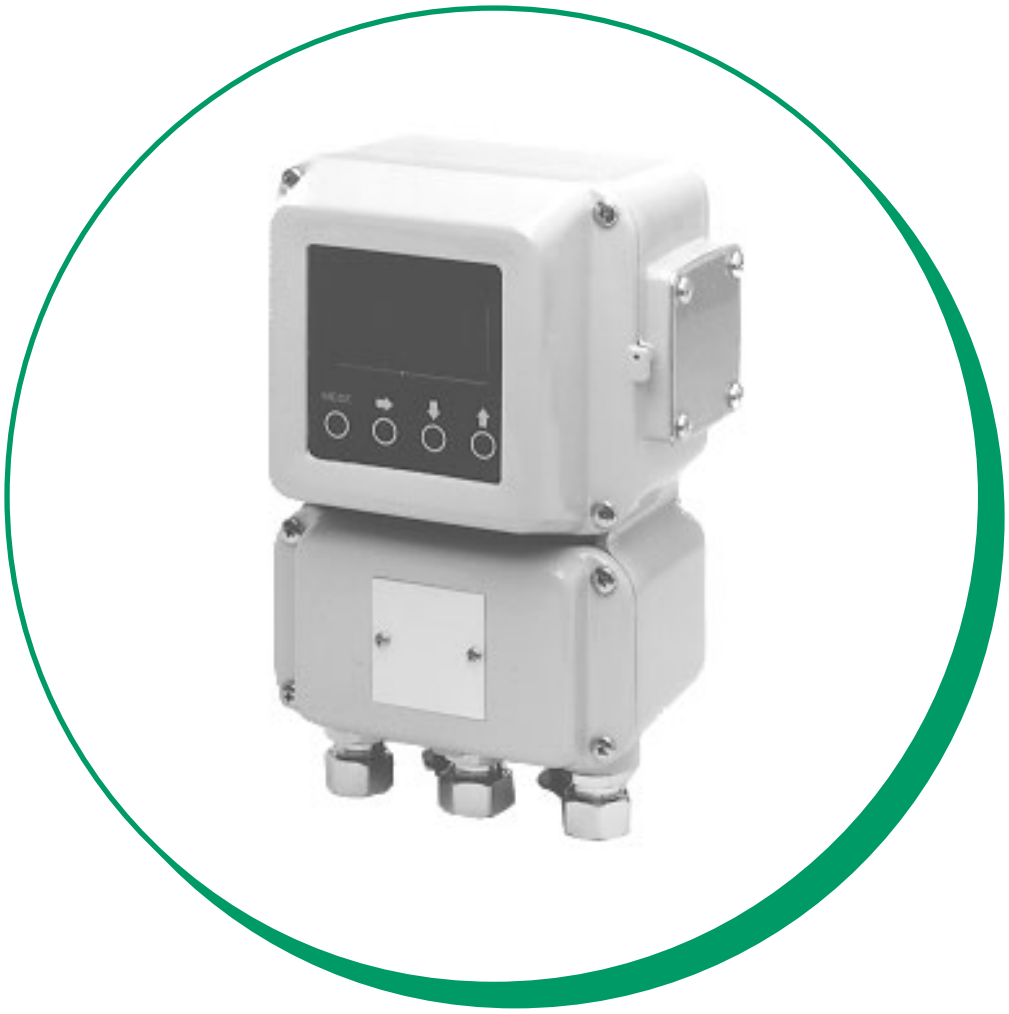
YAMATAKE

MagneW3000 PLUS
Smart Electromagnetic Flowmeter
FOUNDATION™ fieldbus Converter
Model MGH14C

User's Manual



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Safety

About This Manual

This manual contains information and warnings that must be observed to keep the model MGH14C MagneW3000 PLUS Flowmeter operating safely. Correct installation, correct operation and regular maintenance are essential to ensure safety while using this device.

For the correct and safe use of this Flowmeter, it is essential that both operating and service personnel follow generally accepted safety procedures in addition to the safety precautions specified in this manual.

The following symbols are used in this manual to alert you to possible hazards:

⚠ WARNING

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

⚠ CAUTION

Failure to observe these precautions may produce dangerous conditions that could result in operator injury or in physical damage to the device.

Safety Messages

Carefully read this section before installing or operating this device.

⚠ WARNING

ELECTRIC SHOCK HAZARD! Turn the power supply OFF before opening the converter cover.

⚠ CAUTION

Turn off the Fieldbus power supply before connecting the Fieldbus cable to the converter. The Converter or the Fieldbus power supply can be damaged. This type of damage is not covered by Yamatake's warranty.

CAUTION

The Fieldbus signal is polarity sensitive. Check the polarity of the Fieldbus cable and terminals carefully before installation. Fieldbus communication will not be possible if this cable is installed incorrectly.

CAUTION

Switch the control equipment to manual control before terminating Flowmeter operation and shutting off the output to the control equipment. This action prevents the power shut-off from directly affecting the control equipment.

CAUTION

Install the Flowmeter in a location with an ambient temperature of -25 °C to 60 °C (-13 °F to 140 °F) and an ambient humidity of 5 to 100% RH to prevent equipment malfunction or output errors.

CAUTION

Do not install the Flowmeter near high-current power lines, motors or transformers to prevent damage from electromagnetic induction, which can cause equipment malfunction or output errors.

CAUTION

Do not install the Flowmeter in a location subject to direct sunlight, wind, rain, severe vibration, or in a highly corrosive atmosphere. The converter and detector can be damaged.

CAUTION

Be sure to ground the welding power transformer when welding near the Flowmeter to avoid output errors.

CAUTION

DO NOT use the Flowmeter to ground a welder. It can damage the Flowmeter.

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Chapter 1: Introduction

This chapter contains an overview of the model MGH14C MagneW3000 PLUS Flowmeter and FOUNDATION™ fieldbus system. It describes the different available configurations and provides definitions for all the major parts of the converter.

MagneW 3000 PLUS Flowmeter

Thank you for purchasing the Yamatake Corporation model MGH14C MagneW3000 PLUS Flowmeter This system features:

- Advanced multi-variable capacity
- Digital panel display
- Intuitive, versatile operator interface with large characters and backlit liquid crystal display (LCD)
- I/O Capacity
- Flexible digital communication using the FOUNDATION™ fieldbus

Main Components

The model MGH14C MagneW3000 PLUS Flowmeter consists of a Detector and a Converter which operate on the principles of Faraday's law. The Flowmeter is available in two configurations:

Integral - The Converter is mounted directly on the Detector and they are installed as an integrated unit on the fluid pipe.

Remote - The Converter and Detector are installed separately and connected together via cables.

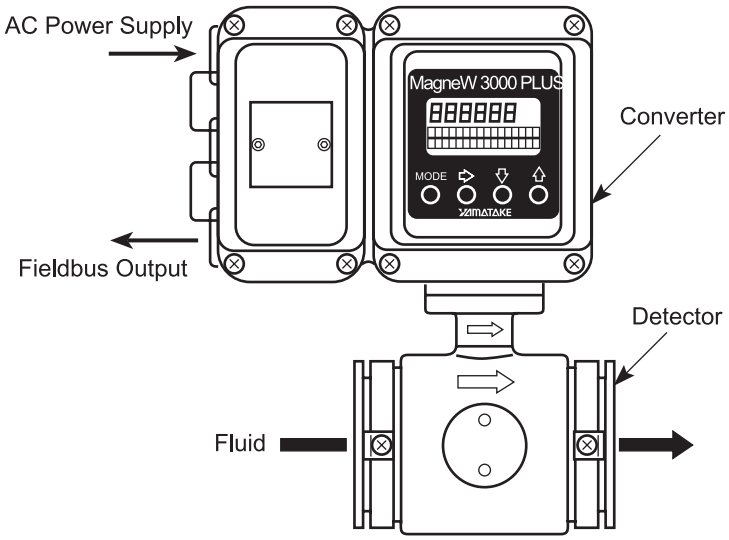


Figure 1-1 Integral System

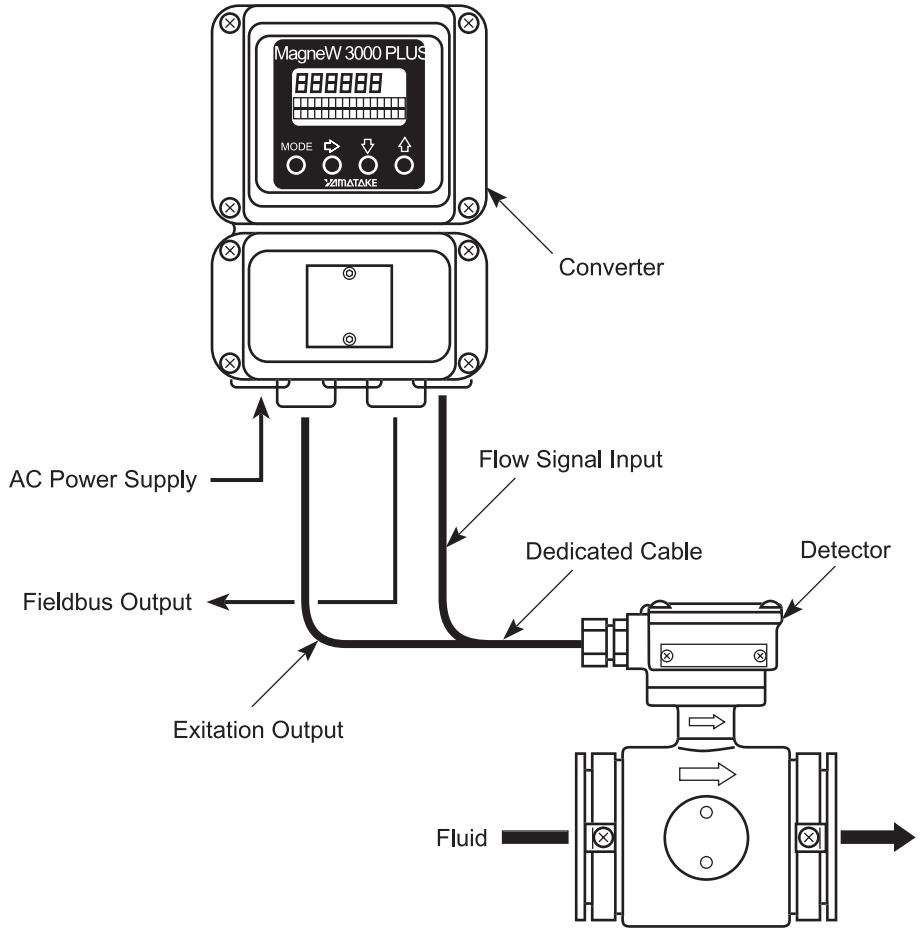


Figure 1-2 Remote System

The Converter consists of the components shown in the figure below.

