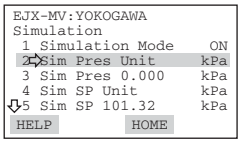
Select ”ON:DP,SP,ET”, and press **ENTER (F4)** .

F0337a.EPS

Example: Setting of simulation condition:
DP = 5kPa, SP = 5MPa, ET = 98degC.

1. Device setup
↓
4. Detailed setup
↓
7. Simulation

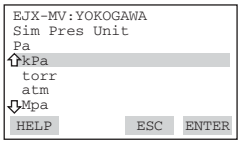
1



or 2

To set differential pressure unit for simulation, select the **Sim Pres Unit** item.

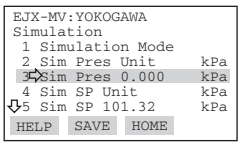
2



F4 (ENTER)

Select kPa and press **ENTER (F4)** .

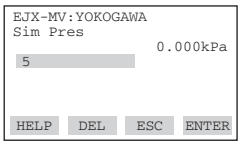
3



or 3

To set differential pressure value for simulation, select the **Sim Pres** item.

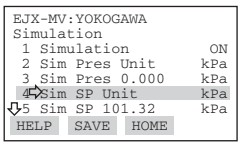
4



'5'
F4 (ENTER)

Set '5'and press **ENTER (F4)**.

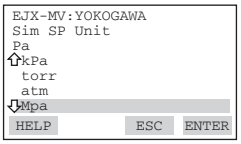
5



or 4

To set static pressure unit for simulation, select the **Sim SP Unit** item.

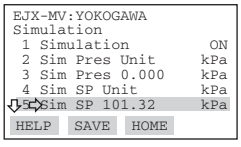
6



F4 (ENTER)

Select **MPa** and press **ENTER (F4)**.

7

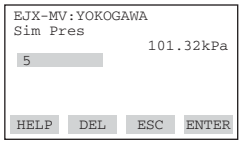


or 5

To set static pressure value for simulation, select the **Sim SP** item.

F0332a.EPS

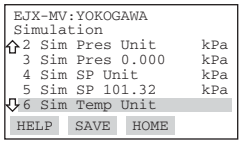
8



'5'
F4 (ENTER)

Set '5'and press **ENTER (F4)**.

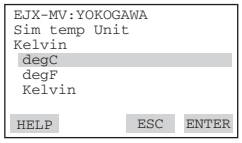
9



or 6

To set external temperature unit for simulation, select the **Sim ET Unit** item.

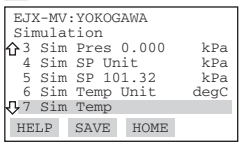
10



F4 (ENTER)

Select **degC** and press **ENTER (F4)** .

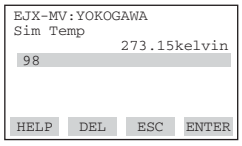
11



or 7

To set external temperature value for simulation, select the **Sim ET** item.

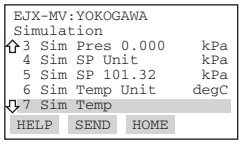
12



'98'
F4 (ENTER)

Set '98'and press **ENTER (F4)**.

13



F2 (SEND)

Press **SEND (F2)** to send the changed data to the transmitter. Check that SEND disappears.

F0333a.EPS

3.5.10 Basic Flow Calculation (Basic mode)

In the case of Basic mode, flow operation and density compensation are performed conventionally with the flow factors manually input.

The flow rate is calculated using the constant flow factor.

Density is compensated as follows according to the selection of gas or liquid.

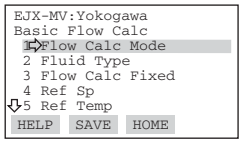
Gas: Compensation as ideal gas by temperature and pressure.

Liquid: Compensation by temperature.

Example: Enable Basic mode.

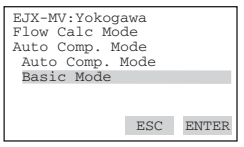
1. Device setup
↓
4. Detailed setup
↓
8. Basic Flow Calc

1



To enable Basic mode, select the **Flow Calc Mode** item.

2




(ENTER)

Select Basic Mode, and press **ENTER (F4)** .

F0337b.EPS

To escape from Basic mode, set **Flow Calc Mode** to Auto Comp. Mode.
The parameters in Table 3.2 are required to set up flow calculation in Basic mode.

Table3.2 Basic Flow Calc Set-up Steps

Step	Parameter	Contents	Remarks
1	**Flow Calc Mode**	Select Basic Mode	
2	Fluid Type	Select liquid or gas	
3	Flow Calc Fixed	Input Kfactor	Kfactor calculated by Table 3.3 Flow Equation and Kfactor Calculation
4	Ref SP	Input reference static pressure	This factor is used for gas. When fluid type is liquid, set 0 to Ref SP(Spb).
5	Ref Temp	Input reference temperature	
6	Temp K1	Input the density rate of change per temperature 1degC.	This factor is used for mass flow and normal standard volume flow of liquid. When fluid type is gas or volume flow of liquid, set 0 to TempK1. Refer to Table 3.4 Symbol

T0310.EPS

Equation for Basic flow calculation

The flow equation shown in Table 3.3 is applied to the transmitter by combination of fluid type and flow unit category.

Table 3.3 Flow Equation and Kfactor Calculation

Fluid Type	Flow unit category	Kfactor *2	Flow Equation
liquid	Mass Flow	Kfactor = $\pi/4 \times Nc \times C / \sqrt{1-\beta^4} \times \epsilon \times d^2 \times \sqrt{2 \times \rho b}$	Qm or Qv or Qv_norm = **Kfactor** $\times \sqrt{\Delta\rho} \times (1+$ **Temp K1** $\times$ (T-**Tb**)) *1
	Normal-Standard Volume Flow	Kfactor = $\pi/4 \times Nc \times C / \sqrt{1-\beta^4} \times \epsilon \times d^2 \times \sqrt{2 \times \rho b} / \rho$ norm	
	Volume Flow	Kfactor = $\pi/4 \times Nc \times C / \sqrt{1-\beta^4} \times \epsilon \times d^2 \times \sqrt{2 / \rho b}$	
Gas	Mass Flow	Kfactor = $\pi/4 \times Nc \times C / \sqrt{1-\beta^4} \times \epsilon \times d^2 \times \sqrt{2 \times \rho b \times 1/K}$	Qm or Qv or Qv_norm = **Kfactor** $\times \sqrt{\Delta\rho} \times$ **Tb**/T $\times$ SP/**SPb** *1
	Normal-Standard Volume Flow	Kfactor = $\pi/4 \times Nc \times C / \sqrt{1-\beta^4} \times \epsilon \times d^2 \times \sqrt{2 \times \rho b \times 1/K} / \rho$ norm	
	Volume Flow	Kfactor = $\pi/4 \times Nc \times C / \sqrt{1-\beta^4} \times \epsilon \times d^2 \times \sqrt{2 / (\rho b \times 1/K)}$	= **Kfactor** $\times \sqrt{\Delta\rho \times T/$ **Tb** $\times$ **SPb**/SP *1

T0311.EPS

*1 ═══ mark indicate user input.

*2 Kfactor must be calculated according to the specified flow unit.

Table 3.4 Flow Factor

No	Symbol	Description
1	Qm	Mass Flow
2	Qv	Volume Flow
3	Qv_norm	Normal-Standard Volume Flow
4	Nc	Unit convert factor
5	Kfactor	Basic flow Calcuration factor
6	C	Discharge Coefficient
7	ϵ	Expansion Factor
8	β	Diameter Ratio
9	d	Diameter of orifice
10	Δp	Differential Pressure (Transmitter Setting unit)
11	ρb	Base Density on Tb, SPb Condition
12	ρnorm	Density on Normal, Standard condition
13	Tb	Reference temperature unit: K
14	T	Temperature unit: K
15	SPb	Reference static pressure unit: kPa abs
16	SP	Static Pressure unit: kPa abs
17	Temp K1	The density rate of change per temperature 1degC of a density base value (value which set 100% to 1) For volume flow: set 0.
18	K	Compressibility factor

T0312.EPS

Note

1. The flow unit is not aoutomatically converted. Refer to IM 01C25R01-01E for Nc calculation.
2. Kfactor, SPb, and Tb are calculated using the equipment setting unit (differential pressure, static pressure, and temperature).
3. Total flow is calculated using the transmitter setting unit.

