User's Manual

ADMAG AXF™

AXF
PROFIBUS PA Communication Type
Magnetic Flowmeter

IM 01E20F12-01E

vigilantplant.®

YOKOGAWA
Yokogawa Electric Corporation

IM 01E20F12-01E
2nd Edition

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1. INTRODUCTION

This manual contains a description of the ADMAG AXF Series Magnetic Flowmeter Converter PROFIBUS PA Communication Type. The PROFIBUS PA communication type is based on the same ADMAG AXF technology used in the BRAIN/HART communication type, and is similar to the communication types in terms of basic performance and operation. This manual describes only those topics that are required for operation of the PROFIBUS PA communication type. For information on the installation, wiring, and maintenance of AXF series magnetic flowmeter, refer to the user's manual for each model (IM 01E20D01-01E or IM 01E20C02-01E).

As far terminal connection, refer to section 8.3 of this manual.

NOTE

When describing the model name like AXF□□□C in this manual, "□□□" means any of the following.
002, 005, 010, 015, 025, 032, 040, 050, 065, 080, 100, 125, 150, 200, 250, 300, 350, 400

■ Regarding This Manual

- This manual should be provided to the end user.
- Before use, read this manual thoroughly to comprehend its contents.
- The contents of this manual may be changed without prior notice.
- All rights are 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 material, including, but not limited to, implied warranties of merchantability and suitability for a particular purpose.
- All reasonable effort has been made to ensure the accuracy of the contents of this manual. However, if any errors or omissions are found, please inform Yokogawa.
- Yokogawa assumes no responsibilities for this product except as stated in the warranty.
- 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 this user's manual may not be revised for any specification changes, construction changes or operating part changes that are not considered to affect function or performance.
- If the customer or any third party is harmed by the use of this product, Yokogawa assumes no responsibility for any such harm owing to any defects in the product which were not predictable, or for any indirect damages.

■ Safety and Modification Precautions

- The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific WARNINGS given elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Yokogawa assumes no liability for the customer's failure to comply with these requirements. If this instrument is used in a manner not specified in this manual, the protection provided by this instrument may be impaired.
- Yokogawa will not be liable for malfunctions or damage resulting from any modification made to this instrument by the customer.
- The following safety symbol marks are used in this user's manual and instrument.

WARNING

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

CAUTION

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

IMPORTANT

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

NOTE

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

⏚ Protective grounding terminal

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

PROFIBUS is a registered trademark of PROFIBUS Nutzerorganisation e.V., Karlsruhe, Germany.

1.1 Using the Magnetic Flowmeter Safely

(1) Installation

WARNING

- Installation of the magnetic flowmeter must be performed by expert engineer or skilled personnel. No operator shall be permitted to perform procedures relating to installation.
- The magnetic flowmeter must be installed within the specification conditions.
- The magnetic flowmeter is a heavy instrument. Be careful that no damage is caused to personnel through accidentally dropping it, or by exerting excessive force on the magnetic flowmeter. When moving the magnetic flowmeter, always use a trolley and have at least two people carry it.
- When the magnetic flowmeter is processing hot fluids, the instrument itself may become extremely hot. Take sufficient care not to get burnt.
- Where the fluid being processed is a toxic substance, avoid contact with the fluid and avoid inhaling any residual gas, even after the instrument has been taken off the piping line for maintenance and so forth.
- Do not apply excessive weight, for example, a person stepping on the magnetic flowmeter.
- All procedures relating to installation must comply with the electrical code of the country where it is used.

(2) Wiring

WARNING

- The wiring of the magnetic flowmeter must be performed by expert engineer or skilled personnel. No operator shall be permitted to perform procedures relating to wiring.
- When connecting the wiring, check that the supply voltage is within the range of the voltage specified for this instrument before connecting the power cable. In addition, check that no voltage is applied to the power cable before connecting the wiring.
- The protective grounding must be connected securely at the terminal with the ⏚ mark to avoid danger to personnel.

(3) Operation

WARNING

- When opening the cover, wait for more than 10 minutes after turning off the power. Only expert engineer or skilled personnel are permitted to open the cover.
- Do not open the cover in wet weather or humid environment. When the cover is open, stated enclosure protection is not applicable.

(4) Maintenance

WARNING

- Maintenance of the magnetic flowmeter should be performed by the trained personnel having knowledge of safety standard. No operator shall be permitted to perform any operations relating to maintenance.
- When opening the cover, wait for more than 10 minutes after turning off the power.

- Do not open the cover in wet weather or humid environment. When the cover is open, stated enclosure protection is not applicable.
- Always conform to maintenance procedures outlined in this manual. If necessary, contact Yokogawa.
- Care should be taken to prevent the build up of dirt, dust or other substances on the display panel glass or data plate. If these surfaces do get dirty, wipe them clean with a soft dry cloth.

(5) Explosion Protected Type Instrument

WARNING

- Magnetic flowmeters with the model name AXF□□□C are products which have been certified as explosion proof type instruments. Strict limitations are applied to the structures, installation locations, external wiring work, maintenance and repairs, etc. of these instruments. Sufficient care must be taken, as any violation of the limitations may cause dangerous situations.
  Be sure to read “EXPLOSION PROTECTED TYPE INSTRUMENT” at the user’s manual for each model (IM 01E20D01-01E or IM 01E20C02-01E), before handling the instruments. The description is prior to the other description in this user’s manual.
  For TIIS flameproof type instruments, be sure to read “INSTALLATION AND OPERATING PRECAUTIONS FOR TIIS FLAMEPROOF EQUIPMENT” at the end of the user’s manual for each model (IM 01E20D01-01E or IM 01E20C02-01E).
- Only trained persons use this instrument in the industrial location.
- The protective grounding ⏚ must be connected to a suitable IS grounding system.
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous locations.

(6) European Pressure Equipment Directive (PED)

WARNING

- When using the instrument in compliance with PED, be sure to read IM 01E20D01-01E before use.

(7) Modification

WARNING

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

(8) Product Disposal

The instrument should be disposed of in accordance with local and national legislation/regulations.

(9) Authorized Representative in EEA

In relation to the CE Marking, The authorized representative for this product in the EEA (European Economic Area) is:
Yokogawa Europe B.V.
Euroweg 2, 3825 HD Amersfoort,The Netherlands

1.2 Warranty

- The terms of this instrument that are guaranteed are described in the quotation. We will make any repairs that may become necessary during the guaranteed term free of charge.
- Please contact our sales office if this instrument requires repair.
- If the instrument is faulty, contact us with concrete details about the problem and the length of time it has been faulty, and state the model and serial number. We would appreciate the inclusion of drawings or additional information.
- The results of our examination will determine whether the meter will be repaired free of charge or on an at-cost basis.

■ The guarantee will not apply in the following cases:

- Damage due to negligence or insufficient maintenance on the part of the customer.
- Problems or damage resulting from handling, operation or storage that violates the intended use and specifications.
- Problems that result from using or performing maintenance on the instrument in a location that does not comply with the installation location specified by Yokogawa.
- Problems or damage resulting from repairs or modifications not performed by Yokogawa or someone authorized by Yokogawa.
- Problems or damage resulting from inappropriate reinstallation after delivery.
- Problems or damage resulting from disasters such as fires, earthquakes, storms, floods, or lightning strikes and external causes.

■ Trademarks:

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

1.3 Combination Remote Flowtubes

IMPORTANT

The AXF remote flowtube (sizes 2.5 to 400 mm (0.1 to 16 in.)) should be combined with one of the following converters:

Remote Flowtube		Combined with the Remote Converter
Model	Communication Code	Model
AXF□□□G AXF□□□C AXF□□□H AXF□□□W	-P	AXFA14C AXFA14G

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Note: "□□□" means any of the following.
002, 005, 010, 015, 025, 032, 040, 050, 065, 080, 100, 125, 150, 200, 250, 300, 350, 400

CAUTION

In case of the explosion proof type, please see the manual IM 01E20D01-01E or IM 01E20C02-01E. The construction of the instrument, installation, external wiring, maintenance, and repair are strictly restricted, and non-observance or negligence of these restriction would result dangerous condition.

2. ABOUT PROFIBUS PA

2.1 Outline

PROFIBUS PA is a widely used bi-directional digital communication protocol that enables the implementation of technologically advanced process control systems. The AXF Series PROFIBUS PA communication type meets the specifications of PROFIBUS Nutzerorganisation e.V. and is interoperable with devices from Yokogawa and other manufacturers.

For information on other features, engineering, design, construction work, startup and maintenance of PROFIBUS PA, please download the adequate documents and read them by visiting the following web-site of PROFIBUS Nutzerorganisation e.V..

http://www.profibus.com/

2.2 Internal Structure of AXF

The AXF contains four blocks that share the following functions:

(1) Physical block

- Manages the status of AXF hardware.
- Automatically informs the host of any detected faults or other problems.

(2) Transducer block

- Converts sensor output to flow rate signal and transfers to AI function block.

(3) AI function block

- Conditions raw data from the transducer block.
- Outputs flow rate signal.
- Carries out scaling and damping extraction.

(4) Totalizer function block

- Totalization of raw data from the Transducer block.

(5) DI function block

- Conditions discrete data from the Transducer block.

2.3 Logical Structure of Each Block

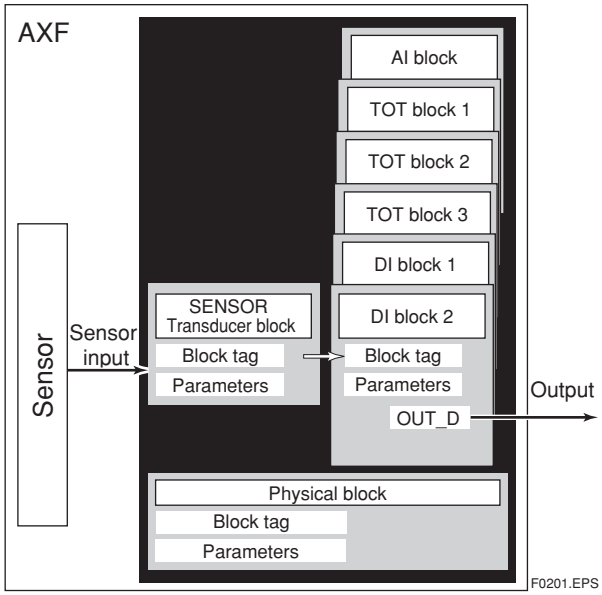

Figure 2.1 Logical Structure of Each Block

The parameters shown in Figure 2.1 must be set before starting operation.

2.4 Wiring System Configuration

The number of devices that can be connected to a single bus and the cable length vary depending on system design. When constructing systems, both the basic and overall design must be carefully considered to allow device performance to be fully exhibited.

3. GETTING STARTED

PROFIBUS PA is fully dependent upon digital communication protocol and differs in operation from conventional 4 to 20 mA transmission and the BRAIN communication protocol.

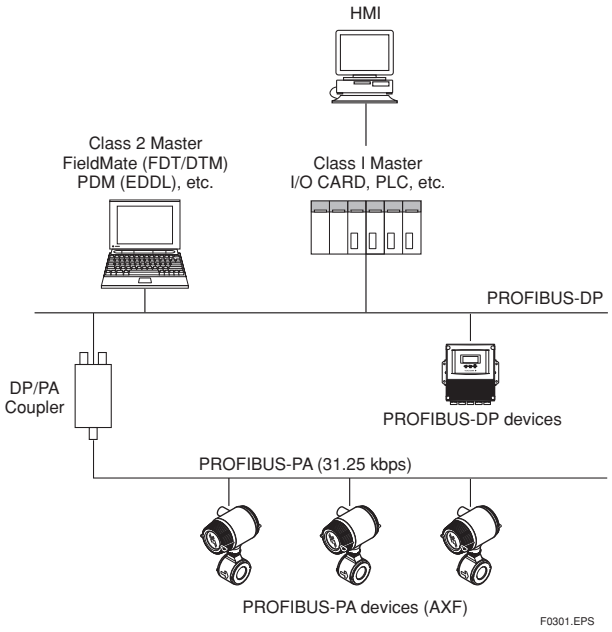

Figure 3.1 PROFIBUS System Construction

3.1 Connection of Devices

The following are required for use with PROFIBUS PA devices:

- **Power supply:**
  PROFIBUS PA requires a dedicated power supply. It is recommended that current capacity be well over the total value of the maximum current consumed by all devices. Power is supplied by a DP/PA coupler.
- **Terminators:**
  PROFIBUS PA requires two terminators. A terminator shall be located at each end of the trunk cable.
- **Field devices:**
  Connect PROFIBUS PA communication type AXF (Refer to section 8.3 terminal connection). Two or more AXF devices or other devices can be connected.
- **DP/PA Couplers:**
  PROFIBUS PA requires DP/PA couplers which convert the RS-485 signals to the IEC 61158-2 signal level and power the field devices via the PROFIBUS PA.
- **Cable:**
  Refer to Figure 3.1.

Table 3.1 PROFIBUS PA Cables and Transmissible Length

Type of cable	Cable specifications	Max. length of cable (reference value)
Type A: Individually-shielded twisted pair cable	#18AWG (0.82 mm^2)	1,900 m
Type B: Overall-shielded twisted pair cable	#22AWG (0.32 mm^2)	1,200 m
Type C: Unshielded twisted pair cable	#26AWG (0.13 mm^2)	400 m
Type D: Overall-shielded non-twisted cable	#16AWG (1.25 mm^2)	200 m

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Note: Yokogawa recommends the use of Type A. Usage of Type B and D is restricted. Yokogawa does not recommend the use of Type C.

Before using a PROFIBUS PA configuration tool other than the existing class 1 and class 2 Masters, confirm it does not affect the loop functionality in which all devices are already installed in operation. Disconnect the relevant control loop from the bus if necessary.

IMPORTANT

- It is mandatory to turn on the power supply of the AXF before turning on the power supply for the PROFIBUS line.
- Connecting a PROFIBUS PA configuration tool to a loop with its existing class 1 and class 2 Masters may cause communication data scrambling resulting in a functional disorder or a system failure.

3.2 Master Settings

To activate PROFIBUS PA, the following bus parameters must be set for the master.

IMPORTANT

Do not turn off the power immediately after setting. When the parameters are saved to the EEPROM, the redundant processing is executed for an improvement of reliability. If the power is turned off within 60 seconds after setting is made, the modified parameters are not saved and the settings may return to the original values.

Table 3.2 Bus Parameters

Symbol	Parameter	Description and Settings
Transmission rate	Transmission Rate	The transmission rate of PROFIBUS PA matches that of the segment coupler. e.g P+F: 93.75 kbps, Siemens: 45.45 kbps
T_{SL}	Slot Time	The maximum time a master station must wait for the complete reception of the first octet of a response (11 bits). e.g: 4095
min T_{SDR}	Min. Station Delay Timer	Sets the minimum time at which a slave can send the first bit of a response back.
max T_{SDR}	Max. Station Delay Time	Sets the maximum time at which a slave can send the first bit of a response back.
T_{QUI}	Quiet Time	Controls the time at which the bus electronics or software of the sender is set to receive mode after a message is sent.
T_{SET}	Setup Time	Sets the maximum allowable time for parameter setting and response by the slave.
HSA	Highest Station Address	Sets the highest station address in the network.
G	Gap update factor	Sets the number of token cycles after which the master will search for a new master.
max. retry limit	Max Retry Limit	Sets the number of retries that are performed after a receiver does not respond to a message.

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3.3 Integration of GSD

A PROFIBUS PA system requires a GSD file containing device parameters such as the supported transmission rate, input data, output data, data format and data length.
The following GSD files are available for the AXF.

Table 3.3 GSD files

Profile Ident-Number	0x9740
Profile GSD file	PA139740.GSD (AIx1, TOTx1)
Device Specific Ident-Number	0x4590
Device Specific GSD file	YEC_4590.GSD

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Download GSD for AXF from the following website.
http://www.yokogawa.com/fld/doc/profibus/

IMPORTANT

Do not change contents in the GSD file from the factory default. The AXF may be given a serious problem in its operation if do so.

3.4 Bus and AXF Power ON

Address setting Switch

A setup of bus address is possible by the change with a parameter, or the hardware slide switch.
The set address which is done by hardware is higher priority than by software.
Following description is how to set the bus address using by hardware slide switch.
Refer to section 5.3 when the bus address is set by software.
The AXF must turn off the power supply when the bus address is changed by hardware slide switch.

The device information, including Tag Desc., Bus address, and Ident Number, is described on the sheet attached to the AXF. The device information is given in duplicate on this sheet.
Confirm the bus address written in the device information.
The default bus address is set as 126 (hexadecimal 7E) at the factory unless otherwise specified when ordered.

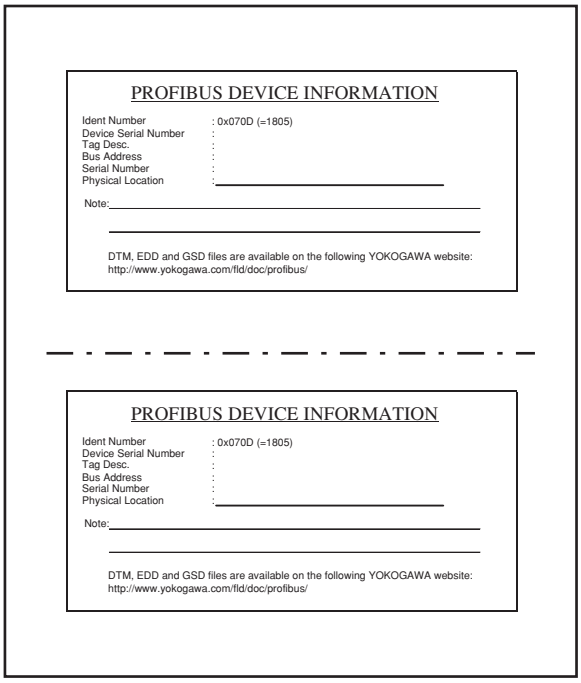

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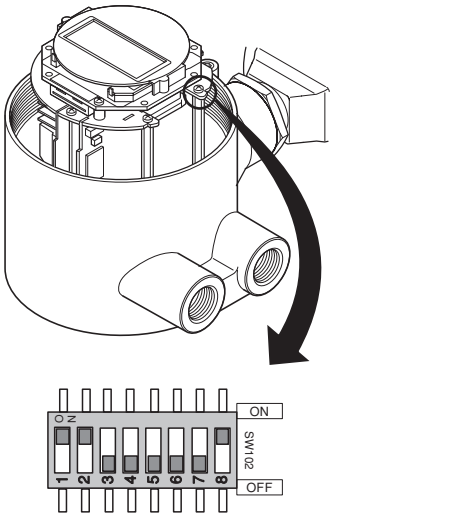
Figure 3.2 Device Information Sheet Attached to AXF

Confirm that the AXF is turned off before opening the front cover.
The bus address switch is located as shown in figure 3.3.
The No. 8 switch of SW102 is turned ON first. Other seven switches of No. 1 to No. 7 on the SW102 are for setting address. No. 1 switch of SW102 is allocated for bit0 of address, and No. 7 switch of SW102 is allocated for bit6 of address. The setting condition of the SW102 as shown in figure 3.3 is 3 as the set bus address number as an example.
If two or more AXFs are connected on the same bus, each AXF must be set as different bus address.

The front cover must be closed after finish the work of the bus address setting.



ADDRESS

MSB							LSB
8	7	6	5	4	3	2	1
ON	OFF	OFF	OFF	OFF	OFF	ON	ON

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Figure 3.3 Address Switch

WARNING

When opening the cover, wait for more than 10 minutes after turning off the power. Furthermore, opening of the cover must also be carried out by the trained personnel having knowledge of safety standard.

IMPORTANT

To preserve the safety, do not touch the electrical circuit and the cables except the Bus address switch.

Bus and AXF Power ON

Firstly, turn on the power of the host, and then, the bus and also the power for the AXF. Where the AXF is equipped with the LCD indicator, first all segments are lit, then the display begins to operate.
Using the host device display function, check that the AXF is in operation on the bus.

If no AXF is detected, check the available address range. If the Bus address and Tag Desc. are not specified when ordering, default value is factory set. If two or more AXFs are connected at the same time with default value, only one AXF will be detected from the host as AXFs have the same initial address. Separately connect each AXF and set a different address for each.

3.5 Setting of Write Protect Switch

A write protection is a function to forbid changing of parameters. It is possible to set the software write protection by parameter setup or the hardware write protection by the hardware slide switch. In case of the setting up by parameters, it can set up in WRITE_LOCKING. When WRITE_LOCKING is "0: Lock", the status of write protect becomes protected mode. And when WRITE_LOCKING is "2457: Disabled", the status becomes disable mode.
In case of the setting up by hardware switch, it can set up on the No.1 switch of SW101. When the switch is turned on, the status becomes protected mode, and when the switch is turned off, the status becomes disable mode. The state of the hardware write-protection switch can be checked with the parameter "HW_WRITE_PROTECTION." As the mentioned above, write protection is available by the setting either of software protection or hardware protection, one of them is set to protect mode, the status becomes protected mode.

Table 3.4 Write Protect

Setting of Hardware Write Protect SW	Displaying of HW_WRITE_PROTECTION	Setting of WRITE_LOCKING	State of Protect Protect State
Enable	0:Unprotected	0: Lock	Protect
Enable	0:Unprotected	2457: Disabled	Enable
Protect	1:Protected	0: Lock	Protect
Protect	1:Protected	2457: Disabled	Protect

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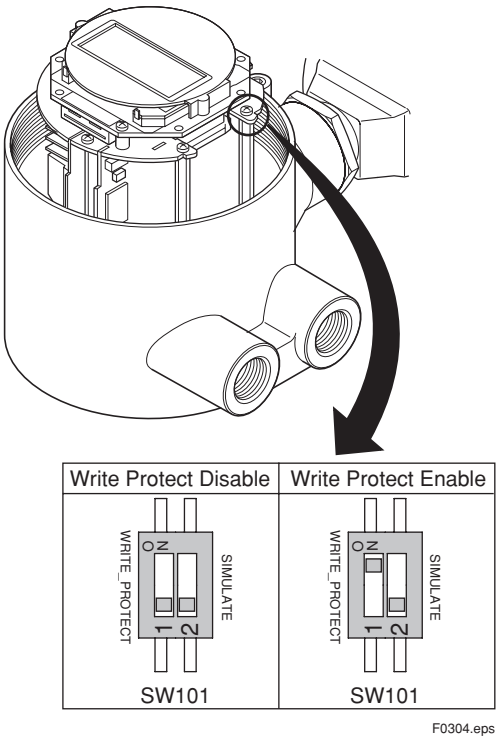

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Figure 3.4 Write Protection Switch

WARNING

When opening the cover, wait for more than 10 minutes after turning off the power. Furthermore, opening of the cover must also be carried out by the trained personnel having knowledge of safety standard.

IMPORTANT

To preserve the safety, do not touch the electrical circuit and the cables except the setting switches.

3.6 Engineering Tools

Engineering of the AXF PROFIBUS PA can be performed with the following two tools.

3.6.1 FieldMate for DTM

Yokogawa's FieldMate is a configuration/management tool for devices based on FDT/DTM technology. DTM is software for the adjustment, configuration, calibration and testing of devices.

For AXF configuration, the following devices and software are required.

• FieldMate R1.03 (FSA110 or FSA111)

• PROFIBUS card2 and COMM DTM Ver. 2.04 or later (supplied by Softing)

• PC

• DP/PA coupler (supplied by SIEMENS or P+F)

• Terminators

• Power supply

• PROFIBUS cable

• AXF DTM

Download DTM for AXF from the following website.

http://downloads.yokogawa-europe.com/

For each device, software and PC operating environment, refer to the corresponding user's manual.

For further information on AXF configuration using FieldMate, see chapter 5. A list on menus is shown in APPENDIX 1.

3.6.2 SIMATIC PDM for EDDL

Electronic Device Description Language (EDDL) defines field device information, and can be used independently of vendors. EDDL files can be read by engineering tools, and the software is used to conduct adjustment, configuration, calibration and tests of devices.

Necessary devices and software

• SIMATIC PDM (supplied by SIEMENS)

• PROFIBUS communication card (supplied by SIEMENS)

• PC

• DP/PA coupler (supplied by SIEMENS or P+F)

• Terminators

• Power supply

• PROFIBUS cable

• AXF EDDL

Download EDDL for AXF from the following website.

http://www.yokogawa.com/fld/doc/profibus/

For further information on the operating environment, refer to the software/device user's manual.

For information on AXF configuration using SIMATIC PDM, refer to the SIMATIC PDM user's manual.

For a list on menus, see APPENDIX 2.

Sample Hardware Setup

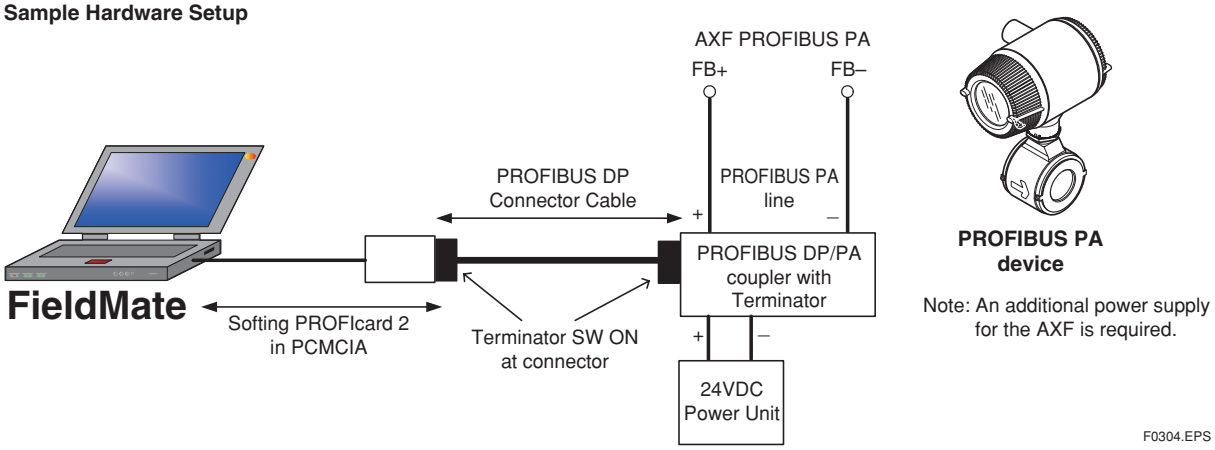

Figure 3.5 Sample Hardware Setup

3.7 Starting FieldMate

The following section describes how to run DTM with FieldMate R1.03.
For the detailed information on FieldMate, see its User's manual.

IMPORTANT

- Before running the program, log-in to Windows as an Administrator or as a user with administrative authority.
- When comm. DTM is connected to the PROFIBUS network with class 1 master running, set the same busparameters of class 1 master.
- The FieldMate R1.03 has the DTM for AXF PROFIBUS PA as its standard package. Hence, it is recommended to use the R1.03 with AXF.
  If the AXF connects to the FieldMate R1.02, the DTM for AXF is necessary to download from the following web-site and combine to the FieldMate R1.02 by DTM Setup tool at first.
  http://downloads.yokogawa-europe.com/

Start FieldMate

Start FieldMate as followings:

Click [Start] → [All Programs] → [YOKOGAWA FieldMate] → [FieldMate]

Select [PROFIBUS] and then click [OK] in the Login Window.

The FieldMate starts to communicate, and the following window is appeared when this action was finished.

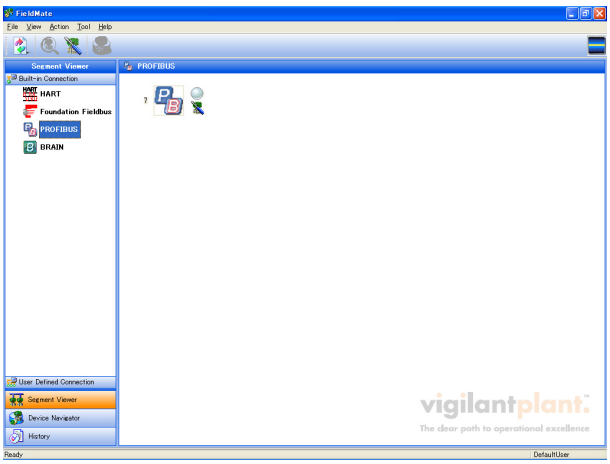

Figure 3.7.1 FieldMate R1.03

New Device Maintenance Info

Click [Action] → [Register Device Maintenance Info].

The new device maintenance information is registered when this work was finished.

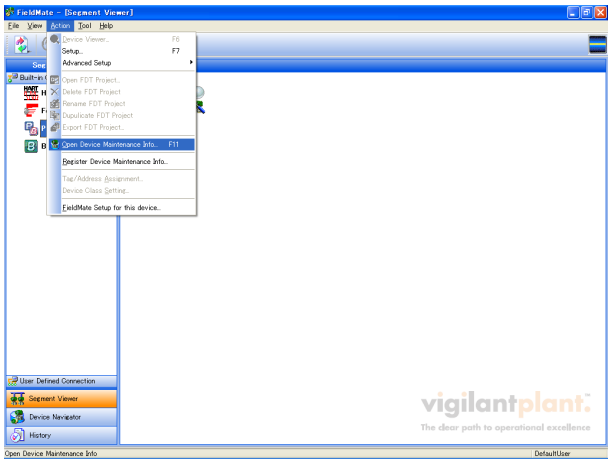

Figure 3.7.2 Register Device Maintenance Info

Next, click [Action] → [Open Device Maintenance Info]. The FieldMate confirms the device to open, then, select the adequate AXF on this menu, and click [OK].