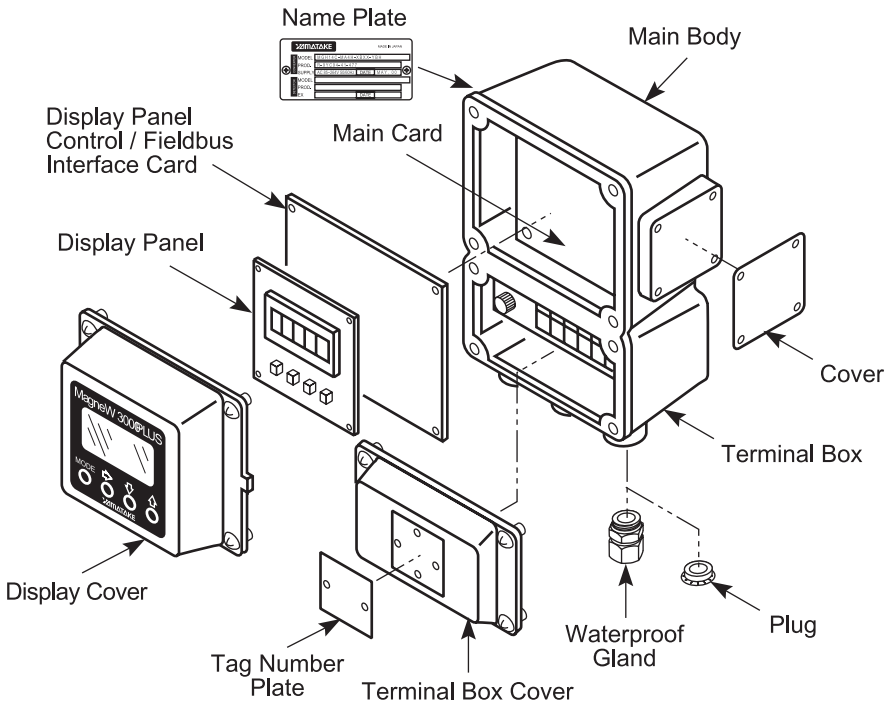


Figure 1-3 Parts of the Converter

Main Body - Encloses the Main Card, Display Panel Control/Fieldbus Interface Card, and the Display Panel.

Name Plate - Indicates model numbers and product numbers, power supply requirements, date of manufacture and the detector constant (EX) for the Flowmeter.

Main Card/Display Panel Control/Fieldbus Interface Card - These cards work together to convert signal electromotive force generated in the Detector into the instantaneous flow rate. The instantaneous flow rate is output to the control equipment as a FOUNDATION™ fieldbus signal.

Display Panel - Indicates the instantaneous flow rate or the totalized valve. The Flowmeter functions can be accessed using the four infrared sensor buttons on the panel.

Display Cover - Protects the Display Panel and contents of the Main Body.

Tag Number Plate - Indicates the Tag Number as specified in the product order.

Terminal Box Cover - Protects the input/output terminals.

Waterproof Gland - Protects cables and keeps moisture from entering the Terminal Box.

Plug - Keeps moisture from entering the Terminal Box from openings without cables.

Terminal Box - Encloses the input/output terminals. Contains an integrated 12 kV, 1000 A isolator.

Connection Cover - Protects the contents of the Main Body in remote installations. In integral Flowmeters, this is where the Detector connects to the Converter.

FOUNDATION™ fieldbus

The FOUNDATION™ fieldbus provides communications and programmability for a single or multiple Flowmeter system. Some features of the Fieldbus include:

- Complies with Fieldbus Foundation H1 (31.25Kbps Voltage Mode Bus) specifications.
- Supports the standard Analog Input (AI) function block.
- Is an externally powered device - AC and DC powered models available.
- Comes with Device Description (DD) files and a Capability File (CF) for automatic configuration.
- A Device Description (DD) file and a Capability File (CF) can be down-loaded from the following Yamatake web site (http://www.yamatake.com).

The following figure shows a system in which the flow rate is output with a FOUNDATION™ fieldbus.

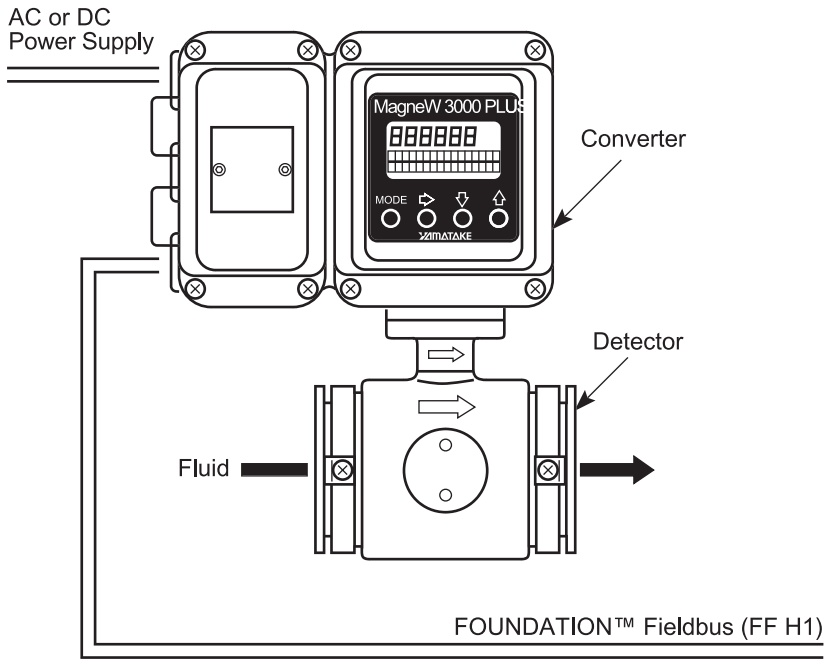


Figure 1-4 System Using a FOUNDATION™ fieldbus

Chapter 2: Installation

This chapter describes the installation and wiring procedures for the Flowmeter.

WARNING

ELECTRIC SHOCK HAZARD! DO NOT perform wiring work while the power is ON!

Site Selection

When selecting an installation site for the Flowmeter, observe the following safety measures:

CAUTION

Install the Flowmeter in a location with an ambient temperature of -25 °C to 60 °C (-13 °F to 140 °F) and an ambient humidity of 5 to 100% RH to prevent equipment malfunction or output errors.

CAUTION

Do not install the Flowmeter near high-current power lines, motors or transformers to prevent damage from electromagnetic induction, which can cause equipment malfunction or output errors.

CAUTION

Do not install the Flowmeter in a location subject to direct sunlight, wind, rain, severe vibration, or in a highly corrosive atmosphere. The converter and detector can be damaged.

CAUTION

Be sure to ground the welding power transformer when welding near the Flowmeter to avoid output errors.

CAUTION

DO NOT use the Flowmeter to ground a welder. It can damage the Flowmeter.

Unpacking and Storage

The model MGH14C MagneW3000 PLUS Flowmeter is a precision instrument and should be handled with care to prevent damage or breakage.

After unpacking the Flowmeter, verify that the following items are included:

- Model MGH14C Converter
- Standard Accessories
- MagneW™ Setting Data Sheet
- Test Report

If you have questions regarding the technical specifications of the Flowmeter, contact your nearest Yamatake Corporation office or Yamatake Corporation representative. When making an inquiry, make sure to provide the model number and product number of your Flowmeter.

Storage

When storing the Flowmeter before use:

- Store indoors at room temperature (77 °F or 25 °C) with a humidity level of approximately 65%.
- Store away from vibration or shock.
- Store the Converter and Detector in the original packaging.

In addition, when storing the Converter after use:

- Attach the Display Cover, Terminal Box Cover and Waterproof Gland(s) to keep moisture out of the device.

Installation Options

There are three ways to install the Flowmeter. Integral systems are pre-assembled with the Converter attached to the Detector; remote systems allow you to install the Converter in a remote location - wall mounted or mounted directly to a two inch (50.8 mm) pipe. The following illustrations provide dimensions for the three different installation options.