Flow unit category

Table 3.5 Mass Flow Unit

Unit	LCD	Communication
grams per second	g/s	←
grams per minute	g/m	g/min
grams per hour	g/h	←
Kilograms per second	kg/s	←
kilograms per minute	kg/m	kg/min
kilograms per hour	kg/h	←
kilograms per day	kg/d	←
metric tons per minute	t/m	t/min
metric tons per hour	t/h	←
metric tons per day	t/d	←
pounds per second	lb/s	←
pounds per minute	lb/m	lb/min
pounds per hour	lb/h	←
pounds per day	lb/d	←
short tons per minute	STon/m	STon/min
short tons per hour	STon/h	←
short tons per day	STon/d	←
long tons per hour	LTon/h	←
long tons per day	LTon/d	←

T0315.EPS

Table 3.6 Normal Standard Volume Flow Unit

Unit	LCD	Communication
normal cubic meter per hour	Nm3/h	←
normal liter per hour	NL/h	←
standard cubic feet per minute	SCFM	←

T0316.EPS

Table 3.7 Volume Flow Unit

Unit	LCD	Communication
cubic feet per minute	CFM	←
gallons per minute	GPM	←
liters per minute	L/m	L/min
imperial gallons per minute	IGal/m	ImpGal/min
cubic meter per hour	m3/h	←
gallons per second	gal/s	←
million gallons per day (FF:mega)	Mgal/d	←
liters per second	L/s	←
million liters per day (FF:mega)	ML/d	←
cubic feet per second	CFS	←
cubic feet per day	ft3/d	←
cubic meters per second	m3/s	←
cubic meters per day	m3/d	←
imperial gallons per hour	IGal/h	ImpGal/h
imperial gallons per day	IGal/d	ImpGal/d
cubic feet per hour	CFH	←
cubic meters per minute	m3/m	m3/min
barrels per second	bbl/s	←
barrels per minute	bbl/m	bbl/min
barrels per hour	bbl/h	←
barrels per day	bbl/d	←
gallons per hour	gal/h	←
imperial gallons per second	IGal/s	ImpGal/s
liters per hour	L/h	←
gallons per day	gal/d	←

T0317.EPS

3.5.11 Software Write Protection

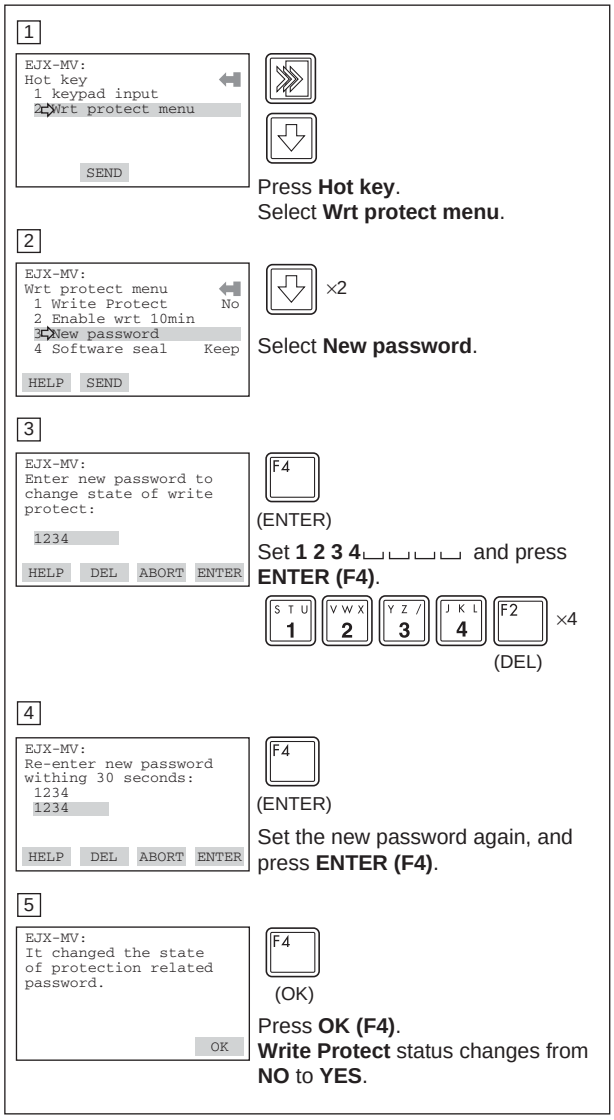
EJX configured data is saved by using a write protection function. The write protection status is set to ”Yes” when 8 alphanumeric characters are entered in the **New password** field and transferred to the transmitter.

When write protection is set to ”Yes,” the transmitter does not accept parameter changes. When the same eight alphanumeric string entered in the **New password** field is also entered in the Enable wrt 10min field and transferred to the transmitter, it will be possible to change transmitter parameters during a 10 minute period.

To change the transmitter from the write protection ”Yes” status back to Write protection ”No” status, use **Enable wrt 10min** to first release the write protection function and then enter eight spaces in the **New password** field.

(1) Setting Password

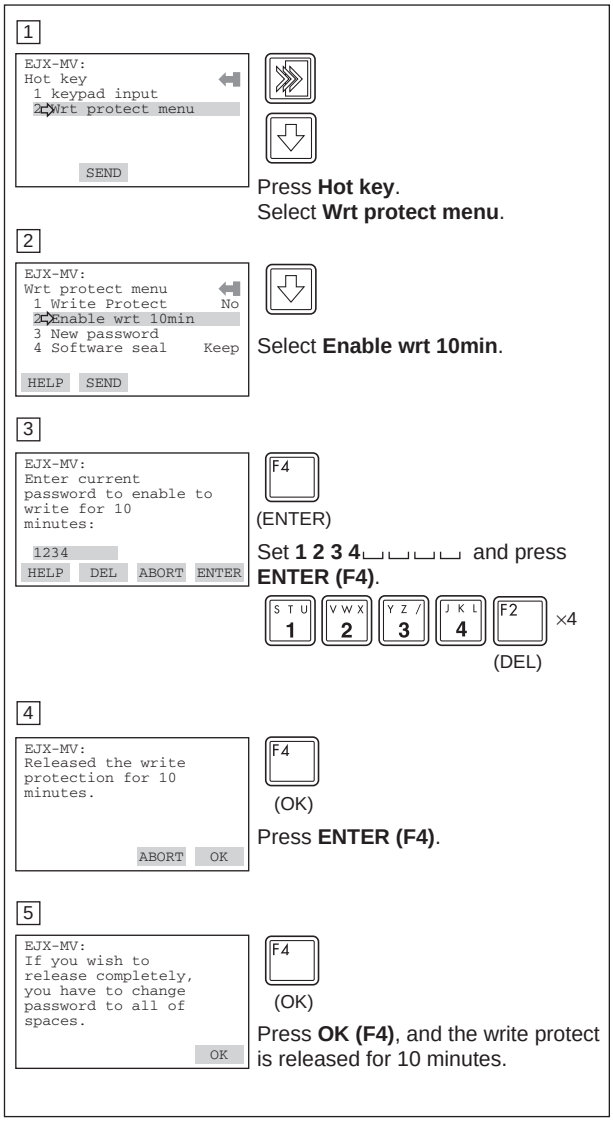
Example: Set the password to **1 2 3 4**␣␣␣␣.



F0338.EPS

(2) Entering Password to Enable the Parameter Changes

Example: Enter the password of **1 2 3 4**␣␣␣␣.



F0339.EPS

(3) Releasing Password

To release the password completely, enter spaces in the **New password** field while the write protect function is released.

(4) Software Seal

When you lose the password that has been registered, it is possible to release the **Write Protect** mode by using the general use password: "YOKOGAWA." When the password is used, the status shown in the parameter of **Software seal** is changed from "KEEP" to "BREAK." The status returns to "KEEP" by entering a newly set password at **Enable wrt 10min**.

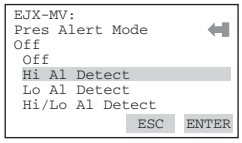
3.5.12 Alarm

The function is used to display the alarm codes when the input differential pressure exceeds the specified value within the calibration range. The same is available for the input static pressure and the external temperature on the pressure sensor. Refer to table 4.1 Alarm Message Summary for the specific alarm code to be generated.

Example: Set the alert mode from **OFF** to **Hi. Al Detect** for the input pressure.

1. Device setup
4. Detailed setup
3. Output condition
4. Process Alerts
1. Pres Alert
1. Pres Alert Mode

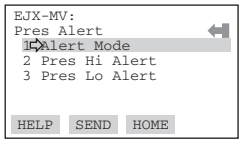
1



(ENTER)

Select **Hi AL Detect**, and press **ENTER (F4)**.

2



(SEND)

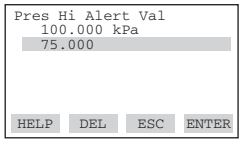
Press **SEND (F2)** to send the data to the transmitter, then check to confirm that SEND disappears.

F0346.EPS

Example: Set the higher alert value of 75 for alarm generation.

1. Device setup
4. Detailed setup
3. Output condition
4. Process Alerts
1. Pres Alert
2. Pres Hi Alert

1

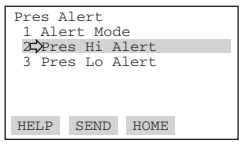


'75'

(ENTER)

Enter **75**, and press **ENTER (F4)**.