The FieldMate shows the [Device Maintenance Info window] for AXF as shown in Figure 3.7.3 next. Set the adequate parameters if necessary depending on changing parameters against factory default values.

Close the window after saving if parameters on this menu were changed ([File] → [Save]).

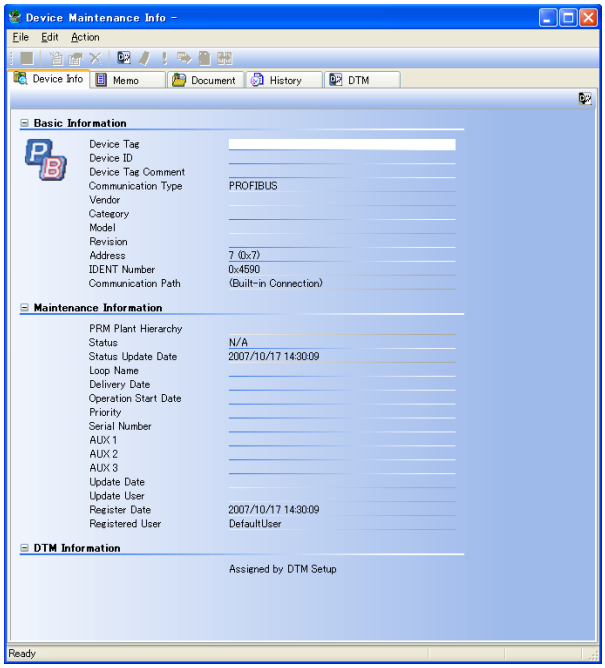

Figure 3.7.3 Device Maintenance Info

Starting DTM Works

In the FieldMate window (as shown in the Figure 3.7.1), click the icon of the device at its Main Window. Next, select [AXF PA V1.1] and click [OK] when the following small window was appeared.

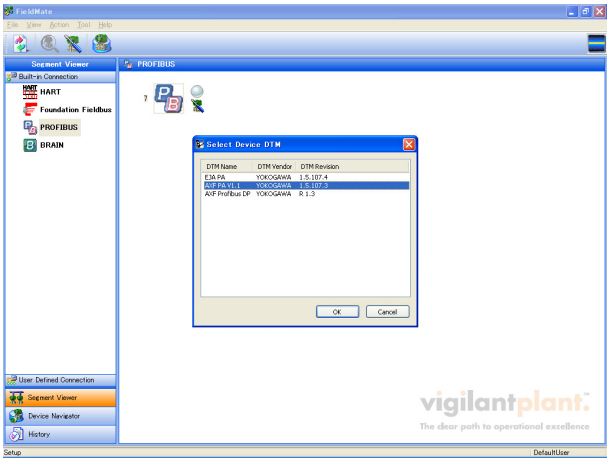

Figure 3.7.4 Select Device DTM

The DTM Works starts to open, and the following new window is appeared. It is able to set parameters of the AXF in detail.

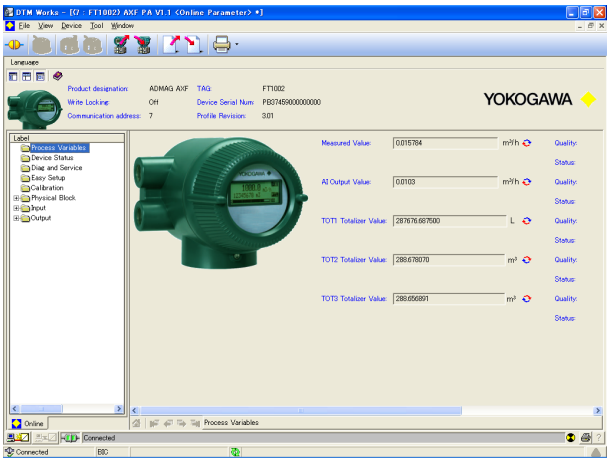

Figure 3.7.5 DTM Works

Refer to Chapter 5 how to operate the AXF in the FieldMate R1.03 for detail.

4. CONFIGURATION

This chapter describes the basic parameters for the three block types and explains how to set and change these parameters.

4.1 Description of Basic Parameters

4.1.1 Physical Block Parameters

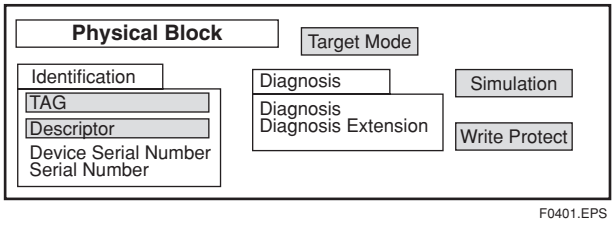

Figure 4.1 Overview of Physical Block

Physical block parameters contain the characteristic data of a device such as the tag number, device name, version, and serial number, etc. For a list of the parameters in the AXF blocks, see “Chapter 9”. The following is a list of basic parameters of the physical block.

TARGET_MODE:
Indicates the physical block mode: Out of Service (O/S) or AUTO. In Out of Service mode, the block does not operate. Under normal circumstances, this is set to AUTO mode.

TAG_DESC:
Tag description parameter (32chars.)

DESCRIPTOR:
User-definable text (a string) to describe the device application (32chars.)

WRITE_LOCKING:
Locks the software in read-only mode.

4.1.2 AI Block Parameters

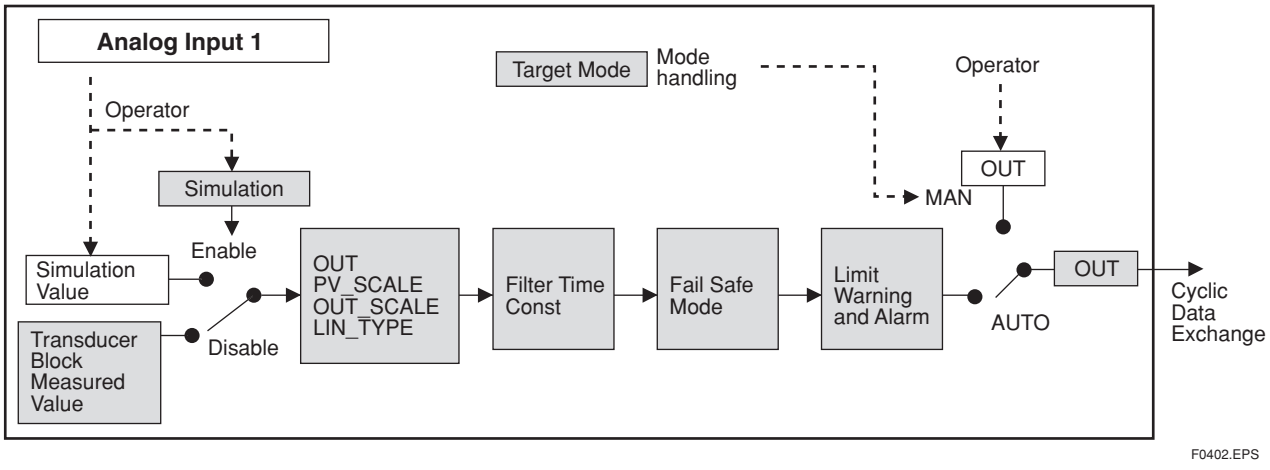

Figure 4.2 Overview of AI Block

The AI block contains all the data for final processing of measured values prior to transmission to the master system. For a list of the parameters in the AXF blocks, see “Chapter 9”. The following describes the basic parameters of the AI block.

TARGET_MODE:
Indicates the AI block mode: Out of Service (O/S), MAN, or AUTO. Target Mode indicates what mode of operation is desired for the AI block. In Out of Service mode, the AI block does not operate. Manual mode does not allow values to be updated. AUTO mode causes the measured values to be updated. Under normal circumstance, set this to AUTO mode. AUTO mode is the factory default.

SIMULATE:
For commissioning and test purposes the input value from the Transducer Block in the Analog Input Function Block AI-FB can be modified. That means that the Transducer and AI-FB will be disconnected.

OUT_SCALE:
Set the range of output (from 0% to 100%). The unit can also be set.

PV_FTIME:
Sets the damping time constant of a single exponential filter for the PV, in seconds.

FSAFE_TYPE:
This defines how the function block will operate if a fault is detected.

FSAFE_VALUE:
This sets the default value for the OUT parameter, if a sensor or a sensor electric fault is detected.

HI_HI_ALM, HI_ALM, LO_ALM, LO_LO_ALM:
Specifies the level setting value for each alarm of flow rate limit depending on the necessity.

4.1.3 Transducer Block Parameters

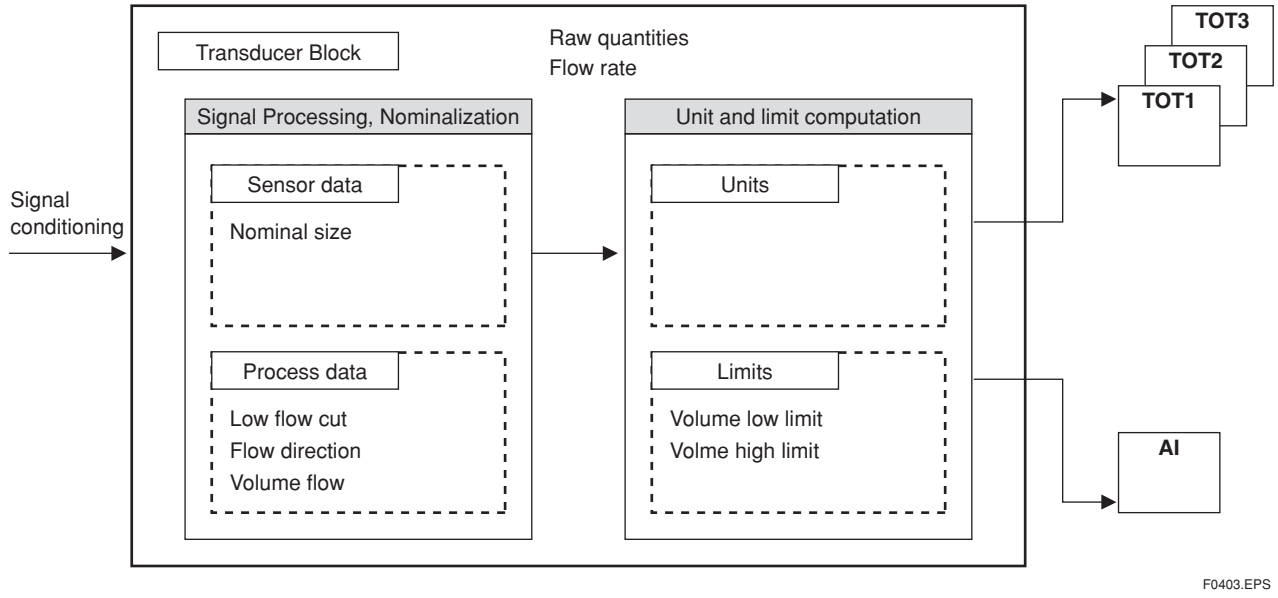

Figure 4.3 Overview of Transducer Block

The transducer block sets functions specific to the measurements AXF. For a list of the AXF block parameters, see “Chapter 9”. The following describes the basic parameters of the transducer block.

TARGET_MODE:
Indicates the physical block mode: Out of Service(O/S) or AUTO. In Out of Service mode, the block does not operate. Under normal circumstances, set this to AUTO mode.

NOMINAL_SIZE:
Specifies the size of the flow tube.

NOMINAL_SIZE_UNITS:
Specifies the unit of the flow tube size.

LOW_MF:
Specifies the meter factor of low frequency side.

HIGH_MF:
Specifies the meter factor of high frequency side.

LOW_MF_EDF:
Specifies the meter factor of low frequency side under enhanced dual frequency mode.

HIGH_MF_EDF:
Specifies the meter factor of high frequency side under enhanced dual frequency mode.

VOLUME_FLOW_UNITS:
Units of VOLUME_FLOW are shown in Table 4.1

Table 4.1 VOLUME_FLOW_UNIT

d	h	min	s
Ml/d(1355)	Ml/h(1522)	Ml/min(1521)	
m3/d(1350)	m3/h(1349)	m3/min(1348)	m3/s(1347)
kL/d(1520)	kL/h(1519)	kL/min(1518)	kL/s(1523)
L/d(1354)	L/h(1353)	L/min(1352)	L/s(1351)
cm3/d(1514)	cm3/h(1513)	cm3/min(1512)	cm3/s(1511)
			m/s(1061)
t/d(1329)	t/h(1328)	t/min(1327)	t/s(1326)
kg/d(1325)	kg/h(1324)	kg/min(1323)	kg/s(1322)
g/d(1321)	g/h(1320)	g/min(1319)	g/s(1318)
kft3/d(1527)	kCFH(1526)	kCFM(1525)	kCFS(1524)
ft3/d(1359)	CFH(1358)	CFM(1357)	CFS(1356)
mft3/d(1531)	mCFH(1530)	mCFM(1529)	mCFS(1528)
Mgal/d(1366)	Mgal/h(1459)	Mgal/min(1455)	Mgal/s(1451)
kgal/d(1462)	kgal/h(1458)	kgal/min(1454)	kgal/s(1450)
gal/d(1365)	gal/h(1364)	GPM(1363)	gal/s(1362)
mgal/d(1461)	mgal/h(1457)	mgal/min(1453)	mgal/s(1449)
kbbl/d(1493)	kbbl/h(1489)	kbbl/min(1485)	kbbl/s(1481)
bbl/d(1374)	bbl/h(1373)	bbl/min(1372)	bbl/s(1371)
mbbl/d(1492)	mbbl/h(1488)	mbbl/min(1484)	mbbl/s(1480)
ubbl/d(1491)	ubbl/h(1487)	ubbl/min(1483)	ubbl/s(1479)
kbbl/d(1534)	kbbl/h(1533)	kbbl/min(1532)	
bbl/d(1538)	bbl/h(1537)	bbl/min(1536)	bbl/s(1535)
mbbl/d(1542)	mbbl/h(1541)	mbbl/min(1540)	mbbl/s(1539)
		ubbl/min(1544)	ubbl/s(1543)
			ft/s(1067)
klb/d(1548)	klb/h(1547)	klb/min(1546)	klb/s(1545)
lb/d(1333)	lb/h(1332)	lb/min(1331)	lb/s(1330)

VOLUME_FLOW_FTIME:
Specifies output time constants. Setting range is 0.1 to 200sec. “3sec.” is factory set.

LOW_FLOW_CUTOFF:
Specifies low cut range for output. Setting range is 0 to 10%. “0%” is factory set. The larger absolute value between Array1 and Array2 is used for the scale.

DISPLAY_SELECT1,2,3:

Table 4.2 DISPLAY_SELECT1, 2, 3

DISPLAY_SELECT 1	DISPLAY_SELECT 2	DISPLAY_SELECT 3
The display content for the display unitís first line.	The display content for the display unitís second line.	The display content for the display unitís third line.
0:Flow Rate(%) 1:Out Value 2:Totalized Flow Rate1 3:Totalized Flow Rate2 4:Totalized Flow Rate3 The factory default setting is 1.	0:Off 1:Flow Rate(%) 2:Out Value 3:Flow Rate(Bar) 4:Totalized Flow Rate1 5:Totalized Flow Rate2 6:Totalized Flow Rate3 7:Tag No 8:Adhesion Check 9:Communication The factory default setting is 0.	0:Off 1:Flow Rate(%) 2:Out Value 3:Flow Rate(Bar) 4:Totalized Flow Rate1 5:Totalized Flow Rate2 6:Totalized Flow Rate3 7:Tag No 8:Adhesion Check 9:Communication The factory default setting is 0.

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DISPLAY_CYCLE:

Specifies the cycle of LCD display. The factory default setting is 400ms, but if a low temperature environment makes it difficult to view the display, it is recommended that you set a longer display cycle.

VOLUME_FLOW:

Indicates the current measured value and status as the primary value (volumetric flow) This parameter is input to the AI Function Block and the Totalizer Function Block.

Table 4.3 VOLUME_FLOW

Quality (bit 6-7)	Sub-status (bit 2-5)	Limit (bit 0-1)	Alarm	Value
2:Good (NC)	0:Ok	0:ok	Normal condition	
	1:Update Event			
	9:Maintenance required	0:ok	80:Adhesion Wng	0xA4
			81:(Reserved)	
1:Uncertain	4:Sensor Conversion Not Accurate	1:low limited or	85:Flow Vel Over	0x49
		2:high limited		0x4A
	7:Configuration Error	0:ok	82:Auto Zero Wng	0x5C
0:Bad	0:Non specific	0:ok	40:PB O/S Mode	0x00
	1:Configuration Error	3:constant	50:Span > 10m/s	0x07
			51:Span < 0.1m/s	
			57:Dens Set Err	
			71:Meas Mod Set	
			72:Size Set Err	
			73:Adh Set Err	
	3:Device Failure	3:constant	10:uP Fault	0x0F
			11:EEPROM Fault	
			12:A/D(H) Fault	
			13:A/D(L) Fault	
			14:A/D(Z) Fault	
			16:EEPROM Dflt	
		0:ok	100:Comm uP Fault	0x0C
			101:Comm EEPROM Fault	
			105:Comm Error1	
			106:Comm Error2	
	4:Sensor Failure	3:constant	15:Coil Open	0x13
			30:Sig Overflow	
			31:Empty Pipe	
			33:Adhesion Alm	
			34:(Reserved)	
	7:Out of Service	0:ok	41:TB O/S Mode	0x1C

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4.1.4 Totalizer Block Parameters

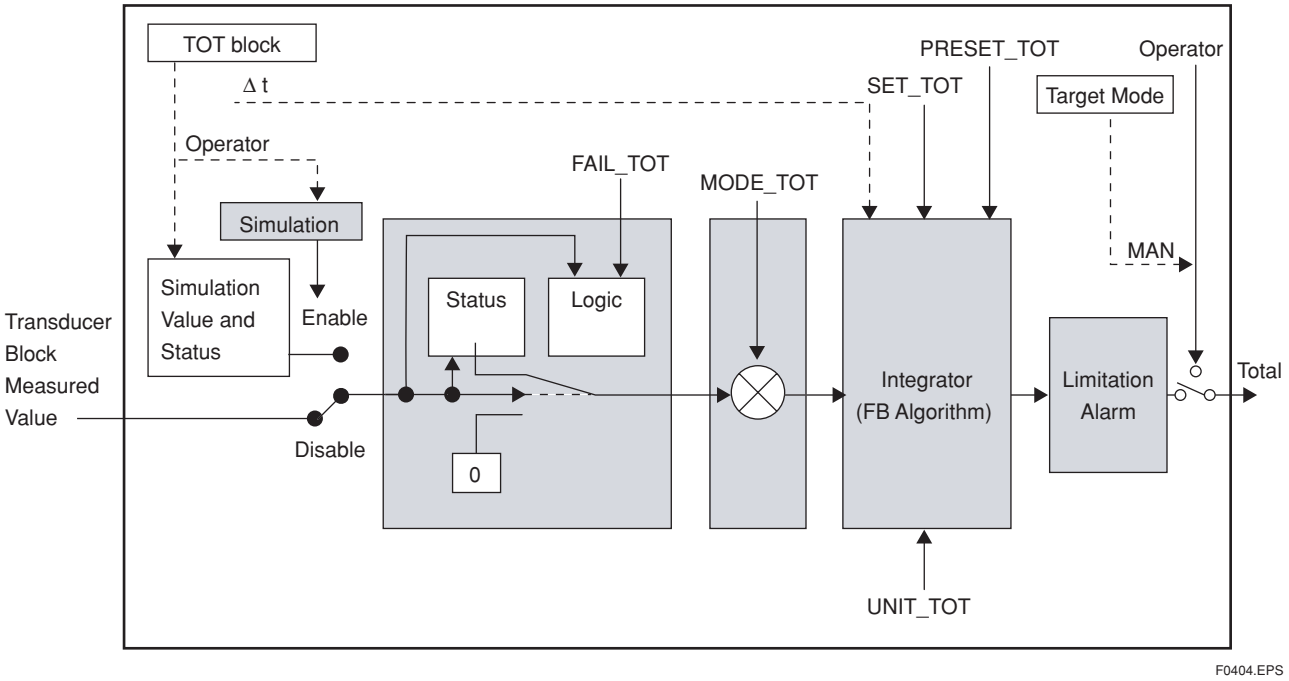

Figure 4.4 Overview of Totalizer Block

Totalizer block parameters can be read or set from the host. The AXF contains three Totalizer blocks. For a list of the parameters of blocks held by the AXF, see Chapter 9.

TARGET_MODE, MODE_BLK:

Indicates the three types of function block modes; Out Of Service (O/S), Manual, and Auto.
TARGET_MODE indicates what mode of operation is desired for Totalizer block. In Out Of Service mode (O/S), the TOT block does not operate. The Manual mode does not allow values to be updated. The Auto mode causes the measured value to be updated. Under normal circumstances, set the Auto mode to take effect. The Auto mode is the factory default.

CHANNEL:

This is the parameter of the transducer block to be input to the Totalizer block. Totalizer block is assigned to flow rate.

UNIT_TOT:

This is the parameter of the unit of the totalized value coming from the transducer block. Totalizer block doesn't have the scaling which is similar to AI Block.

Available units for UNIT_TOT are the units shown below.

1549:Ml, 1034:m3 , 1035:dm3, 1517:kL, 1041:hL, 1038:L, 1040:mL,1036:cm3, 1092:t, 1091:Mg, 1088:kg, 1089:g, 1090:mg, 1043:CF, 1048:gallon, 1051:bbl, 1094:lb, 1641:bbl (US federal)

FAIL_TOT:

This is the parameter which defines the fail safe mode of the Totalizer block. This parameter determines the operation of the Totalizer block during the occurrence of input values with bas status.

	FAIL_TOT value	TOTAL Status
1	0: RUN	UNCERTAIN: Non Specific, ok
2	1: HOLD	UNCERTAIN: Last Usable Value, const.
3	2: MEMORY	UNCERTAIN: Non Specific, ok

Note: Suppose that SET_TOT = TOTALIZE, MODE_TOT ≠ HOLD.

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MODE_TOT:

This is the parameter which defines the direction of the totalization.

0: BALANCED; True arithmetic integration of the incoming rate values.

1: POS_ONLY; Totalization of positive incoming rate values only.

2: NEG_ONLY; Totalization of negative incoming rate values only.

3: HOLD; Totalization stopped.

SET_TOT:

SET_TOT is the parameter in order to assign the condition to the Totalizer.

0: TOTAILIZE; “Normal” operation of the Totalizer.

1: RESET; Assign value “0” to Totalizer.

2: PRESET; Assign value of PRESET_TOT to Totalizer.

PRESET_TOT:

This is the parameters in order to define the starting value to the Totalizer.

TOTAL:

This parameter contains the integrated quantity of the rate parameter provided by CHANNEL and the associated status.
The alarm information that a priority is the highest is set as status.
In case of two or more alarms belonging to the same sub status are generated, the priority of alarm is so high that the number of an alarm message is small. However, as for O/S Mode alarm of Totalizer block and Physical Block, a priority becomes high most.

Table 4.4 TOTAL

Quality (bit 6-7)	Sub-status (bit 2-5)	Limit (bit 0-1)	Alarm	Value
2:Good (NC)	0:Ok	0:ok		
	1:Update Event			
	2:Active Advisory Alarm	1:low limited	--:Total1 Lo Alm	0x89
			--:Total2 Lo Alm	
			--:Total3 Lo Alm	
		2:high limited	--:Total1 Hi Alm	0x8A
			--:Total2 Hi Alm	
			--:Total3 Hi Alm	
	3:Active Critical Alarm:	1:low limited	--:Total1 Lo Lo Alm	0x8D
			--:Total2 Lo Lo Alm	
			--:Total3 Lo Lo Alm	
		2:high limited	--:Total1 Hi Hi Alm	0x8E
			--:Total2 Hi Hi Alm	
			--:Total3 Hi Hi Alm	
	4:Unack. Update Event			
	5:Unack. Advisory Alarm			
	6:Unack. Critical Alarm			
	9:Maintenance required	0:ok	80:Adhesion Wng	0xA4
			81:(Reserved)	
1:Uncertain	0:Non specific	0:ok	10:uP Fault	0x40
			11:EEPROM Fault	
			12:A/D(H) Fault	
			13:A/D(L) Fault	
			14:A/D(Z) Fault	
			16:EEPROM Dflt	
			100:Comm uP Fault	
			101:Comm EEPROM Fault	
			105:Comm Error1	
			106:Comm Error2	
			15:Coil Open	
			30:Sig Overflow	
			31:Empty Pipe	
			33:Adhesion Alm	
			34:(Reserved)	
			41:TB O/S Mode	
			50:Span > 10m/s	
			51:Span < 0.1m/s	
			57:Dens Set Err	
			71:Meas Mod Set	
			72:Size Set Err	
			73:Adh Set Err	
			82:Auto Zero Wng	
		1:low limited or 2:high limited	85:Flow Vel Over	0x41 0x42
0:Bad	1:Configuration Error	0:ok	120:Total1 Unit Set Err	0x04
			121:Total2 Unit Set Err	
			122:Total3 Unit Set Err	
	7:Out of Service	3:constant	40:PB O/S Mode	0x1F
			43:Total1 FB O/S Mode	
			44:Total2 FB O/S Mode	
			45:Total3 FB O/S Mode	

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4.1.5 DI Block Parameters

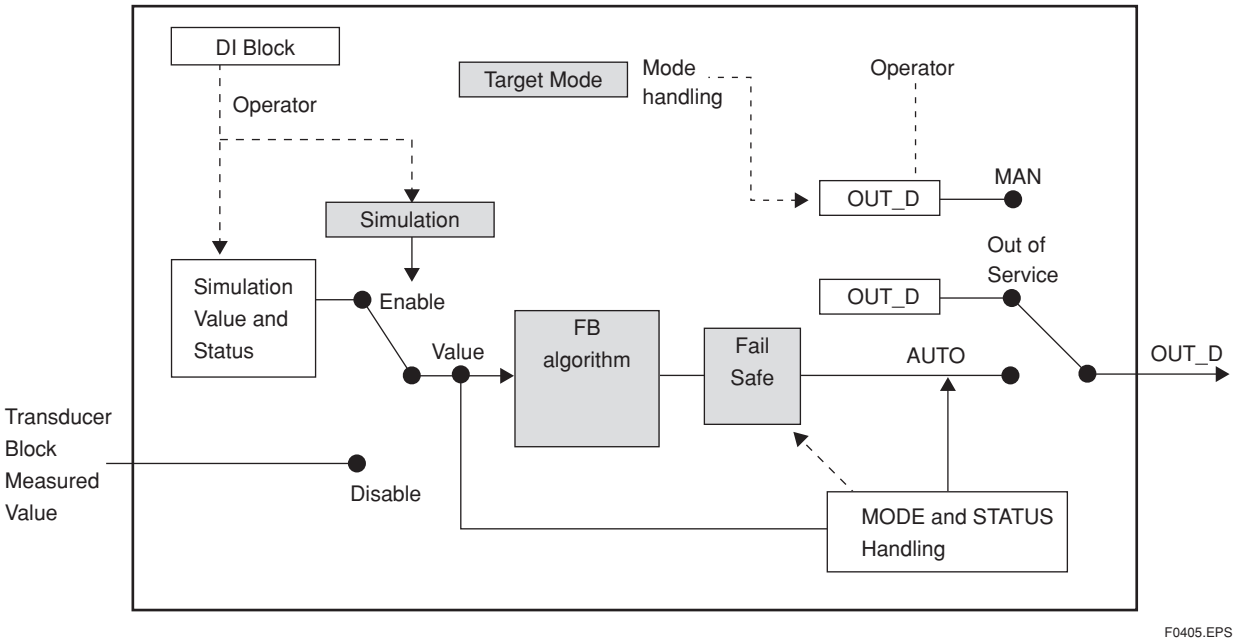

Figure 4.5 Overview of DI Block

DI block parameters can be read or set from the host. The AXF contains two DI blocks, which individually transfer the "High Limit", "Low Limit", "Adhesion Alarm" and "Adhesion warning" generated by the transducer block. For a list of the parameters of blocks held by the AXF, refer to Chapter 9.

TARGET_MODE:

Indicates the three types of function block modes; Out_Of_Service (O/S), Manual, and Auto. TARGET_MODE indicates what mode of operation is desired for the block. In Out_Of_Service mode (O/S), the DI block does not operate. The Manual mode does not allow values to be updated. The Auto mode causes the measured value to be updated. Under normal circumstances, set the Auto mode to take effect. The Auto mode is the factory default.

MODE_BLK:

The mode parameter is a structured parameter composed of the actual mode, the normal mode and the permitted mode.

Table 4.5 Data structure of MODE_BLK

	Member	Description
1	Actual	The actual mode is set (calculated) by the block during its execution to reflect the mode used during execution.
2	Permitted	The permitted mode shows which changes of the target mode is valid for the specific block to the remote user of the MODE_BLK parameter.
3	Normal	The normal mode is the desired operating mode of the block.