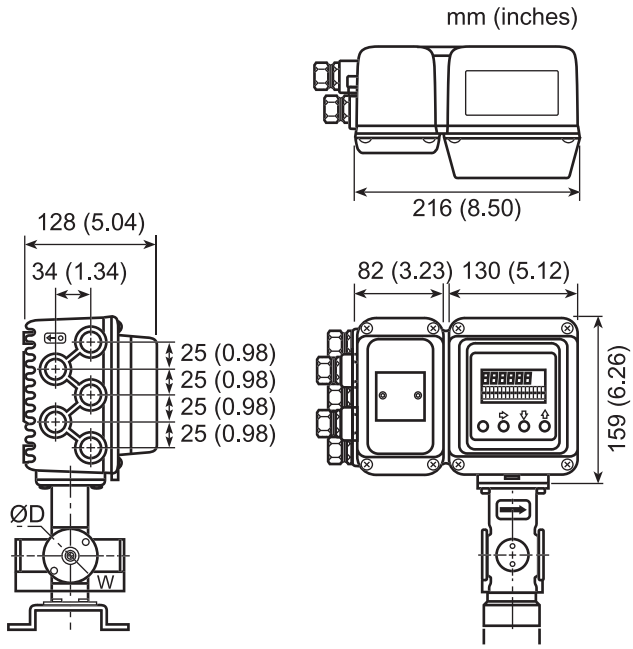


Figure 2-1 Integral Installation

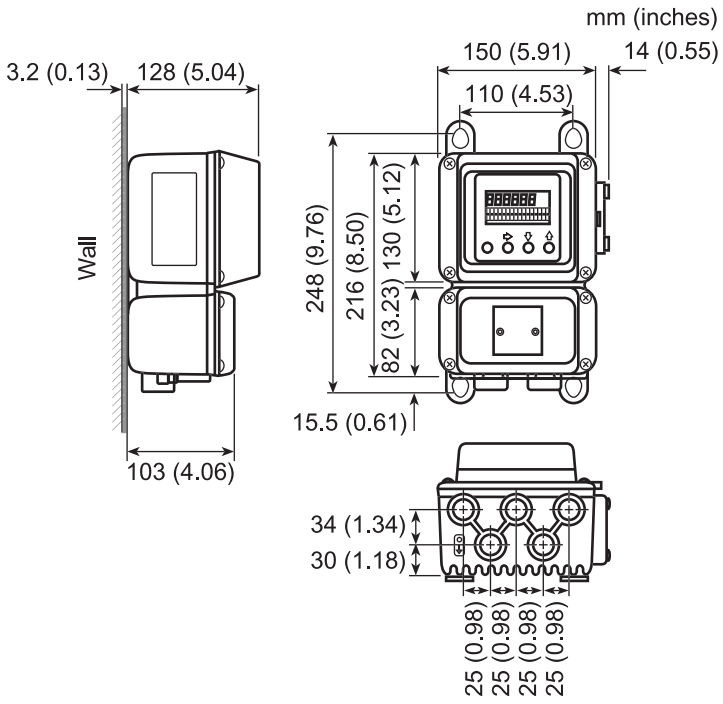


Figure 2-2 Wall Mounted Remote Installation

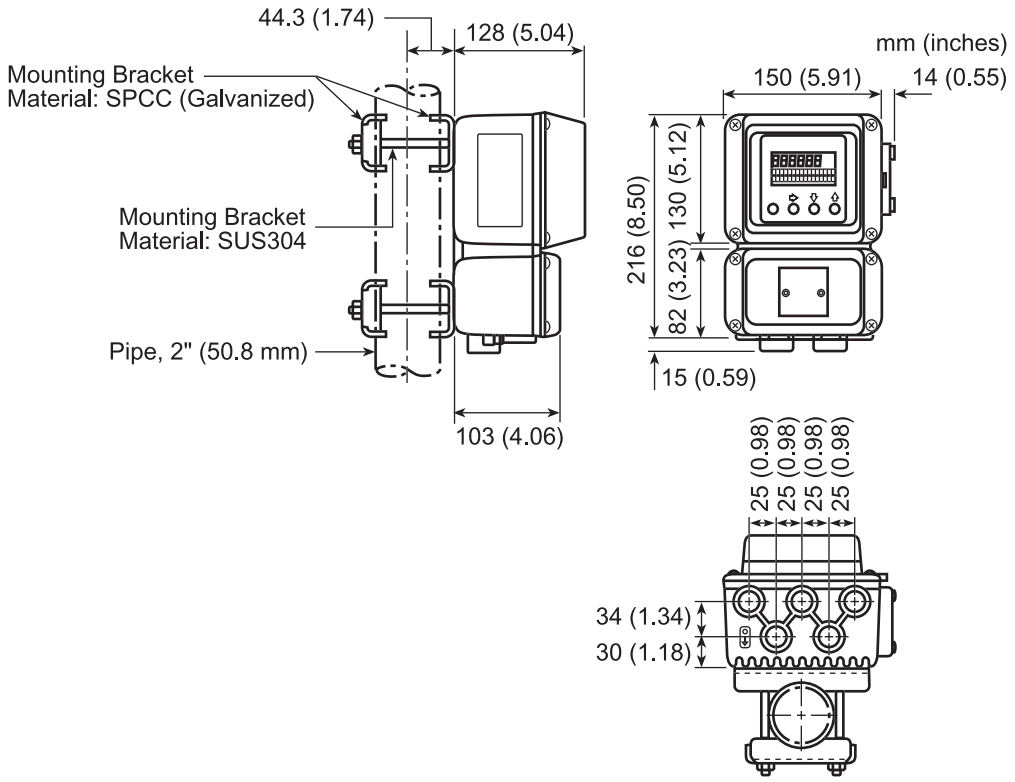


Figure 2-3 Pipe Mounted Remote Installation

Changing the Orientation of the Converter

The model selected when the Flowmeter is purchased determines the orientation of the display. It is possible, however, to change the horizontal or vertical orientation of the Converter.

To change the orientation of the converter:

1. Remove the four screws holding the Display Cover to the Main Body and remove the cover.
2. Remove the four screws holding the Display Panel to the Main Body.
3. Remove and rotate the Display Panel to the required orientation.
4. Replace the four screws and tighten.
5. Rotate the Display Cover so that the openings for the LEDs are correctly aligned with the Display Panel.
6. Replace the four screws and tighten.

Integral Wiring

An integral Flowmeter already contains the necessary Converter to Detector connections. Therefore, only the following cables are required:

- Fieldbus cable - see page 2-13
- Power cable - see page 2-19

The following pages provide information on selecting the correct cables and wiring the system. A diagram of the terminal block for an integral system is shown below.

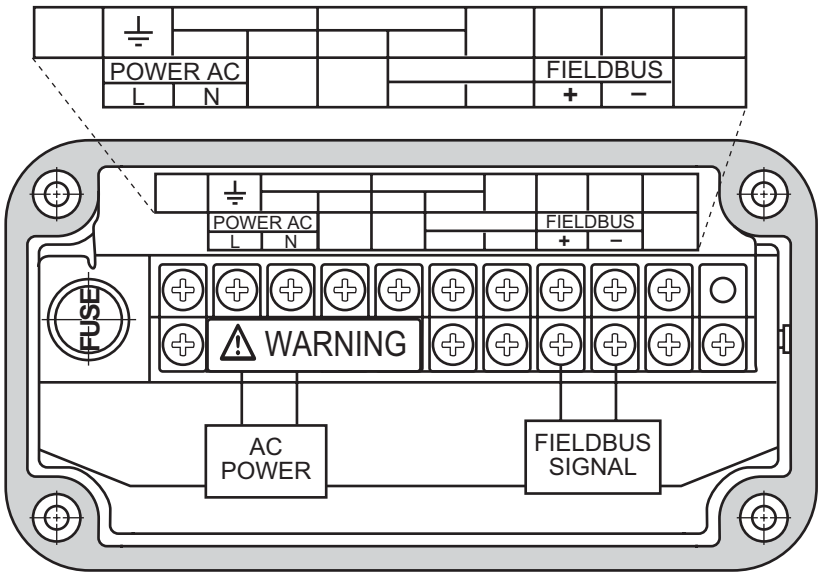


Figure 2-4 Integral Converter Terminal Block

Table 2-1 • Integral Converter Terminal Descriptions

Symbol		Description
FIELDBUS	+	Fieldbus
	–	
E		Not used
⏚		Grounding (grounding resistance must be <100Ω)

Remote Wiring

To wire a remote system, the following cables are required:

- Signal cable - see page 2-7
- Excitation cable - see page 2-7
- Fieldbus cable - see page 2-13
- Power cable - see page 2-19

The following pages provide information on selecting the correct cables and wiring the system. A diagram of the terminal block for a remote system is shown below.

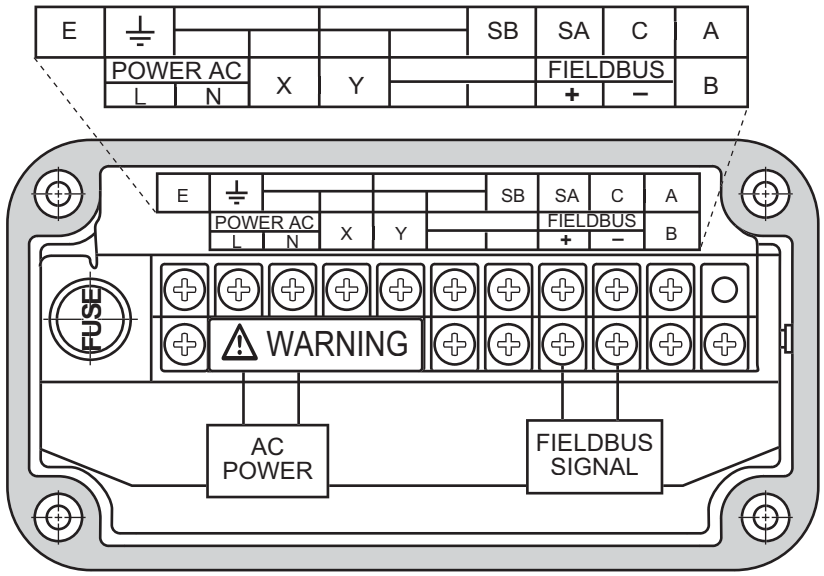


Figure 2-5 Remote Converter Terminal Block

Table 2-2 • Remote Converter Terminal Descriptions

Symbol		Description
A		Flow rate signal input
B		
C		
SA		
SB		
FIELDBUS	+	Fieldbus
	–	
X		Excitation
Y		
E		Not used
⏚		Grounding (grounding resistance must be <100Ω)

Grounding

CAUTION

ELECTRIC SHOCK HAZARD! Grounding is essential for accurate measurement. The grounding resistance must be less than 100Ω.

Signal and Excitation Cable Specifications

For remote installations, the Converter and Detector are connected using a set of dedicated cables (Model MGA12W). The signal cable connects the output signal of the detector to the converter and the excitation cable feeds the excitation current to the detector. You can obtain these cables from Yamatake or purchase commercially available cables. Integral Flowmeters already contain the converter to detector connections.

The cables between the Detector and Converter should be no longer than 300 m (984 ft.), but the actual length depends on conductivity of the fluid being measured.

The following cable diameters apply:

Signal cable - 11.4 mm (0.45 in.), 0.75 mm^2 (.0011625 sq. in.) or equivalent commercially available cable (CVVS or CEEV, for example)

Excitation cable - 10.5 mm (0.41 in.), 2 mm^2 (.0031 sq. in.) or equivalent commercially available cable (CVV, for example)

Cable dimensions and construction are shown on the following pages.

The following graphs show the ratio of fluid conductivity to cable length and show cable usage ranges for different diameter cables. The acceptable usage range for Yamatake cable Model MGA12W cables encompass both areas A and B in the graphs below while commercially available cables are limited to area A only.