2



(SEND)

Press **SEND (F2)** to send the data to the transmitter, then check to confirm that SEND disappears.

F0347.EPS

3.5.13 Status Output

This feature is used for a transistor output (open collector) of an on/off signal according to the status of high and low alarm limits, which are user-configurable values as shown in 3.5.12 Alarm. The status output can be assigned as any combination of the high or low limits of the input pressure, input static pressure, external temperature, or flow.

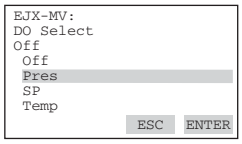
NOTE

No status output signal has been defined for a CPU failure or hardware error. Use a 4-20 mA signal to indicate a transmitter's failure.

Example: Set the status output to output an off signal when the input pressure exceeds 75 kPa with the alert mode of Hi. Al Detect.

1. Device setup
4. Detailed setup
3. Output condition
4. Process Alerts
5. DO Config
2. DO Select and **3. DO Signal type**

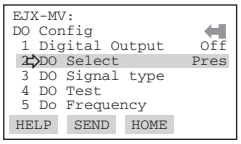
1



(ENTER)

Select **Pres**, and press **ENTER (F4)**.

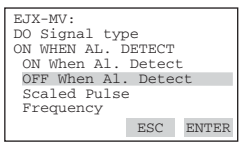
2



(SEND)

Press **SEND (F2)** to send the data to the transmitter, then check to confirm that SEND disappears.

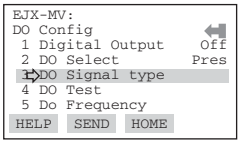
3



(ENTER)

Select **OFF WHEN AL. DETECT**, and press **ENTER (F4)**.

4



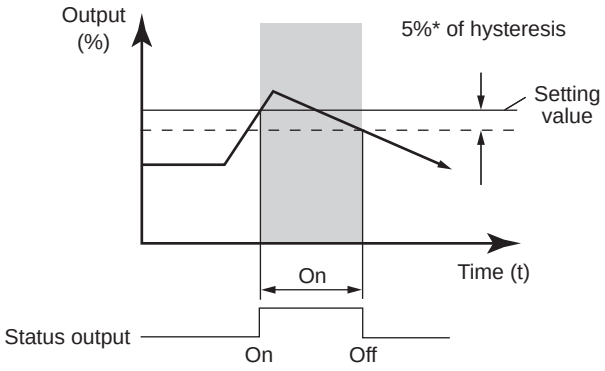
(SEND)

Press **SEND (F2)** to send the data to the transmitter, then check to confirm that SEND disappears.

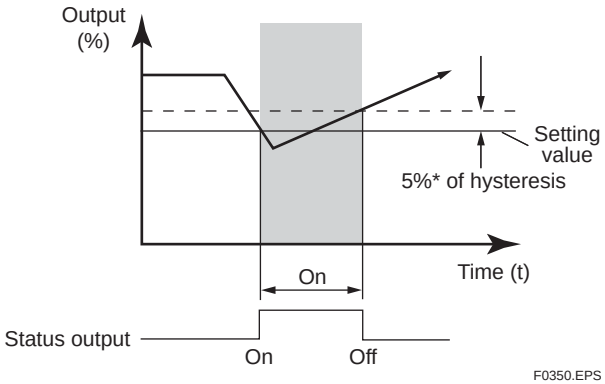
F0349.EPS

Example: Status output operation of **ON WHEN AL. DETECT**

● Status output for higher alert value



● Status output for lower alert value



F0350.EPS

*: 5% of setting span for differential pressure / pressure

(1) Status output (contact output)

The status signal is output by **Pres**, SP, ET or Flow. The HI/LO alarm is output by the pulse terminal.

(2) DO Signal type

The output from a pulse terminal is chosen from the fllowing.

Item	Contents
Status Output	Digital Output: On When Al. Detect (Status Low)
	Digital Output: OFF When Al. Detect (Status High)
Pulse Output	Scaled Pulse
	Frequency

T0318.EPS

(3) Digital Output

Alarm output ON/OFF is displayed.
(Effective, when On When AI Detect or Off When AI Detect is chosen by DO Signal type)

(4) DO Select

The process values that are output as an status alarm are given in the following table.

Display Item	Contents
Off	-
Press	DP
SP	SP
Temp	ET
Press/SP	DP/SP
Press/Temp	DP/ET
SP/Temp	SP/ET
Press/SP/Temp	DP/SP/ET
Flow	Flow
Press/Flow	DP/Flow
SP/Flow	SP/Flow
Temp/Flow	ET/Flow
Press/SP/Flow	DP/ET/Flow
Press/Temp/Flow	DP/ET/Flow
SP/Temp/Flow	SP/ET/Flow
Press/SP/Temp/Flow	DP/SP/ET/Flow

T0319.EPS

3.5.14 Pulse Output

As both the contact output and the pulse output use the same terminal, either may be used.
Pulse Output process value: Flow

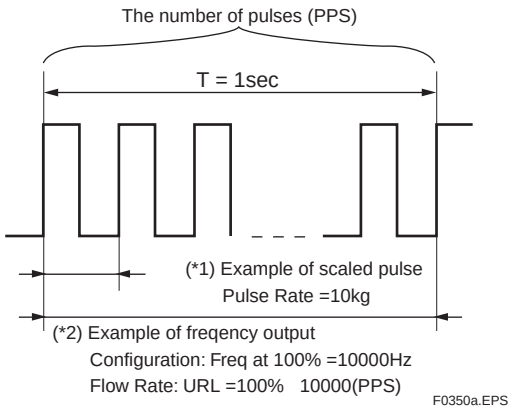
The pulse output is selected from the following two kinds by the mode.

(1) Scaled pulse
A single pulse is output for a specified flow amount.

(2) Frequency output
The flow rate is determined from the number of pulses output each second in which it is made to be going to output in one second at 100% flowing quantity.

Max. frequency : 10kHz
Duty cycle : Approx 50%

Example of Pulse Output



F0350a.EPS

(1) Scale pulse

Example: Scaled Pulse 10 kg Set

Setting of Total Flow Units

1. Device setup
4. Detailed setup
2. Signal condition
5. Total Flow
2. Total Flow Unit

1

```
EJX-MV:
Total Flow Unit
  g
⇧g
  kg
  t
⇩Ib
HELP          ESC  ENTER
```

F4 (ENTER)

Select **kg**, and press **ENTER (F4)**

2

```
EJX-MV:
Total Flow Unit
⇧1 Total flow        0 kg
 2 Total Flow Unit    kg
  3 Pulse rate        10
  4 Freq at 100%
⇩5 Total Flow Mode
HELP  SEND  HOME
```

F2 (SEND)

Press **SEND (F2)**

F0354.EPS

Setting of Pulese rate

1. Device setup
4. Detailed setup
2. Signal condition
5. Total Flow
3. Pulse rate

1

```
EJX-MV:
Pulse rate

        1200

10

HELP  DEL  ESC  ENTER
```

F4 (ENTER)

Set **10** and press **ENTER (F4)**

S T U 1, # % & 0, F4 (ENTER)

2

```
EJX-MV:
Total Flow Unit
 1 Total flow        0 kg
 2 Total Flow Unit    kg
 3 Pulse rate        10
 4 Freq at 100%
⇩5 Total Flow Mode
HELP  SEND  HOME
```

F2 (SEND)

Press **SEND (F2)**

F0355.EPS

Set Scaled Pulse

1. Device setup
4. Detailed setup
3. Output condition
4. Process Alerts
5. DO Config
3. DO Signal Type

1

```
EJX-MV:Yokogawa
Do signal type
Scaled Pulse
 On when Al. Detect
 Off when Al. Detect
 Scaled Pulse
 Frequency
              ESC  ENTER
```

F4 (ENTER)

Select **Scaled Pulse**, and press **ENTER (F4)**.

2

```
EJX-MV:Yokogawa
Do Confing
 1 Digital Output    Off
 2 DO Select         Flow
 3 DO Signal Type
 4 DO Test
 5 DO Frequency      0Hz
HELP  SEND  HOME
```

F2 (SEND)

Press **SEND (F2)**

F0358.EPS

(2) Frequency output

Example: Freq at 100% is 1000 Hz Set

Setting of Freq at 100%

1. Device setup
4. Detailed setup
2. Signal condition
5. Total Flow
4. Freq at 100%

1

```
EJX-MV:
Freq at 100%

      1200 Hz

1000

HELP  DEL  ESC  ENTER
```

F4 (ENTER)

Set **1000** and press **ENTER (F4)**

S T U 1, # % & 0, # % & 0, # % & 0, F4 (ENTER)

2

```
EJX-MV:
Total Flow Unit
 1 Total flow        0 kg
 2 Total Flow Unit    kg
 3 Pulse rate        10
 4 Freq at 100%
⇩5 Total Flow Mode
HELP  SEND  HOME
```

F2 (SEND)

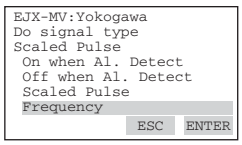
Press **SEND (F2)**

F0357.EPS

Set Frequency

1. Device setup
4. Detailed setup
3. Output condition
2. Process Alerts
5. DO Config
3. DO Signal Type

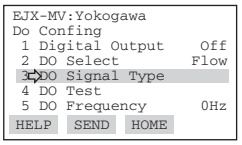
1



F4 (ENTER)

Select **Frequency**, and press **ENTER (F4)**.