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Table 4.6 Initial value of MODE_BLK

	Member	Initial value	Remark
1	Actual	Auto	When the Actual of Physical Block is O/S, the Actual of DI changes in O/S mode.
2	Permitted	O/S, Man, Auto	
3	Normal	Auto	

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CHANNEL:

This is the parameter to specify the value of the transducer block to be input to the DI block. Each DI block is assigned to either “High Limit”, “Low Limit”, “Adhesion Alarm” or “Adhesion Warning”.

This parameter enables to select among “LIMSW_1_VALUE_D”, “LIMSW_2_VALUE_D”, “SWITCH_1_VALUE_D” and “SWITCH_2_VALUE_D”.

Also it enables to set “High/Low Limit” or “Adhesion Alarm/Warning” in each DI block.

INVERT:

This is the parameter which indicates whether the input value from the transducer block should be logically inverted before it is stored in the OUT_D.

0: Not inverted
1:invert

FSAFE_TYPE:

This is the parameter which defines the operation of the function block if a fault is detected.

Table 4.7 FSAFE_TYPE

	Value	Status	Remark
1	0: FSAFE_VAL	UNCERTAIN_Substitude Value	FSAFE_VAL is used as OUT_D.
2	1: last valid OUT Value	UNCERTAIN_LastUsable Value	If there is no valid value available, then UNCERTAIN- Inital_Value.
3	2: wrong calculated Val	Bad:* (* as calculated)	The status is shown in Table 4.8

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FSAFE_VAL_D:

This is the parameter which sets the default value for the OUT_D parameter, if sensor or sensor electric fault is detected.

OUT_D:

OUT_D is the output of the function block. The value is specified by the operator in MODE MAN.

The relationship between OUT_D.Status and the result of the DIAGNOSIS are described as below.

The alarm information that a priority is the highest is set as status.

In case of two or more alarms belonging to the same sub status are generated, the priority of alarm is so high that the number of an alarm message is small. However, as for O/S Mode alarm of DI function block and Physical Block, a priority becomes high most.

Table 4.8 OUT_D

Quality (bit 6-7)	Sub-status (bit 2-5)	Limit (bit 0-1)	Alarm	Value
2:Good (NC)	0:Ok	0:ok 1:low limited 2:high limited 3:constant		
	1:Update Event			
	2:Active Advisory Alarm			
	3:Active Critical Alarm:			
	4:Unack. Update Event			
	5:Unack. Advisory Alarm			
	6:Unack. Critical Alarm			
	9:Maintenance required	0:ok	80:Adhesion Wng	0xA4
			81:(Reserved)	
1:Uncertain	0:Non specific	0:ok	82:Auto Zero Wng	0x40
		1:low limited or 2:high limited	85:Flow Vel Over	0x41 0x42
0:Bad	0:Non specific	3:constant	50:Span > 10m/s	0x03
			51:Span < 0.1m/s	
			57:Dens Set Err	
			71:Meas Mod Set	
			72:Size Set Err	
			73:Adh Set Err	
	3:Device Failure	3:constant	10:uP Fault	0x0F
			11:EEPROM Fault	
			12:A/D(H) Fault	
			13:A/D(L) Fault	
			14:A/D(Z) Fault	
			16:EEPROM Dflt	
		0:ok	100:Comm uP Fault	0x0C
			101:Comm EEPROM Fault	
			105:Comm Error1	
			106:Comm Error2	
	4:Sensor Failure	3:constant	15:Coil Open	0x13
			30:Sig Overflow	
			31:Empty Pipe	
			33:Adhesion Alm	
			34:(Reserved)	
	7:Out of Service	0:ok	41:TB O/S Mode	0x1C
		3:constant	40:PB O/S Mode	0x1F
			46:DI1FB O/S Mode	
			47:DI2FB O/S Mode	

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5. EXPLANATION OF BASIC ITEMS

5.1 Outline

This section describes basic parameter setting by use of FieldMate R1.03 including easy setup and AXF display of integral indicator.

The following sections describe how to adapt the function and performance of the AXF to suit specific applications because two or more devices are connected to PROFIBUS PA, setting including the requirements of all devices need to be determined. Practically, the following steps must be taken.

Refer to Chapter 4 when the AXF is set parameters by use of other engineering tools in each function block.

5.2 Basic Parameter Setting and Changing

This section describes basic parameter setting and changing with FieldMate R1.03. For detailed information on FieldMate, refer to its User's manual.

5.2.1 Explanation of Menu.

The DTM Works window is shown below.

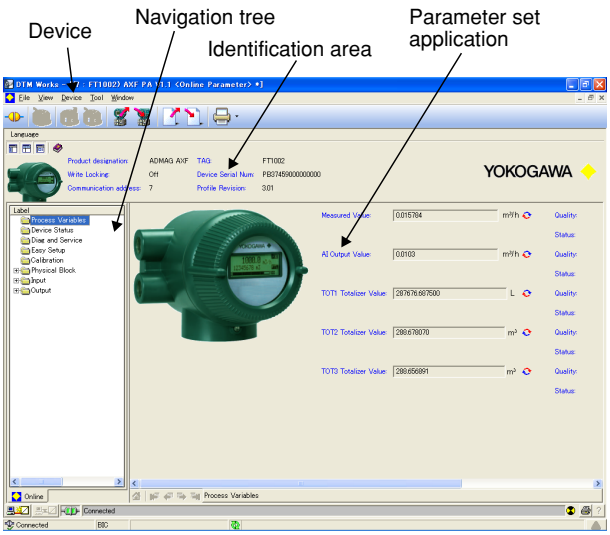

Figure 5.2.1 DTM Works

Identification area

This area contains information about the device that is handled by the DTM. At online parameter, all parameters in this area must be handled as dynamic variables.

Parameter set application

This area displays the device parameters. Parameter setting and changing are performed in this area.

If the mouse of PC moves to each parameter name, its explanation is appeared.

Navigation tree

The navigation tree provides an overview of the parameter settings. User can easily navigate the folders and submenus using the tree view. The tree view is similar to that of windows explorer. A submenu is viewed by clicking a folder with the plus sign [+].

Clicking the minus sign [-] will close the submenu.

User can select an element by pushing the up or down arrow key. The navigation tree for online parameters is described in the following table.

IMPORTANT

- Before running the program, log-in to Windows as an Administrator or as a user with administrative authority.
- When comm. DTM is connected to the PROFIBUS network with class 1 master running, set the same busparameters of class 1 master.

Table 5.2.1 Navigation tree structure of online parameters

Level of node		
1st level	**2nd level**	**3rd level**
Process Variable		
Device Status		
Diag and Service		
Easy Setup		
Calibration		
Physical Block	Identification	
	Diagnosis	
	Simulate Diagnosis	
	Function Block Status	
	Configuration	
Input	Transducer Block	Flow Tube
		DI Set
		AUX
		Mask Alarm
		Simulate Measured Value
		Adhesion
		Alarm Record
		Local Display
Output	Analog Input	Batch Information
		PV Scale
		Output scale
		Warning and Alarm
	Totalizer 1	Batch Information
		Totalizer Reset
		Warning and Alarm
	Totalizer 2	Batch Information
		Totalizer Reset
		Warning and Alarm
	Totalizer 3	Batch Information
		Totalizer Reset
		Warning and Alarm
	Discrete Input 1	Batch Information
	Discrete Input 2	Batch Information

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Device

This menu shows the current accessible functions of the DTM for AXF ([Device] menu).

Table 5.2.2 DTM context menu for AXF

DTM Function		
1st level	**2nd level**	**Description**
Connect/ Disconnect		Connect/Disconnect
Parameter	Online Parameter	Online Parameterization
	Offline Parameter	Offline Parameterization
	Configuration	The Query Device is located under Configuration. The Query Device provides a list of all parameters in a designated block.
Additional Functions	Observe	Indicates actual process conditions. All parameters must be handled as dynamic variables and updated periodically.
	Diagnosis	Provides device diagnosis information.
	Process Trend	Trend display of process value
	About	Displays DTM version of the device
	Refresh Online Data	Refresh (reload) the online data
Register Device Maintenance Info		Registration of a new device maintenance information based on the device information
Unregister Device Maintenance Info		Unregisters the device maintenance information
Upload from Device		All parameters are uploaded from device to DTM.
Download to Device		All parameters are downloaded from DTM to device.
Print		Print specified parameter sets.
Document		Displays the related document for DTM (*1)
Property		Displays DTM version of the device

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*1: The AXF does not have this function.

Example of DTM context screen

There are 8 kinds of menus as [Process Variable], [Device Status], [Diag and Service], [Easy Setup], [Calibration], [Physical Block], [Input] and [Output].

Their examples are shown in Figure 5.2.2 to 5.2.6.

(a) Process Variables

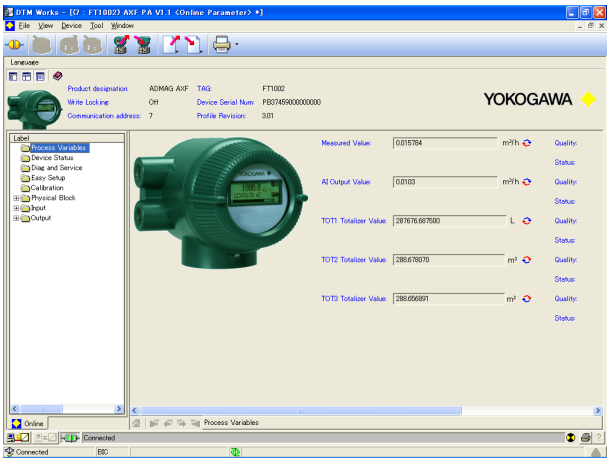

Figure 5.2.2 Process Variables

(b) Device Status

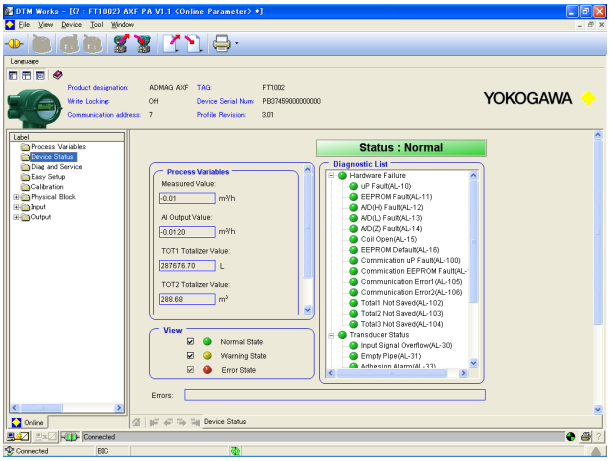

Figure 5.2.3 Device Status

Note: This function is only available if an online connection to the device is established.

(c) Diag and Service

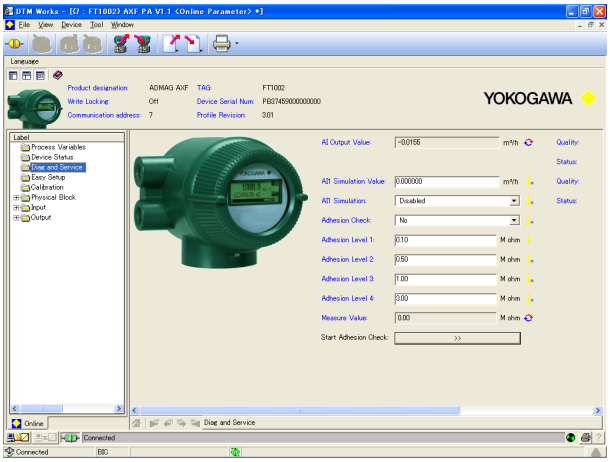

Figure 5.2.4 Diag and Service

(d) Easy Setup

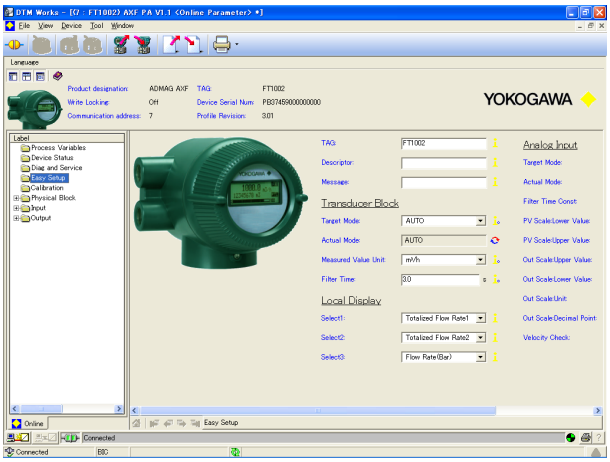

Figure 5.2.5 Easy Setup

(e) Calibration

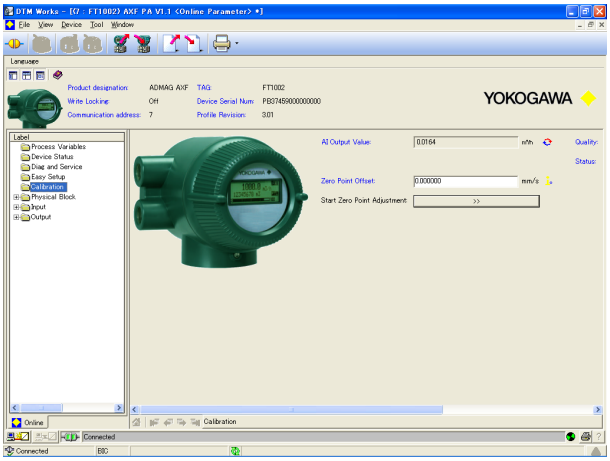

Figure 5.2.6 Calibration

5.3 Bus Address Setup

This section describes how to set the bus address by FieldMate R1.03. The AXF also has a hardware slide switch. If the bus address is set by FieldMate R1.03, the No. 8 switch of the hardware slide switch must be set OFF beforehand. Refer to section 3.4 for its detail.

(1) Bus Address change for AXF

In the DTM Works window, click [Device] → [Parameter] → [Configuration].

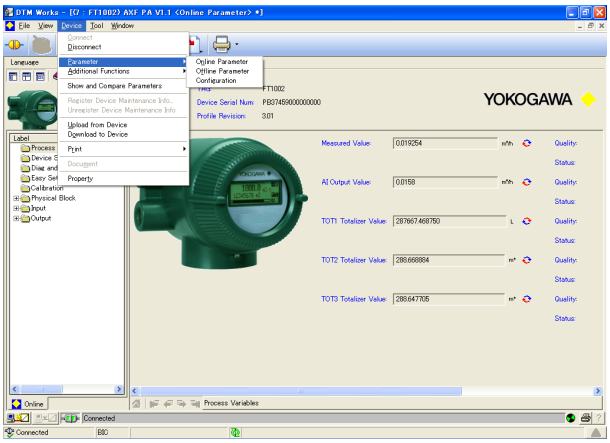

Figure 5.3.1 DTM Works window

The DTM Works shows the following window.

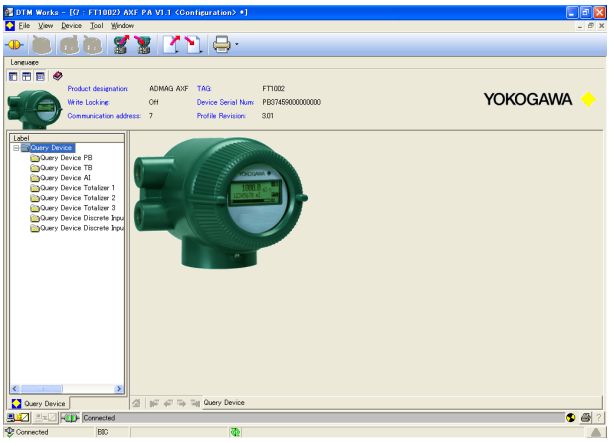

Figure 5.3.2 Query Device window

Click [Query Device PB] at the Navigator tree.

The DTM Works shows parameters for [Query Device PB] in the Parameter set application.

Firstly, the [Target Mode] on this application must be changed from [AUTO] to [Out of Service (O/S)], and press the [Enter] key after this change. The DTM Works starts to communicate with the AXF, and [Mode Block: Actual] parameter is changed to [Out of Service] after finish this communication.

In the meantime, the AXF starts to generate its alarm message and is displayed to its LCD at the same time.

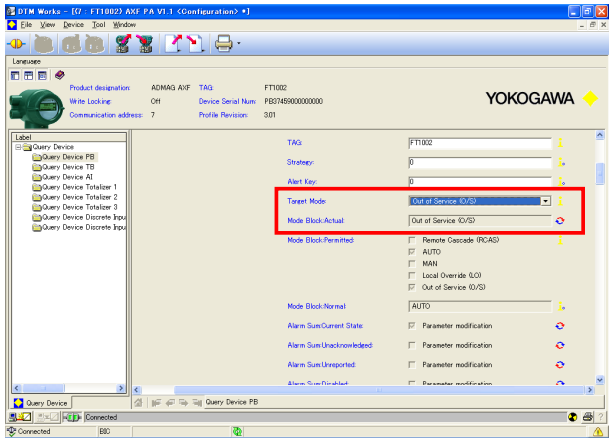

Figure 5.3.3 Target Mode change

The bus address setting function is located down below in the [Query Device PB] menu.

Entry the adequate bus address at [Set Address] and press [Enter] key. The following figure is a case of changing from 7 to 10.

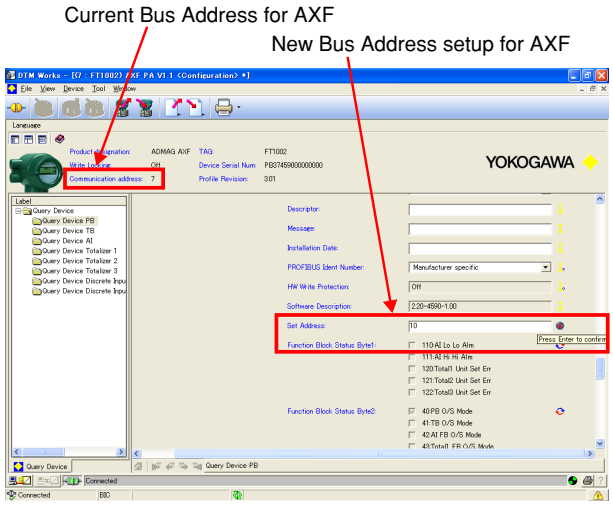

Figure 5.3.4 Bus Address change for AXF

(2) Bus Address change for DTM

A message as “The communication DTM sent abort” in the DTM Works is appeared as shown in figure 5.3.5. Click [OK] for this message window. A new DTM Works window is established as shown in figure 5.3.6, however, close this DTM Works window.

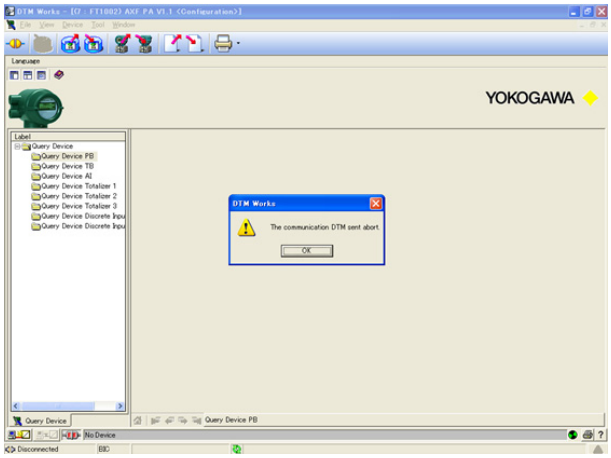

Figure 5.3.5 Message from DTM Works

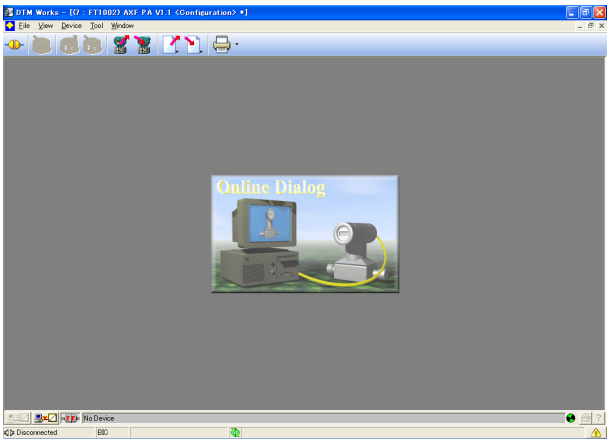

Figure 5.3.6 New DTM Works window

Go back to the FieldMate window as shown in Figure 5.3.7 and confirm that the address is still no change. Next, click the icon for “Update”. The FieldMate starts to communicate with the AXF and the new address is set after several seconds (Figure 5.3.8).

Click this icon as “Update”.

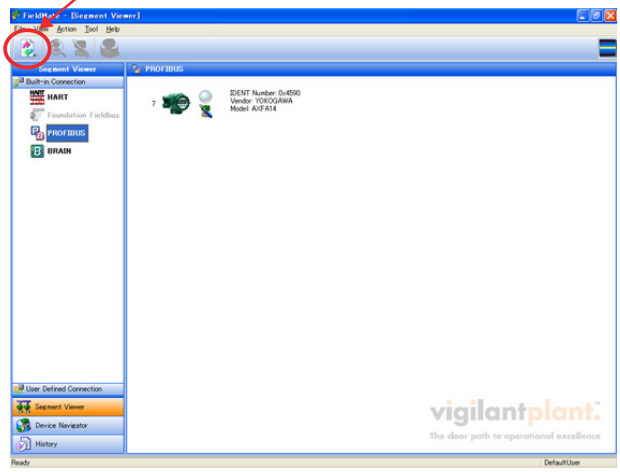

Figure 5.3.7 FieldMate window

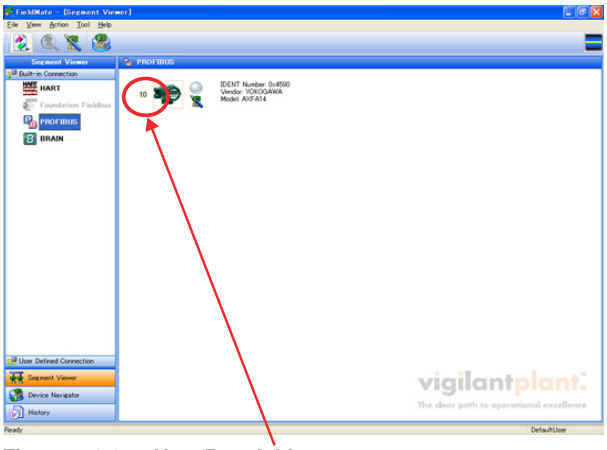

Figure 5.3.8 New Bus Address was set

Change the parameter from [Out of Service (O/S)] to [AUTO] again at [Target Mode] in the [Query Device PB] menu and confirm that the parameter is changed to [AUTO] at [Mode Block: Actual] at the same time by referring to the Figure 5.3.1 to 5.3.3 when the bus address change work was finished.

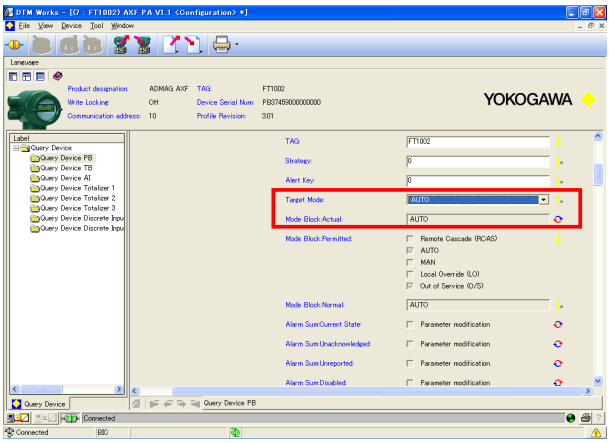

Figure 5.3.9 Mode Block: Actual confirmation

The procedure of the Bus Address setup was finished.

5.4 Easy Setup

Easy Setup tracks parameters that often need to be configured or changed.

Click [Easy Setup] at the Navigation tree. It shows the Easy setup window at the Parameter Set Application as shown in Figure 5.2.5. The following figure is [Easy Setup] window in the toggle the tree window mode, and its contents is described Table 5.4.1.

Figure 5.4.1 Easy Setup

Table 5.4.1 Easy Setup Items

Block name	Item	Type of Entry
	TAG	ASCII code
	Descriptor	ASCII code
	Message	ASCII code
Transducer Block	Target Mode	Alternative
	Actual Mode	Monitor only
	Measured Value Unit	Alternative
	Filter Time	Numeric
Analog Input	Target Mode	Alternative
	Actual Mode	Monitor only
	Filter Time Const	Numeric
	PV Scale: Lower Value	Numeric
	PV Scale: Upper Value	Numeric
	Out Scale: Upper Value	Numeric
	Out Scale: Lower Value	Numeric
	Out Scale: Unit	Alternative
	Out Scale: Decimal Point	Numeric
	Velocity Check	Monitor only
Local Display	Select 1	Alternative
	Select 2	Alternative
	Select 3	Alternative

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The [Target Mode] in each function block must be set from [AUTO] to [O/S] before changing parameters.

When the parameter in each item has been changed, the DTM Works confirms its update, hence, press the [Enter] key to fix. If the [ESC] key is pressed before fixing, the data comes back to the set data without changing.

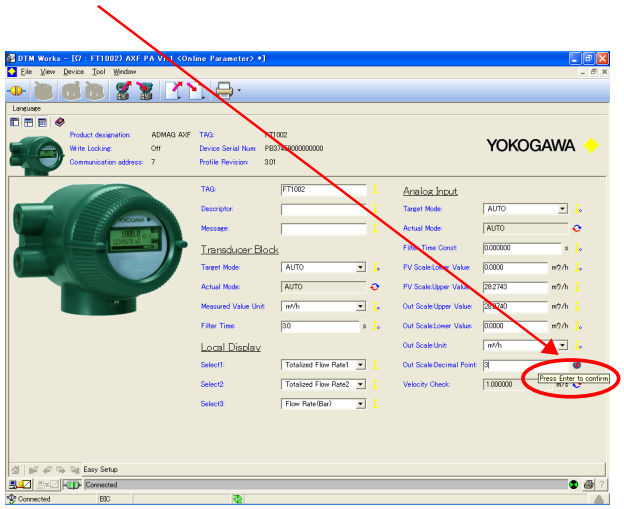

Figure 5.4.2 Parameter change

The [Target Mode] must be returned [AUTO] when the parameter setting work was finished.

IMPORTANT

Do not turn power OFF immediately after parameter setting. When parameters are saved to the EEPROM, the redundant processing is executed for an improvement of reliability. Should the power be tumed OFF within 60 seconds after setting of parameters, changed parameters are not saved and may return to their original values.

5.5 Function Blocks Setting

This section describes the procedure taken to set and change the parameters for each block. Obtaining access to each parameter differs depending on the configuration system used. For detail, refer to Chapter 4 for each configuration system.

Block mode consists of the following four modes that are controlled by the universal parameter that displays the running condition of each block.

- TARGET_MODE: Sets the operating condition of the block.
- Actual: Indicates the current operating condition.
- Permit: Indicates the operating condition that the block is allowed to take.
- Normal: Indicates the operating condition that the block will usually take.

Table 5.5.1 shows the operating conditions which the individual blocks will take.

Table 5.5.1 Operating condition in each function block

	AI block	TOT block	DI block	Transducer block	Physical block
Automatic (Auto)	Yes	Yes	Yes	Yes	Yes
Manual (Man)	Yes	Yes	Yes		
Out of Service (O/S)	Yes	Yes	Yes	Yes	Yes

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The [Target Mode] in each function block must be set from [AUTO] to [O/S] before changing parameters, and then, return [AUTO] this mode after finish the parameter setting work.

5.5.1 Physical Block Parameters Setup

There are 5 kinds of submenus as [Identification], [Diagnosis], [Simulate Diagnosis], [Function Block Status] and [Configuration].

Refer to section 6.3.4 for [Simulate Diagnosis] function.

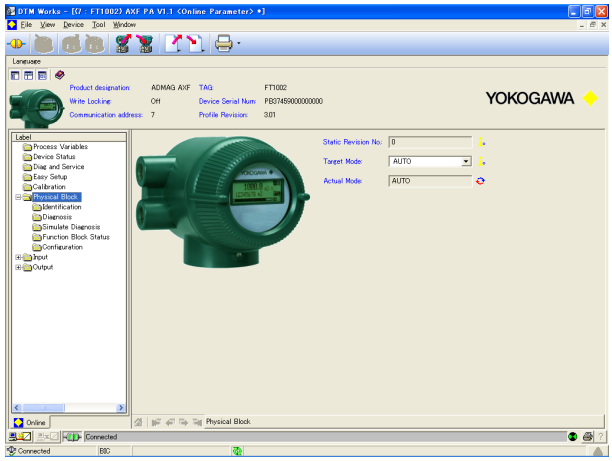

Figure 5.5.1 Physical Block menu

(1) Configuration setting

There are 2 items to set parameters as [Write Locking] and [Factory Reset] at [Configuration] in the [Physical Block] menu. The write locking function enables to use not only parameter setting but also setting by hardware switch at the same time. Refer to section 3.5 detail.