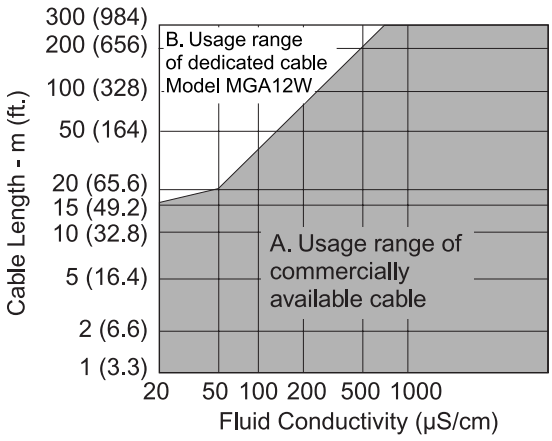


Figure 2-6 Cable Usage Ranges

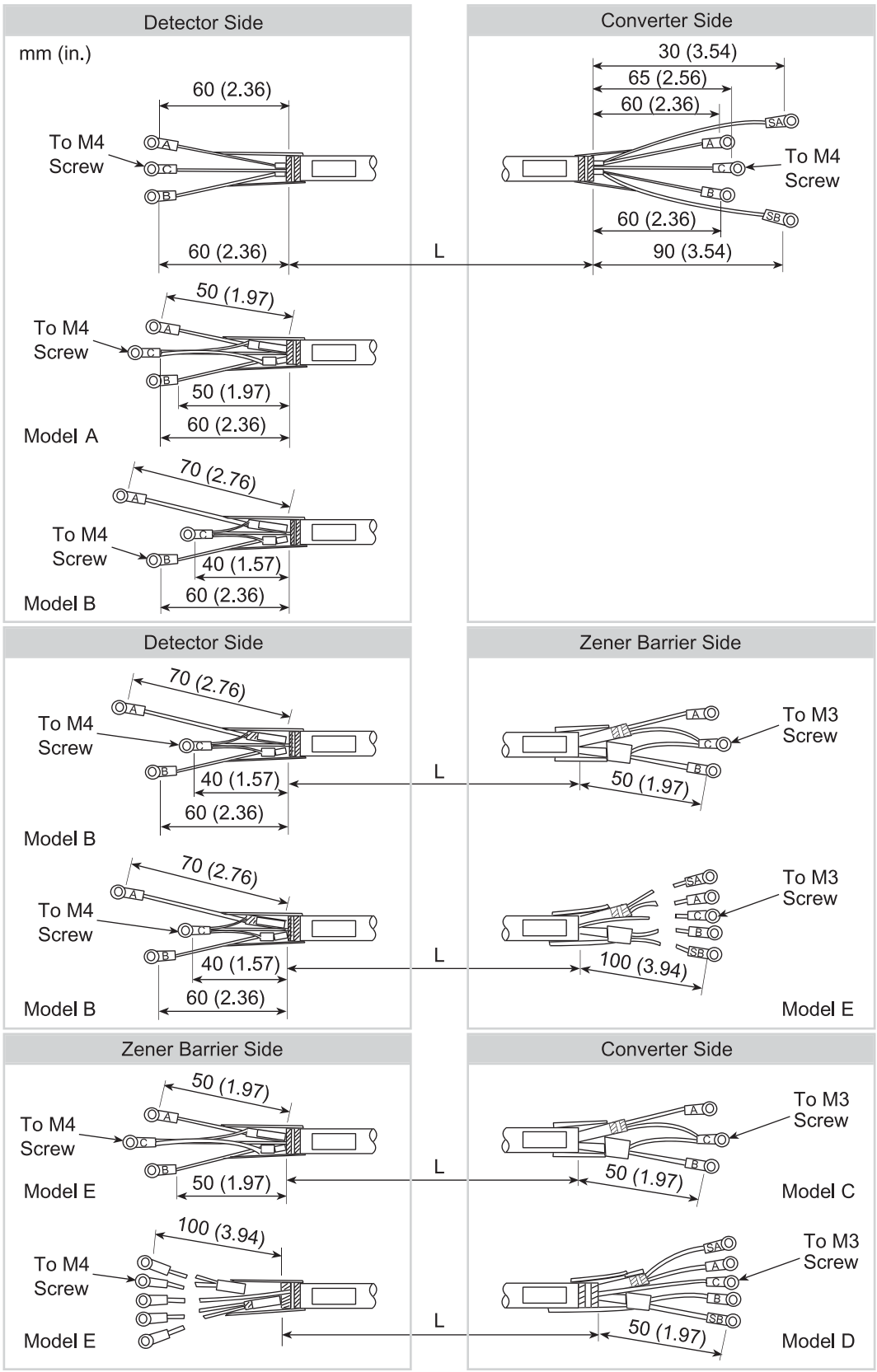


Figure 2-7 Signal Cable Dimensions

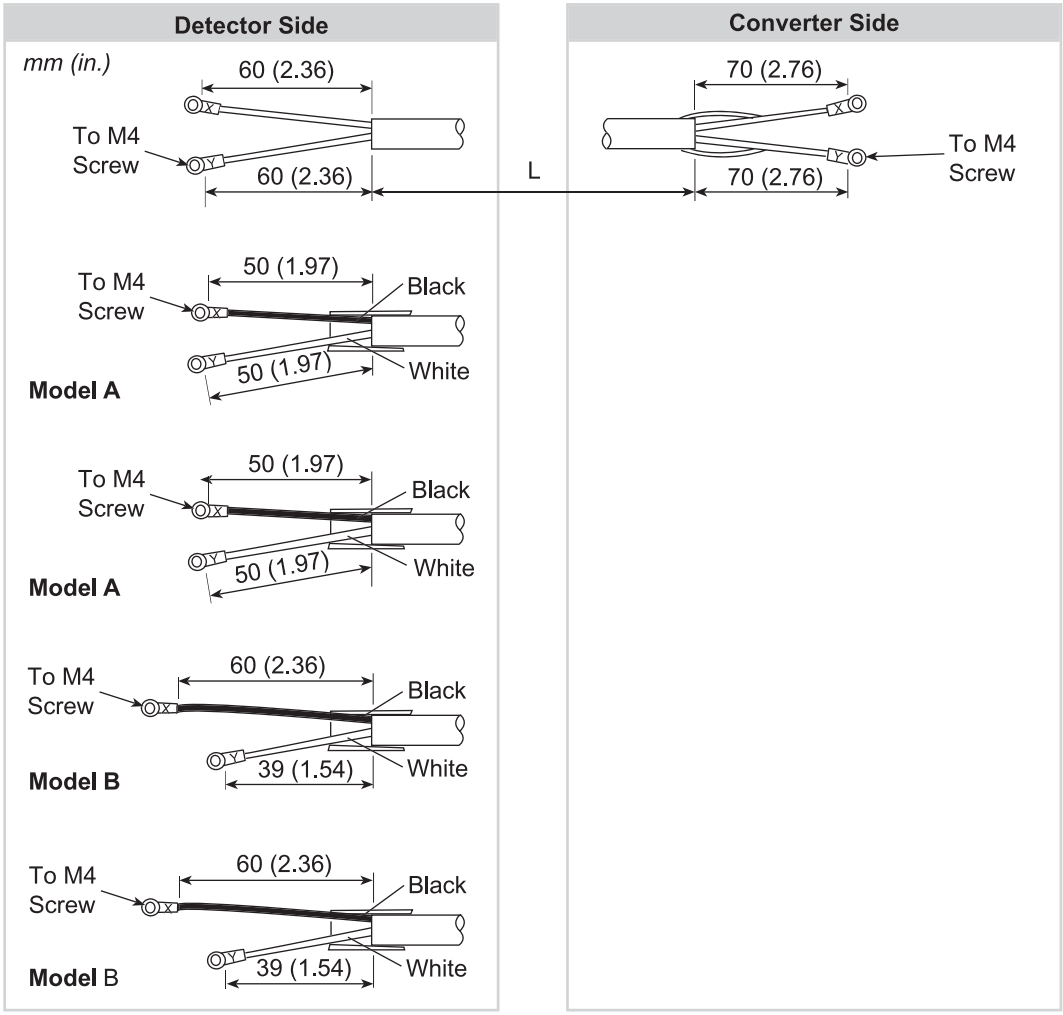


Figure 2-8 Excitation Cable Dimensions

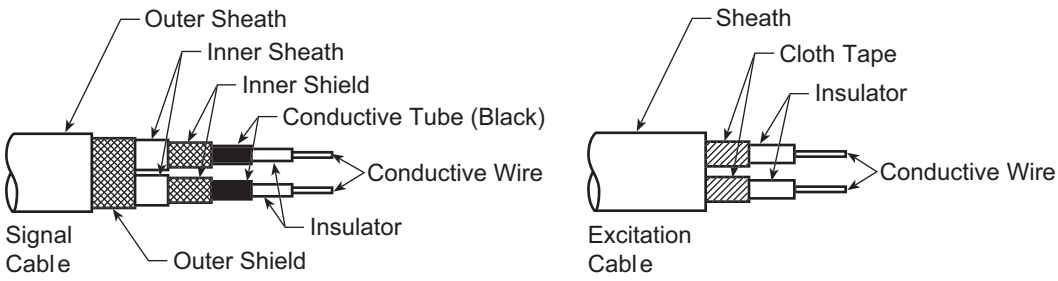


Figure 2-9 Signal and Excitation Cable Construction

~ Note *Strip the conductive tubing (black) down to the ends of the inner shields on the conductive wires for terminals A and B of the signal cable.*

Signal and Excitation Cable Wiring

The following figure shows the proper terminal connections for the signal and excitation cables for both Model MGA12W cables and commercial cable.

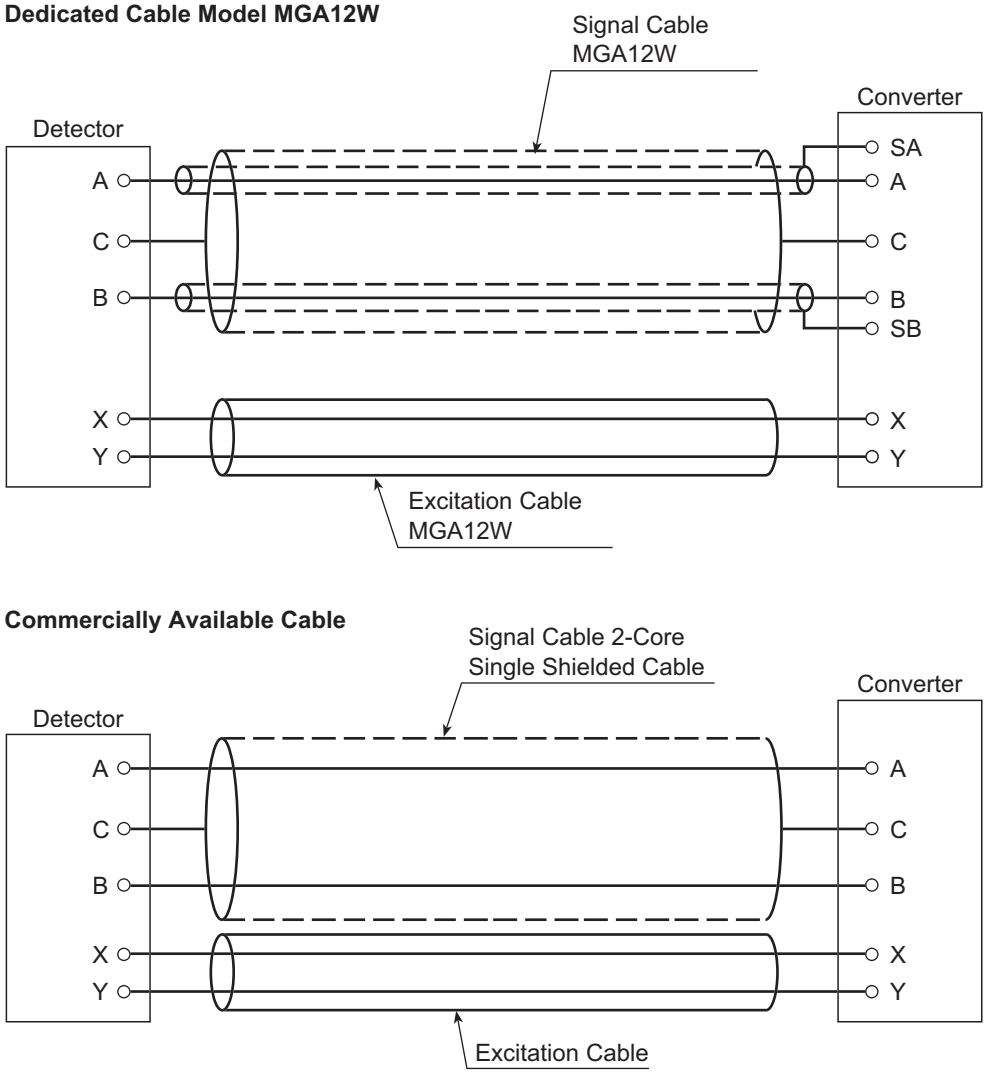


Figure 2-10 Detector to Converter Wiring Diagram

Connecting to the Fieldbus

CAUTION

DO NOT install the Fieldbus cable in the same tray or duct as other power cables. Keep Fieldbus wiring away from any equipment that may cause noise, such as high-capacity transformers, motors or power supplies. Output errors can result.

CAUTION

Use electrical tube and duct to keep water out and protect the cable from external damage.

CAUTION

Be sure to use a waterproof gland at the conduit connection to keep water out of the terminal box and prevent output errors.

CAUTION

Turn off the Fieldbus power supply before connecting the Fieldbus cable to the converter. The Converter or the Fieldbus power supply can be damaged. This type of damage is not covered by Yamatake's warranty.