2



F2 (SEND)

Press **SEND (F2)**

F0351.EPS

3.5.15 DO Test

Contact and pulse output test

The following table gives information on the contact and pulse output test.

This test function is canceled if no operations are performed for about 10 minutes.

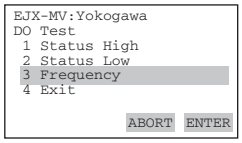
Item	Contents
Status High	Contact Output: OFF
Status Low	Contact Output: ON
Frequency	Frequency Range 0-10000Hz
Exit	Contact and a pulse output test are canceled

T0320.EPS

Example: Frequency 1000Hz Set

1. Device setup
4. Detailed setup
3. Output condition
4. Process Alerts
5. DO Config
4. DO Test

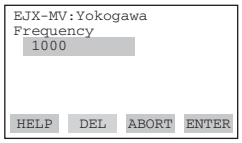
1



F4 (ENTER)

Select **Scaled Pulse**, and press **ENTER (F4)**.

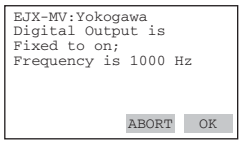
2



'1000'
F4 (ENTER)

Set '1000'and press **ENTER (F4)**.

3



F4 (OK)

Press OK (F4) .

F0352.EPS

3.6 Diag/Service

3.6.1 Test Output

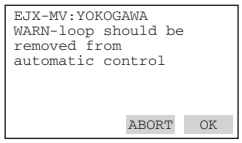
This feature can be used to output a fixed current for loop checks. The available range for test output depends on the settings for the **AO lower limit** and **AO upper limit** parameters, whose limit is from 3.8 mA (-1.25%) to 21.6 mA (110%) .

Example: To output 12 mA (50%)

1. Device setup
↓
2. Diag/Service
↓
2. Test

1. Loop test

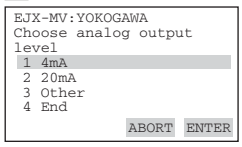
1



F4 (OK)

Set the control loop in manual mode, and press **OK (F4)**.

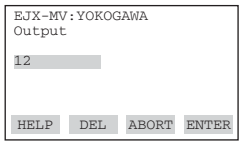
2



↓ ×2
F4 (ENTER)

Select **Other,** and press **ENTER (F4)**.
Supplementary explanation.
1. 4 mA:
   Outputs a 4 mA current signal
2. 20 mA:
   Outputs a 20 mA current signal
3. Other:
   Sets a desired output using the alphanumeric keys
4. End: Exits

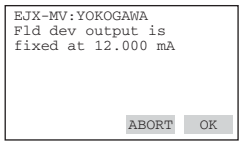
3



'1 2'
F4 (ENTER)

Enter **12**, and press **ENTER (F4)**.
A fixed current of 12 mA is output.

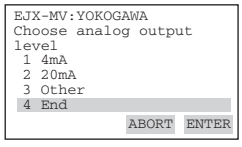
4



F4 (OK)

Press **OK (F4)**.

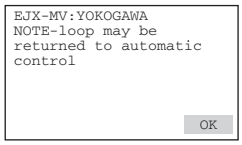
5



↓ ×3
F4 (ENTER)

To finish the loop test, select **End**, and press **ENTER (F4)**.

6



F4 (OK)

Press **OK (F4)**.

F0325.EPS

⚠ CAUTION

Test output continues for approximately 10 minutes, then is released automatically. Even if the HART communicator power supply is turned off or the communication cable is disconnected, test output will continue for approximately 10 minutes.

3.6.2 Sensor Trim

Each DPharp EJX series transmitter is factory characterized. Factory characterization is the process of comparing a known pressure input with the output of each transmitter sensor module over the entire pressure and temperature operating range. During the characterization process, this comparison information is stored in the transmitter EEPROM. In operation, the transmitter uses this factory-stored curve to produce a process variable output (PV), in engineering units, dependent on the pressure input.

The sensor trim procedure allows you to adjust for local conditions, changing how the transmitter calculates process variables. There are two ways to trim the sensor: a zero trim and a full sensor trim. A zero trim is a one-point adjustment typically used to compensate for mounting position effects or zero shifts caused by static pressure. A full sensor trim is a two-point process, in which two accurate end-point pressures are applied (equal to or greater than the range values), and all output is linearized between them.

Full Sensor Trim—Auto Trim and Manual Trim

Full sensor trim is carried out by performing **Auto, Lower Pt** followed by **Auto, Upper Pt**.

Also, you can manually perform the trimming procedure with **Manual, Lower Pt** and **Manual, Upper Pt**.

The full sensor trim is a two-point adjustment, and the lower point adjustment should always be performed before the upper point adjustment in order to maintain the pitch between the zero and 100% points within the calibration range.

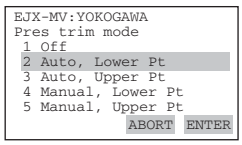
In the manual method, the reference pressure should also be applied to the transmitter at both the lower and upper points. Without the reference pressure, **Manual, Lower Pt** and **Manual, Upper Pt** may not represent the correct value for each adjustment point.

(1) Auto Sensor Trim

Example: For the range of 1000 to 3000 mmH_2O

1. Device setup
2. Diag/Service
3. Calibration
3. Pres sensor trim
1. Pres Trim

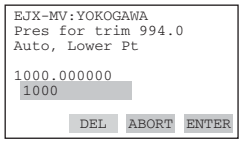
1



F4 (ENTER)

Select **Auto , Lower Pt**, and press **ENTER (F4)**.

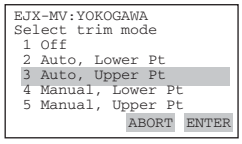
2



'1000' F4 (ENTER)

Apply a standard pressure of 1000 mmH_2O to the transmitter. After obtaining a stable pressure, press **ENTER (F4)**.

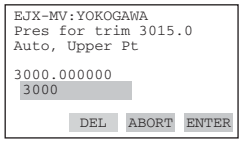
3



×2 F4 (ENTER)

Select **Auto, Upper Pt**, and press **ENTER (F4)**.

4



'3000' F4 (ENTER)

Apply a standard pressure of 3000 mmH_2O to the transmitter. After obtaining a stable pressure, press **ENTER (F4)**.

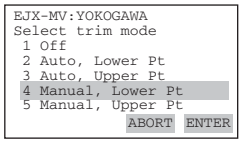
F0329.EPS

(2) Manual Sensor Trim

Example: For the range of 1000 to 3000 mmH_2O
P LTD = −4.0 mmH_2O
P UTD = −3.0 mmH_2O

1. Device setup
2. Diag/Service
3. Calibration
3. Pres sensor trim
1. Pres Trim

1



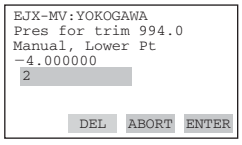
×3 F4 (ENTER)

Select **Manual, Lower Pt**, and press **ENTER (F4)**.

Suppose that a standard pressure of 1000 mmH_2O is applied and the value of the Pres for Trim in 2 is 994.0. Correct for this output error of 6 mmH_2O by adding 6 mmH_2O to **P LTD**.

$-4.0+6.0=+2.0$

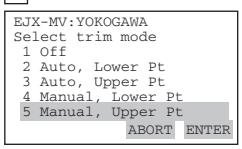
2



'2' F4 (ENTER)

Enter the correction value of 2. Then press **ENTER (F4)**.

3



×4 F4 (ENTER)

Select **Manual, Upper Pt**, and press **ENTER (F4)**.

Suppose that a standard pressure of 3000 mmH_2O is applied and the value of the Pres for Trim in 4 is 3015.0. Firstly, obtain the slope error for the span as follows;

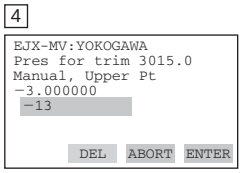
$$\text{Slope Error} = \frac{\text{Applied Pressure Value} - \text{Value of Pres for Trim}}{\text{Applied Pressure Value}} \times (\text{URV} - \text{LRV})$$

$$= \frac{3000-3015}{3000} \times (3000-1000) = -10$$

Then correct for this slope error of −10 by adding −10 to **P UTD**.