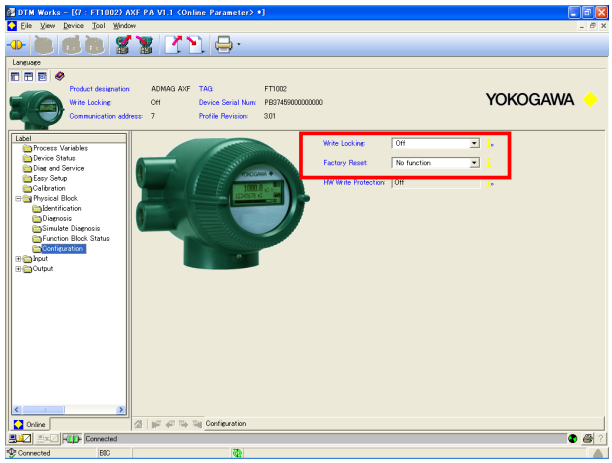

Figure 5.5.2 Configuration Setup

5.5.2 AI Block Parameters Setup

The AI block outputs the flow rate signals.

There are 4 kinds of submenus as [Batch Information], [PV Scale], [Output Scale] and [Warning and Alarm] in the [Analog Input] menu.

Click [Output] → [Analog Input] at the Navigation Tree.

Refer to section 6.3.4 for [Simulation] function.

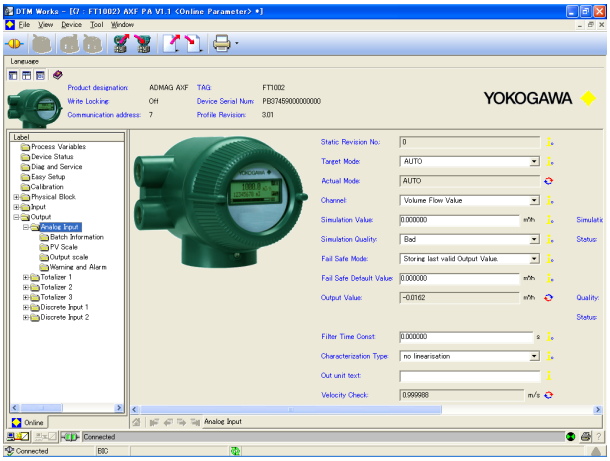

Figure 5.5.3 Analog Input menu

(1) Calibration range setting

Entry the upper and lower values in the [PV Scale] submenu.

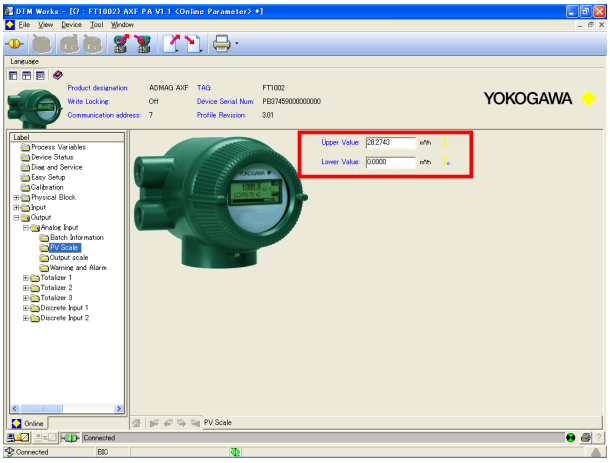

Figure 5.5.4 PV Scale Setup

(2) Output Scale setting

Entry the flow unit, upper and lower values with their decimal points in the [Output scale] submenu.

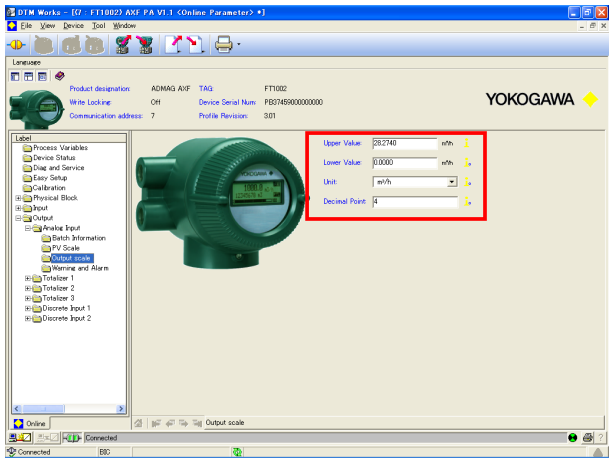

Figure 5.5.5 Output Scale Setup

(3) Fail Safe Mode setting

Entry the fail safe mode, fail scale default value and output value in the [Analog Input] menu.

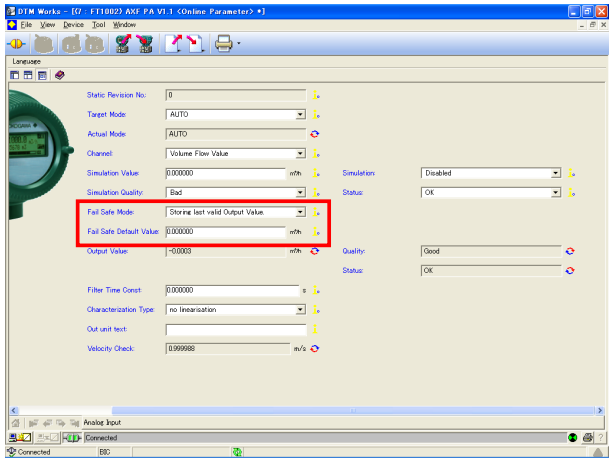

Figure 5.5.6 Fail Safe Mode Setup

5.5.3 Transducer Block Parameters Setup

There are 8 kinds of submenus as [Flow Tube], [DI Set], [AUX], [Mask Alarm], [Simulate Measured Value], [Adhesion], [Alarm Record] and [Local Display] in the [Transducer Block] menu.

Click [Input] → [Transducer Block] at the Navigation tree.

Refer to section 6.3.4 for [Simulate Measured Value] function.

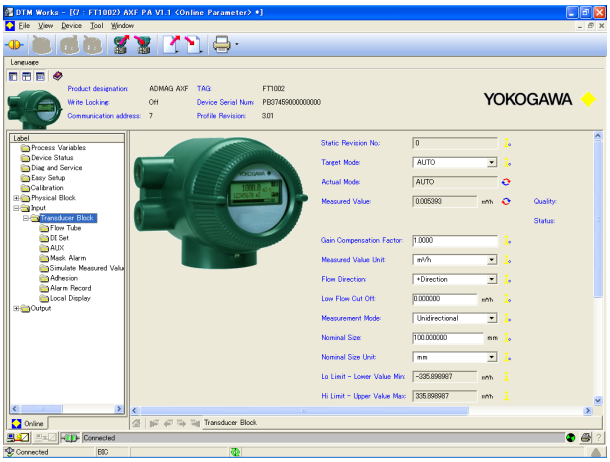

Figure 5.5.7 Transducer Block menu

(1) Damping time constant setting

Entry the adequate numeric at [Filter Time] in the [Transducer Block] menu.

This data is also available to set at [Filter Time] in the [Easy Setup] menu.

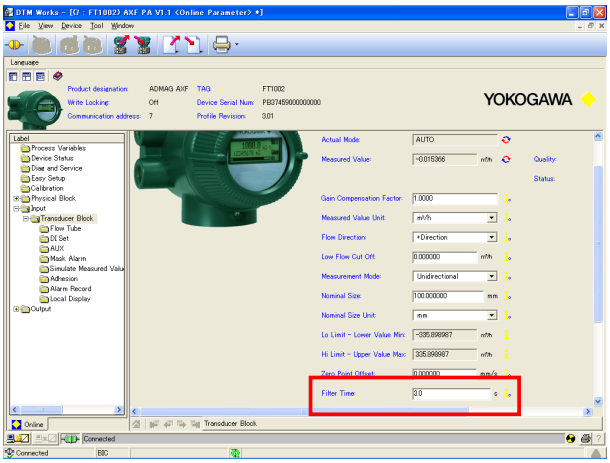

Figure 5.5.8 Damping time constant Setup

(2) Output Signal Low Cut setting

Entry the adequate numeric at [Low Flow Cut Off] in the [Transducer Block] menu.

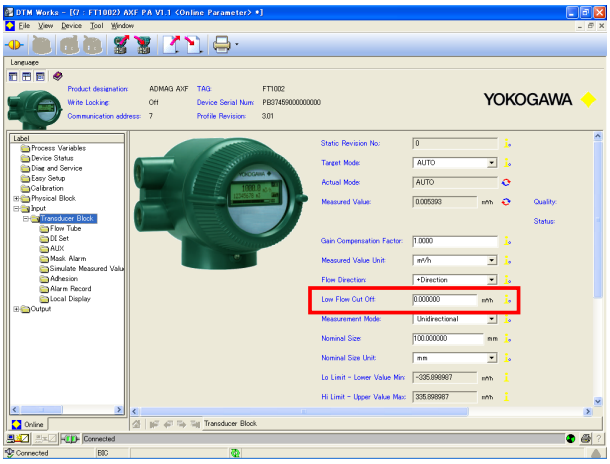

Figure 5.5.9 Output Signal Low Cut Setup

(3) LCD Display setting

Select the adequate type of indication for the LCD Display with its Display Cycle.

This data is also available to set at [Local Display] in the [Easy Setup] menu.

Please note the AXF PROFIBUS PA type is only available to indicate English.

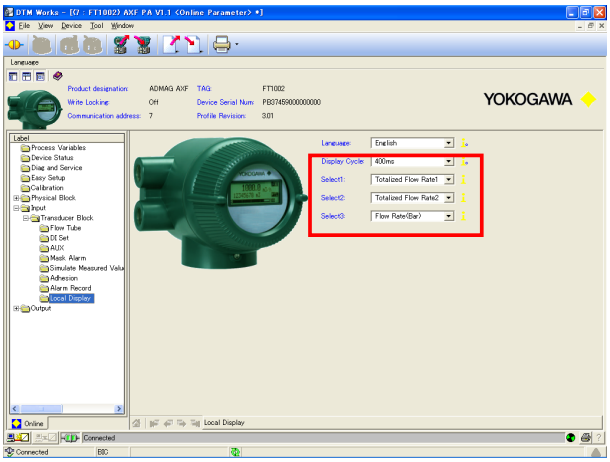

Figure 5.5.10 Local Display Setup

5.5.4 Totalizer Block Parameters Setup

There are 3 kinds of submenus as [Batch Information], [Totalizer Reset] and [Warning and Alarm]. The AXF has 3 totalizers and their setting contents are same. The following figure is the [Totalizer 1] menu.

Click [Output] → [Totalizer 1], [Totalizer 2] or [Totalizer 3] at the Navigation tree.

Refer to section 6.3.4 for [Simulation] function.

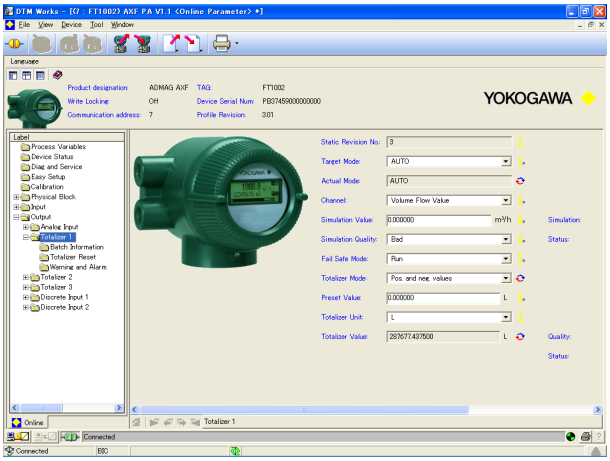

Figure 5.5.11 Totalizer 1 Parameter menu

(1) Unit of Totalization setting

Select the adequate unit at [Totalizer unit] in each [Totalizer] menu.

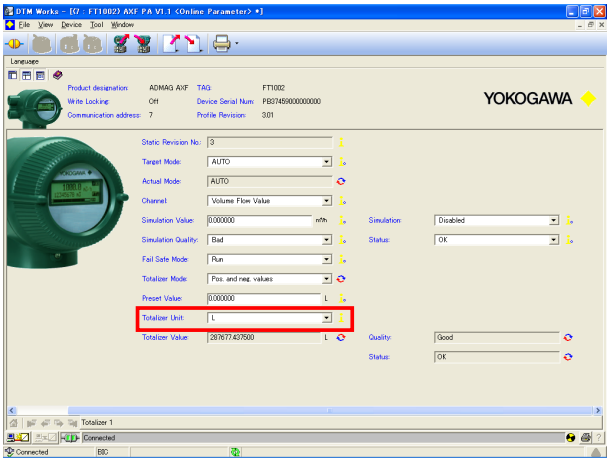

Figure 5.5.12 Totalizer Unit Setup

(2) Direction of Totalization setting

Select the adequate direction at [Totalizer Mode] in each [Totalizer] menu.

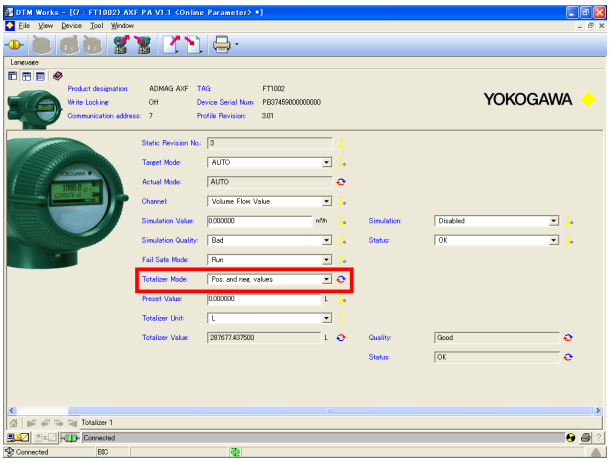

Figure 5.5.13 Totalizer Mode Setup

(3) Fail Sale Mode setting

Select the adequate mode at [Fail Safe Mode] in each [Totalizer] menu.

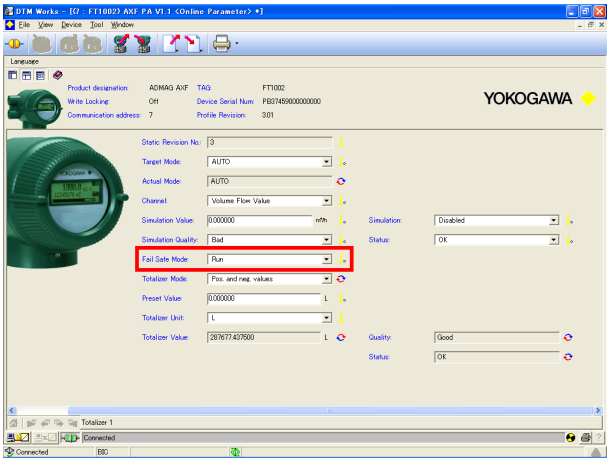

Figure 5.5.14 Fail Safe Mode Setup

(4) Resetting or Presetting Total Value

Select type and entry the adequate numeric in each [Totalizer Reset] submenu.

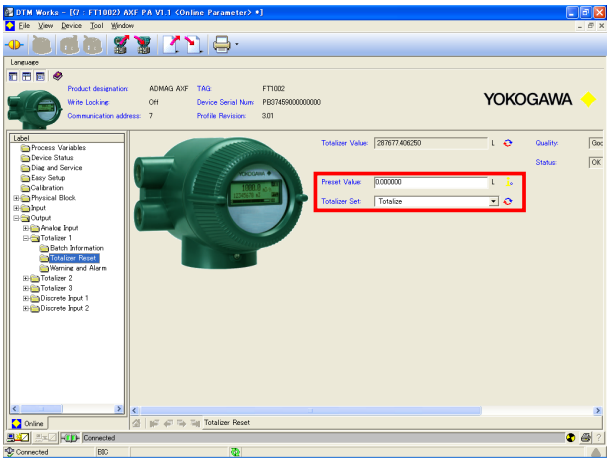

Figure 5.5.15 Totalizer Reset Setup

5.5.5 DI Block Parameters Setup

There is one submenu as [Batch Information]. The AXF has 2 Discrete Inputs and their setting contents are same. The following figure is the [Discrete Input 1] menu.

Click [Output] → [Discrete Input 1] or [Discrete Input 2] at the Navigation tree.

Refer to section 6.3.4 for [Simulation] function.

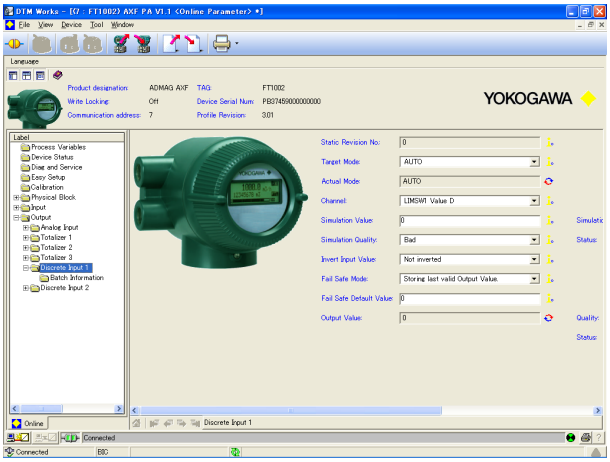

Figure 5.5.16 Discrete Input 1 menu

(1) Limit Switch setting

Select type and entry data for Limit Switch 1 and 2 adequately at [DI Set] in the [Transducer Block] menu.

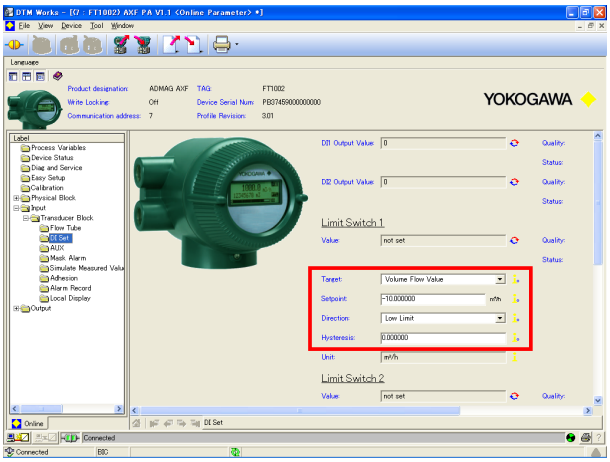

Figure 5.5.17 Limit Switch Setup

(2) Channel setting

Select the adequate type at [Channel] in each [Discrete Input] menu.

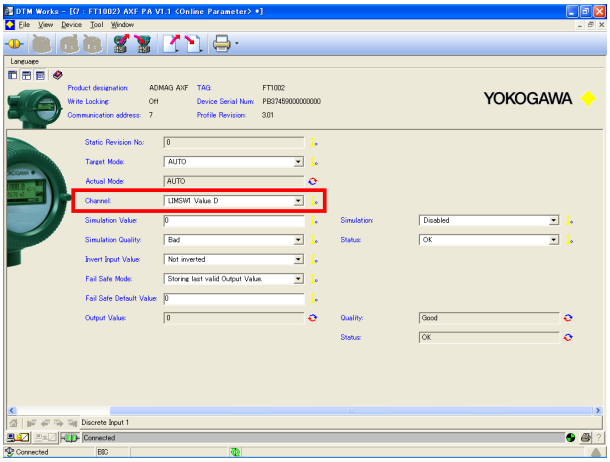

Figure 5.5.18 Selection of Channel Setup

(3) Invert setting

Select a use of invert at [Invert Input Value] in each [Discrete Input] menu.

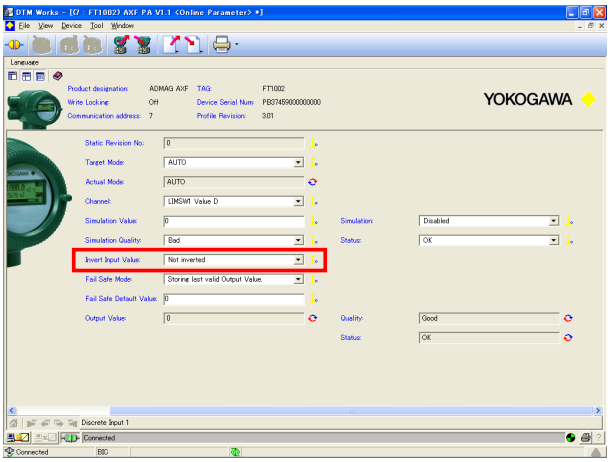

Figure 5.5.19 Invert Input Value Setup

(4) Fail Safe Mode setting

Select the adequate mode and entry the value at [Fail Safe Mode] along with [Fail Safe Default Value] in each [Discrete Input] menu.

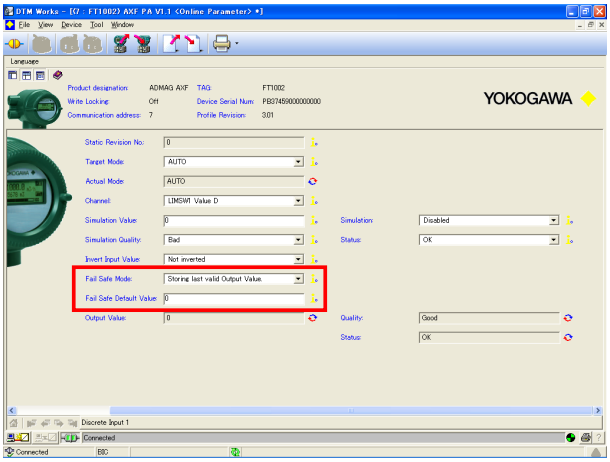

Figure 5.5.20 Fail Safe Mode Setup

5.6 Integral LCD Indicator

Employing 32*132 full dot matrix backlit LCD, various display can be obtained.

5.6.1 Flow Data Display

By the transducer block parameters setting in DISPLAY_SELECT1, 2, 3 as described in section 4.1.3, up to three lines display can be made among the following data.

-Flow Rate(%)
-Out Value
-Flow Rate(Bar)
-Totalized Flow Rate1
-Totalized Flow Rate2
-Totalized Flow Rate3
-Tag No.
-Adhesion Check
-Communication

The number of the data can be configured by setting DISPLAY_SELECT1, 2, 3 as follows;

	1 line display	2 line display	3 line display
Display Select1	-	-	-
Display Select2	Off	Other than "Off"	Other than "Off"
Display Select3	-	Off	Other than "Off"

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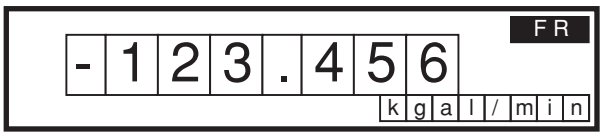
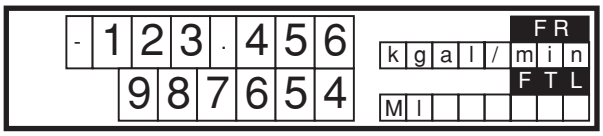
Followings are the display examples depending on choosing 1 to 3 value modes.

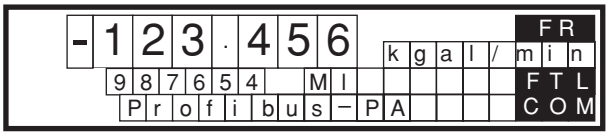
1 value mode



2 value mode



3 value mode



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The data titles are displayed together with the flow data and units.

FR : Out Value Flow Rate
FTL : Positive Total (Forward Total)
RTL : Negative Total (Reverse Total)
DTL : Balanced Total (Differential Total)
HTL : Hold Total
TAG : Tag Number
ADH : Adhesion Check
COM : Communication

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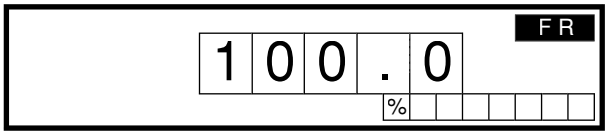
Flow Rate (%)



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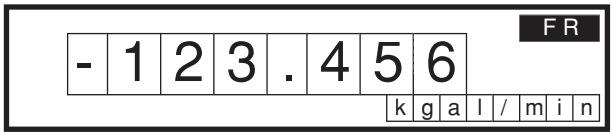
Decimal point is always to the first place.

Out Value

Flow rate is displayed together with the units set in OUT_SCALE, the maximum number of figures is six.



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In the case of Characterization Type is "Direct " decimal point location of the data becomes as follows.

OUT_SCALE. Decimal Point	Place of decimal	Example
0	0	123
1	1	123.4
2	2	123.45
3	3	123.456
Other	Auto	Refer to below

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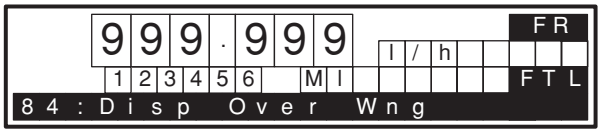
When OUT_SCALE. Decimal Point is set as Other, decimal point location of the data becomes as follows.

OUT.Value	Place of decimal	Example
-999999<OUT.Value≤-10000	0	-222222
-10000<OUT.Value≤-1000	1	-4444.1
-1000<OUT.Value≤-100	2	-555.12
-100<OUT.Value<100	3	-66.123
100≤OUT.Value<1000	2	555.12
1000≤OUT.Value<10000	1	4444.1
10000≤OUT.Value≤999999	0	222222

T0508.eps

When the flow data exceeds the maximum number of figures six, then "84:Disp Over Wng" message is displayed.



F0507.eps

Unit of Out Value on LCD

Applicable Unit of Out Value is shown by the following tables corresponding to the OUT_SCLAE Unit Codes.

Table 5.6.1 Display Unit Codes 1

Units Codes	Unit on Display
1342:%	%

Table 5.6.2 Display Unit Codes 2

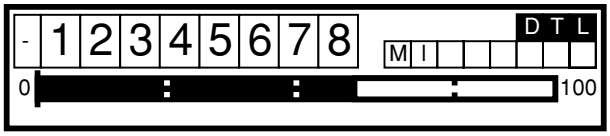
Units Codes	Unit on Display [/d]	Units Codes	Unit on Display [/h]
1355:Ml/d	Ml/d	1522:Ml/h	Ml/h
1350:m3/d	m^3/d	1349:m3/h	m^3/h
1520:kL/d	kl/d	1519:kL/h	kl/h
1354:L/d	l/d	1353:L/h	l/h
1514:cm3/d	cm^3/d	1513:cm3/h	cm^3/h
1329:t/d	t/d	1328:t/h	t/h
1325:kg/d	kg/d	1324:kg/h	kg/h
1321:g/d	g/d	1320:g/h	g/h
1527:kft3/d	kcf/d	1526:kCFH	kcf/h
1359:ft3/d	cf/d	1358:CFH	cf/h
1531:mft3/d	mcf/d	1530:mCFH	mcf/h
1366:Mgal(US)/d	Mgal/d	1459:Mgal(US)/h	Mgal/h
1462:kgal(US)/d	kgal/d	1458:kgal(US)/h	kgal/h
1365:gal(US)/d	gal/d	1364:gal(US)/h	gal/h
1461:mgal(US)/d	mgal/d	1457:mgal(US)/h	mgal/h
1493:kbbl(US Oil)/d	kbbl/d	1489:kbbl(US Oil)/h	kbbl/h
1374:bbl(US Oil)/d	bbl/d	1373:bbl(US Oil)/h	bbl/h
1492:mbbl(US Oil)/d	mbbl/d	1488:mbbl(US Oil)/h	mbbl/h
1491:ubbl(US Oil)/d	µbbl/d	1487:ubbl(US Oil)/h	µbbl/h
1534:kbbl(US Federal)/d	kbbl/d	1533:kbbl(US Federal)/h	kbbl/h
1645:bbl(US Federal)/d	bbl/d	1644:bbl(US Federal)/h	bbl/h
1542:mbbl(US Federal)/d	mbbl/d	1541:mbbl(US Federal)/h	mbbl/h
1548:klb(US)/d	klb/d	1547:klb(US)/h	klb/h
1333:lb(US)/d	lb/d	1332:lb(US)/h	lb/h
1337:STON/d	STon/d	1336:STON/h	STon/h
1341:LTON/d	LTon/d	1340:LTON/h	LTon/h
1478:MImpGal/d	Mgal/d	1474:MImpGal/h	Mgal/h
1477:kImpGal/d	kgal/d	1473:kImpGal/h	kgal/h
1370:ImpGal/d	gal/d	1369:ImpGal/h	gal/h
1476:mImpGal/d	mgal/d	1472:mImpGal/h	mgal/h

Table 5.6.3 Display Unit Codes 3

Units Codes	Unit on Display [/min]	Units o s	Unit on Display [/s]
1521:Ml/min	Ml/min		
1348:m3/min	m^3/min	1347:m3/s	m^3/s
1518:kL/min	kl/min	1523:kL/s	kl/s
1352:L/min	l/min	1351:L/s	l/s
1512:cm3/min	cm^3/min	1511:cm3/s	cm^3/s
		1061:m/s	m/s
1327:t/min	t/min	1326:t/s	t/s
1323:kg/min	kg/min	1322:kg/s	kg/s
1319:g/min	g/min	1318:g/s	g/s
1525:kCFM	kcf/min	1524:kCFS	kcf/s
1357:CFM	cf/min	1356:CFS	cf/s
1529:mCFM	mcf/min	1528:mCFS	mcf/s
1455:Mgal(US)/min	Mgal/min	1451:Mgal(US)/s	Mgal/s
1454:kgal(US)/min	kgal/min	1450:kgal(US)/s	kgal/s
1363:GPM	gal/min	1362:gal(US)/s	gal/s
1453:mgal(US)/min	mgal/min	1449:mgal(US)/s	mgal/s
1485:kbbl(US Oil)/min	kbbl/min	1481:kbbl(US Oil)/s	kbbl/s
1372:bbl(US Oil)/min	bbl/min	1371:bbl(US Oil)/s	bbl/s
1484:mbbl(US Oil)/min	mbbl/min	1480:mbbl(US Oil)/s	mbbl/s
1483:ubbl(US Oil)/min	µbbl/min	1479:ubbl(US Oil)/s	µbbl/s
1532:kbbl(US Federal)/min	kbbl/min		
1643:bbl(US Federal)/min	bbl/min	1642:bbl(US Federal)/s	bbl/s
1540:mbbl(US Federal)/min	mbbl/min	1539:mbbl(US Federal)/s	mbbl/s
1544:ubbl(US Federal)/min	µbbl/min	1543:ubbl(US Federal)/s	µbbl/s
		1067:ft/s	ft/s
1546:klb(US)/min	klb/min	1545:klb(US)/s	klb/s
1331:lb(US)/min	lb/min	1330:lb(US)/s	lb/s
1335:STON/min	STon/min	1334:STON/s	STon/s
1339:LTON/min	LTon/min	1338:LTON/s	LTon/s
1470:MImpGal/min	Mgal/min	1466:MImpGal/s	Mgal/s
1469:kImpGal/min	kgal/min	1465:kImpGal/s	kgal/s
1368:ImpGal/min	gal/min	1367:ImpGal/s	gal/s
1468:mImpGal/min	mgal/min	1464:mImpGal/s	mgal/s

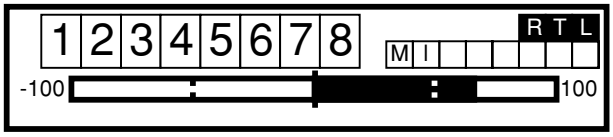
Flow Rate (Bar)

Bi Direction is set "Unidirectional"



F0508.eps

Bi Direction is set "Bidirectional"



F0509.eps

Totalized Flow Rate1, 2, 3

The maximum number of figures is eight in addition to sign (±) for Totalized Flow Rate display.