Fieldbus Topology

The FOUNDATION™ fieldbus can be wired using either bus topology or tree topology (chicken foot). The following figure shows the two different topologies.

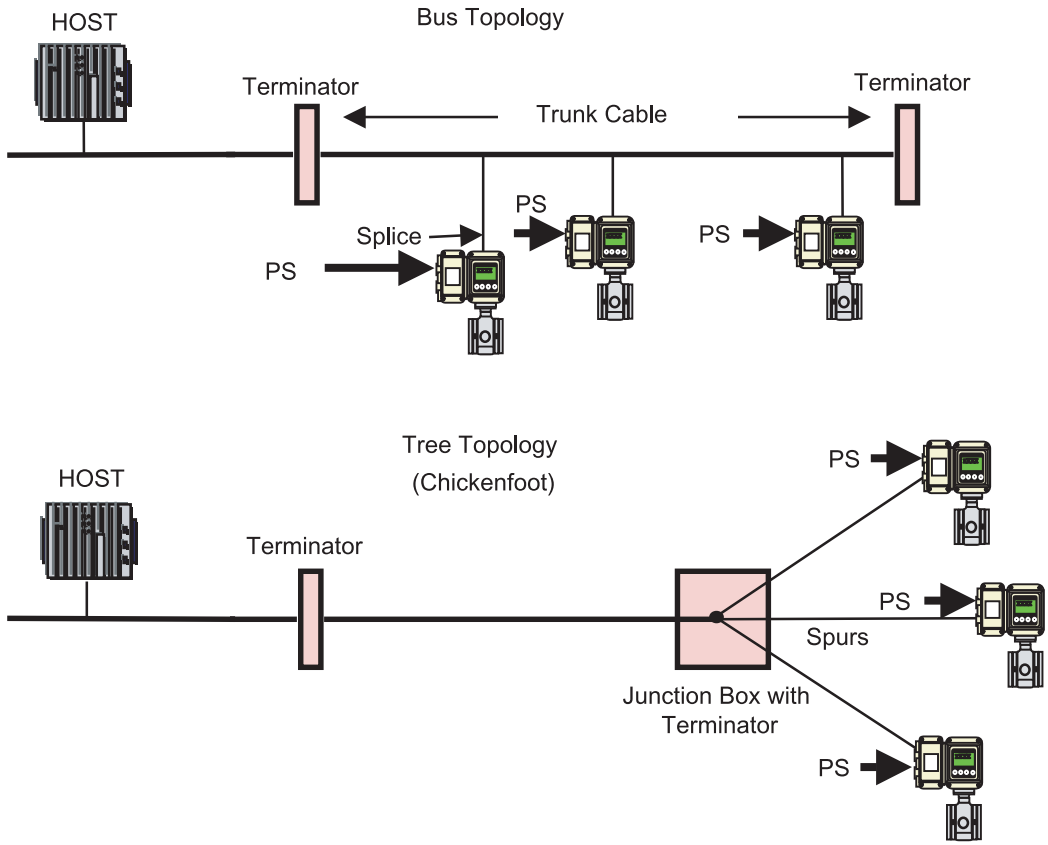


Figure 2-11 Fieldbus Topology

Fieldbus Cable Specifications

The recommended cable for wiring for Fieldbus communications is Type A Fieldbus cable. Other types of cable can be used for Fieldbus wiring. Table2-3 shows the necessary specifications.

Select a sheath material suitable for the installation environment (ambient temperature, exposure to corrosive gas or corrosive fluid, etc.).

For stable and reliable fieldbus communication under possible electromagnetic disturbances, use shielded fieldbus cables, or locate the cables on conductive cable trays or in conduits.

Table 2-3 • Typical Fieldbus Cable Specifications at 25 °C (77 °F)

Parameter	Conditions	Type A	Type B	Type C	Type D
Characteristic impedance	31.25 kHz	100±20 Ω	100±30 Ω	not specified	not specified
Maximum DC resistance	per conductor	22 Ω/km	56 Ω/km	132 Ω/km	20 Ω/km
Maximum attenuation	39.06 kHz	3.0 dB/km (.914 dB/ 1000 ft)	5.0 dB/km (1.523 dB/ 1000 ft)	8.0 dB/km (2.437 dB/ 1000 ft)	8.0 dB/km (2.437 dB/ 1000 ft)
Nominal conductor cross-sectional area		0.8 mm^2 (#18 AWG)	0.32 mm^2 (#22 AWG)	0.13 mm^2 (#26 AWG)	1.25 mm^2 (#16 AWG)
Maximum capacitive unbalance to shield		2nF/km	–	–	–
Maximum capacitive unbalance	1 meter length (3.28 ft)	–	2 pF	not specified	not specified
Maximum shield coverage		90%	–	–	–
Maximum propagation delay change	7.812 kHz to 39.06 kHz 0.25 fr to 1.25 fr	1.7 µs/km (518 ps/ft)	–	–	–
Maximum cable length		1900 m (6270 ft)	1200 m (3960 ft)	400 m (1320 ft)	200 m (660 ft)

Wiring the Fieldbus

CAUTION

The Fieldbus signal is polarity sensitive. Check the polarity of the Fieldbus cable and terminals carefully before installation. Fieldbus communication will not be possible if this cable is installed incorrectly.

Before wiring the Fieldbus, it is important to check the Fieldbus Switch positions on the Main Card.

~ Note *These switch settings must be correct for the Flowmeter to communicate via the Fieldbus.*

To check the Fieldbus Switch positions on the main card:

1. Remove the four screws holding the Display Cover to the Main Body of the Converter and remove the cover.
2. Locate the Fieldbus Switch.

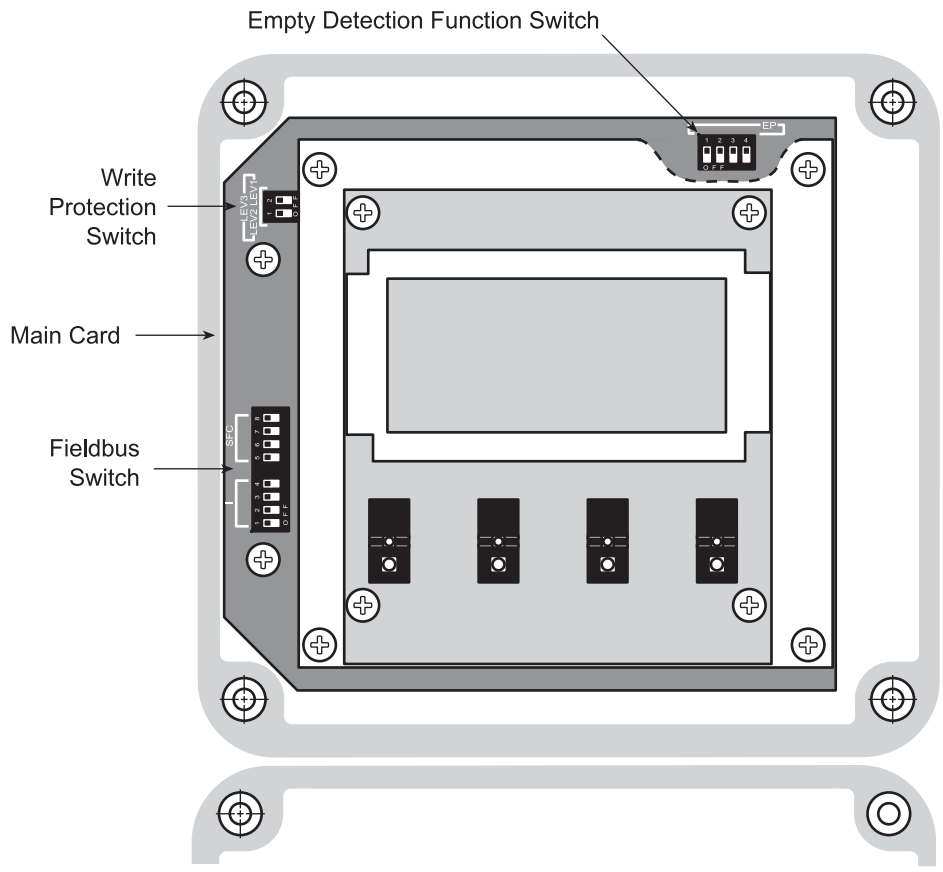


Figure 2-12 Switch Locations on Main Card

3. Make sure that all positions of the Fieldbus Switch (1-8) are OFF.

Figure 2-13 Fieldbus Switch Positions

The Fieldbus cable connects to the screw terminals of the converter at the locations shown in the terminal block diagrams in Figure 2-4 and Figure 2-5.

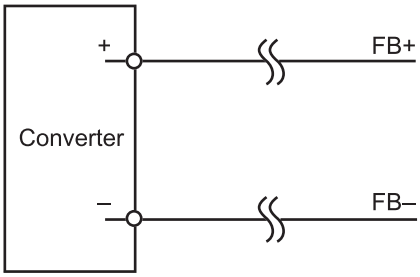


Figure 2-14 Fieldbus Wiring Diagram

To connect the Fieldbus cable to the terminals:

1. Turn off the Fieldbus power supply.
2. Remove the four screws on the Terminal Box Cover and remove the cover.
3. Run the cable into the Terminal Block through the conduit connection. The terminal block has a G1/2 internal thread. Three adaptors are available:
   Adaptor 1 - G1/2 external thread to 1/2NPT internal thread.
   Adaptor 2 - G1/2 external thread to CM20 internal thread.
   Adaptor 3 - G1/2 external thread to pg13.5 internal thread.
4. Insert an appropriate waterproof gland (G1/2, 1/2NPT, CM20, or p13.5) on each end of the adaptor. A G1/2 waterproof gland is supplied for connection to the terminal block.
5. Make the terminal connections using a crimp terminal (M4 screw) with an insulation sleeve.

Setting Write Protection

Write protection settings allow you to control the level at which data confirmation and manipulation are possible. The system has three modes:

Operator's Mode - used to run the Flowmeter on a day-to-day basis.

Engineering Mode - used by those who are responsible for running tests.

Maintenance Mode - used when system maintenance is required.

Write protection settings are changed by setting the switch positions of the Write Protection Switch on the main card in the converter. When the Flowmeter is shipped, settings can be made in any mode (Level 0). The following table shows the write protect levels available by resetting the switch:

Table 2-4 • Write Protection Levels

Level	Operator's Mode	Engineering Mode	Maintenance Mode	Remarks
0	O	O	O	Setting when shipped
1	O	O	×	
2	O	–	×	
3	–	–	×	

O - Both data confirmation and manipulation are possible.
– - Only data confirmation is possible.
× - Neither data confirmation nor manipulation are possible.