$-3.0+(-10.0)=-13.0$

4



'−13' F4 (ENTER)

Enter the correction value of −13. Then press **ENTER (F4)**.

F0348.EPS

(3) Sensor Trim for Static Pressure or External Temperature

For the EJX multivariable transmitter, full sensor trim of the static pressure or external temperature is performed in the same way as with the differential pressure.

(4) Reset Trim Adjustment to Factory Setting

The **Clear P trim, Clear SP trim** and **Clear ET trim** commands can reset the trim adjustment to the initial calibrated values that were set. The amount of the adjustment performed with the external zero-adjustment screw is returned to the initial setting as well.

3.6.3 Trim Analog Output

Fine current output adjustment is carried out with **D/A trim** or **Scaled D/A trim**.

- **D/A Trim**
  D/A trim is to be carried out if the calibration digital ammeter does not exactly read 4.000 mA and 20.000 mA with an output signal of 0% and 100%.
- **Scaled D/A Trim**
  Scaled D/A trim is to be carried out if the output is adjusted using a voltmeter or a meter whose scale is 0 to 100%.

Example 1: For an adjustment using an ammeter (±1µA is measurable)

1. Device setup
↓
2 Diag/Service
↓
3. Calibration
↓
2. Analog output trim
↓
1. D/A trim

1

```
EJX-MV:YOKOGAWA
Analog output trim
 1 D/A trim
 2 Scaled D/A trim
 3 Clear D/A trim

HELP  SAVE  HOME
```

Select the **D/A trim** item.

2

```
EJX-MV:YOKOGAWA
WARN-Loop should be
removed from
automatic control

              ABORT  OK
```

F4 (OK)

Press **OK (F4)**.

3

```
EJX-MV:YOKOGAWA
Connect reference
meter

              ABORT  OK
```

F4 (OK)

Connect the ammeter (±1µA is measurable), and press **OK (F4)**.

4

```
EJX-MV:YOKOGAWA
Setting fld dev
output to 4mA

              ABORT  OK
```

F4 (OK)

Press **OK (F4)**, and the transmitter outputs a 0% output signal.

5

```
EJX-MV:YOKOGAWA
Enter meter value
    4.000
    4.115

HELP  DEL  ESC  ENTER
```

'4 . 1 1 5'

F4 (ENTER)

Ammeter reading: 4.115

Enter the read value **4.115** of the ammeter, and press **ENTER (F4)**. (The output of the transmitter changes.)

F0330.EPS

6

```
EJX-MV:YOKOGAWA
Fld dev output 4.000
mA equal to reference
meter?
 1 Yes
 2 No

              ABORT  ENTER
```

F4 (ENTER)

Ammeter reading: 4.000

If the reading on the ammeter is 4.000 mA, select **YES** and press **ENTER (F4)**.
If the reading is not 4.000 mA, select item 2. **NO**. Repeat steps 4 and 5 until the ammeter reads 4.000 mA.

7

```
EJX-MV:YOKOGAWA
Setting fld dev
output to 20mA

              ABORT  OK
```

F4 (OK)

Press **OK (F4)**, and the transmitter outputs a 100% output signal.

8

```
EJX-MV:YOKOGAWA
Enter meter value
    20.000
    19.050

HELP  DEL  ABORT  ENTER
```

'1 9.0 5 0'

F4 (ENTER)

Ammeter reading: 19.050

Carry out the same procedures as those described under 4 and 5.

9

```
EJX-MV:YOKOGAWA
Fld dev output 20.000
mA equal to reference
meter?
 1 Yes
 2 No

              ABORT  ENTER
```

F4 (ENTER)

Ammeter reading: 20.000

Returning fld dev to original output appears.

10

```
EJX-MV:YOKOGAWA
NOTE-Loop may be
returned to automatic
control

                     OK
```

F4 (OK)

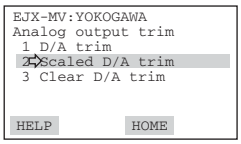
Press **OK (F4)**.

F0331.EPS

Example 2: To adjust using a voltmeter

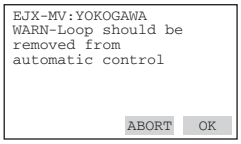
1. Device setup
↓
2 Diag/Service
↓
3. Calibration
↓
2. Analog output trim
↓
2. Scaled D/A trim

1



Select the **Scaled D/A trim** item.

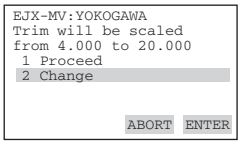
2



F4 (OK)

Press **OK (F4)**.

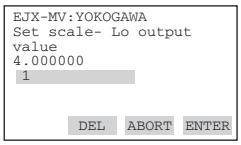
3



V W X 2

Select **Change**, and press **ENTER (F4)**.
When item 3. **Proceed** is selected, **D/A trim** must be carried out.

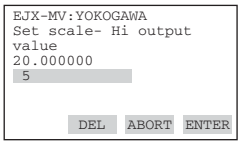
4



'1'
F4 (ENTER)

Enter the value read on the meter when the signal is 4 mA. In this case, Enter the value of the voltage across a 250 Ω resistor (1 V), and press **ENTER (F4)**.

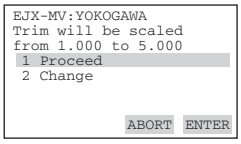
5



'5'
F4 (ENTER)

Enter the value read on the meter when the signal is 20 mA. Then, enter **5**, and press **ENTER (F4)**.

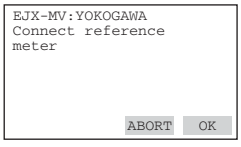
6



F4 (ENTER)

Select **Proceed** and press **ENTER (F4)**.

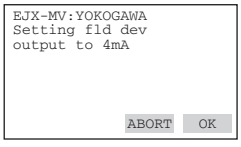
7



F4 (OK)

Connect the voltmeter, and press **OK (F4)**.

8

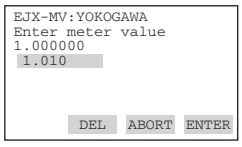


F4 (OK)

Press **OK (F4)**. A 0% output signal is output.

F0332.EPS

9

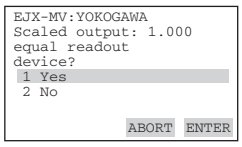


'1 . 0 1'
F4 (ENTER)

Voltmeter reading: 1.010

Enter the reading of the voltmeter (1.010), and press **ENTER (F4)**. (The output of the transmitter changes.)

10

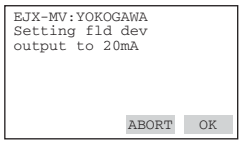


F4 (ENTER)

Voltmeter reading: 1.000

If the reading on the voltmeter is 1.000, select **Yes** and press **ENTER (F4)**.
If the reading is not 1.000, select **No**. Repeat steps 8 and 9 until the voltmeter reads 1.000 V.

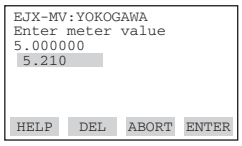
11



F4 (OK)

Press **OK (F4)**. A 100% output signal is output.

12

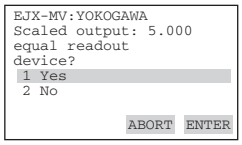


'5 . 2 1'
F4 (ENTER)

Voltmeter reading: 5.210

Enter the reading of the voltmeter (5.210), and press **ENTER (F4)**.

13



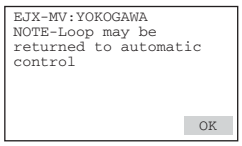
F4 (ENTER)

Voltmeter reading: 5.000

"Returning fid dev to original output"

Select **Yes** and press **ENTER (F4)**.

14



F4 (OK)

Press **OK (F4)**.

F0333.EPS

4. SELF-DIAGNOSTICS

4.1 Self-Diagnostics

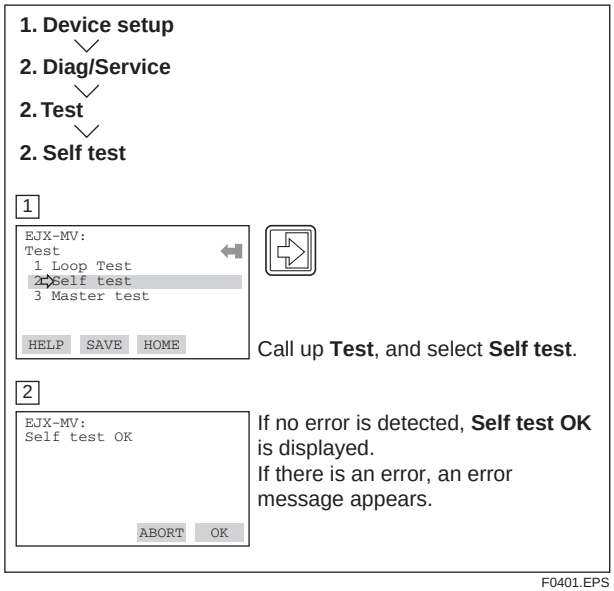
4.1.1 Identify Problems by Using the Communicator

The HART communicator can be used to run self-diagnostics on a transmitter and check for incorrect data settings.