F0510.eps

Totalized Flow Rate Unit Display

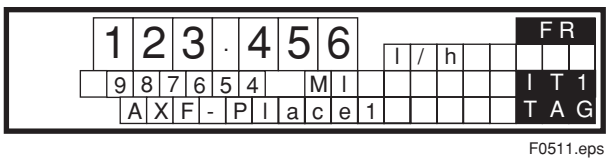
Table 5.6.4 Totalized Flow Rate Unit

Units Codes	Display	Units Codes	Display
1549:Ml	Ml	1091:Mg	Mgl
1034:m³	m³	1088:kg	kg
1035:dm³	dm³	1089:g	g
1517:kL	kl	1090:mg	mg
1041:hL	hl	1043:CF	cf
1038:L	l	1048:gallon	gal
1040:mL	ml	1051:bbl	bbl
1036:cm³	cm³	1094:lb	lb
1092:t	t	1641:bbl(US Federal)	bbl

T0511.eps

Tag No.

The third line shows the example of Tag No. display. Maximum number of figures is 16, on LCD the head 16 characters out of 32 characters of management Tag No. can be displayed.



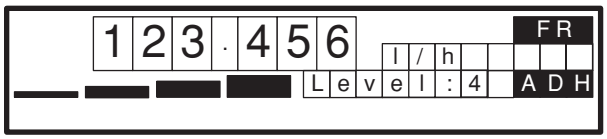
F0511.eps

Adhesion Check

When Adhesion Check display is selected result is displayed as below showing the level number.

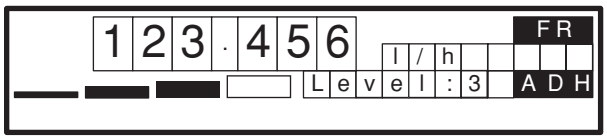
Adhesion Check Level Judge

Level4 : Adh Measure Value > Adhesion Level4



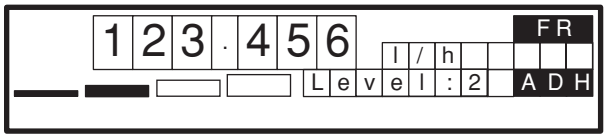
F0513.eps

Level3 : Adhesion Level4 ≥ Adh Measure Value > Adhesion Level3



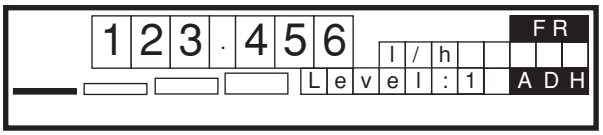
F0514.eps

Level2 : Adhesion Level3 ≥ Adh Measure Value > Adhesion Level2



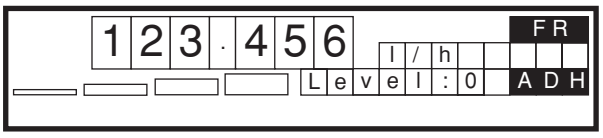
F0515.eps

Level1 : Adhesion Level2 ≥ Adh Measure Value > Adhesion Level1



F0516.eps

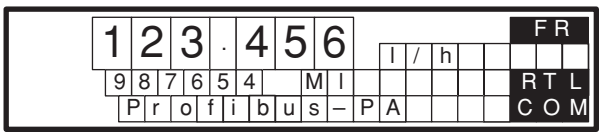
Level0 : Adhesion Level1 ≥ Adh Measure Value



F0517.eps

Communication

The third line shows the example of Communication display.



F0518.eps

5.6.2 Display Modes

ADMAG AXF has following display modes.

- Normal Display
- Alarm Display
- Warning Display
- Autozero Display

Display Renewal Time

Display renewal time for each display modes depends on Display Cycle setting;

Display Mode	Display Cycle set Time		
	2s,1s,400ms,200ms	4s	8s
Normal Display	2s	4s	8s
Alarm Display	4s	4s	8s
Warning Display	4s	4s	8s

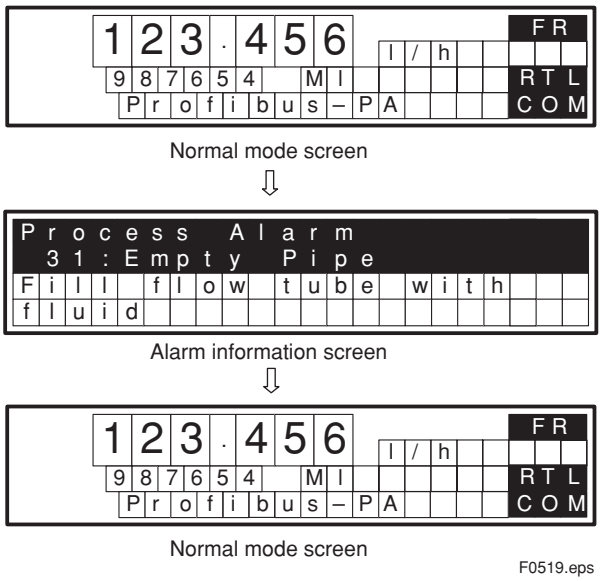
T0512.eps

Normal Display

In this display mode various flow data from one to three lines are displayed as described in 5.6.1.

Alarm Display

When alarm is generated, alarm message is displayed alternatively at the first line. Followings are an example of alarm display situation.



F0519.eps

Alarm Message / Countermeasure Message

On the Integral LCD indicator, following messages are displayed when alarm is generated.

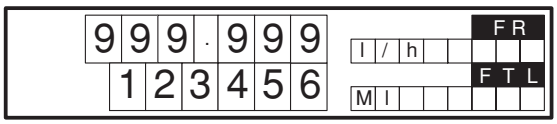
Table 5.6.5 Alarm Message Display

Category	Display Message	Countermeasure Message	Alarm Description
System Alarms	10:uP Fault	Contact nearest office or service center	Microprocessor error
	11:EEPROM Fault		EEPROM error
	12:A/D(H) Fault		A/D converter error
	13:A/D(L) Fault		
	14:A/D(Z) Fault		
	15:Coil Open	Cut the power and check coil & EX cables	Flowtube coil open-circuit
	16:EEPROM Dflt	Contact nearest office or service center	EEPROM default values
	100:Comm uP Fault		FB Microprocessor error
	101:Comm EEPROM Fault		FB EEPROM error
	102:Total1 Not Saved		Total1 had not been stored when the device was turned off.
	103:Total2 Not Saved		Total2 had not been stored when the device was turned off.
	104:Total3 Not Saved		Total3 had not been stored when the device was turned off.
	105:Comm Error1	Contact nearest office or service center	Communication error
	106:Comm Error2		Communication error
Process Alarms	30 Sig Overflow	Check signal cable and grounding	Input signal error
	31:Empty Pipe	Fill flow tube with fluid	Flowtube is not filled with fluid
	33:Adhesion Alm	Clean electrodes	Electrode adhesion alarm
	110:AI Lo Lo Alm	Check the flow rate and setting value.	Process alarm in AI function block.
	111:AI Hi Hi Alm		Process alarm in AI function block.
O/S Mode Alarms	40:PB O/S Mode		RS.TARGET_MODE is O/S mode.
	41:TB O/S Mode		TB.TARGET_MODE is O/S mode.
	42:AI FB O/S Mode		AI.TARGET_MODE is O/S mode.
	43:Total1 FB O/S Mode		Total1.TARGET_MODE is O/S mode.
	44:Total2 FB O/S Mode		Total2.TARGET_MODE is O/S mode.
	45:Total3 FB O/S Mode		Total3.TARGET_MODE is O/S mode.
	46:DI1 FB O/S Mode		DI1.TARGET_MODE is O/S mode.
	47:DI2 FB O/S Mode		DI2.TARGET_MODE is O/S mode.
Setting Alarms	50:Span > 10m/s	Check parameter 27 of AI and 34 of TB	Span flow velocity setting is 11 m/s or more
	51:Span < 0.1m/s		Span flow velocity setting is 0.05 m/s or less
	57:Dens Set Err	Check parameter 34, 76 and 77 of TB	Mass units have been selected for Base Flow Unit but density is set to 0.
	71:Meas Mod Set	Check parameter 70 of TB	Measure_Mode is set to Enhanced DF without selecting an optional specification code /HF1 or /HF2.
	72:Size Set Err	Check parameter 31 and 32 of TB	A value of 3000.1 mm or more is set for Nominal_Size.
	73:Adh Set Err	Check parameter 115 to 118 of TB	The condition in Adhesion detection level, Level:1<Level:2<Level:3<Level:4 is not satisfied.
	120:Total1 Unit Set Err	Unify the unit between volume and mass.	The mismatch of the unit set as TOTAL1 UNIT_TOT and VOLUME_FLOW_UNITS.
	121:Total2 Unit Set Err		The mismatch of the unit set as TOTAL2 UNIT_TOT and VOLUME_FLOW_UNITS.
	122:Total3 Unit Set Err		The mismatch of the unit set as TOTAL3 UNIT_TOT and VOLUME_FLOW_UNITS.

T0513.eps

Warning Display

When warning is generated, warning message is displayed alternatively at the third line. Followings are an example of warning display situation.

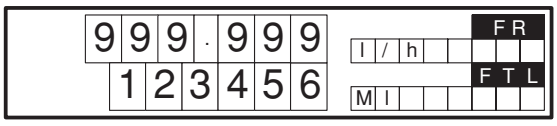


Normal mode screen

⇩

Alarm information screen

⇩



Normal mode screen

F0520.eps

Warning Message

On the Integral LCD indicator, following messages are displayed when warning is generated.

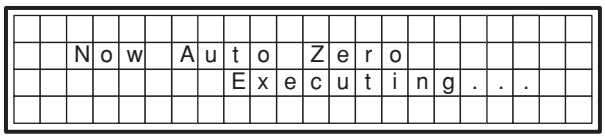
Table 5.6.6 Warning Message Display

Category	Display Message	Description
Warning	80:Adhesion Wng	Slight adhesion to electrodes.
	82:Auto Zero Wng	Results of automatic zero adjustment are higher than the rated values.
	84:Disp Over Wng	Overflow in the display digits during instantaneous flow rate display. Display at the LCD indicator only.
	85:Flow Vel Over	Flow velocity overflow.
	140:Sim.Jmpr On	Simulation jumper is ON.
	141:PB Sim. Enabled	PB.DIAGNOSIS_SIM_MODE is enabled.
	142:TB VF Sim. Enabled	TB.SIMULATE_MODE is ON (Volume Flow Value).
	143:AI Sim. Enabled	AI.SIMULATE is enabled.
	144:Total1 Sim. Enabled	TOTAL1.SIMULATE is enabled.
	145:Total2 Sim. Enabled	TOTAL2.SIMULATE is enabled.
	146:Total3 Sim. Enabled	TOTAL3.SIMULATE is enabled.
	147:DI1 Sim. Enabled	DI1.SIMULATE is enabled.
	148:DI2 Sim. Enabled	DI2.SIMULATE is enabled.
	150:AI FB Man Mode	AI.TARGET_MODE is Manual mode.
	151:Total1 FB Man Mode	TOTAL1.TARGET_MODE is Manual mode.
	152:Total2 FB Man Mode	TOTAL2.TARGET_MODE is Manual mode.
	153:Total3 FB Man Mode	TOTAL3.TARGET_MODE is Manual mode.
	154:DI1 FB Man Mode	DI1.TARGET_MODE is Manual mode.
	155:DI2 FB Man Mode	DI2.TARGET_MODE is Manual mode.

T0514.eps

Auto Zero Display

When ZERO_POINT_ADJUST is executed, the following is displayed until auto zeroing finishes.



F0521.eps

6. IN-PROCESS OPERATION

This chapter describes the procedure performed when changing the operation of the function block of the AXF in process.

6.1 Mode Transition

When the function block mode is changed to Out_Of_Service, the function block pauses and a block alarm is issued.

When the function block mode is changed to Manual, the function block suspends updating of output values. In this case alone, it is possible to write a value to the OUT parameter of the block for output. Note that no parameter status can be changed.

6.2 Generation of Alarm

6.2.1 Indication of Alarm

When the self-diagnostics function indicates that a device is faulty, a diagnostic message (DIAGNOSIS or DIAGNOSIS_EXTENSION) is issued from the physical block. When a diagnostic message is detected in each function block or a diagnostic message in the process value (process alarm) is detected, a diagnostic message is issued from each block. If a LCD indicator is installed, the error number is displayed. If two or more alarms are issued, multiple error messages are displayed.

When an alarm has been occurred, the corresponding alarm name, description, and suitable countermeasure will be displayed on the display unit. The normal Display Mode and Alarm Mode may be displayed alternatively. When a warning has been issued, the corresponding content will be shown in the third line in the Display Mode.

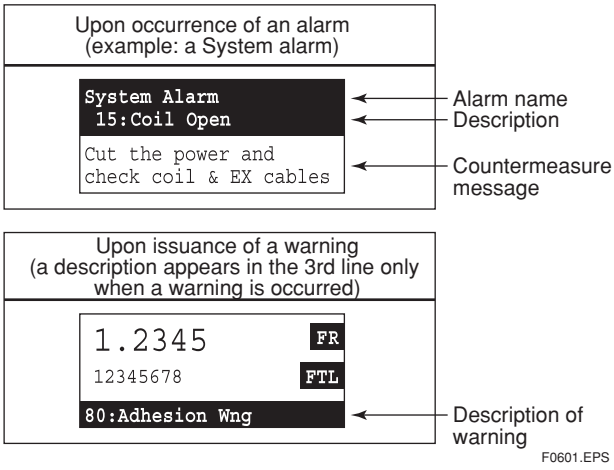


Figure 6.1 Error Identification on Indicator

6.2.2 Alarms and Warnings

The alarm and warning lists in each function block are shown in table 6.1 and 6.2.

Table 6.1 Status of each parameter in failure mode (1/2)

Category	Alarm	AI Block			TOT Block			DI Block		
		FSAFE_TYPE = 0	FSAFE_TYPE = 1	FSAFE_TYPE = 2	FAIL_TOT = 0	FAIL_TOT = 1	FAIL_TOT = 2	FSAFE_TYPE = 0	FSAFE_TYPE = 1	FSAFE_TYPE = 2
System Alarms	10:uP Fault	Uncertain; Substitude Value, ok	Uncertain; Last Usage Value, ok	Bad; Device Failure, Const.	Uncertain Non Specific, ok	Uncertain; Last Usable Value, Const.	Uncertain Non Specific, ok	Uncertain; Substitude Value, ok	Uncertain; Last Usage Value, ok	Bad; Device Failure, Const.
	11:EEPROM Fault									
	12:A/D(H) Fault									
	13:A/D(L) Fault									
	14:A/D(Z) Fault									
	15:Coil Open			Bad; Sensor Failure, Const.						Bad; Sensor Failure, Const.
	16:EEPROM Dflt			Bad; Device Failure, Const.						Bad; Device Failure, Const.
	100:Comm uP Fault			Bad; Device Failure, ok						Bad; Device Failure, ok
	101:Comm EEPROM Fault									
	102:Total1 Not Saved	–	–	–				–	–	–
	103:Total2 Not Saved	–	–	–				–	–	–
	104:Total3 Not Saved	–	–	–				–	–	–
	105:Comm Error1	Uncertain; Substitude Value, ok	Uncertain; Last Usage Value, ok	Bad; Device Failure, ok	Uncertain Non Specific, ok	Uncertain; Last Usable Value, Const.	Uncertain Non Specific, ok	Uncertain; Substitude Value, ok	Uncertain; Last Usage Value, ok	Bad; Device Failure, ok
	106:Comm Error2									
	107:DL Incomplete	–	–	–	–	–	–	–	–	–
	108:Download Fail	–	–	–	–	–	–	–	–	–
Process Alarms	30:Sig Overflow	Uncertain; Substitude Value, ok	Uncertain; Last Usage Value, ok	Bad; Sensor Failure, Const.	Uncertain Non Specific, ok	Uncertain; Last Usable Value, Const.	Uncertain Non Specific, ok	Uncertain; Substitude Value, ok	Uncertain; Last Usage Value, ok	Bad; Sensor Failure, Const.
	31:Empty Pipe									
	32:HH/LL Alm									
	33:Adhesion Alm	Uncertain; Substitude Value, ok	Uncertain; Last Usage Value, ok	Bad; Sensor Failure, Const.	Uncertain Non Specific, ok	Uncertain; Last Usable Value, Const.	Uncertain Non Specific, ok	Uncertain; Substitude Value, ok	Uncertain; Last Usage Value, ok	Bad; Sensor Failure, Const.
	34:Insulation Alm									
	110:AI Lo Lo Alm	Good; Active Critical Alarm, Low limt.	Good; Active Critical Alarm, Low limt.	Good; Active Critical Alarm, Low limt.	–	–	–	–	–	–
	111:AI Hi Hi Alm	Good; Active Critical Alarm, High limt.	Good; Active Critical Alarm, High limt.	Good; Active Critical Alarm, High limt.	–	–	–	–	–	–
	AI Lo Alm	Good; Active Advisory Alarm, Low limt.	Good; Active Advisory Alarm, Low limt.	Good; Active Advisory Alarm, Low limt.	–	–	–	–	–	–
	AI Hi Alm	Good; Active Advisory Alarm, High limt.	Good; Active Advisory Alarm, High limt.	Good; Active Advisory Alarm, High limt.	–	–	–	–	–	–
	Total1 Lo Lo Alm	–	–	–	TOT1: Good; Active Critical Alarm, Low limt. TOT2: -- TOT3: --	TOT1: Good; Active Critical Alarm, Low limt. TOT2: -- TOT3: --	TOT1: Good; Active Critical Alarm, Low limt. TOT2: -- TOT3: --	–	–	–
	Total1 Hi Hi Alm	–	–	–	TOT1: Good; Active Critical Alarm, High limt. TOT2: -- TOT3: --	TOT1: Good; Active Critical Alarm, High limt. TOT2: -- TOT3: --	TOT1: Good; Active Critical Alarm, High limt. TOT2: -- TOT3: --	–	–	–
	Total1 Lo Alm	–	–	–	TOT1: Good; Active Advisory Alarm,Low limt. TOT2: -- TOT3: --	TOT1: Good; Active Advisory Alarm,Low limt. TOT2: -- TOT3: --	TOT1: Good; Active Advisory Alarm,Low limt. TOT2: -- TOT3: --	–	–	–
	Total1 Hi Alm	–	–	–	TOT1: Good; Active Advisory Alarm,High limt. TOT2: -- TOT3: --	TOT1: Good; Active Advisory Alarm,High limt. TOT2: -- TOT3: --	TOT1: Good; Active Advisory Alarm,High limt. TOT2: -- TOT3: --	–	–	–
	Total2 Lo Lo Alm	–	–	–	TOT1: -- TOT2: Good; Active Critical Alarm, Low limt. TOT3: --	TOT1: -- TOT2: Good; Active Critical Alarm, Low limt. TOT3: --	TOT1: -- TOT2: Good; Active Critical Alarm, Low limt. TOT3: --	–	–	–
	Total2 Hi Hi Alm	–	–	–	TOT1: -- TOT2: Good; Active Critical Alarm, High limt. TOT3: --	TOT1: -- TOT2: Good; Active Critical Alarm, High limt. TOT3: --	TOT1: -- TOT2: Good; Active Critical Alarm, High limt. TOT3: --	–	–	–
	Total2 Lo Alm	–	–	–	TOT1: -- TOT2: Good; Active Advisory Alarm,Low limt. TOT3: --	TOT1: -- TOT2: Good; Active Advisory Alarm,Low limt. TOT3: --	TOT1: -- TOT2: Good; Active Advisory Alarm,Low limt. TOT3: --	–	–	–
	Total2 Hi Alm	–	–	–	TOT1: -- TOT2: Good; Active Advisory Alarm,High limt. TOT3: --	TOT1: -- TOT2: Good; Active Advisory Alarm,High limt. TOT3: --	TOT1: -- TOT2: Good; Active Advisory Alarm,High limt. TOT3: --	–	–	–
	Total3 Lo Lo Alm	–	–	–	TOT1: -- TOT2: -- TOT3: Good; Active Critical Alarm, Low limt.	TOT1: -- TOT2: -- TOT3: Good; Active Critical Alarm, Low limt.	TOT1: -- TOT2: -- TOT3: Good; Active Critical Alarm, Low limt.	–	–	–
	Total3 Hi Hi Alm	–	–	–	TOT1: -- TOT2: -- TOT3: Good; Active Critical Alarm, High limt.	TOT1: -- TOT2: -- TOT3: Good; Active Critical Alarm, High limt.	TOT1: -- TOT2: -- TOT3: Good; Active Critical Alarm, High limt.	–	–	–
	Total3 Lo Alm	–	–	–	TOT1: -- TOT2: -- TOT3: Good; Active Advisory Alarm,Low limt.	TOT1: -- TOT2: -- TOT3: Good; Active Advisory Alarm,Low limt.	TOT1: -- TOT2: -- TOT3: Good; Active Advisory Alarm,Low limt.	–	–	–
	Total3 Hi Alm	–	–	–	TOT1: -- TOT2: -- TOT3: Good; Active Advisory Alarm,High limt.	TOT1: -- TOT2: -- TOT3: Good; Active Advisory Alarm,High limt.	TOT1: -- TOT2: -- TOT3: Good; Active Advisory Alarm,High limt.	–	–	–

Table 6.1 Status of each parameter in failure mode (2/2)

Category	Alarm	AI Block			TOT Block			DI Block		
		FSAFE_TYPE = 0	FSAFE_TYPE = 1	FSAFE_TYPE = 2	FAIL_TOT = 0	FAIL_TOT = 1	FAIL_TOT = 2	FSAFE_TYPE = 0	FSAFE_TYPE = 1	FSAFE_TYPE = 2
O/S Mode Alarms	40:PB O/S Mode	Bad; Out of Service, Const.	Bad; Out of Service, Const.	Bad; Out of Service, Const.	Bad; Out of Service, Const.	Bad; Out of Service, Const.	Bad; Out of Service, Const.	Bad; Out of Service, Const.	Bad; Out of Service, Const.	Bad; Out of Service, Const.
	41:TB O/S Mode	Uncertain; Substitude Value, ok	Uncertain; Last Usage Value, ok	Bad; Out of Service, ok	Uncertain Non Specific, ok	Uncertain; Last Usable Value, Const.	Uncertain Non Specific, ok	Uncertain; Substitude Value, ok	Uncertain; Last Usage Value, ok	Bad; Out of Service, ok
	42:AI FB O/S Mode	Bad; Out of Service, Const.	Bad; Out of Service, Const.	Bad; Out of Service, Const.	–	–	–	–	–	–
	43:Total1 FB O/S Mode	–	–	–	TOT1: Bad; Out of Service, Const. TOT2: – TOT3: –	TOT1: Bad; Out of Service, Const. TOT2: – TOT3: –	TOT1: Bad; Out of Service, Const. TOT2: – TOT3: –	–	–	–
	44:Total2 FB O/S Mode	–	–	–	TOT1: – TOT2: Bad; Out of Service, Const. TOT3: –	TOT1: – TOT2: Bad; Out of Service, Const. TOT3: –	TOT1: – TOT2: Bad; Out of Service, Const. TOT3: –	–	–	–
	45:Total3 FB O/S Mode	–	–	–	TOT1: – TOT2: – TOT3: Bad; Out of Service, Const.	TOT1: – TOT2: – TOT3: Bad; Out of Service, Const.	TOT1: – TOT2: – TOT3: Bad; Out of Service, Const.	–	–	–
	46:DI1 FB O/S Mode	–	–	–	–	–	–	DI1: Bad; Out of Service, Const. DI2: –	DI1: Bad; Out of Service, Const. DI2: –	DI1: Bad; Out of Service, Const. DI2: –
	47:DI2 FB O/S Mode	–	–	–	–	–	–	DI1: – DI2: Bad; Out of Service, Const.	DI1: – DI2: Bad; Out of Service, Const.	DI1: – DI2: Bad; Out of Service, Const.
Setting Alarms	50:Span > 10m/s	Uncertain; Substitude Value, ok	Uncertain; Last Usage Value, ok	Bad; Non specific, Const.	Uncertain Non Specific, ok	Uncertain; Last Usable Value, Const.	Uncertain Non Specific, ok	Uncertain; Substitude Value, ok	Uncertain; Last Usage Value, ok	Bad; Non specific, Const.
	51:Span < 0.1m/s									
	56:H/L HH/LL Set									
	57:Dens Set Err	Uncertain; Substitude Value, ok	Uncertain; Last Usage Value, ok	Bad; Non specific, Const.	Uncertain Non Specific, ok	Uncertain; Last Usable Value, Const.	Uncertain Non Specific, ok	Uncertain; Substitude Value, ok	Uncertain; Last Usage Value, ok	Bad; Non specific, Const.
	71:Meas Mod Set									
	72:Size Set Err									
	73:Adh Set Err									
	120:Total1 Unit Set Err	–	–	–	TOT1:Bad; Configuration Error, ok TOT2: – TOT3: –	TOT1:Bad; Configuration Error, ok TOT2: – TOT3: –	TOT1:Bad; Configuration Error, ok TOT2: – TOT3: –	–	–	–
	121:Total2 Unit Set Err	–	–	–	TOT1: – TOT2:Bad; Configuration Error, ok TOT3: –	TOT1: – TOT2:Bad; Configuration Error, ok TOT3: –	TOT1: – TOT2:Bad; Configuration Error, ok TOT3: –	–	–	–
	122:Total3 Unit Set Err	–	–	–	TOT1: – TOT2: – TOT3:Bad; Configuration Error, ok	TOT1: – TOT2: – TOT3:Bad; Configuration Error, ok	TOT1: – TOT2: – TOT3:Bad; Configuration Error, ok	–	–	

Table 6.2 Status of each parameter in warning mode

Category	Warning	AI Block			TOT Block			DI Block		
		FSAFE_TYPE = 0	FSAFE_TYPE = 1	FSAFE_TYPE = 2	FAIL_TOT = 0	FAIL_TOT = 1	FAIL_TOT = 2	FSAFE_TYPE = 0	FSAFE_TYPE = 1	FSAFE_TYPE = 2
Warning	80:Adhesion Wng	Good (NC); Maintenance required, ok	Good (NC); Maintenance required, ok	Good (NC); Maintenance required, ok	Good (NC); Maintenance required, ok	Good (NC); Maintenance required, ok	Good (NC); Maintenance required, ok	Good (NC); Maintenance required, ok	Good (NC); Maintenance required, ok	Good (NC); Maintenance required, ok
	81:Insu-Brk Wng									
	82:Auto Zero Wng	Uncertain; Non specific, ok	Uncertain; Non specific, ok	Uncertain; Non specific, ok	Uncertain; Non specific, ok	Uncertain; Non specific, ok	Uncertain; Non specific, ok	Uncertain; Non specific, ok	Uncertain; Non specific, ok	Uncertain; Non specific, ok
	84:Disp Over Wng	–	–	–	–	–	–	–	–	–
	85:FLow Vel Over	Uncertain; Non specific, Low/High limt.	Uncertain; Non specific, Low/High limt.	Uncertain; Non specific, Low/High limt.	Uncertain; Non specific, Low/High limt.	Uncertain; Non specific, Low/High limt.	Uncertain; Non specific, Low/High limt.	Uncertain; Non specific, Low/High limt.	Uncertain; Non specific, Low/High limt.	Uncertain; Non specific, Low/High limt.
	90:Display Sw	–	–	–	–	–	–	–	–	–
	140:Sim. Jmpr On	–	–	–	–	–	–	–	–	–
	141:PB Sim. enabled (Note1)	–	–	–	–	–	–	–	–	–
	142:TB VF Sim. enabled (Note1)	–	–	–	–	–	–	–	–	–
	143:AI Sim. enabled (Note1)	Depend on SIMULATE.Status	Depend on SIMULATE.Status	Depend on SIMULATE.Status	–	–	–	–	–	–
	144:Total1 Sim. enabled (Note1)	–	–	–	TOT1: Depend on SIMULATE. Status TOT2: – TOT3: –	TOT1: Depend on SIMULATE. Status TOT2: – TOT3: –	TOT1: Depend on SIMULATE. Status TOT2: – TOT3: –	–	–	–
	145:Total2 Sim. enabled (Note1)	–	–	–	TOT1: – TOT2: Depend on SIMULATE. Status TOT3: –	TOT1: – TOT2: Depend on SIMULATE. Status TOT3: –	TOT1: – TOT2: Depend on SIMULATE. Status TOT3: –	–	–	–
	146:Total3 Sim. enabled (Note1)	–	–	–	TOT1: – TOT2: – TOT3: Depend on SIMULATE. Status	TOT1: – TOT2: – TOT3: Depend on SIMULATE. Status	TOT1: – TOT2: – TOT3: Depend on SIMULATE. Status	–	–	–
	147:DI1 Sim. enabled (Note1)	–	–	–	–	–	–	DI1: Depend on SIMULATE. Status DI2: –	DI1: Depend on SIMULATE. Status DI2: –	DI1: Depend on SIMULATE. Status DI2: –
	148:DI2 Sim. enabled (Note1)	–	–	–	–	–	–	DI1: – DI2: Depend on SIMULATE. Status	DI1: – DI2: Depend on SIMULATE. Status	DI1: – DI2: Depend on SIMULATE. Status
	150:AI FB Man Mode	–	–	–	–	–	–	–	–	–
	151:Total1 FB Man Mode	–	–	–	–	–	–	–	–	–
	152:Total2 FB Man Mode	–	–	–	–	–	–	–	–	–
	153:Total3 FB Man Mode	–	–	–	–	–	–	–	–	–
	154:DI1 FB Man Mode	–	–	–	–	–	–	–	–	–
	155:DI2 FB Man Mode	–	–	–	–	–	–	–	–	–

Note1: Make it the condition that the hardware simulation jumper is ON.