To set the write protection level:

1. Remove the four screws holding the Display Cover to the Main Body of the Converter and remove the cover.

2. Locate the Write Protection Switch.

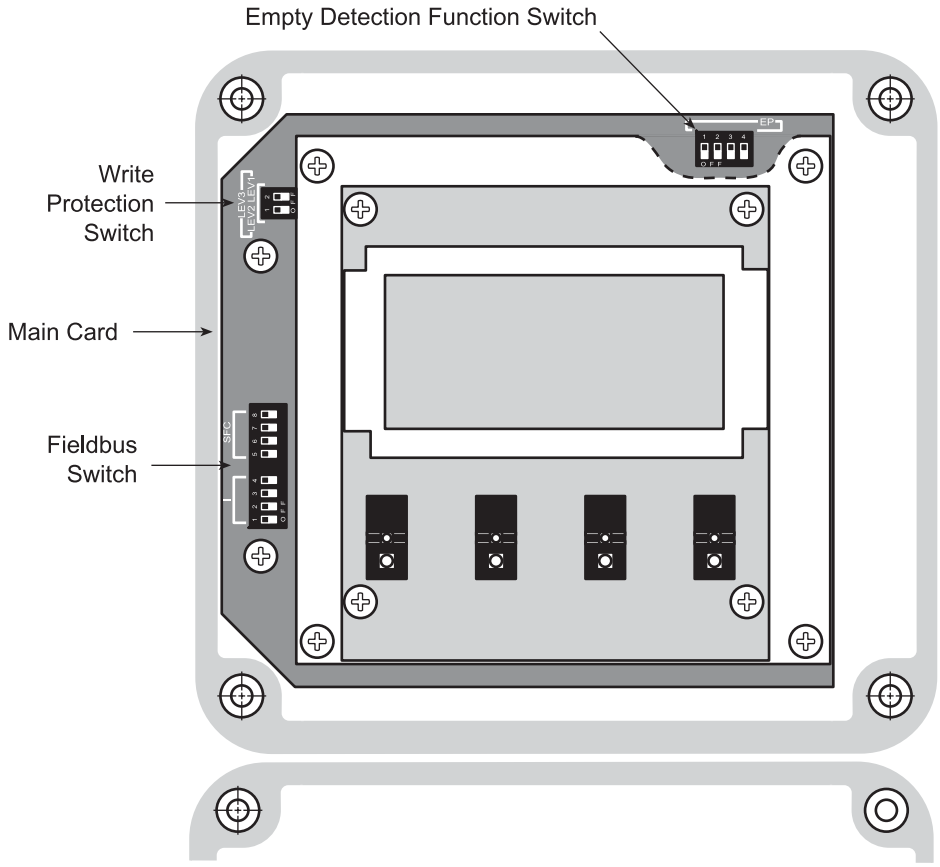


Figure 2-15 Switch Locations on Main Card

3. Set the Write Protection Switch positions to the required level of protection.

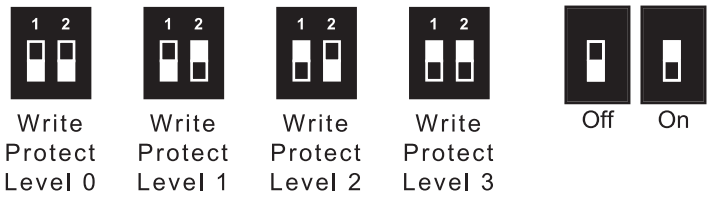


Figure 2-16 Write Protection Switch Positions

~ Note *For Fieldbus communications, the Write Protection Switch must be set to Level 0. Write protection is then set using the WRITE_LOCK parameter. See page 3-2 to set the write protection for Fieldbus communication.*

Setting the Empty Detection Function

This function fixes the Fieldbus output and latches the display to zero when the detector is empty.

To set the empty detection function:

1. Remove the four screws holding the Display Cover to the Main Body of the Converter and remove the cover.
2. Locate the Empty Detection Function Switch.

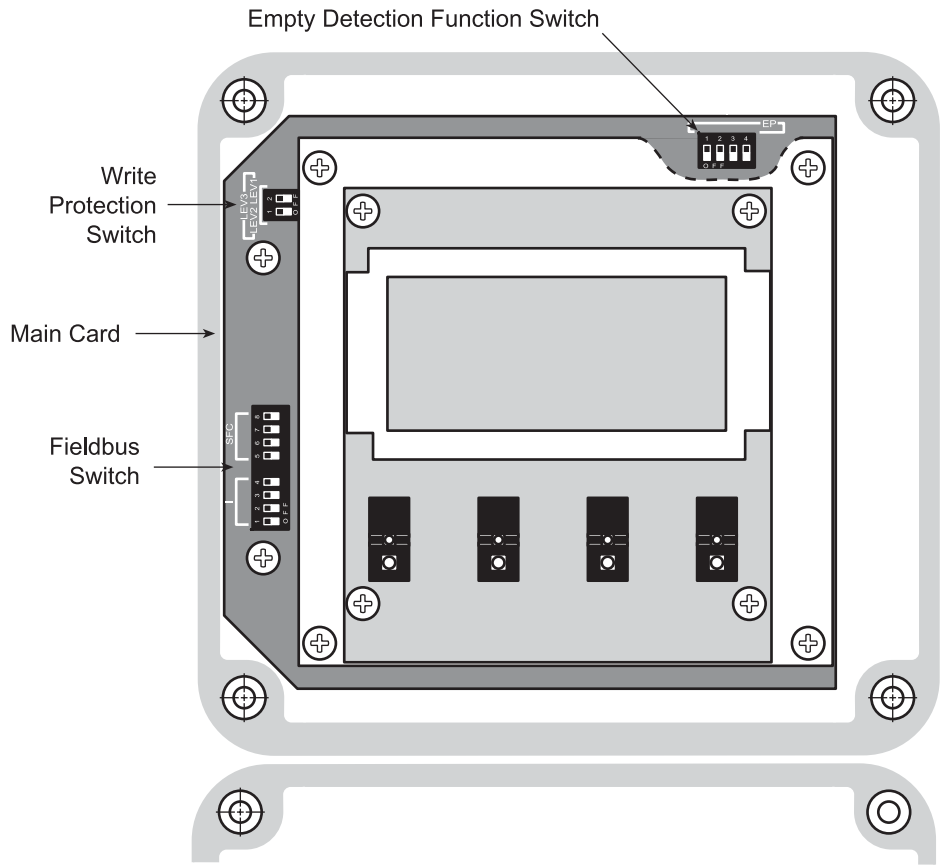


Figure 2-17 Switch Locations on Main Card

3. Set the Empty Detection Function Switch positions to the required setting.

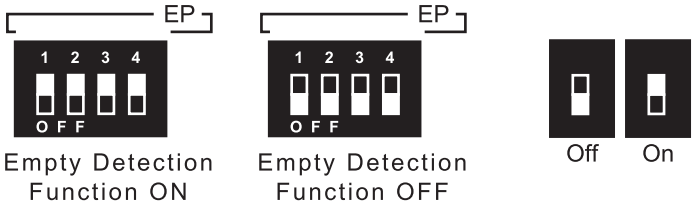


Figure 2-18 Empty Detection Function Switch Positions

Simulation switch

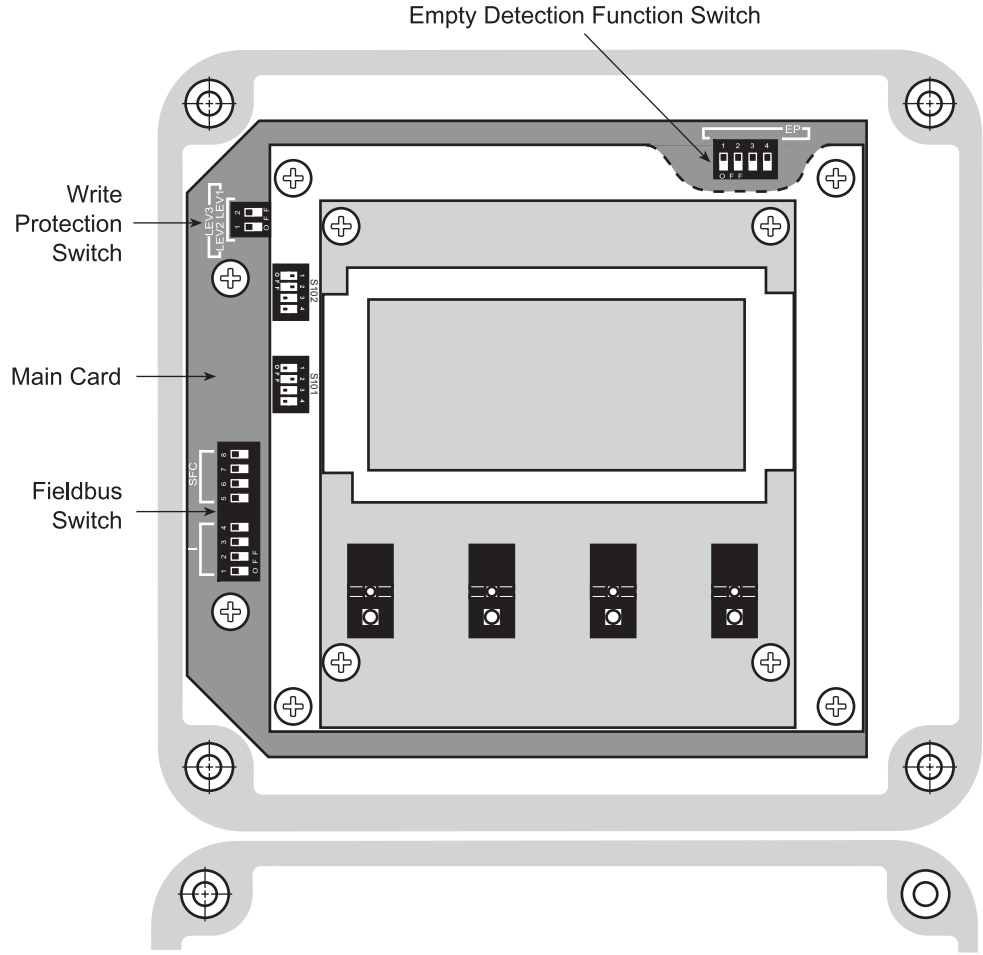


Figure 2-19 Switch locations on main card

Figure 2-20 Simulation switch positions (Default)

Figure 2-21 Simulation switch positions (Simulation function activates.)

Connecting Power

WARNING

ELECTRIC SHOCK HAZARD! DO NOT perform wiring work while the power is ON!

Commercial power (85-264Vrms, 50-60 Hz) or a 24 VDC ± 10% power supply is required for this system. The power supply specification is shown on the name plate of your converter.

The 24 VDC converter has a terminal marked “POWER DC24V” instead of “POWER,” as on the remote converter.

Chapter 3: Operation

This chapter describes the procedure for starting and shutting down the Flowmeter and using the Display Panel and the infrared touch sensor buttons.

Start-Up

To start operation of the Flowmeter:

1. Verify that the Detector is properly installed on the pipe.
2. Verify that the wiring between the Converter and the Detector has been properly completed according to the instructions in "Installation" of this manual.
3. Begin and then stop fluid flow through the Detector so that fluid is present in the Detector, but it is not in motion.
4. Verify that no fluid is leaking from either flange of the Detector.
5. Apply power to the Converter.
6. The following display appears:

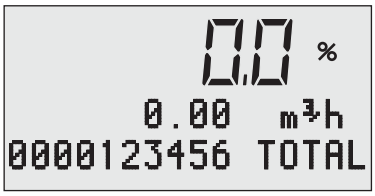


Figure 3-1 Start-Up Display

7. Zero the Flowmeter using the procedure on page 4-7.

   The Flowmeter is now on and operational.