The **Self test** and **Status** commands are available for self-diagnostics. When **Self test** is run, the integral indicator shows an error code and alarm message if the transmitter detects any illegal parameter settings or functional faults. See table 4.1 Alarm Message Summary for probable causes and countermeasures. If the specific diagnostic item is known for the check, you can directly call up the item by using the **Status** command. See table 4.1 to determine the status group.

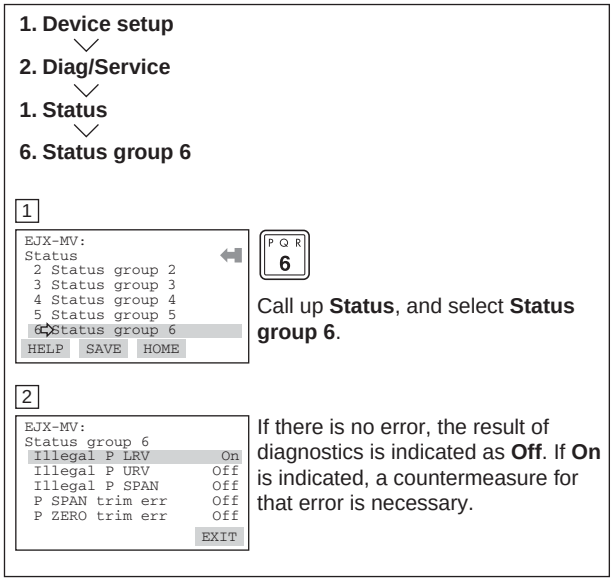
The HART communicator diagnoses every command you make. When a faulty command or keypad input is performed, an error message appears. See table 4.2 HART Commnicator Error Messages for the details.

Diagnostic by "self test"



F0401.EPS

Diagnostic by "status"



F0402EPS

4.1.2 Checking with Integral Indicator

NOTE

If an error is detected by running self-diagnostics, an error number is displayed on the integral indicator. If there is more than one error, the error number changes at three-second intervals. See table 4.2.1 regarding the alarm codes.

F0403.EPS

Figure 4.1 Integral Indicator

4.2 Alarms and Countermeasures

Table 4.1 Alarm Message Summary

Integral indicator	HART communicator display	Cause	4-20mA Output operation during error	Countermeasure	Status group
AL. 01 CAP.ERR	**P sensor error**	Sensor problem.	Outputs the signal (High or Low) set with burnout direction switch. [status output: undefined]	Replace capsule if the error recurs after the transmitter is restarted	1
	CT sensor error	Capsule temperature sensor problem.		Replace capsule.	
	Cap EEPROM error	Capsule EEPROM problem.			
AL. 02 AMP.ERR	**AT sensor error**	Amplifier temperature sensor problem.		Replace amplifier.	
	Amp EEPROM error	Amplifier EEPROM problem.			
	CPU board error	Amplifier problem.			2
	AD Converter error	A/D Converter problem.			4
AL. 03 ET.ERR	**ET sensor error**	External temperature sensor disconnection		Check external temperature sensor.	
–	**No device ID**	No device ID is found.	Continues to operate and output.	Replace amplifire	2
AL. 10 PRESS	**P outside limit**	Input is outside measurement range limit of capsule.	When PV is Pres Output AO upper limit or AO lower limit.	Check input or replace capsule when necessary.	3
AL. 11 ST. PRSS	**SP outside limit**	Static pressure exceeds limit.	When PV is SP Output AO upper limit or AO lower limit.		
AL. 12 CAP.TMP	**CT outside limit**	Capsule temperature is outside range (-50 to 130°C).	Continues to operate and output.	Use heat insulation or make lagging to keep temperature within range.	
AL. 13 AMP.TMP	**AT outside limit**	Amplifier temperature is outside range (-50 to 95°C).			
AL. 14 EXT. TMP	**ET outside limit**	External temperature is outside range.	When PV is ET Output AO upper limit or AO lower limit.		
AL. 15 EXT. TMP	**OHM outside limit**	External temperature sensor resistance is out specification			
AL. 16 PLS	**PLS outside limit**	Pulse output is out specification.	Continues to operate and output.	Check settings and change them as needed.	
AL. 30 PRS.RNG	**P over range**	Differential pressure exceeds specified range.	When PV is Pres. Outputs the signal (High or Low) set with burnout direction switch. Low:-1.25%, High:110%	Check input and range setting, and change them as needed.	4
AL. 31 SP. RNG	**SP over range**	Static pressure exceeds specified range.	When PV is SP Outputs the signal (High or Low) set with burnout direction switch. Low:-1.25%, High:110%		
AL. 32 F. RNG	**F over range**	Flow exceeds specified range.	When PV is Flow Outputs the signal (High or Low) set with burnout direction switch. Low:-1.25%, High:110%		
AL. 33 ET. RNG	**ET over range**	External temperature exceeds specified range.	When PV is ET Outputs the signal (High or Low) set with burnout direction switch. Low:-1.25%, High:110%		
AL. 41 F.HI	**F high alarm**	Input flow exceeds specified threshold.	Continues to operate and output.	Check input.	5
AL. 42 F.LO	**F low alarm**				
AL. 35 P.HI	**P high alarm**	Input pressure exceeds specified threshold.			
AL. 36 P.LO	**P low alarm**				
AL. 37 SP.HI	**SP high alarm**	Input static pressure exceeds specified threshold.			
AL. 38 SP.LO	**SP low alarm**				
AL. 43 ET.HI	**ET high alarm**	Input external temperature exceeds specified threshold.			
AL. 44 ET.LO	**ET low alarm**				

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Integral indicator	HART communicator display	Cause	4-20mA Output operation during error	Countermeasure	Status group
AL. 50 P. LRV	**Illegal P LRV**	Specified value is outside of setting range.	Holds at the output value that existed immediately before the error occurred.	Check settings and change them as needed.	6
AL. 51 P. URV	**Illegal P URV**				
AL. 52 P. SPN	**Illegal P SPAN**				
AL. 53 P. ADJ	**P SPAN trim err**		Continues to operate and output.	Adjust settings and change them as needed.	
	P ZERO trim err				
AL. 54 SP. RNG	**Illegal SP LRV**		Holds at the output value that existed immediately before the error occurred.	Check settings and change them as needed.	
	Illegal SP URV				
	Illegal SP SPAN				
AL. 55 SP. ADJ	**SP SPAN trim err**		Continues to operate and output.	Adjust settings and change them as needed.	7
	SP ZERO trim err				
AL. 56 ET. RNG	**Illegal ET LRV**		Holds at the output value that existed immediately before the error occurred.	Check settings and change them as needed.	8
	Illegal ET URV				
	Illegal ET SPAN				
AL. 57 ET. ADJ	**ET SPAN trim err**		Continues to operate and output.	Adjust settings and change them as needed.	7
	ET ZERO trim err				
AL. 58 FL. ADJ	**F set outside Range**	Specified value is outside of setting range.	Holds at the output value that existed immediately before the error occurred.	Check settings and change them as needed.	8
AL. 59 PLS.ADJ	**PLS set err**	Specified value is outside of setting Pulse output.	Normal calculation.		7
AL. 79 OV. DISP	**(None)**	Displayed value exceeds limit.	Continues to operate and output.		-
AL. 90 SIM	**Simulate Mode**	Under Simulation Mode.	Simulate input output.	Check Simulation Mode.	5
-	**ET Fixed Mode**	Under Temperature Fix Mode. PV is ET	Temp. Output Fix at 4mA.	Leave from Temperature Fix Mode.	7

T0403.EPS

If one of following alarm occurs, all the output data is hold to the value before alarm occurs.