6.3 Simulation Function

The AXF has a simulation function and it is possible to conduct testing for the downstream function blocks or alarm processes. Following description is how to use and how to set parameters in this function.

A SIMULATE_ENABLE switch is mounted in the AXF amplifier (See Figure 6.3.1). This is to prevent the accidental operation of this function. When the No 2 switch is ON, simulation function is enabled.

The [Target Mode] in each function block must be also changed from [AUTO] to [O/S] before setting the simulation parameters.

The simulation parameters in each function block including alarm set as diagnosis in the AI block are described below.

The SIMULATE_ENABLE switch (No 2 switch) and the [Target Mode] in each function block must be returned “OFF” / “AUTO” when the simulation operation was finished.

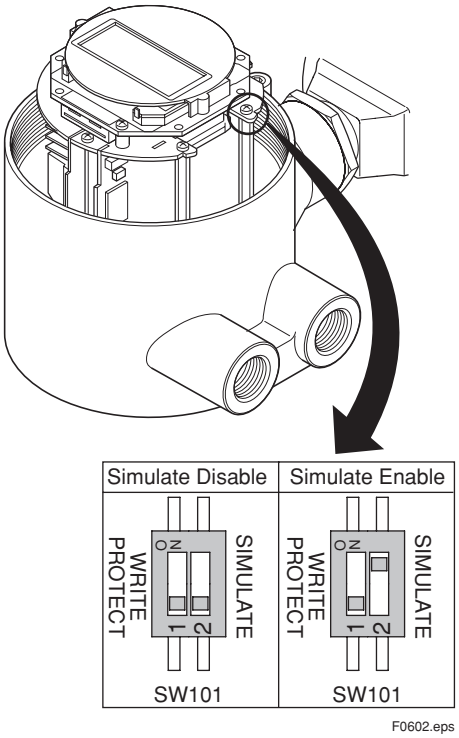


Figure 6.3.1 SIMULATE_ENABLE Switch Position

WARNING

When opening the cover, wait for more than 10 minutes after turning off the power. Furthermore, opening of the cover must also be carried out by the trained personnel having knowledge of safety standard.

IMPORTANT

- To preserve the safety, do not touch the electrical circuit and cable except the SIMULATE_ENABLE switch.
- Removing and installing cover are necessary for the setting SIMULATE_ENABLE switch. Perform removing and installing cover as described in following Section of user’s manual. Refer to Subsection 5.4.2 of IM 01E20D01-01E, or refer to Subsection 10.1.2 of IM 01E20C02-01E.

6.3.1 Transducer Block

The configuration of transducer block for this function is shown at Figure 6.3.2. It is necessary to set parameters as shown in Table 6.3.1 when the simulation function is used.

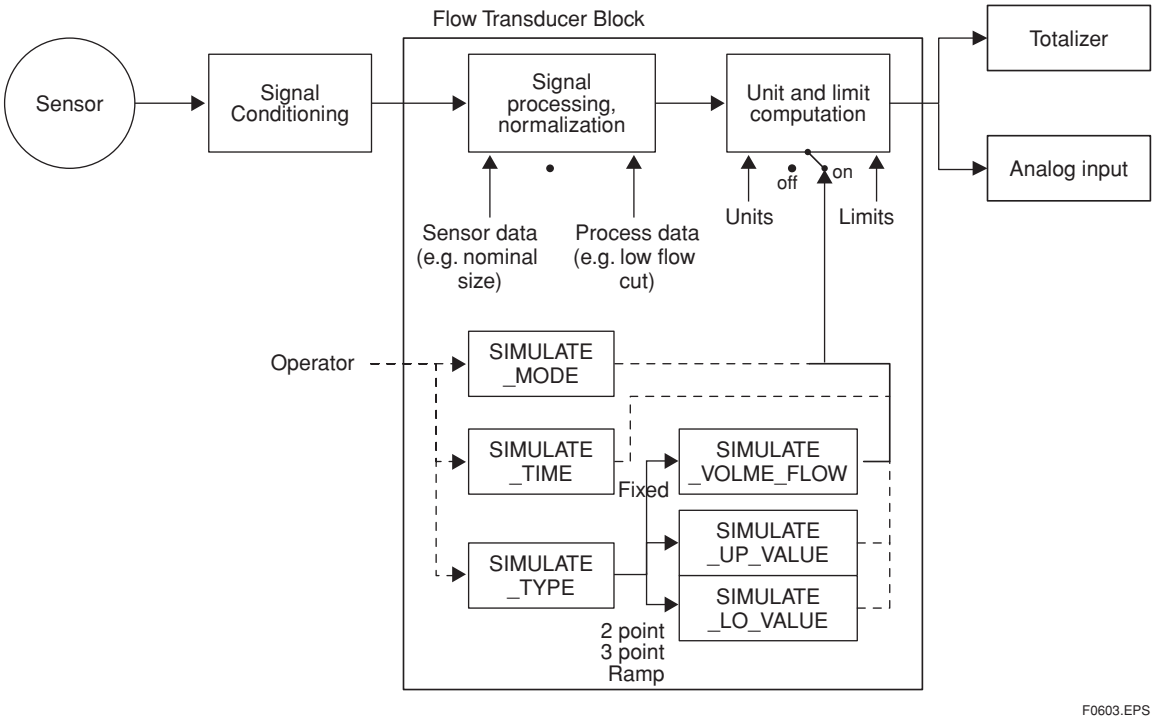


Figure 6.3.2 Configuration of Simulation function in the Transducer block

Table 6.3.1 Simulation parameters in the Transducer Block

Index	Parameters	Description	Valid Range	Initial Value
96	SIMULATE_MODE	Select “1: Volume Flow” when the simulation function is used.	0: Off 1: Volume Flow	0: Off
97	SIMULATE_TYPE	Set the SIMULATE TYPE.	0: Fixed, 1: 2 points, 2: 3 points, 3: Ramp	0: Fixed
98	SIMULATE_VOLUME _FLOW	Set the value to be simulated.	None (Treated as VOLUME_FLOW _UNITS)	Value: 0, Status: Good
99	SIMULATE_UP_VALUE	Set the simulated upper value when SIMULATE_TYPE is selected as 1, 2 or 3.	Except SIMULATE_LO_ VALUE	0
100	SIMULATE_LO_VALUE	Set the simulated lower value when SIMULATE_TYPE is selected as 1, 2 or 3.	Except SIMULATE_UP_ VALUE	0
101	SIMULATE_TIME	Show the time to maintain a constant value when SIMULATE_TYPE is selected as 1 or 2. When SIMULATE_TYPE is selected as 3, show the time to maintain a constant change.	Except 0	30 Sec

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6.3.2 AI / TOT / DI Blocks

When the parameters are set in the transducer block, it is necessary to set parameters as shown in Table 6.3.2 in the AI, TOT and DI blocks next. When Simulate_Enabled in each function block described at Table 6.3.2 is set to "1: Enabled", the applicable function block uses the simulation value set in this parameter instead of the data from the transducer block.

Table 6.3.2 Simulation parameters in the AI, TOT and DI Blocks

Sub-index	Parameters	Description	Valid Range	Initial Value
1	Simulate_Status	Set the data status to be simulated.	Unsigned8	0
2	Simulate_Value	Set the value of the data to be simulated.	Float	0
3	Simulate_Enabled	Controls the simulation function of this block.	0: Disabled, 1: Enabled	0: Disabled

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6.3.3 Physical Block

It is also necessary to set alarms as diagnosis in the Physical block at the same time when the simulation function is used. The Figure 6.3.3 shows the configuration of alarm for simulation function and the Table 6.3.3 is described its parameter setting.

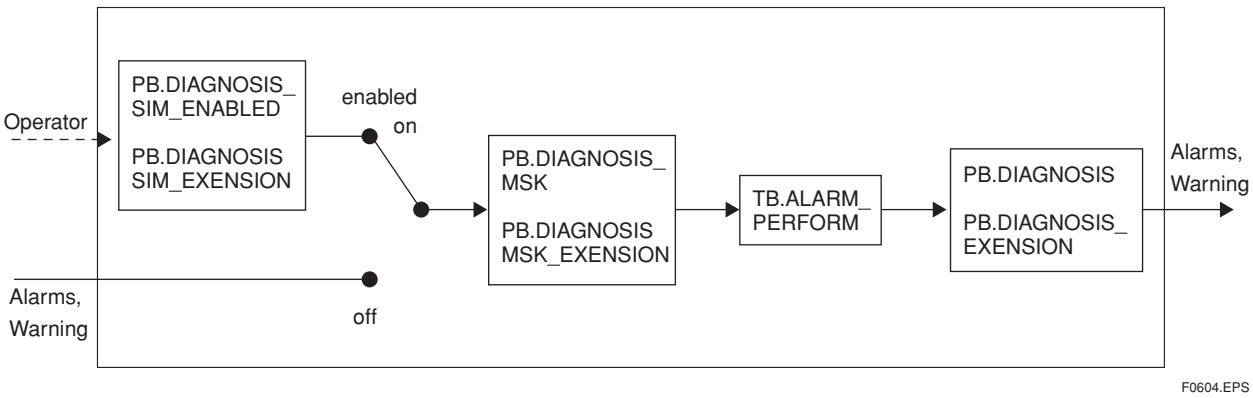

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Figure 6.3.3 Configuration of simulated alarm in the Physical block

Table 6.3.3 Alarm parameters as simulation function in the Physical block

Index	Parameters	Explanation	Valid Range	Initial Value
52	DIAGNOSIS_SIM _MODE	When the hardware simulation jumper is on, DIAGNOSIS_SIM_MODE is set to enable, and the bits are set to “on”, the alarms (or warnings) can be modified.	0: Disabled, 1: Enabled	0: Disabled
53	DIAGNOSIS_SIM _EXTENSION	Definition of supported DIAGNOSIS_EXTENSION information-bits for testing alarms and warnings can be modified.	0: Off, 1: On (Note 1)	0x0000 0000 0000 0000 0000 0000

Note 1: When the valid range is set to “1: ON”, the following data is necessary to set.

Octet	Bit	Alarm	
		No.	Name
1	0	10	uP Fault
	1	11	EEPROM Fault
	2	12	A/D(H) Fault
	3	13	A/D(L) Fault
	4	14	A/D(Z) Fault
	5	15	Coil Open
	6	16	EEPROM Dflt
	7	100	Comm uP Fault
2	0	101	Comm EEPROM Fault
	1	102	Total1 Not Saved
	2	103	Total2 Not Saved
	3	104	Total3 Not Saved
	4	105	Comm Error1
	5	106	Comm Error2
	6	107	(Reserved)
	7	108	(Reserved)
3	0		(Not Used)
	1		(Not Used)
	2		(Not Used)
	3		(Not Used)
	4	30	Sig Overflow
	5	31	Empty Pipe
	6	33	Adhesion Alm
	7	34	(Reserved)

Octet	Bit	Alarm	
		No.	Name
4	0	50	Span > 10m/s
	1	51	Span < 0.1m/s
	2	57	Dens Set Err
	3	71	Meas Mod Set
	4	72	Size Set Err
	5	73	Adh Set Err
	6		(Not Used)
	7		(Not Used)
5	0		(Not Used)
	1		(Not Used)
	2		(Not Used)
	3		(Not Used)
	4	80	Adhesion Wng
	5	81	(Reserved)
	6	82	Auto Zero Wng
	7	85	Flow Vel Over
6	0	90	(Reserved)
	1		(Not Used)
	2		(Not Used)
	3		(Not Used)
	4		(Not Used)
	5		(Not Used)
	6		(Not Used)
	7	140	Sim. Jmpr On

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6.3.4 Simulation Parameter Setup by FieldMate R1.03

This section describes the procedure taken to set and change the parameters in a use of simulation function in each function block.

IMPORTANT

- Before running the program, log-in to Windows as an Administrator or as a user with administrative authority.
- When comm. DTM is connected to the PROFIBUS network with class 1 master running, set the same busparameters of class 1 master.

It is mandatory to change the [Target Mode] from [AUTO] to [O/S] before using this function in each function block. Also the hardware slide switch (No 2) in the AXF amplifier must be set "ON" beforehand when this function is used.

The hardware slide switch and the [Target Mode] in each function block must be returned "OFF" / "AUTO" when the simulation operation was finished.

IMPORTANT

Do not turn power OFF immediately after parameter setting. When parameters are saved to the EEPROM, the redundant processing is executed for an improvement of reliability. Should the power be tumed OFF within 60 seconds after setting of parameters, changed parameters are not saved and may return to their original values.

(1) Simulate Measured Value Setup in the Transducer Block

Entry simulation, its type, its values at [Simulate Measured Value] in the [Transducer Block] menu.

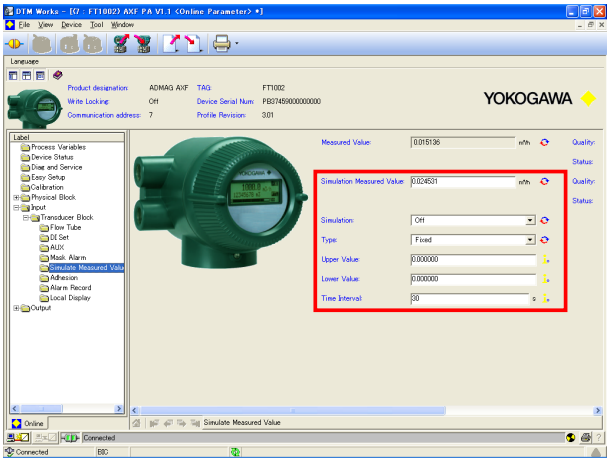

Figure 6.3.4 Simulate Measured Value Setup

(2) Simulation Setup in the AI Block

Entry the simulation value, simulation quality, status and simulation in the [Analog Input] menu.

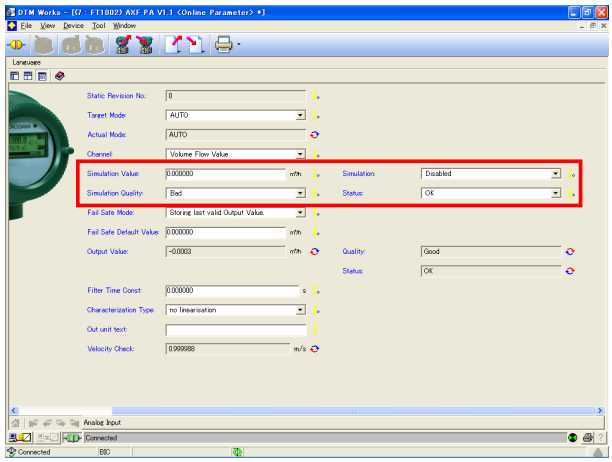

Figure 6.3.5 Simulation Setup

(3) Simulation Setup in the TOT Block

Select adequate [Simulation Value], [Simulation Quality], [Simulation] and [Status] in each [Totalizer] menu.

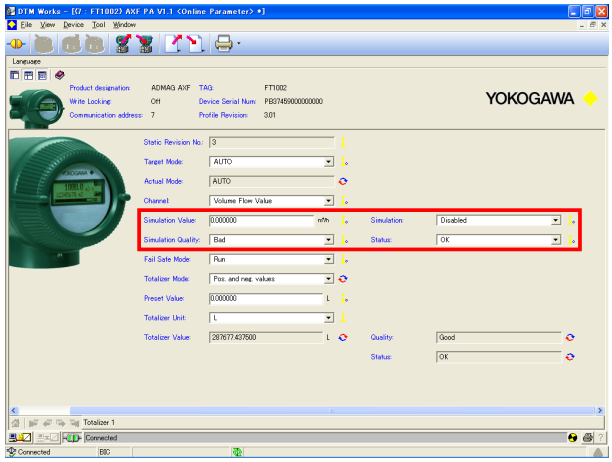

Figure 6.3.6 Simulation Setup

(4) Simulation Setup in the DI Block

Select the adequate type at [Simulation Value], [Simulation Quality], [Simulation] and [Status] in each [Discrete Input] menu.

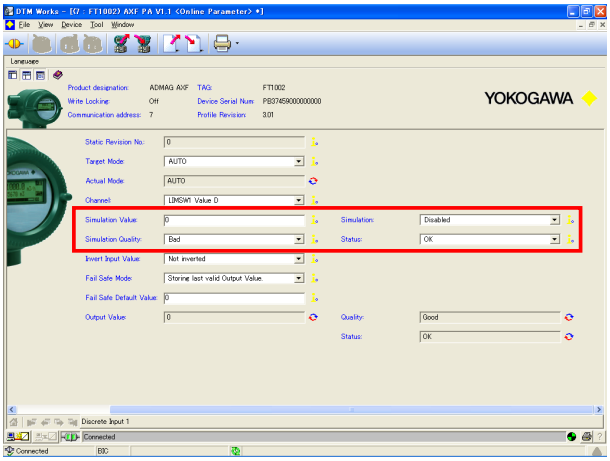

Figure 6.3.7 Simulation Setup

(5) Simulate Diagnosis setup in the Physical Block

Select a use of Simulation function and parameters at [Simulation Diagnosis] in the [Physical Block] menu.

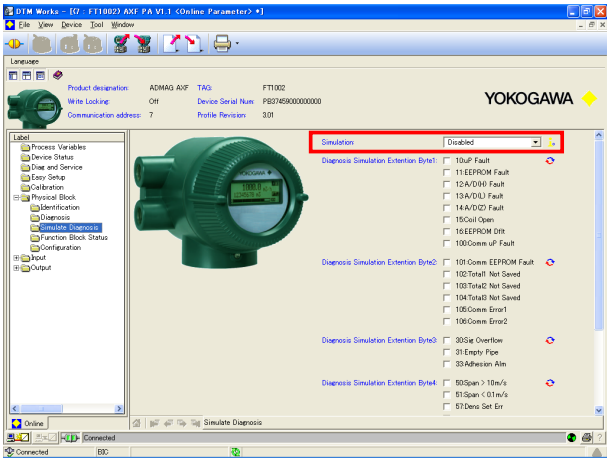

Figure 6.3.8 Simulate Diagnosis Setup

7. DIAGNOSTIC INFORMATION

7.1 DEVICE STATUS

Diagnostic information and failures of the AXF are indicated by using parameter DIAGNOSIS (slot 0, index 29) and DIAGNOSIS_EXTENSION (slot:0, index 30) in Physical Block. Each diagnostic information is supported when the corresponding bit in DIAGNOSIS_MASK and DIAGNOSIS_EXTENSION is set. Diagnosis and Diagnosis Extension are listed in Table 7.1 and Table 7.2.

Table 7.1 Contents of DIAGNOSIS

Octet	Bit	Mnemonic	Description	Remarks	Mask
1	0	DIA_HW_ELECTR	Hardware failure of the electronic	10:uP Fault 17:Comm uP Fault 19:I/F Module Fault 12:A/D(H) Fault 13:A/D(L) Fault 14:A/D(Z) Fault 100:Comm uP Fault 105:Comm Error1 106:Comm Error2	1
	1	DIA_HW_MECH	Hardware failure mechanics	15:Coil Open	1
	2	DIA_TEMP_MOTOR	Motor temperature too high	–	0
	3	DIA_TEMP_ELECTR	Electronic temperature too high	–	0
	4	DIA_MEM_CHKSUM	Memory error	11:EEPROM Fault 101:Comm EEPROM Fault	1
	5	DIA_MEASUREMENT	Failure in Measurement	30:Sig Overflow	1
	6	DIA_NOT_INIT	Device not initialized (No self calibration)	16:EEPROM Dflt	1
	7	DIA_INIT_ERR	Self calibration failed	–	0
2	0	DIA_ZERRO_ERR	Zero point error (limit position)	82:Auto Zero Wng	1
	1	DIA_SUPPLY	1 DIA_SUPPLY Power supply failed (electrical, pneumatic)	–	0
	2	DIA_CONF_INVAL	Configuration not valid	50:Span > 10m/s 51:Span < 0.1m/s 57:Dens Set Err 71:Meas Mod Set 72:Size Set Err 73:Adh Set Err	1
	3	DIA_WARMSTART	New-start-up (warm start up) carried out.	hot start	0
	4	DIA_COLDSTART	Re-start-up (cold start up) carried out.	HW,SW,DL restart power fail	0
	5	DIA_MAINTENANCE	Maintenance required	31:Empty Pipe 33:Adhesion Alm 80:Adhesion Wng 85:Flow Vel Over	1
	6	DIA_CHARACT	Characterization invalid	–	0
	7	IDENT_NUMBER_Violation	Set to 1 (one), if the Ident_Number of the running cyclic data transfer and the value of Physical Block IDENT_NUMBER_SELECTOR parameter are different.		1
3	0-7	Reserved	Reserved for use within the PNO		X
4	0-6	Reserved	Reserved for use within the PNO		X
	7	EXTENSION_AVAILABLE	More diagnosis information is available.		1

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Table 7.2 List of DIAGNOSIS_EXTENSION

Category	DIAGNOSIS_EXTENSION Octet	DIAGNOSIS_EXTENSION Bit	Display Message	Countermeasure Message	Alarm Description
System Alarms	1	0	10:uP Fault	Contact nearest office or service center	Microprocessor error
		1	11:EEPROM Fault		
		2	12:A/D(H) Fault		A/D converter error
		3	13:A/D(L) Fault		
		4	14:A/D(Z) Fault		
		5	15:Coil Open	Cut the power and check coil & EX cables	Flowtube coil open-circuit
		6	16:EEPROM Dflt	Contact nearest office or service center	EEPROM default values
		7	100:Comm uP Fault		FB Microprocessor error
	2	0	101:Comm EEPROM Fault		FB EEPROM error
		1	102:Total1 Not Saved		Total1 had not been stored when the device was turned off.
		2	103:Total2 Not Saved		Total2 had not been stored when the device was turned off.
		3	104:Total3 Not Saved		Total3 had not been stored when the device was turned off.
		4	105:Comm Error1	Contact nearest office or service center	Communication error
		5	106:Comm Error2	Contact nearest office or service center	Communication error
		6	(Reserved)		
		7	(Reserved)		
(Not Used)	3	0	(Not Used)		
		1	(Not Used)		
		2	(Not Used)		
		3	(Not Used)		
Process Alarms		4	30 Sig Overflow	Check signal cable and grounding	Input signal error
		5	31:Empty Pipe	Fill flow tube with fluid	Flowtube is not filled with fluid
		6	33:Adhesion Alm	Clean electrodes	Electrode adhesion alarm
		7	(Reserved)		
Setting Alarms	4	0	50:Span > 10m/s	Check parameter 27 of AI and 34 of TB	Span flow velocity setting is 11 m/s or more
		1	51:Span < 0.1m/s		Span flow velocity setting is 0.05 m/s or less
		2	57:Dens Set Err	Check parameter 34, 76 and 77 of TB	Mass units have been selected for Base Flow Unit but density is set to 0.
		3	71:Meas Mod Set	Check parameter 70 of TB	Measure_Mode is set to Enhanced DF without selecting an optional specification code /HF1 or /HF2.
		4	72:Size Set Err	Check parameter 31 and 32 of TB	A value of 3000.1 mm or more is set for Nominal_Size.
		5	73:Adh Set Err	Check parameter 115 to 118 of TB	The condition in Adhesion detection level, Level:1<Level:2<Level:3<Level:4 is not satisfied.
(Not Used)		6	(Not Used)		
		7	(Not Used)		
(Not Used)	5	0	(Not Used)		
		1	(Not Used)		
		2	(Not Used)		
		3	(Not Used)		
Warning		4	80:Adhesion Wng		Slight adhesion to electrodes.
		5	(Reserved)		
		6	82:Auto Zero Wng		Results of automatic zero adjustment are higher than the rated values.
		7	85:Flow Vel Over		Flow velocity overflow.
(Not Used)	6	0	(Reserved)		
		1	(Not Used)		
		2	(Not Used)		
		3	(Not Used)		
		4	(Not Used)		
		5	(Not Used)		
		6	(Not Used)		
Warning		7	140:Sim.Jmpr On		Simulation Jumper is set to ON (Hardware).

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8. GENERAL SPECIFICATIONS

8.1 STANDARD SPECIFICATIONS

For items other than those described below, refer to IM 01E20D01-01E, IM 01E20C02-01E.

Applicable Models:

Integral Flowmeter AXF
Remote Converter AXFA14

Output Signal:

Digital communication signal based on PROFIBUS PA protocol.

Output data

Volumetric flow, Totalized value, Status output (Adhesion alarm, HH/H/L/LL alarm)

Input data

Totalized value reset

Function Blocks:

One AI Function block, Three Totalizer function blocks and Two DI function blocks are available (PROFIBUS Profile 3.01 Compliant)

Conditions of Communication Line:

Supply voltage from the Bus: 9 to 32 V DC
Current Draw: 15mA (maximum)

Bus Address Switch:

via Hardware Address Switch or via Software

FDE (Fault Disconnection Electronic):

0 mA

Alarm Selection Function:

These informations are indicated in DIAGNOSTICS parameter, which can be handled during normal operation.

(Note 1) The following functions are not supported in the PROFIBUS model.
- Pulse Output
- Multi-range Function
- Totalization Switch
- Alarm Output

Power Supply Voltage:

Power supply code 1:

• AC specifications
Rated power supply: 100 to 240 V AC, 50/60 Hz
• DC specifications
Rated power supply: 100 to 120 V DC

Power supply code 2:

• AC specifications
Rated power supply: 24 V AC, 50/60 Hz
• DC specifications
Rated power supply: 24 V DC

Displayed Language:

In the case of PROFIBUS PA communication type, only English is provided.

STANDARD PERFORMANCE

Accuracy:

Note: The accuracy of a product before shipment is defined as totalized value at the result of calibration test in our water actual flow test facility.
Calibrated conditions in our water actual test facility are as follows:
Fluid temperature; 20 ± 10°C
Ambient temperature; 20 ± 5°C
Length of straight runs; 10 D or more on the upstream side; 5 D or more on the downstream side
Reference conditions; Similar to BS EN29104 (1993); ISO 9104 (1991)

PFA/Ceramics Lining;

Size mm (in.)	Flow Velocity *V* m/s (ft/s)	Standard Accuracy (Calibration code B)	Flow Velocity *V* m/s (ft/s)	High Grade Accuracy (Calibration code C)
2.5 (0.1) to 15 (0.5)	$V < 0.3$ (1)	±1.0 mm/s	—	
	$0.3 \leqq V \leqq 10$ (1) (33)	±0.35% of Rate		
25 (1.0) to 200 (8.0)	$V < 0.15$ (0.5)	±0.5 mm/s	$V < 0.15$ (0.5)	±0.5 mm/s
	$0.15 \leqq V \leqq 10$ (0.5) (33)	±0.35% of Rate	$0.15 \leqq V < 1$ (0.5) (3.3)	±0.18% of Rate ± 0.2mm/s
			$1 \leqq V \leqq 10$ (3.3) (33)	±0.2% of Rate
250 (10) to 400 (16)	$V < 0.15$ (0.5)	±0.5 mm/s	—	
	$0.15 \leqq V \leqq 10$ (0.5) (33)	±0.35% of Rate		

T02.EPS

Polyurethane Rubber /Natural Soft Rubber / EPDM Rubber Lining;

Size mm (in.)	Flow Velocity *V* m/s (ft/s)	Standard Accuracy (Calibration code B)
25 (1.0) to 400 (16)	$V < 0.3$ (1.0)	±1.0 mm/s
	$0.3 \leqq V \leqq 10$ (1.0) (33)	±0.35% of Rate

T03.EPS

Enhanced dual frequency excitation
(Option code HF2): Standard accuracy ±1 mm/s

Repeatability:

± 0.1% of Rate (V ≧ 1 m/s (3.3 ft/s))
± 0.05% of Rate ± 0.5 mm/s (V < 1 m/s (3.3 ft/s))

MODEL AND SUFFIX CODE

Integral Flowmeter AXF:

AXF□□□□-G□□□□□-□□□□-□□□/□

Remote Converter AXFA14:

AXFA14□-G□-□□/□

(Note1) "G" following the first dash indicates that the output is digital communication compliant with the PROFIBUS PA protocol.