Shut Down

CAUTION

Switch the control equipment to manual control before terminating Flowmeter operation and shutting off the output to the control equipment. This action prevents the power shut-off from directly affecting the control equipment and causing the valve positioner to malfunction.

To stop operation of the Flowmeter:

1. Switch the control equipment connected to the flowmeter to manual control.
2. Remove power from the Converter.

Using the Display Panel

The Display Panel is shown below, followed by a description of each feature. The infrared touch sensor buttons are described in the next section.

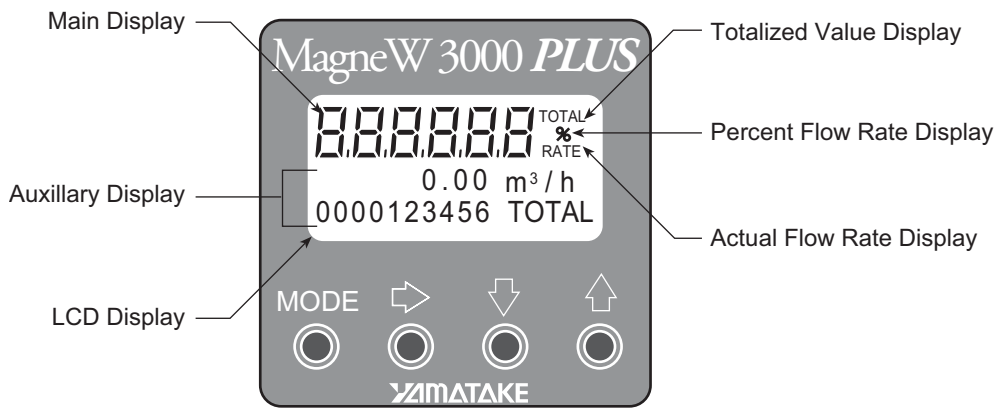


Figure 3-2 Display Panel

Main Display - Indicates the flow rate selected in Operator's Mode.

Auxiliary Display - Several values are displayed in this area:

- During Measurement Mode, indicates a flow rate to supplement the flow rate selected in the Operator's Mode.
- Indicates the Totalized Value
- When not in Measurement Mode, indicates the procedures for parameter setting, adjustment, etc.

Percent Flow Display - When lit, indicates that the percent flow rate is currently being displayed.

Actual Flow Rate Display - When lit, indicates that the actual flow rate is currently being displayed.

Totalized Value Display - When lit, indicates that the totalized value is currently being displayed.

Using the Infrared Touch Sensor Buttons

The infrared touch sensor buttons allow you to make selections on the by simply touching the Display Panel.

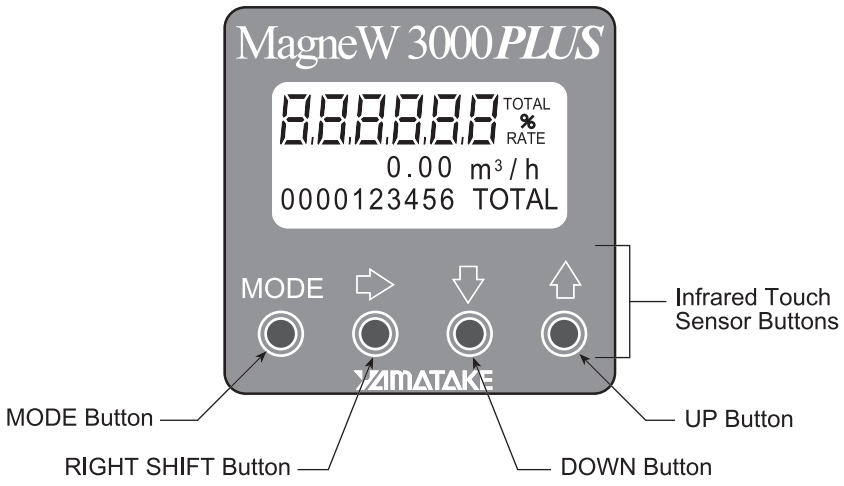


Figure 3-3 Touch Sensor Buttons

For best results, approach the button from below and completely cover the circle. Then move your finger straight down to its original position. These motions ensure correct operation. Moving sideways across the buttons can accidently activate the wrong control.

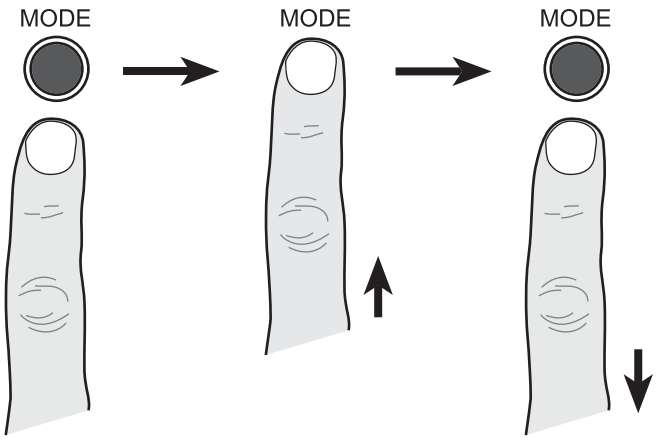


Figure 3-4 Using the Touch Sensor Buttons

The following table is a summary of the functions of each of the buttons.

Table 3-1 • Touch Sensor Button Functions

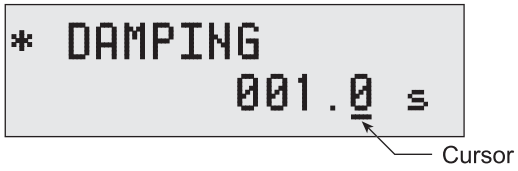
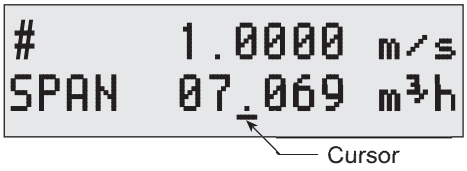
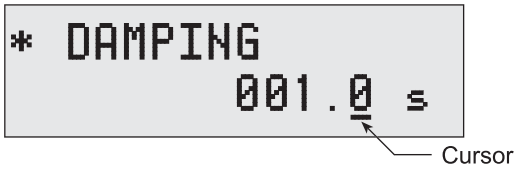
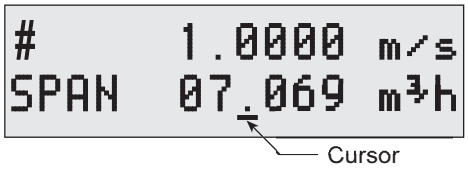
Button	Function
MODE Button MODE	Touching and holding this button for two seconds opens OPERATOR'S MODE. Writes data into memory after changing the parameters or internal data in Engineering Mode or Maintenance Mode
RIGHT SHIFT Button	Shifts the cursor in the display to the right.
DOWN Button	When the cursor is on the Mode Indicator as shown below, touching the DOWN button displays the next screen.  When the cursor is located at a number, touching the DOWN button decrements the number.  When the cursor is located at the decimal point, touching the DOWN button moves the decimal point to the right. 

Table 3-1 • Touch Sensor Button Functions

Button	Function
UP Button 	When the cursor is on the Mode Indicator as shown below, touching the UP button displays the next screen.  When the cursor is located at a number, touching the UP button increments the number.  When the cursor is located at the decimal point, touching the UP button moves the decimal point to the left.  When the cursor is located at READY, touching the UP button starts operation. 

Chapter 4: Using the Display Panel

This chapter describes the four modes of operation and how to use each one. A flow chart of the functions for each mode is also included.

About Modes

The MagneW3000 PLUS Flowmeter has four modes of operation:

- Measuring mode
- Operator's mode
- Engineering mode
- Maintenance mode
- Calibration mode

The following table describes the functions available in each mode.

Table 4-1 • Mode Functions

Mode	Description
MEASURING MODE	This is the normal operational mode and indicates the measuring status. Each time the Measuring Mode is selected, data is written into memory. Settings entered in other modes are held in temporary memory for two minutes, but will return to the previously saved value unless the Measuring Mode is selected to save the data. The only exception is the counter, which is always saved into memory immediately.
OPERATOR'S MODE Mode Indicator: 	This mode is used to change data settings that must be recorded or changed frequently. These settings include: Damping Time Constant Flow Counter Flow Rate Indicator Auto Spike Cut Function
ENGINEERING MODE Mode Indicator: 	This mode is used to change data settings that are used less frequently. These settings include: ID Function Detector Data Flow Rate Span Pulse Data Drop Out Output At Error
MAINTENANCE MODE Mode Indicator: 	This mode is used when adjustment or verification is required for regular maintenance of the system or when troubleshooting the system. This mode includes: Output Adjustment Gain Adjustment This mode is further divided into the following three modes: OUTPUT CHECK MODE CALIBRATION MODE CRITICAL MODE

CAUTION

The CALIBRATION MODE and CRITICAL MODE contain adjustments and operations that are very important for proper flow rate measurement. Improper settings in these modes will prevent measurement.

Measuring mode

This is the normal operational mode. In this mode, the screen indicates the measuring status. What is displayed on screen depends upon the setting selections made in the other modes.

This mode performs one other important function. Entering this mode causes the system to save settings entered in other modes. Each time the MEASURING MODE is selected, data is written into memory. Settings entered in other modes are held in temporary memory for two minutes, but will return to the previously saved value unless the MEASURING MODE is selected. The only exception is the counter, which is always saved into memory immediately.

⚠ CAUTION

After entering settings in other modes, ALWAYS immediately select the MEASURING MODE to avoid losing those settings.

Operator's mode

The following screens appear in this order in OPERATOR'S MODE.