AL.01 (CAP. ERR)
AL.02 (AMP. ERR)
AL.03 (ET. ERR)

Table 4.2 HART Communicator Error Messages

Error message	Probable cause	Countermeasure
Invalid selection	—	Change the setting.
Passed Parameter Too Large	Set value is too high.	
Passed Parameter Too Small	Set value is too low.	
Too Few Data Bytes Received	—	—
In Write Protect Mode	Operation is set in the Write Protect mode.	—
Lower Range Value too High	LRV set point is too high.	Change the range.
Lower Range Value too Low	LRV set point is too low.	
Upper Range Value too High	URV set point is too high.	
Upper Range Value too Low	URV set point is too low.	
Span too Small	Set span is too small.	
Applied Process too High	Applied pressure is too high.	Adjust the applied pressure.
Applied Process too Low	Applied pressure is too low.	
New Lower Range Value Pushed Upper Range Value Over Sensor Limit	The shift of URV according to the new LRV setting exceeds USL.	Change the URV setting within the range of USL.
Excess Correction Attempted	Amount of correction is too much.	Adjust the amount.
Small Char. did not convert successfully	Characters are not convertible. e.g. %	Correct the setting.
Not in fixed current mode	The fixed current mode is desired but not set in that mode.	Set in the fixed current mode.
In Multidrop Mode	Operation is set in the multi-drop mode.	—
Not write Protect	Operation is set without a password.	—

T0402.EPS

5. PARAMETER SUMMARY

Function	Label	Item	Contents	Default value	Handling	Fast key sequences
Analog output	AO alm typ	Analog output alarm type	High or Low		R	1, 4, 3, 2, 5
	AO lower limit	Lower limit of analog output	3.8000 to 21.6000 mA	3.8000 mA	W	1, 4, 3, 2, 7
	AO upper limit	Upper limit of analog output	3.8000 to 21.6000 mA	21.6000 mA	W	1, 4, 3, 2, 8
	Auto recover	Auto-recover from hardware error	Off or On	On	W	1, 4, 3, 2, 6
Analog output trim	Clear D/A trim	Reset analog output trim			M	1, 2, 3, 2, 3
	D/A trim	Analog output trim with ammeter			M	1, 2, 3, 2, 1
	Scaled D/A trim	Analog output trim with voltmeter			M	1, 2, 3, 2, 2
Burst mode	Burst mode	Burst mode	Off or On	Off	W	1, 4, 3, 3, 3
Burst operation option	Burst option	Burst option	Off or On	Off	W	1, 4, 3, 3, 4
Burst transmitter values	Burst Xmtr Vals	Burst transmitter values			M	1, 4, 3, 3, 5
Date	Date	Date	**/**/**		W	1, 3, 4, 1
Descriptor	Descriptor	Descriptor	16 alphanumerics		W	1, 3, 4, 2
Device information	Dev id	Device ID			R	1, 4, 5, 1, ↓, 6
	Distributor	Yokogawa			R	1, 4, 5, 1, ↓, 7
	Drain vent matl	Drain and vent plug material			W	1, 4, 5, 2, 5
	Extra No.	Customizaion number			R	1, 4, 5, 1, ↓, 4
	Ext SW	External zeroing permission	Disabled or Enabled	Enabled	W	1, 4, 5, 1, 9
	Fill fluid	Fill fluid			W	1, 4, 5, 2, 2
	Final asmbly num	Final assembly number			W	1, 4, 5, 1, ↓, 5
	Fld dev rev	Field device revision			R	1, 4, 5, 1, ↓, 2
	Gasket matl	Gasket material			W	1, 4, 5, 2, 3
	Isoltr matl	Capsule material			W	1, 4, 5, 2, 1
	Mftr Date	Manufactured date			R	1, 4, 5, 1, _, 3
	MS Code 1	Memo field for MS code 1	32 alphanumerics		W	1, 4, 5, 1, 5
	MS Code 2	Memo field for MS code 2	32 alphanumerics		W	1, 4, 5, 1, 6
	MS Code 3	Memo field for MS code 3	32 alphanumerics		W	1, 4, 5, 1, 7
	Num of RS	Number of remote seal			W	1, 4, 5, 2, 9
	Process Conn matl	Process connection material			W	1, 4, 5, 2, 4
	Process Conn size	Process connection size			W	1, 4, 5, 2, 6
	Process Conn type	Process connection type			W	1, 4, 5, 2, 8
	PT100 Serial No.	Serial number of PT100			W	1, 4, 5, 1, ↓, 8
	RS fill fluid	Fill fluid of remote seal			W	1, 4, 5, 2, ↓
	RS Isoltr matl	Remote seal material			W	1, 4, 5, 2, 7
	RS type	Remote seal type			W	1, 4, 5, 2, ↓
	Serial No.	Serial number			R	1, 4, 5, 1, ↓, 2
	Softtware rev	Software revision			R	1, 4, 5, 1, ↓, 3
	Style No.	Style number	Style number of product		R	1, 4, 5, 1, ↓, 1
	Universal rev	Universal revision	16 alphanumerics		R	1, 4, 5, 1, ↓, 1
Display setup	Bar Indicator	Bar indicator	Off or On	On	W	1, 4, 4, 5
	Disp1	LCD output 1	PV %, Flow, Pres, SP, EXT. TEMP, ENGR.PV, or TOTAL FLOW	PV %	W	1, 4, 4, 1, 1
	Disp2	LCD output 2	PV %, Flow, Pres, SP, EXT. TEMP, ENGR.PV, TOTAL FLOW, or Not used	Not used	W	1, 4, 4, 1, 2
	Disp3	LCD output 3	(Ditto)	Not used	W	1, 4, 4, 1, 3
	Disp4	LCD output 4	(Ditto)	Not used	W	1, 4, 4, 1, 4
	Disp % Reso	% display resolution	Normal or High resolution	Normal	W	1, 4, 4, 2
	Engr LRV	Use set lower range value	Unit specified in Set Engr Unit	As specified	W	1, 4, 4, 4, 1
	Engr point	Decimal place for user set	0 to 4	2	W	1, 4, 4, 4, 5
	Engr URV	Use set upper range value	Unit specified in Set Engr Unit	As specified	W	1, 4, 4, 4, 2
	ET disp point	Decimal place for external temperature	0 to 4	2	W	1, 4, 4, 3, 4
	Flow disp point	Decimal place for flow	0 to 4	2	W	1, 4, 4, 3, 1
	Modify Engr Unit	User set engineering unit			M	1, 4, 4, 4, 7
	Pres disp point	Decimal place for differential pressure	0 to 4	2	W	1, 4, 4, 3, 2
	Set Engr Unit	Engineering unit select			M	1, 4, 4, 4, 6
	SP disp point	Decimal place for static pressure	0 to 4	2	W	1, 4, 4, 3, 3
	TF disp point	Decimal place for total flow	0 to 4	2	W	1, 4, 4, 3, 5
DP setup	Pres Damp	Damping time constant for DP	0.00 to 100.00 sec		W	1, 4, 2, 2, 7
	Pres Min Span	Minimum span for differential pressure			R	1, 4, 2, 2, 6
	Pres LRV	Lower range value for differential pressure			W	1, 4, 2, 2, 1
	Pres LSL	Lower sensor limit for differential pressure			R	1, 4, 2, 2, 4
	Pres URV	Upper range value for differential pressure			W	1, 4, 2, 2, 2
	Pres USL	Upper sensor limit for differential pressure	0 to 4		R	1, 4, 2, 2, 5
Error log	Error log Clear	Clear error records			M	1, 2, 4, 2
	Error log view	Error records	Log1 (latest) to log4		M	1, 2, 4, 1
ET setup	ET Damp	Damping time constant for ET	0.00 to 100.00 sec		W	1, 4, 2, 4, 7
	ET Fixed	External temperature fix mode	No,Yes, or FALL BACK	No	W	1, 4, 2, 4, 8, 1
	ET Min Span	Minimum span for external temperature			R	1, 4, 2, 4, 6
	ET LRV	Lower range value for ET			W	1, 4, 2, 4, 1
	ET LSL	Lower sensor limit for ET			R	1, 4, 2, 4, 4
	ET URV	Upper range value for ET			W	1, 4, 2, 4, 2
	ET USL	Upper sensor limit for ET			R	1, 4, 2, 4, 5
	Fixed ET Val	Temperature value at ET fix mode	20 ˚C (deg C)		W	1, 4, 2, 4, 8, 2
Flow setup	Flow Damp	Damping time constant for flow	0.00 to 100.00 sec		W	1, 4, 2, 1, 4
	Flow LRV	Lower range value for flow			W	1, 4, 2, 1, 1
	Flow URV	Upper range value for flow			W	1, 4, 2, 1, 2
	Vol Flow Base Dens	Volume Flow Base Density Value			W	1, 4, 2, 1, 5, 2
Keypad Input	Change PV Assgn	Change the allocation to PV			M	hot key, 1, 2
	PV Damp	Damping time constant for PV			W	hot key, 1, 6
	PV is	Current PV			R	hot key, 1, 1
	PV LRV	Lower range value for PV			W	hot key, 1, 4
	PV URV	Upper range value for PV			W	hot key, 1, 5
Loop test	Loop test	Test output setting	Within AO lower and upper limits		M	1, 2, 2

*1: Handling: R-Read only, W-Read & Write, M-Method.