8.2 OPTIONAL SPECIFICATIONS

For options other than below, refer to IM 01E20D01-01E and IM 01E20C02-01E (Optional codes C1, C2, C3, EM, G11 and G13 are unable to select).

<Factory Setting>

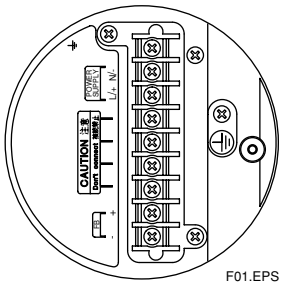
Tag Number (Name Plate and/or stainless steel tag plate)	As specified in order
Software Tag (TAG NO)	In case of different Software Tag (TAG NO) is required from Tag Number above in the amplifier memory, specify at Software Tag. Default (FT2001) be set for TAG NO unless otherwise both Tag Number and Software Tag specified in order.
Node ADDRESS (Bus Address)	'0x7E' unless otherwise specified in order
Output Mode (Characterization Type)	Always set as 'No Linearization'
Calibration Range (PV SCALE) Lower/Higher Range Value	FROWRATE SPAN of flowtube order information be set in PV SCALE. Lower Range Value be always zero.
Calibration Range Unit	Refer to Table below.
Output Scale (OUT SCALE) Lower/Higher Range Value	'OUT SCALE' always be the same as 'PV SCALE'.

T05.EPS

8.3 TERMINAL CONNECTION

Integral Flowmeter AXF

Terminal configuration



F01.EPS

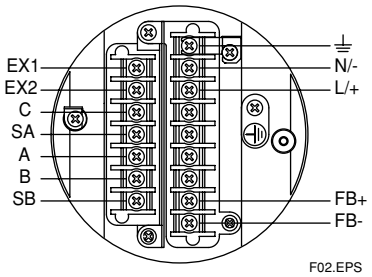
Terminal wiring

Terminal Symbols	Description
⏚	Functional grounding
N/– L/+	Power supply
FB+ FB–	PROFIBUS PA communication signal
⊜	Protective grounding (Outside of the terminal)

T06.EPS

Remote Type Converter AXFA14

Terminal configuration



F02.EPS

Terminal wiring

Terminal Symbols	Description
EX1 EX2	Excitation current Output
C SA A B SB	Flow singal input

Terminal Symbols	Description
⏚	Functional grounding
N/– L/+	Power supply
FB+ FB–	PROFIBUS PA communication signal
⊜	Protective grounding (Outside of the terminal)

T07.EPS

⚠ CAUTION

Do not connect to these terminals which are marked “CAUTION Don’t connect”.

9. PARAMETER LISTS

Note The Write Mode column indicates the mode in which the parameter is write enabled.
O/S: Write enabled in O/S mode.
MAN: Write enabled in manual mode.
AUTO: Write enabled in auto mode, manual mode, and O/S mode.
–: Read only.

9.1 Physical Block Parameter List (Slot 0)

Index	Parameter		Write Mode	Valid Range	Initial Value	Description
16	BLOCK_OBJECT		–			Information on this block such as Block Tag, DD Revision, Execution Time etc.
17	ST_REV		–		0	The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed.
18	TAG_DESC		Auto		Specified at the time of order	The user description of the intended application of the block.
19	STRATEGY		Auto	0 to 65535	0	The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
20	ALERT_KEY		Auto	0 to 255	0	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc...
21	TARGET_MODE		Auto	The permitted bit is only available.	Auto	Set the Target of block mode (MODE_BLK) to Auto or O/S according to the Write Mode of the parameter to be set or changed.
22	MODE_ BLK (DS-37)	Actual	–		Auto	The mode parameter is a structured parameter composed of the actual mode, the normal mode and the permitted mode. Actual: Indicates the current operating condition. Permit: Indicates the operating condition that the block is allowed to take. Normal: Indicates the operating condition that the block will usually take.
		Permitted	–	O/S, Auto bit	O/S, Auto	
		Normal	–	The permitted bit is only available.	Auto	
23	ALARM_ SUM (DS-42)	Current	–	Bit7 is only available.	0	The current alert status, unacknowledged status, unreported status and disabled status of the alarms associated with the function block.
		Unacknowledged	–		0	for future use
		Unreported	–		0	for future use
		Disabled	–		0	for future use
24	SOFTWARE_REVISION		–			Revision-number of the software of the field device.
25	HARDWARE_REVISION		–			Revision-number of the hardware of the field device.
26	DEVICE_MAN_ID		–		55 (0x37)	Identification code of the manufacturer of the field device.
27	DEVICE_ID		–		AXF	Manufacturer specific identification of the field device.
28	DEVICE_SER_NUM		Auto		Serial No.	Serial number of the field device.
29	DIAGNOSIS		–		0	Detailed information of the device, bitwise coded. More than one message possible at once.
30	DIAGNOSIS_EXTENSION		–		0	Additional manufacturer-specific information of the device, bitwise coded.
31	DIAGNOSIS_MASK		–	0: Not supported 1: Supported	1: Supported	Definition of supported DIAGNOSIS information-bits.
32	DIAGNOSIS_MASK_ EXTENSION		–	0: Not supported 1: Supported	1: Supported	Definition of supported DIAGNOSIS_EXTENSION information-bits.
33	DEVICE_CERTIFICATION		–	No information	Space	Not used for ADMAG AXF
34	WRITE_LOCKING		Auto	0: Lock 2457: Disabled	2457 (0x999)	If set, no writes from anywhere are allowed, except to clear WRITE_LOCKING.

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Index	Parameter	Write Mode	Valid Range	Initial Value	Description
35	FACTORY_RESET	Auto	0: No function 1: Factory Reset 2506: Warm start 2712: Reset Address to “126”	0	Allows a manual restart to be initiated. 0: No function. 1: Resetting device to the factory default. 2506: Warm start of the device. All parameterization remains unchanged. 2712: Reset the bus address to “126”.
36	DESCRIPTOR	Auto			User definition text (a string) to describe the device within the application.
37	DEVICE_MESSAGE	Auto			User definable MESSAGE (a string) to describe the device within the application or in the plant.
38	DEVICE_INSTAL_DATE	Auto			Date of installation of the device.
39	Not used				
40	IDENT_NUMBER_ SELECTOR	Auto	0: PROFILE ID 1: device-specific ID	1	Each PROFIBUS-DP device shall have an Ident_Number provided by the PNO.
41	HW_WRITE_PROTECTION	–	0: Unprotected 1: Protected	0	This parameter is used in order to indicate the position of a write blocking mechanism which protests all acyclic write access to all writable parameters of a device.
42-48	reserved by PNO				
49	SOFT_DESC	–			Yokogawa internal use.
50	SET_ADDRESS	O/S	0 to 126	0	This parameter is used in order to set or change the station address.
51	FUNCTION_BLOCK_ STATUS	Auto		0x00...0 (12 digits)	This parameter is used in order to indicate the status of the function block. (0x000000000000)
52	DIAGNOSIS_SIM_MODE	Auto	0: Disabled 1: Enabled	0: Disabled	For testing alarms and warnings can be modified. Switch to enable or disable alarm simulation. When this parameter is set to enable and the hardware simulation jumper is on, all of alarms and warnings in DIAGNOSIS_ EXTENSION can be modified with DIAGNOSIS_SIM_EXTENSION.
53	DIAGNOSIS_SIM_ EXTENSION	Auto		0x00...0 (12 digits)	Definision of supported DIAGNOSIS_EXTENSION information-bits. For testing alarms and warnings can be modified. When the hardware simulation jumper is on, DIAGNOSIS_SIM_ MODE is set to enable, and the bits are set to “on”, the arlarms (or warnings) can be modified. (0x000000000000)
54	VIEW_PHYSICAL_BLOCK	–			View objects allow the following groups of physical block parameter values to be read with one read request. ST_REV, MODE_BLK, ALARM_SUM, DIAGNOSIS

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9.2 AI Block Parameter List (Slot 1)

Index	Parameter		Write Mode	Valid Range	Initial Value	Description
16	BLOCK_OBJECT		–			Information on this block such as Block Tag, DD Revision, Execution Time etc.
17	ST_REV		–		0	The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed.
18	TAG_DESC		Auto			The user description of the intended application of the block.
19	STRATEGY		Auto	0 to 65535	0	The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
20	ALERT_KEY		Auto	0 to 255	0	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
21	TARGET_MODE		Auto	The permitted bit is only available.	Auto	Set the Target of block mode (MODE_BLK) to Auto or O/S according to the Write Mode of the parameter to be set or changed.
22	MODE_ BLK (DS-37)	Actual	–		Auto	The mode parameter is a structured parameter composed of the actual mode, the normal mode and the permitted mode. Actual: Indicates the current operating condition. Permit: Indicates the operating condition that the block is allowed to take. Normal: Indicates the operating condition that the block will usually take.
		Permitted	–	O/S bit, Man bit, Auto bit	O/S, Man, Auto	
		Normal	–	Permitted bit is only available.	Auto	
23	ALARM_ SUM (DS-42)	Current	–	Bit1, 2, 3, 4, and 7 are available.	0	The current alert status, unacknowledged status, unreported status and disabled status of the alarms associated with the function block.
		Unacknowledged	–		0	for future use
		Unreported	–		0	for future use
		Disabled	–		0	for future use
24	BATCH (DS-67)	BATCH_ID	Auto		0	This parameter is intended to be used in Batch applications in line with IEC 61512.
		RUP	Auto		0	
		OPERATION	Auto		0	
		PHASE	Auto		0	
25	Not used					
26	OUT (DS-33)	Value	Man		0	This parameter contains the current measurement value from Transducer Block or configuration adjusted engineering unit and the belonging state in AUTO MODE. OUT contains the value and status set by an operator in MAN MODE.
		Status	Man		0	
27	PV_ SCALE	Array 1	O/S	0.00001 to 32000 or 0	Specified at the time of order	Conversion of the Process Variable into percent using the high and low scale values. The engineering unit of PV_SCALE high and low scale values are direct related to the PRIMARY_VALUE_UNIT of the configured Transducer Block (configured via Channel parameter). The PV_SCALE high and low scale values follow the changes of the PRIMARY_VALUE_UNIT of the related Transducer Block automatically, i.e. a change of the Transducer Block PRIMARY_ VALUE_Unit causes no bump at OUT from AI.
		Array 2	O/S	0.00001 to 32000 or 0	0	
28	OUT_ SCALE (DS-68)	EU at 100%	O/S		Specified at the time of order	Scale of the Process Variable. This parameter contains the values of the lower limit and upper limit effective range, the code number of the engineering unit of Process Variable and the number of digits on the right hand side of the decimal point.
		EU at 0%	O/S		0	
		Units Index	O/S	1342: %, 1355:Ml/d 1522: Ml/h 1521: Ml/min , etc	Specified at the time of order	
		Decimal Point	O/S	Auto exclude 0, 1, 2, 3	4	
29	LIN_TYPE		O/S	0: no linearisation 250: Not used 251: None	0	This parameter is used in order to select the type of linearization.
30	CHANNEL		O/S	273	273	Reference to the active Transducer Block which provides the measurement value to the Function Block.
31	Not used					
32	PV_FTIME		Auto	more than 0sec	0.000	Time constant of a single exponential filter for the PV, in seconds.

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Index	Parameter		Write Mode	Valid Range	Initial Value	Description
33	FSAFE_TYPE		Auto	0: Failsafe Value 1: Last Valid OUT Value 2: Wrong Calculated Value	1: Last Valid OUT Value	Defines reaction of device, if a fault is detected.
34	FSAFE_VALUE		Auto		0.0	Default value for the OUT parameter, if sensor or sensor electronic fault is detected. The unit of this parameter is the same like the OUT one.
35	ALARM_HYS		Auto	0.0 to 50.0% of range	0.5% of range	Amount the PV must return within the alarm limits before the alarm condition clears. Alarm Hysteresis is expressed as engineering units of the PV span.
37	HI_HI_LIM		Auto	max. Value	+INF	The setting for high high alarm in engineering units.
39	HI_LIM		Auto	max. Value	+INF	The setting for high alarm in engineering units.
41	LO_LIM		Auto	min. Value	-INF	The setting of the low alarm in engineering units.
43	LO_LO_LIM		Auto	min. Value	-INF	The setting of the low low alarm in engineering units.
46	HI_HI_ ALM (DS-39)	Unacknowledged	–		0	This parameter is used in order to show the state of the upper limit of alarms. This parameter contains the state of the upper limit of an alarm and the related time stamp. The time stamp expresses the time the measured variable has been equal or higher than the upper limit of the alarm.
		Alarm State	–	0: No alarm Alarm active exclude 0	0	
		Time_Stamp	–		0	
		Subcode	–		0	
		Value	–		0	
47	HI_ALM (DS-39)	Unacknowledged	–		0	This parameter is used in order to show the state of the upper limit of warnings. This parameter contains the state of the upper limit of a warning and the related time stamp. The time stamp expresses the time the measured variable has been equal or higher than the upper limit of the warning.
		Alarm State	–	0: No alarm Alarm active exclude 0	0	
		Time_Stamp	–		0	
		Subcode	–		0	
		Value	–		0	
48	LO_ALM (DS-39)	Unacknowledged				This parameter is used in order to show the state of the lower limit of warnings. This parameter contains the state of the lower limit of a warning and the related time stamp. The time stamp expresses the time the measured variable has been equal or lower than the lower limit of the warning.
		Alarm State	–	0: No alarm Alarm active exclude 0	0	
		Time_Stamp	–		0	
		Subcode	–		0	
		Value	–		0	
49	LO_LO_ ALM (DS-39)	Unacknowledged	–		0	This parameter is used in order to show the state of the lower limit of alarms. This parameter contains the state of the lower limit of an alarm and the related time stamp. The time stamp expresses the time the measured variable has been equal or lower than the lower limit of the alarm.
		Alarm State	–	0: No alarm Alarm active exclude 0	0	
		Time_Stamp	–		0	
		Subcode	–		0	
		Value	–		0	
50	SIMULATE (DS-50)	Simulate_Status	Auto		0	For commissioning and test purposes the input value from the Transducer Block in the Analog Input Function Block AI-FB can be modified. That means that the Transducer and AI-FB will be disconnected.
		Simulate_Value	Auto		0	
		Simulate_Enabled	Auto	0: Disabled, Enable exclude 0	0: Disabled	
51	OUT_UNIT_TEXT		Auto	Character		If a specific unit of OUT parameter is not in the code list the user has the possibility to write the specific text in this parameter. The unit code is then equal “textual unit definition”.
52-60	reserved by PNO					
61	VELOCITY_CHECK		–	0 to 99.999	0	This parameter is used in order to display the span velocity corresponding to PV_SCALE.EU100 (EU0).
62	VIEW_ANALOG_INPUT_FB		–			View objects allow the following groups of physical block parameter values to be read with one read request. ST_REV, MODE_BLK, ALARM_SUM, OUT

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9.3 Transducer Block Parameter List (Slot 7)

Index	Parameter		Write Mode	Valid Range	Initial Value	Description
16	BLOCK_OBJECT (DS-32)					Information on this block such as Block Tag, DD Revision, Execution Time etc.
17	ST_REV		–		0	The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed.
18	TAG_DESC		Auto			The user description of the intended application of the block.
19	STRATEGY		Auto	0 to 65535	0	The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
20	ALERT_KEY		Auto	0 to 255	0	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
21	TARGET_MODE		Auto	The permitted bit is only available.	0x08: Auto	Set the Target of block mode (MODE_BLK) to Auto or O/S according to the Write Mode of the parameter to be set or changed.
22	MODE_BLK (DS-37)	Actual	–		0x08: Auto	The mode parameter is a structured parameter composed of the actual mode, the normal mode and the permitted mode. Actual: Indicates the current operating condition. Permit: Indicates the operating condition that the block is allowed to take. Normal: Indicates the operating condition that the block will usually take.
		Permitted	–	O/S bit, Auto bit	0x80: O/S, 0x08: Auto	
		Normal	–	The permitted bit is only available.	0x08: Auto	
23	ALARM_SUM (DS-42)	Current	–	Bit7 is only available.	0	The current alert status, unacknowledged status, unreported status and disabled status of the alarms associated with the function block.
		Unacknow-ledged	–		0	for future use
		Unreported	–		0	for future use
		Disabled	–		0	for future use
24	CALIBR_FACTOR		O/S	0.01 to 3.0000	1.0000	Gain compensation value for the detector, so that flow indication is accurate. This parameter means the meter factor of low frequency side (LOW_MF). This parameter must not be downloaded by the operator.
25	LOW_FLOW_CUTOFF		O/S	The value which corresponds to 0 to 10% of PV_SPAN is permitted.	0	Set the low cut range corresponding 0 to 10 % of the large absolute value between PV_SCALE.Array1 and PV_SCALE.Array2. This value must be set to the lower switching point because this function has a hysterisis.
26	MEASUREMENT_MODE		O/S	0: Unidirectional 1: Bidirectional	0: Unidirectional	Set the mode of the flow measurement,either unidirectional or bidirectional.
27	FLOW_DIRECTION		O/S	0: Positive 1: Negative	0: Positive	Assign an arbitrary positive or negative sign to the measured PV value.
28	ZERO_POINT		O/S	-999.9 to 999.9	0.000	This function shows the current zero point compensation value for the sensor. This parameter is used to display the results obtained from ZERO_POINT_ADJUST . Specifically, the correction values displayed, and it is also possible to directly enter correction values. This parameter must not be downloaded by the operator.
29	ZERO_POINT_ADJUST		Auto	0: Cancel 1: Execute	0: Cancel	This parameter executes the automatic zero adjustment function: If “Execute” is selected, this function will be started. “Now Auto Zero Executing...” is indicated while the Auto Zero function is being carried out and After finishing the adjustment, this parameter is set to “Cancel”. The result of the automatic zero adjustment is confirmed using ZERO_POINT , and if the result exceeds the rated value, the warning “82: Auto Zero Wng” will be displayed.
30	ZERO_POINT_UNIT		O/S	1062: mm/s	1062: mm/s	This parameter is used in order to select the unit for zero point.
31	NOMINAL_SIZE		O/S	0.99 to 3000.10 (mm) 0.01 to 120.10 (inch)	Specified at the time of order	This parameter is used in order to set the size (diameter) of the sensor (flow tube). If the setting value exceeds the valid range, the warning “72:Size Set Err” will be displayed.

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Index	Parameter		Write Mode	Valid Range	Initial Value	Description
32	NOMINAL_SIZE_UNITS		O/S	1013: mm 1019: inch	Specified at the time of order	This parameter is used in order to select the unit of size (diameter) of the sensor (flow tube).
33	VOLUME_ FLOW (DS-33)	Value	–		0	Indicates the current measured value and status as the primary value (volumetric flow). This parameter is input to the AI Function Block and the Totalizer Function Block.
		Status	–		Good	
34	VOLUME_FLOW_UNITS		O/S	See the “Unit” sheet.	Specified at the time of order	This parameter is used in order to select the unit for VOLUME_ FLOW, VOLUME_FLOW_LO_LIMIT and VOLUME_FLOW_HI_ LIMIT parameters.
35	VOLUME_FLOW_LO_LIMIT		O/S	-11.88 to 11.88 m/s or -22.68 to 22.68 m/s The value depends on a volume flow unit.	Specified at the time of order	This parameter is used in order to enter the lower range value for volumetric flow.
36	VOLUME_FLOW_HI_LIMIT		O/S	-11.88 to 11.88 m/s or -22.68 to 22.68 m/s The value depends on a volume flow unit.	Specified at the time of order	This parameter is used in order to enter the upper range value for volumetric flow.
57	SAMPLING_ FREQ (DS-33)	Value	–		75	This parameter is used in order to indicates the field frequency of the sensor (Sensor specific, must not be downloaded).
		Status	–		Good	
58	SAMPLING_FREQ_UNITS		O/S	1077: Hz	1077: Hz	This parameter is used in order to selected unit code for SAMPLING_FREQ parameter.
59-68	reserved by PNO					
69	VOLUME_FLOW_FTIME		O/S	0.1 to 200.0	3.0	Setting of the damping time constant to VOLUME_FLOW. The output to reach 63.2% from 0%.
70	DUAL_FREQUENCY_ MODE		O/S	0: Standerd DF 1: Enhanced DF	0: Standard DF	Selection of excitation mode. This parameter is effective when FLOW_TUBE is “ADMAG AXF” and NOMINAL_SIZE is in between 25mm to 200mm. Outside the field of that condition, the warning “71:Meas Mod Set” will be displayed.
71	LOW_MF		O/S	0.01 to 3.0000	1.0000	This parameter is used in order to set the low-frequency meter factor. This setting is linked with that of parameter CALIBR_FACTOR.
72	HIGH_MF		O/S	0.01 to 3.0000	1.0000	This parameter is used in order to set the high-frequency meter factor.
73	LOW_MF_EDF		O/S	0 to 3.0000	1.0000	This parameter is used in order to set the low-frequency meter factor as required when Enhanced DF (i.e., enhanced dual frequency excitation) is selected. If “Standard DF” has been selected for Measure_Mode, neither Low_MF(EDF) nor High_MF(EDF) is displayed.
74	HIGH_MF_EDF		O/S	0 to 3.0000	1.0000	This parameter is used in order to set the high-frequency meter factor as required when Enhanced DF (i.e., enhanced dual frequency excitation) is selected.
75	SELECT_FLOW_TUBE		O/S	0: ADMAG AXF 1: ADMAG 2: ADMAG AE 3: ADMAG SE 4: YEWMAG 5: Calibrator 6: Other	0: ADMAG AXF	This parameter is used in order to set the types of flow tube. When combining this product with an AXF Remote Flow tube, “ADMAG AXF” should be selected.
76	DENSITY_UNIT		O/S	1097: kg/m^3 1108: lb/gal 1107: lb/cf	1097: kg/m^3	This parameter selects the units for density as required when making settings using Mass_Density.

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Index	Parameter		Write Mode	Valid Range	Initial Value	Description
77	MASS_FLOW_DENSITY		O/S	0 to 32000	0	Setting of the density for mass-flow rate. This parameter is necessary in situations where t, kg, g, klb or lb has been selected as the mass unit in VOLUME_FLOW_UNITS. If a mass unit is selected in VOLUME_FLOW_UNITS and a value of 0 is set for this parameter, the setting alarm “57: Density SetErr.” will be displayed. In such a case, ensure that the density is set correctly.
78	LIMSW_1_ VALUE_D (DS-34)	Value	–	0: not set, set exclude 0	0	This parameter is used in order to indicate the current input value selected LIMSW_1_TARGET. If the target alarm occurred the value is set 1. Refore to LIMSW_1_TARGET.
		Status	–		Good	
79	LIMSW_1_TARGET		O/S	0: Volume Flow Value	0	This parameter selects the input channel used to LIMSW_1_ VALUE_D.
80	LIMSW_1_SETPOINT		O/S		-10	Sets the threshold of limitswitch 1. If the value of LIMSW_1_ACT_DIRECTION is HIGH LIMIT, limit switch 1 turns ON when LIMSW_1_TARGET has gone beyond LIMSW_1_SETPOINT. If the value of LIMSW_1_ACT_DIRECTION is LO LIMIT, limit switch 1 turns ON when LIMSW_1_TARGET has gone below LIMSW_1_SETPOINT. The unit set in LIMSW_1_UNIT applies.
81	LIMSW_1_ACT_ DIRECTION		O/S	0: Low Limit 1: High Limit	0: Low Limit	Selects the direction of the limit switch 1’s actions: 1: LO LIMIT (Low-limit switch) 2: HIGH LIMIT (high-limit switch)
82	LIMSW_1_HYSTERESIS		O/S	0 or larger.	0.0	Sets the hysteresis of limit switch 1 to be applied for resetting the LIMSW_1_VALUE_D to OFF after LIMSW_1_TARGET went beyond LIMSW_1_SETPOINT and LIMSW_1_VALUE_D turned ON (when used as a high-limit switch), or after LIMSW_1_TARGET went below LIMSW_1_SETPOINT and LIMSW_1_VALUE_D turned ON (when used as a low-limit switch).
83	LIMSW_1_UNIT		–		1349: m^3/h	Indicate the unit set in LIMSW_1_TARGET.
84	LIMSW_2_ VALUE_D (DS-34)	Value	–	0: not set, set exclude 0	0	This parameter is used in order to indicate the current input value selected LIMSW_2_TARGET. If the target alarm occurred the value is set 1. Refore to LIMSW_2_TARGET.
		Status	–		Good	
85	LIMSW_2_TARGET		O/S	0: Volume Flow Value	0	Select the input channel to LIMSW_2_VALUE_D.
86	LIMSW_2_SETPOINT		O/S		10	Sets the threshold of limitswitch 2. If the value of LIMSW_2_ACT_ DIRECTION is HIGH LIMIT, limit switch 2 turns ON when LIMSW_ 2_TARGET has gone beyond LIMSW_2_SETPOINT. If the value of LIMSW_2_ACT_DIRECTION is LO LIMIT, limit switch 2 turns ON when LIMSW_2_TARGET has gone below LIMSW_2_SETPOINT. The unit set in LIMSW_2_UNIT applies.
87	LIMSW_2_ACT_ DIRECTION		O/S	0: Low Limit 1: High Limit	1: High Limit	Selects the direction of the limit switch 2’s actions 0: LO LIMIT (Low-limit switch) 1: HIGH LIMIT (high-limit switch)
88	LIMSW_2_HYSTERESIS		O/S	0 or larger.	0	Sets the hysteresis of limit switch 2 to be applied for resetting the LIMSW_2_VALUE_D to OFF after LIMSW_2_TARGET went beyond LIMSW_2_SETPOINT and LIMSW_2_VALUE_D turned ON (when used as a high-limit switch), or after LIMSW_2_TARGET went below LIMSW_2_SETPOINT and LIMS W_2_VALUE_D turned ON (when used as a low-limit switch).
89	LIMSW_2_UNIT		–		1349: m^3/h	Indicate the unit set in LIMSW_2_TARGET.
90	SWITCH_1_ VALUE_D (DS-34)	Value	–	0: not set, set exclude 0	0	Indicate the value of switch 1, which switches ON and OFF depending on the digital value of the target input parameter selected in SWITCH_1_TARGET.
		Status	–		Good	
91	SWITCH_1_TARGET		O/S	0: Adheshion Alarm 1: Adhesion Warning	0: Adheshion Alarm	This parameter selects the input channel used to LIMSW_1_ VALUE_D.

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Index	Parameter		Write Mode	Valid Range	Initial Value	Description
92	SWITCH_2_ VALUE_D (DS-34)	Value	–	0: not set, set exclude 0	0	Indicate the value of switch 2, which switches ON and OFF depending on the digital value of the target input parameter selected in SWITCH_2_TARGET.
		Status	–		Good	
93	SWITCH_2_TARGET		O/S	0: Adheshion Alarm 1: Adhesion Warning	1: Adhesion Warning	This parameter selects the input channel used to LIMSW_2_ VALUE_D.
94	SIGNAL_LOCK		Auto	0: Unlock 1: Lock	0: Unlock	This parameter executes the signal lock function: If “Lock” is selected, this function will be started.
95	ALARM_PERFORM		O/S	0x00000000 to 0x003F003F	0x00010033	This parameter masks Alarm/Warning. By setting “0” to each bit, corresponding Alarm/Warning are cleared. When masked the corresponding bit of DEVICE_STATUS becomes OFF and no alarm is displayed on LCD, and also becomes out of scope of Primary value status, ED_ERROR setting. Valid range is 0x00000000 to 0x003F003F.
96	SIMULATE_MODE		Auto	0: Off 1: Volume Flow	0: Off	For commissioning and test purposes the input value from sensor value in the Transducer Block. TB can be modified when the hardware simulation jumper is on. It means that the sensor value and TB will be disconnected.
97	SIMULATE_TYPE		Auto	0: Fixed 1: 2 points 2: 3 points 3: Ramp	0: Fixed	Select the type of the simulated value.
98	SIMULATE_ VOLUME_ FLOW (DS-33)	Value	Auto		0	Set the fixed value for simulating the volume flow value when SIMULATE_TYPE is selected “0: Fixed”. When SIMULATE_MODE is selected “0: Off”, SIMULATE_ VOLUME_FLOW.Value has the same value as the current value from the sensor. (That is, the sensor value is copied to this parameter internally at each TB execution.) And SIMULATE_ VOLUME_FLOW.Status has the same value as VOLUME_FLOW_ VALUE.Status. When SIMULATE_TYPE is not selected “0: Fixed”, SIMULATE_ VOLUME_FLOW shows the current simulated value.
		Status	Auto		Good	
99	SIMULATE_UP_VALUE		Auto	Except SIMULATE_LO_ VALUE	0	Set the simulated upper value when SIMULATE_TYPE is selected “1: 2 points”, “2: 3 points”, or “Ramp”.
100	SIMULATE_LO_VALUE		Auto	Except SIMULATE_UP_ VALUE	0	Set the simulated lower value when SIMULATE_TYPE is selected “1: 2 points”, “2: 3 points”, or “3: Ramp”.
101	SIMULATE_TIME		Auto	Except 0	30	Show the time to maintain a constant value when SIMULATE_TYPE is selected “1: 2 points” or “2: 3 points”. Show the time to maintain a constant change, when SIMULATE_ TYPE is selected “3: Ramp”.
102	OPERATION_TIME		–	0D 00:00 to 99999D 23:59	0D 00:00	This parameter is used to display the operation time. For example, “1D23:45” indicates an operation time of 1 day, 23 hours, and 45 minutes.
103	ALM_RECORD1		–	0 to 14	0	This parameter is used to display the most-recent alarm.
104	ALM_RECORD_TIME1		–	0D 00:00 to 99999D 23:59	0D 00:00	This parameter is used to display the operation time at which the alarm indicated by Alm_Record1 was occurred. For example, “1D23:45” indicates that an alarm was triggered at the operation time of 1 day, 23 hours, and 45 minutes.
105	ALM_RECORD2		–	0 to 14	0	This parameter is used to display the second most recent alarm.
106	ALM_RECORD_TIME2		–	0D 00:00 to 99999D 23:59	0D 00:00	This parameter is used to display the operation time at which the alarm indicated by Alm_Record2 was occurred.
107	ALM_RECORD3		–	0 to 14	0	This parameter is used to display the third most recent alarm.
108	ALM_RECORD_TIME3		–	0D 00:00 to 99999D 23:59	0D 00:00	This parameter is used to display the operation time at which the alarm indicated by Alm_Record3 was occurred.
109	ALM_RECORD4		–	0 to 14	0	This parameter is used to display the fourth most recent alarm.
110	ALM_RECORD_TIME4		–	0D 00:00 to 99999D 23:59	0D 00:00	This parameter is used to display the operation time at which the alarm indicated by Alm_Record4 was occurred.

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Index	Parameter	Write Mode	Valid Range	Initial Value	Description
111	DISPLAY_SELECT1	Auto	0 to 4	1: Out Value	This parameter is used in order to set the LCD display mode.
112	DISPLAY_SELECT2	Auto	0 to 9	0: Off	
113	DISPLAY_SELECT3	Auto	0 to 9	0: Off	
114	DISPLAY_CYCLE	Auto	0: 200ms 1: 400ms 2: 1s, 3: 2s, 4: 4s, 5: 8s	1: 400ms	This parameter is used in order to set the renewal cycle of LCD display. Renewal cycle: 200 msec “DISPLAY_CYCLE”
115	LANGUAGE	Auto	0: English	0: English	
116	RATE_LIMIT	O/S	0 to 10	5	This parameter is used in order to set the rate limit value.
117	DEAD_TIME	O/S	0 to 15	0	This parameter is used in order to set the time for application of the rate limit, and if a value of 0 is set, the rate limit function will be terminated.
118	PULSING_FLOW	O/S	0: No 1: Yes	0: No	This parameter is used in order to set the pulsing flow support.
119	POWER_SYNCH	O/S	0: No 1: Yes	1: Yes	This parameter is used in order to indicate whether or not the internal frequency is to be synchronized with that of the power supply.
120	POWER_FREQUENCY	O/S	47.00 to 63.00	50	This parameter is used in order to set the power frequency.
121	SOFTWARE_REV_NO	–			This parameter is used to display the software revision number.
122	ADHESION_CHECK	O/S	0: No 1: Yes	0: No	This parameter selects whether or not the adhesion diagnostic function will be carried out. NOTE If the judgment value for Level 3 is exceeded, a warning is displayed; and if the value for Level 4 is exceeded, an alarm is displayed.
123	ADHESION_LEVEL1	O/S	0.00 to 100.00	0.10	This parameter is used in order to set the resistance value for judgment of Level 1.
124	ADHESION_LEVEL2	O/S	0.00 to 100.00	0.50	This parameter is used in order to set the resistance value for judgment of Level 2.
125	ADHESION_LEVEL3	O/S	0.00 to 100.00	1.00	This parameter is used in order to set the resistance value for judgment of Level 3.
126	ADHESION_LEVEL4	O/S	0.00 to 100.00	3.00	This parameter is used in order to set the resistance value for judgment of Level 4.
127	ADH_MEASURE_VALUE	–	0.00 to 1000.00	–	This parameter displays the value measured using the adhesion diagnostic function.

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9.4 Totalizer Block Parameter List (TOT1: Slot2, TOT2: Slot3,TOT3: Slot4)

Index	Parameter		Write Mode	Valid Range	Initial Value	Description
16	BLOCK_OBJECT (DS-32)		–			Information on this block such as Block Tag, DD Revision, Execution Time etc.
17	ST_REV		–		0	The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed.
18	TAG_DESC		Auto		Space	The user description of the intended application of the block.
19	STRATEGY		Auto	0 to 65535	0	The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
20	ALERT_KEY		Auto	0 to 255	0	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
21	TARGET_MODE		Auto	The permitted bit is only available.	Auto	Set the Target Auto, Man or O/S according to the Write Mode of the parameter to be set or changed.
22	MODE_BLK (DS-37)	Actual	–		Auto	The mode parameter is a structured parameter composed of the actual mode, the normal mode and the permitted mode. Actual: Indicates the current operating condition. Permit: Indicates the operating condition that the block is allowed to take. Normal: Indicates the operating condition that the block will usually take.
		Permitted	–	O/S bit, Man bit, Auto bit.	O/S, Man, Auto	
		Normal	–	The permitted bit is only available.	Auto	
23	ALARM_SUM (DS-42)	Current	–	Bit1, 2, 3, 4, 7 are available.	0	The current alert status, unacknowledged status, unreported status and disabled status of the alarms associated with the function block.
		Unacknow-ledged	–		0	for future use
		Unreported	–		0	for future use
		Disabled	–		0	for future use
24	BATCH (DS-67)	BATCH_ID	Auto		0	This parameter is intended to be used in Batch applications in line with IEC 61512.
		RUP	Auto		0	
		OPERATION	Auto		0	
		PHASE	Auto		0	
25	Not used					
26	TOTAL (DS-33)	Value	Man		0	This parameter contains the integrated quantity of the rate parameter provided by CHANNEL and the associated status.
		Status	Man		0	
27	UNIT_TOT		O/S	1549:Ml, 1034:m^3, 1517:kL, 1041:hL, 1038:L, 1040:mL, 1035:dm^3, 1036:cm^3, 1092:t, 1091:Mg, 1088:kg, 1089:g, 1090:mg, 1043:CF, 1048:gallon, 1051:bbl 1641:bbl (US federal), 1094:lb	1034:m^3	This parameter is used in order to set the unit of the totalized quantity. The unit must be compatible to VOLUME_FLOW_UNITS. Set UNIT_TOT to a mass unit when a mass unit is set into VOLUME_FLOW_UNITS. If the mismatch units are set, the alarm of "120:Total1 Unit Set Err", "121:Total2 Unit Set Err" or "122:Total3 Unit Set Err" will be displayed.
28	CHANNEL		O/S	273	273	Reference to the active Transducer Block which provides the measurement value to the Function Block.
29	SET_TOT		Auto	0: TOTALIZE 1: RESET 2: PRESET	0: TOTALIZE	This parameter is used in order to assign the condition to the totalizer.
30	MODE_TOT		O/S	0: BALANCED 1: POS_ONLY 2: NEG_ONLY 3: HOLD	0: BALANCED	This parameter is used in order to define how the totalizer counts.
31	FAIL_TOT		O/S	0: RUN 1: HOLD 2: MEMORY	0: RUN	This parameter is used in order to define error response in the event of the device error or bad measured value.

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Index	Parameter		Write Mode	Valid Range	Initial Value	Description
32	PRESET_TOT		Auto	-99999999 to +99999999	0.000	This parameter is used in order to define the starting value to the totalizer.
33	ALARM_HYS		Auto	0 or larger	0.000	Amount the PV must return within the alarm limits before the alarm condition clears. Alarm Hysteresis is expressed as a percent of the PV span.
34	HI_HI_LIM		Auto	max. Value	+INF	The setting for high high alarm in engineering units.
35	HI_LIM		Auto	max. Value	+INF	The setting for high alarm in engineering units.
36	LO_LIM		Auto	min. Value	-INF	The setting of the low alarm in engineering units.
37	LO_LO_LIM		Auto	min. Value	-INF	The setting of the low low alarm in engineering units.
38	HI_HI_ALM (DS-39)	Unacknow-ledged	–		0	This parameter is used in order to set the state of the upper limit of alarms. This parameter contains the state of the upper limit of an alarm and the related time stamp. The time stamp expresses the time the measured variable has been equal or higher than the upper limit of the alarm.
		Alarm State	–	0: No alarm Alarm active exclude 0	0	
		Time_Stamp	–		0	
		Subcode	–		0	
		Value	–		0	
39	HI_ALM (DS-39)	Unacknow-ledged	–		0	This parameter is used in order to set the state of the upper limit of warnings. This parameter contains the state of the upper limit of a warning and the related time stamp. The time stamp expresses the time the measured variable has been equal or higher than the upper limit of the warning.
		Alarm State	–	0: No alarm Alarm active exclude 0	0	
		Time_Stamp	–		0	
		Subcode	–		0	
		Value	–		0	
40	LO_ALM (DS-39)	Unacknow-ledged	–		0	This parameter is used in order to set the state of the lower limit of warnings. This parameter contains the state of the lower limit of a warning and the related time stamp. The time stamp expresses the time at which the measured variable has been equal to or lower than the lower limit of the warning.
		Alarm State	–	0: No alarm Alarm active exclude 0	0	
		Time_Stamp	–		0	
		Subcode	–		0	
		Value	–		0	
41	LO_LO_ALM (DS-39)	Unacknow-ledged	–		0	This parameter is used in order to set the state of the lower limit of alarms. This parameter contains the state of the lower limit of an alarm and the related time stamp. The time stamp expresses the time at which the measured variable has been equal to or lower than the lower limit of the alarm.
		Alarm State	–	0:No alarm Alarm active exclude 0	0	
		Time_Stamp	–		0	
		Subcode	–		0	
		Value	–		0	
42-51	reserved by PNO					
52	SIMULATE (DS-50)	Simulate_ Status	Auto		0	For commissioning and test purposes the input value from the Transducer Block in the Totalizer Function Block, TOT-FB can be modified when the hardware simulation jumper is on. That means that the Transducer and TOT-FB will be disconnected.
		Simulate_ Value	Auto		0	
		Simulate_ Enabled	Auto	0: Disabled, Enable exclude 0	0: Disabled	
53	VIEW_TOTALIZER_FB		–			View objects allow the following groups of physical block parameter values to be read with one read request. ST_REV, MODE_BLK, ALARM_SUM, TOTAL

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9.5 DI Block Parameter List (DI1: Slot5, DI2: Slot6)

Index	Parameter		Write Mode	Valid Range	Initial Value	Description
16	BLOCK_OBJECT (DS-32)		–			Information on this block such as Block Tag, DD Revision, Execution Time etc.
17	ST_REV		–		0	The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed.
18	TAG_DESC		Auto		Space	The user description of the intended application of the block.
19	STRATEGY		Auto	0 to 65535	0	The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
20	ALERT_KEY		Auto	0 to 255	0	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
21	TARGET_MODE		Auto	The permitted bit is only available.	Auto	Set the Target of block mode (MODE_BLK) to Auto, Man or O/S according to the Write Mode of the parameter to be set or changed.
22	MODE_ BLK (DS-37)	Actual	–		Auto	The mode parameter is a structured parameter composed of the actual mode, the normal mode and the permitted mode. Actual: Indicates the current operating condition. Permit: Indicates the operating condition that the block is allowed to take. Normal: Indicates the operating condition that the block will usually take.
		Permitted	–	O/S bit, Man bit, Auto bit	O/S,Man,Auto	
		Normal	–	The permitted bit is only available.	Auto	
23	ALARM_ SUM (DS-42)	Current	–	Bit0, Bit7 are available.	0	The current alert status, unacknowledged status, unreported status and disabled status of the alarms associated with the function block.
		Unacknowledged	–		0	for future use
		Unreported	–		0	for future use
		Disabled	–		0	for future use
24	BATCH (DS-67)	BATCH_ID	Auto		0	This parameter is intended to be used in Batch applications in line with IEC 61512 .
		RUP	Auto		0	
		OPERATION	Auto		0	
		PHASE	Auto		0	
25	Not used					
26	OUT_D (DS-34)	Value	Man		0	This parameter contains the current measurement value from Transducer Block or configuration adjusted engineering unit and the belonging state in AUTO MODE. OUT contains the value and status set by an operator in MAN MODE.
		Status	Man		0	
30	CHANNEL		O/S	318, 324, 330, 332	DI1: 0x013E (1, 62), DI2: 0x0144 (1,68)	Reference to the active Transducer Block which provides the measurement value to the Function Block. 318: LIMSW_1_VALUE_D 324: LIMSW_2_VALUE_D 330: SWITCH_1_VALUE_D 332: SWITCH_2_VALUE_D
31	INVERT		Auto	0: not inverted 1: invert	0: not inverted	Indicates whether the input value of the PV_D should be logically inverted before it is stored in the OUT_D.
36	FSAFE_TYPE		Auto	0: FSAFE_VAL, 1: last valid OUT Value 2: wrong calculated Val	1: last valid OUT Value	Defines reaction of device, if a fault is detected.
37	FSAFE_VAL_D		Auto	0 or 1	0	Default value for the OUT_D parameter, if sensor or sensor electronic fault is detected.
40	SIMULATE (DS-51)	Simulate_Status	Auto		0	For commissioning and test purposes the input value from the Transducer Block in the Discrete Input Function Block, DI-FB can be modified when the hardware simulation jumper is on. That means that the Transducer and DI-FB will be disconnected.
		Simulate_Value	Auto		0	
		Simulate_Value	Auto	0: Disabled, Enable exclude 0	0: Disabled	
41-50	reserved by PNO					
51	VIEW_DI_FB		–			View objects allow the following groups of physical block parameter values to be read with one read request. ST_REV, MODE_BLK, ALARM_SUM, OUT_D

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10. MAINTENANCE

For maintenance items, please refer to user's manual IM 01E20D01-01E or IM 01E20C02-01E.

APPENDIX 1. LIST OF DTM MENU

Label for node and parameter				
1st node	2nd node	3rd node	1st row parameter	2nd row parameter
Process Variables				
			Measured Value	Quality
				Status
			AI Output Value	Quality
				Status
			TOT1 Totalizer Value	Quality
				Status
			TOT2 Totalizer Value	Quality
				Status
			TOT3 Totalizer Value	Quality
				Status
Device Status				
			Not specified here	
Diag and Service				
			AI Output Value	Quality
				Status
			AI1 Simulation Value	Quality
			AI1 Simulation	Status
			Adhesion Check	
			Adhesion Level 1	
			Adhesion Level 2	
			Adhesion Level 3	
			Adhesion Level 4	
			Measure Value	
			Start Adhesion Check	
Easy Setup				
			TAG	Analog Input
			Descriptor	Target Mode
			Message	Actual Mode
			Transducer Block	Filter Time Const
			Target Mode	PV Scale:Lower Value
			Actual Mode	PV Scale:Upper Value
			Measured Value Unit	Out Scale:Upper Value
			Filter Time	Out Scale:Lower Value
			Local Display	Out Scale:Unit
			Select1	Out Scale:Decimal Point
			Select2	Velocity Check
			Select3	
Calibration				
			AI Output Value	Quality
				Status
			Zero Point Offset	
			Start Zero Point Adjustment	
Physical Block				
			Static Revision No.	
			Target Mode	
			Actual Mode	
	Identification			
			TAG	
			Descriptor	
			Message	
			Manufacturer	
			Product designation	
			Device Serial Num	
			Software Revision	
			Hardware Revision	
			Profile Revision	
			PROFIBUS Ident Number	
			Installation Date	
			Software Description	
	Diagnosis			
			Diagnosis	
			Diagnosis Extension	
	Simulation Diagnosis			
			Simulation	
			Diagnoisis Simulation Extention	
	Function Block Status			
			Function Block Status	
	Configuration			
			Write Locking	
			Factory Reset	
			HW Write Protection	
Input				
	Transducer Block			
			Static Revision No.	
			Target Mode	
			Actual Mode	
			Measured Value	Quality
				Status
			Gain Compensation Factor	
			Measured Value Unit	
			Flow Direction	
			Low Flow Cut Off	
			Measurement Mode	
			Nominal Size	
			Nominal Size Unit	
			Lo Limit - Lower Value Min	
			Hi Limit - Upper Value Max	
			Zero Point Offset	
			Filter Time	
			Density Unit	
			Mass Flow Density	
			Sample Rate	Quality
				Status
			Sample Rate Unit	
			Singal Lock	
	Flow Tube			
			Select Flow Tube	
			Dual Frequency Mode	
			Low MF	
			High MF	
			Low MF EDF	
			High MF EDF	
	DI Set			
			DI1 Output Value	Quality
				Status
			DI2 Output Value	Quality
				Status
			Limit Switch 1	
			Value	Quality
				Status
			Target	
			Setpoint	
			Direction	
			Hysteresis	
			Unit	
			Limit Switch 2	
			Value	Quality
				Status
			Target	
			Setpoint	
			Direction	
			Hysteresis	
			Unit	
			Switch 1	
			Value	Quality
				Status
			Target	
			Switch 2	
			Value	Quality
				Status
			Target	
	AUX			
			Rate Limit	
			Dead Time	
			Pulsing Flow	
			Power Synch	
			Power Frequency	
			Software Rev No	
	Mask Alarm			
			Alarm Perform	
	Simulation Measured Value			
			Measured Value	Quality
				Status
			Simulation Measured Value	Quality
				Status
			Simulation	
			Type	
			Upper Value	
			Lower Value	
			Time Interval or Cycle or	
	Adhesion			
			Adhesion Check	
			Adhesion Level 1	
			Adhesion Level 2	
			Adhesion Level 3	
			Adhesion Level 4	
			Measure Value	
	Alarm Record			
			Operation Time	
			Alarm Record 1	Alarm Record Time 1
			Alarm Record 2	Alarm Record Time 2
			Alarm Record 3	Alarm Record Time 3
			Alarm Record 4	Alarm Record Time 4
	Local Display			
			Language	
			Display Cycle	
			Select1	
			Select2	
			Select3	

- Output
  - Analog Input
    - Static Revision No.
    - Target Mode
    - Actual Mode
    - Channel
    - Simulation Value — Simulation
    - Simulation Quality — Status
    - Fail Safe Mode
    - Fail Safe Default Value
    - Output Value — Quality / Status
    - Filter Time Const
    - Characterization Type
    - Out unit text
    - Velocity Check
    - Batch Information
      - Batch ID
      - Batch Unit
      - Batch Operation
      - Batch Phase
    - PV Scale
      - Upper Value
      - Lower Value
    - Output Scale
      - Upper Value
      - Lower Value
      - Unit
      - Decimal Point
    - Warning and Alarm
      - Upper Limit Alarm
      - Upper Limit Warning
      - Lower Limit Warning
      - Lower Limit Alarm
      - Hysteresis
      - Upper Limit Alarm Status — Value
      - Upper Limit Warning Status — Value
      - Lower Limit Warning Status — Value
      - Lower Limit Alarm Status — Value
  - Totalizer 1
    - Static Revision No.
    - Target Mode
    - Actual Mode
    - Channel
    - Simulation Value — Simulation
    - Simulation Quality — Status
    - Fail Safe Mode
    - Totalizer Mode
    - Preset Value
    - Totalizer Unit
    - Totalizer Value — Quality / Status
    - Batch Information
      - Batch ID
      - Batch Unit
      - Batch Operation
      - Batch Phase
    - Totalizer Reset
      - Totalizer Value — Quality / Status
      - Preset Value
      - Totalizer Set
    - Warning and Alarm
      - Upper Limit Alarm
      - Upper Limit Warning
      - Lower Limit Warning
      - Lower Limit Alarm
      - Limit Hysteresis
      - Upper Limit Alarm Status — Value
      - Upper Limit Warning Status — Value
      - Lower Limit Warning Status — Value
      - Lower Limit Alarm Status — Value
  - Totalizer 2
    - Static Revision No.
    - Target Mode
    - Actual Mode
    - Channel
    - Simulation Value — Simulation
    - Simulation Quality — Status
    - Fail Safe Mode
    - Totalizer Mode
    - Preset Value
    - Totalizer Unit
    - Totalizer Value — Quality / Status
    - Batch Information
      - Batch ID
      - Batch Unit
      - Batch Operation
      - Batch Phase
    - Totalizer Reset
      - Totalizer Value — Quality / Status
      - Preset Value
      - Totalizer Set
    - Warning and Alarm
      - Upper Limit Alarm
      - Upper Limit Warning
      - Lower Limit Warning
      - Lower Limit Alarm
      - Limit Hysteresis
      - Upper Limit Alarm Status — Value
      - Upper Limit Warning Status — Value
      - Lower Limit Warning Status — Value
      - Lower Limit Alarm Status — Value
  - Totalizer 3
    - Static Revision No.
    - Target Mode
    - Actual Mode
    - Channel
    - Simulation Value — Simulation
    - Simulation Quality — Status
    - Fail Safe Mode
    - Totalizer Mode
    - Preset Value
    - Totalizer Unit
    - Totalizer Value — Quality / Status
    - Batch Information
      - Batch ID
      - Batch Unit
      - Batch Operation
      - Batch Phase
    - Totalizer Reset
      - Totalizer Value — Quality / Status
      - Preset Value
      - Totalizer Set
    - Warning and Alarm
      - Upper Limit Alarm
      - Upper Limit Warning
      - Lower Limit Warning
      - Lower Limit Alarm
      - Limit Hysteresis
      - Upper Limit Alarm Status — Value
      - Upper Limit Warning Status — Value
      - Lower Limit Warning Status — Value
      - Lower Limit Alarm Status — Value
  - Discrete Input 1
    - Static Revision No.
    - Target Mode
    - Actual Mode
    - Channel
    - Simulation Value — Simulation
    - Simulation Quality — Status
    - Invert Input Value
    - Fail Safe Mode
    - Fail Safe Default Value
    - Output Value — Quality / Status
    - Batch Information
      - Batch ID
      - Batch Unit
      - Batch Operation
      - Batch Phase
  - Discrete Input 2
    - Static Revision No.
    - Target Mode
    - Actual Mode
    - Channel
    - Simulation Value — Simulation
    - Simulation Quality — Status
    - Invert Input Value
    - Fail Safe Mode
    - Fail Safe Default Value
    - Output Value — Quality / Status
    - Batch Information
      - Batch ID
      - Batch Unit
      - Batch Operation
      - Batch Phase

APPENDIX 2. LIST OF PDM (EDDL) MENU

- AXF PA
  - Easy Setup
    - TAG
    - Descriptor
    - Volume Flow-Mesasured Value
      - Unit
      - Filter Time
    - Process Value Scale
      - Lower Value
      - Upper Value
    - Out scale
      - Lower Value
      - Upper Value
      - Unit
      - Decimal Point
    - Local Display
      - Select1
      - Select2
      - Select3
    - Transducer Block
      - Target Mode
      - Actual Mode
    - Analog Input
      - Target Mode
      - Actual Mode
      - Filter Time Const
      - Velocity Check
  - Identification
    - Operation Unit
      - TAG
      - Descriptor
      - Message
    - Device
      - Manufacturer
      - Product designation
      - Device Serial Num
      - Software Revision
      - Hardware Revision
      - Profile Revision
      - Static Revision No.
      - PROFIBUS Ident Number
      - Installation Date
      - Software Description
  - Input
    - Transducer Block - Flow
      - Gain Compensation Factor
      - Unit
      - Flow Direction
      - Low Flow Cut Off
      - Mode
      - Nominal Size
      - Nominal Size Unit
      - Low Limit - Lower Value Min
      - High Limit - Upper Value Max
      - Zero Point Offset
      - Filter Time
      - Density Unit
      - Mass Flow Density
      - Target Mode
      - Actual Mode
      - Flow Tube
        - Select Flow Tube
        - Dual Frequency Mode
        - Low MF
        - High MF
        - Low MF EDF
        - High MF EDF
    - DI Set
      - Limit Switch 1
        - Value
        - Status
        - Limit
        - Target
        - Setpoint
        - Direction
        - Hysteresis
        - Unit
      - Limit Switch 2
        - Value
        - Status
        - Limit
        - Target
        - Setpoint
        - Direction
        - Hysteresis
        - Unit
      - Switch 1
        - Value
        - Status
        - Limit
        - Target
      - Switch 2
        - Value
        - Status
        - Limit
        - Target
      - AUX
        - Rate Limit
        - Dead Time
        - Pulsing Flow
        - Power Synch
        - Power Frequency
        - Software Rev No
      - Mask Alarm
        - Alarm Perform
      - Adhesion
        - Adhesion Check
        - Adhesion Level1
        - Adhesion Level2
        - Adhesion Level3
        - Adhesion Level4
        - Measure Value
  - Output
    - Analog Input
      - Static Revision No.
      - Channel
      - Unit
      - Out unit text
      - Filter Time Const
      - Characterization Type
      - Target Mode
      - Actual Mode
      - Batch Information
        - Batch ID
        - Batch Unit
        - Batch Operation
        - Batch Phase
      - Process Value Scale
        - Lower Value
        - Upper Value
      - Output scale
        - Lower Value
        - Upper Value
      - Output Limits
        - Lower Limit Alarm

- Lower Limit Warning
- Upper Limit Warning
- Upper Limit Alarm
- Hysteresis
- Fail Safe Mode
  - Fail Safe Mode
  - Fail Safe Default Value
- Human Interface
  - Decimal Point
- Velocity check
  - Velocity Check

Discrete Input1

- Satic Revision No.
- Channel
- Invert Input Value
- Target Mode
- Actual Mode
- Batch Information
  - Batch ID
  - Batch Unit
  - Batch Operation
  - Batch Phase
- Fail Safe Mode
  - Fail Safe Mode
  - Fail Safe Default Value

Discrete Input2

- Satic Revision No.
- Channel
- Invert Input Value
- Target Mode
- Actual Mode
- Batch Information
  - Batch ID
  - Batch Unit
  - Batch Operation
  - Batch Phase
- Fail Safe Mode
  - Fail Safe Mode
  - Fail Safe Default Value

Totalizer1

- Satic Revision No.
- Channel
- Unit (Totalizer)
- Mode
- Preset Value
- Fail Safe Mode
- Target Mode
- Actual Mode
- Batch Information
  - Batch ID
  - Batch Unit
  - Batch Operation
  - Batch Phase
- Output Limits
  - Lower Limit Alarm
  - Lower Limit Warning
  - Upper Limit Warning
  - Upper Limit Alarm
  - Limit Hysteresis

Totalizer2

- Satic Revision No.
- Channel
- Unit (Totalizer)
- Mode
- Preset Value
- Fail Safe Mode
- Target Mode
- Actual Mode
- Batch Information
  - Batch ID
  - Batch Unit
  - Batch Operation
  - Batch Phase
- Output Limits
  - Lower Limit Alarm
  - Lower Limit Warning
  - Upper Limit Warning
  - Upper Limit Alarm
  - Limit Hysteresis

Totalizer3

- Satic Revision No.
- Channel
- Unit (Totalizer)
- Mode
- Preset Value
- Fail Safe Mode
- Target Mode
- Actual Mode
- Batch Information
  - Batch ID
  - Batch Unit
  - Batch Operation
  - Batch Phase
- Output Limits
  - Lower Limit Alarm
  - Lower Limit Warning
  - Upper Limit Warning
  - Upper Limit Alarm
  - Limit Hysteresis

Local Display

- Select1
- Select2
- Select3
- Display Cycle
- Language

Target Mode

- Physical Block
  - Target Mode
  - Actual Mode
- Transducer Block
  - Target Mode
  - Actual Mode
- Analog Input
  - Target Mode
  - Actual Mode
- Totalizer1
  - Target Mode
  - Actual Mode
- Totalizer2
  - Target Mode
  - Actual Mode
- Totalizer3
  - Target Mode
  - Actual Mode
- Discrete Input1
  - Target Mode
  - Actual Mode
- Discrete Input2
  - Target Mode
  - Actual Mode

REVISION RECORD

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Edition	Date	Page	Revised Item
1st	Mar. 2008	–	New publication
2nd	Sep. 2015	1-1	1. Added the NOTE for this manual.
		1-2 to 1-3	1.1 (1), (3), (4), (5), (6), (7), (8), (9) Added the WARNING.
		1-3	1.2 Added the Trademarks.
		1-4	1.3 Changed the IMPORTANT for combination remote flowtubes.
		8-1	8.1 Changed the definition of accuracy.

REVISION RECORD.EPS