Function	Label	Item	Contents	Default value	Handling	Fast key sequences
Low cut	Low cut	Low cut	0.00 to 20.00%	10.00%	W	1, 3, 5, 1
	Low cut mode	Low cut mode	Off or On	Off	W	1, 3, 5, 2
Master test	Master test	Master test	32 alphanumerics		M	1, 2, 2, 3
Message	Message	Message	Off or On	As specified	W	1, 3, 4, 3
Model	Model	Model			W	1, 3, 4, 5
Number of requested preambles	Numreqpreams	Number of requested preambles			R	1, 4, 3, 3, 2
Piping orientation	H/L Swap	Impulse piping accessing direction	Normal or Reverse	Normal	R	1, 3, 5, 3
Poll address	Poll addr	Poll address for multidrop use	0 to 15	0	W	1, 4, 3, 3, 1
Process Alerts	Digital Output	Display of contact output	Off or On	Off	W	1, 4, 3, 1, 7
	DO Frequency	Frequency of Digtal Output			W	1, 4, 3, 4, 5, 5
	DO Select	Contact output select	Combination of Pres, SP, Temp, and Flow		W	1, 4, 3, 4, 5, 2
	DO Signal type	Signal type select	On When Al. Detect, Off When Al. Detect, Scaled Pulse, or Frequency		W	1, 4, 3, 4, 5, 3
	DO Test	Test output contact			M	1, 4, 3, 4, 5, 4
	ET Alert	Set alert for external temperature			M	1, 4, 3, 4, 3
	Flow Alert	Set alert for flow			M	1, 4, 3, 4, 4
	Pres Alert	Set alert for differential pressure			M	1, 4, 3, 4, 1
	SP Alert	Set alert for static pressure			M	1, 4, 3, 4, 2
Process variables	Amp temp	Amplifier temperature			RR	1, 1, 7, 7
	Cap temp	Capsule temperature			RR	1, 1, 7, 6
	Engr Disp	User scaled value	Unit specified in Set Engr Unit		R	1, 1, 40
	Engr exp	Exponents	x1, x10, x100, or x1000	As specified or -	W	1, 1, 5
	Engr Unit	User set engineering unit	Unit specified in Set Engr Unit		R	1, 1, 6
	ET	External temperature value			RR	1, 1, 7, 4
	Flow	Flow value			RR	1, 1, 7, 1
	Pres	Differential pressure value			RR	1, 1, 7, 2
	PV	PV value	Unit specified in PV Unit		R	2
	PV %	PV value in %	-2.50 to 110.00%		R	1, 1, 2
	PV AO	Analog output current	3.8000 to 21.6000 mA		R	3
	SP	Static pressure value			RR	1, 1, 7, 3
	Total Flow	Total flow value			RR	1, 1, 7, 5
Self test	Self test	Self-diagnostics	0 to 15	0	M	1, 2, 1, 2
Sensor trim	Clear ET trim	Reset ET trim to factory setting			M	1, 2, 3, 5, 2
	Clear P trim	Reset pressure trim to factory setting			M	1, 2, 3, 3, 2
	Clear SP trim	Reset SP trim to factory setting			M	1, 2, 3, 4, 2
	ET trim	External temperature trim			M	1, 2, 3, 5, 1
	Pres trim	Pressure trim			M	1, 2, 3, 3, 1
	SP trim	Static pressure trim			M	1, 2, 3, 4, 1
	Sim Flow Mode	Simulate Flow Mode			W	1, 4, 7, 1
	Sim Pres	Differential pressure value for simulate			W	1, 4, 7, 3
	Sim Pres Unit	Differential pressure unit for simulate			W	1, 4, 7, 2
	Sim SP	Static pressure value for simulate			W	1, 4, 7, 5
	Sim SP Unit	Static pressure unit for simulate			W	1, 4, 7, 4
	Sim Temp	Temperature value for simulate			W	1, 4, 7, 7
	Sim Temp Unit	Temperature unit for simulate			W	1, 4, 7, 6
Basic Flow Calc	Flow Calc Fixed	Calculation fixation value of flow			W	1, 4, 8, 3
	Flow Calc mode	Flow cauculation mode	Auto Comp. Mode or Basic Mode		W	1, 4, 8, 1
	Fluid Type	Fluid type			W	1, 4, 8, 2
	Ref SP	Referrence static pressure			W	1, 4, 8, 4
	Ref Temp	Referrence temperature			W	1, 4, 8, 5
	Temp K1	The first in temperature correction coefficient for liquid			W	1, 4, 8, 6
SP setup	A/G Select				W	1, 4, 2, 3, 8
	Atm. Pres Value				W	1, 4, 2, 3, ↓
	SP Damp	Damping time constant for SP		As specified or -	W	1, 4, 2, 3, 7
	SP H/L Select				W	1, 4, 2, 3, 9
	SP Min Span	Minimum span for static pressure			R	1, 4, 2, 3, 6
	SP LRV	Lower range value for static pressure			W	1, 4, 2, 3, 1
	SP LSL	Lower sensor limit for static pressure			R	1, 4, 2, 3, 4
	SP URV	Upper range value for static pressure			W	1, 4, 2, 3, 2
	SP USL	Upper sensor limit for static pressure			R	1, 4, 2, 3, 5
Status	Status group 1	Device status information for hardware			R	1, 2, 1, 1, 1
	Status group 2	Device status information for hardware			R	1, 2, 1, 1, 2
	Status group 3	Device status information for process			R	1, 2, 1, 1, 3
	Status group 4	Device status information for process			R	1, 2, 1, 1, 4
	Status group 5	Device status information for process			R	1, 2, 1, 1, 5
	Status group 6	Device status information for data			R	1, 2, 1, 1, 6
	Status group 7	Device status information for data			R	1, 2, 1, 1, 7
	Status group 8	Device status information for data			R	1, 2, 1, 1, 8
SV	Change SV Assgn	Change the allocation to SV			M	1, 1, 8, 2, 2
	SV	SV value	Unit specified in SV Unit		R	1, 1, 8, 2, 3
	SV is	Current SV			R	1, 1, 8, 2, 1
Tag	Tag	Tag number	16 alphanumerics	As specified	W	1, 2, 2, 3
Test key	Test key	Special maintenance parameter			M	1,4,6
Total Flow	Cvt Val	Convert value for total flow base unit			W	1, 4, 2, 5, 6, 1
	Freq at 100%	Digtal otput fequency at 100%			W	1, 4, 2, 5, 4
	Pulse rate	Pulse rate			W	1, 4, 2, 5, 3
	Modify Unit	Modify flow base unit			M	1, 4, 2, 5, 6, 3
	Set Base Unit	Set total flow base unit			M	1, 4, 2, 5, 6, 2
	Total Flow Mode	Total flow mode	Reset, Start or Stop		W	1, 4, 2, 5, 5
	Total Flow Unit	Current total flow unit			W	1, 4, 2, 5, 2

*1: Handling: R-Read only, W-Read & Write, M-Method.

Function	Label	Item	Contents	Default value	Handling	Fast key sequences
Trim information	Trim Data	Trim data	**/**/**		W	1, 2, 3, 6, 2
	Trim Desc	Trim description	16 alphanumerics		W	1, 2, 3, 6, 4
	Trim Loc	Trim location	8 alphanumerics		W	1, 2, 3, 6, 3
	Trim Who	Trim person	8 alphanumerics		W	1, 2, 3, 6, 1
TV	Change TV Assgn	Change the allocation to TV			M	1, 1, 8, 3, 2
	TV	TV value			R	1, 1, 8, 3, 3
	TV is	Current TV			R	1, 1, 8, 3, 1
Units	Density Unit	Density unit			W	1, 4, 2, 1, 5, 1
	ET Unit	External temperature unit			W	1, 3, 2, 3
	Flow Unit	Flow unit			W	1, 3, 2, 4
	Pres Unit	Differential pressure unit			W	1, 3, 2, 1
	PV Unit	PV unit			W	hot key, 1, 3
	SP Unit	Static pressure unit			W	1, 3, 2, 2
	SV Unit	SV unit			W	1, 1, 8, 2, 4
	Total Flow Unit	Total flow unit			W	1, 3, 2, 5
	TV Unit	TV unit			W	1, 1, 8, 3, 4
	4V Unit	4V unit			W	1, 1, 8, 4, 4
Write protectin menu	Enable wrt 10min	Write protection release	8 alphanumerics		M	hot key, 2, 2
	New password	User set password for write protection	8 alphanumerics		M	hot key, 2, 3
	Software seal	Software seal	Keep or Break	Keep	R	hot key, 2, 4
	Write protect	Write protection indicator	Yes or No	No	R	hot key, 2, 1
4V	Change 4V Assgn	Change the allocation to 4V			M	1, 1, 8, 4, 2
	4V	4V value	Unit specified in 4V Unit		R	1, 1, 8, 4, 3
	4V is	Current 4V			R	1, 1, 8, 4, 1

*1: Handling: R-Read only, W-Read & Write, M-Method.

REVISION RECORD

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1st	Mar. 2005	–	New publication
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REVISION RECORD.EPS