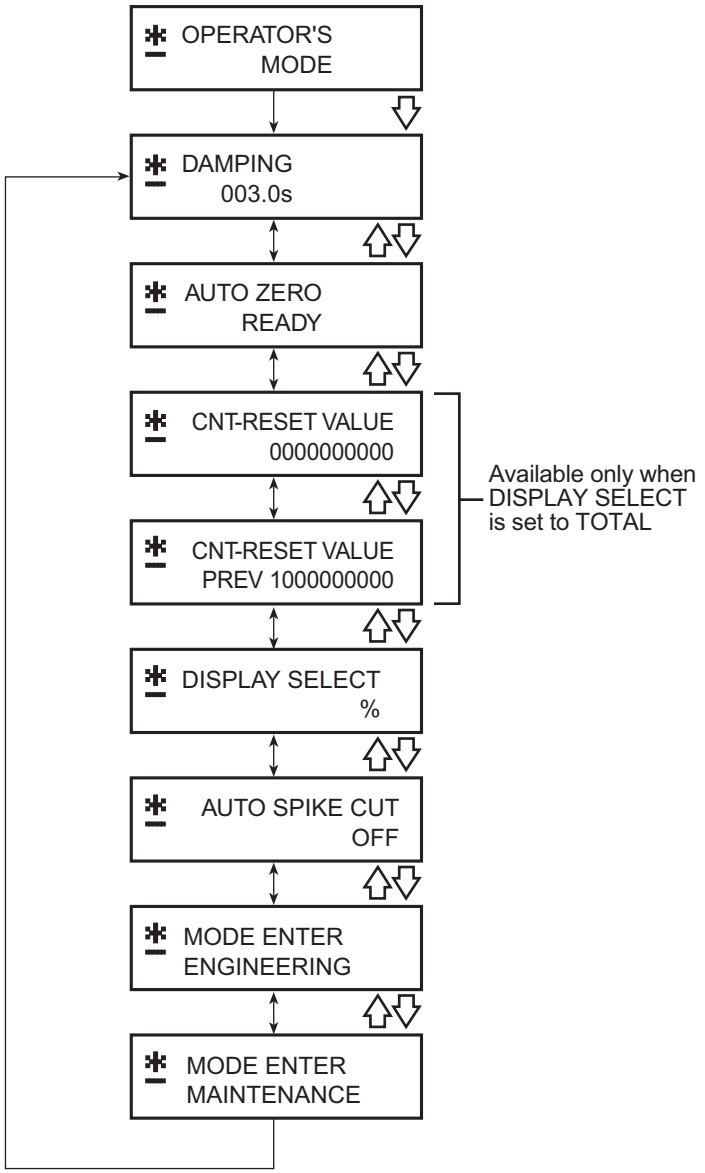


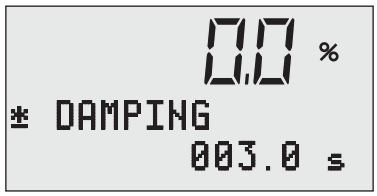
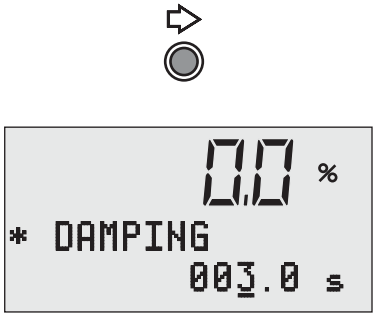
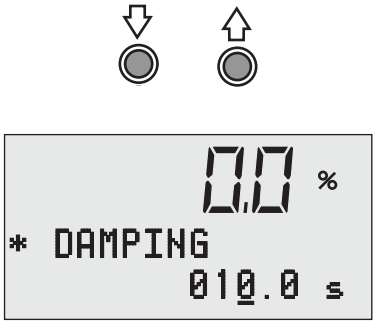
Figure 4-1 OPERATOR'S MODE Screen Organization

Entering OPERATOR'S MODE

Step	Screen/Button	Procedure
1	MODE	Touch the MODE button and hold for three seconds.
2	100.0 % ENTER IN OP.MODE YES OR NO	The MODE ENTER screen appears.
3	100.0 % ENTER IN OP.MODE YES OR NO	Touch the RIGHT SHIFT button twice to move the cursor to YES. (To exit without changing modes, move the cursor to NO.)
4		Touch the UP button once to make the selection.
5	100.0 % * OPERATOR'S MODE 0.0 % * DAMPING 003.0 s	The OPERATOR'S MODE screen appears for approximately two seconds followed by the DAMPING screen. As long as the cursor remains under the Mode Indicator (the * symbol), touching the DOWN or UP button cycles through the screens available in this mode.

Damping Time Constant

The Damping Time Constant removes minute fluctuations when transmitting the measured flow rate to the control equipment. Check the amplitude of fluctuation in flow output and set the damping time constant to an appropriate value. The new value becomes effective as soon as it is entered.

Step	Screen/Button	Procedure
1		Enter OPERATOR's MODE (see page 3-3). In OPERATOR'S MODE, the DAMPING screen is the first screen that appears.
2		Touch the RIGHT SHIFT button until the cursor is at the value to be changed. (In the example, the button is touched three times.)
3		Use the DOWN or UP button to change the numerical value. Touching and holding either button quickly increments or decrements the values.
4		Touch the RIGHT SHIFT button until the cursor is back at the Mode Indicator.
5	MODE 	Touch the MODE button and hold for three seconds to return to MEASUREMENT MODE to save the Damping Time Value. ⚠ **CAUTION**: You have only two minutes to return to MEASUREMENT MODE to save this new value before the system resets it to the previously saved value.

Auto Zero

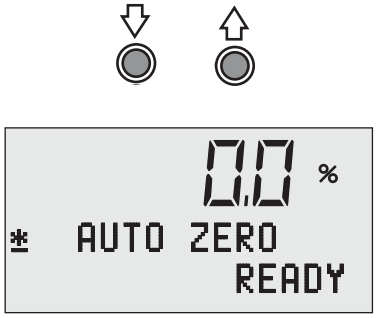
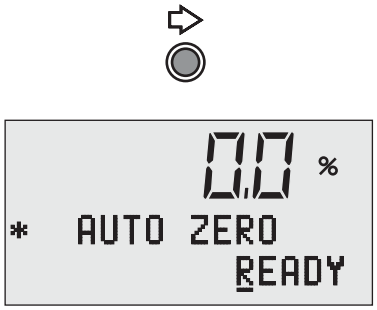
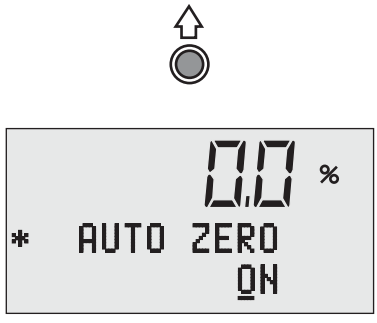
This function adjusts the Flowmeter so that the measured flow rate is zero when the fluid stands still in the detector.

CAUTION

Before operating the Flowmeter for the first time, be sure to zero it. Zero adjustment is very important for accurate flow measurement.

CAUTION

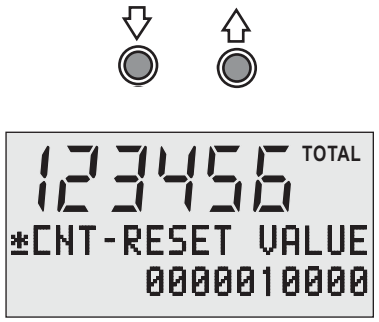
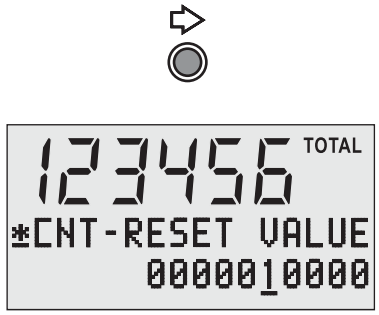
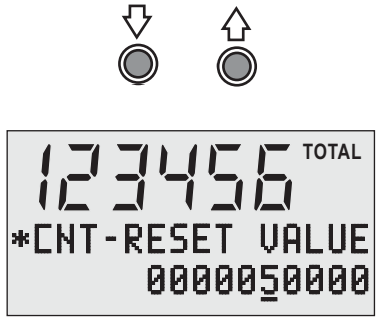
Before zeroing the Flowmeter, make sure the Detector is properly grounded (grounding resistance must be less than 100 Ω), that the Detector is filled with the fluid to be measured and that the fluid is standing still. Zero adjustment is possible with a flow speed of 0.2 m/s (.656 ft./s) or less, but the flow speed should be 0.0 m/s (0.0 ft./s) for accurate adjustment. Output errors can result from improper zeroing.

Step	Screen/Button	Procedure
1		Enter OPERATOR's MODE (see page 4-4). (The first screen in this mode is always the DAMPING screen.) Use the DOWN or UP button to cycle through the screens until the AUTO ZERO screen appears.
2		Touch the RIGHT SHIFT button once to move the cursor to READY to indicate that the system is ready for zeroing.
3		Touch the UP button once to select READY and start the auto zero adjustment. The large numerical display flashes and READY changes to ON during adjustment. When the zero adjustment is complete, the flashing stops and ON changes back to READY. Zero adjustment takes approximately 30 seconds.

Step	Screen/Button	Procedure
4		Touch the RIGHT SHIFT button until the cursor is back at the Mode Indicator.
5	MODE 	Touch the MODE button and hold for three seconds to return to MEASUREMENT MODE to save the zero setting. ⚠ **CAUTION**: You must return to MEASUREMENT MODE within two minutes to save this new value before the system resets it to the previously saved value.

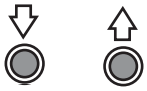
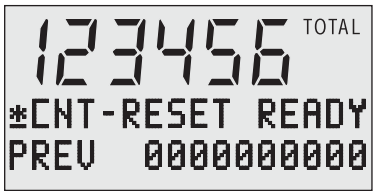
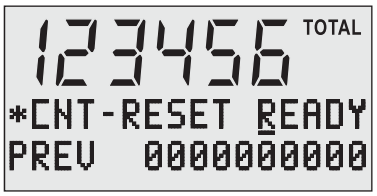
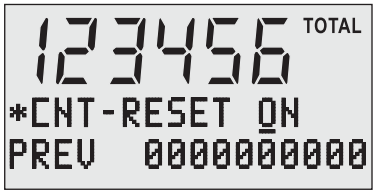
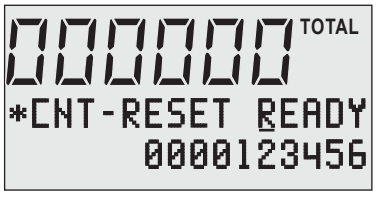
Flow Counter - Reset Value

This function sets the integration starting value of the built-in flow counter.

Step	Screen/Button	Procedure
1		To change this function, the DISPLAY SELECT must be set to TOTAL (see page 4-12). Enter OPERATOR's MODE (see page 4-4). (The first screen in this mode is always the DAMPING screen.) Use the DOWN or UP button to cycle through the screens until the CNT-RESET VALUE screen appears.
2		Touch the RIGHT SHIFT button as many times as is necessary to move the cursor to the value to be changed. (In the example, the button is touched six times.) **Default Setting**: 0000000000 **Setting Range:** -999999999 to 999999999
3		Touch the DOWN or UP button to change the numerical value. Touching and holding either button quickly increments or decrements the values.
4		Touch the RIGHT SHIFT button until the cursor is back at the Mode Indicator.
5		Touch the MODE button and hold for three seconds to return to MEASUREMENT MODE to save the new value. ⚠ **CAUTION**: You must return to MEASUREMENT MODE within two minutes to save this new value before the system resets it to the previously saved value.

Flow Counter - Resetting

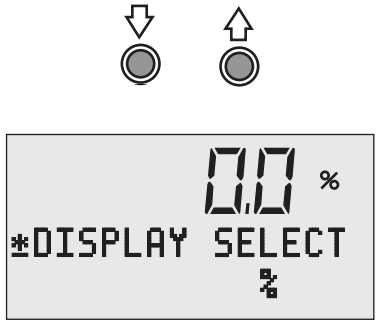
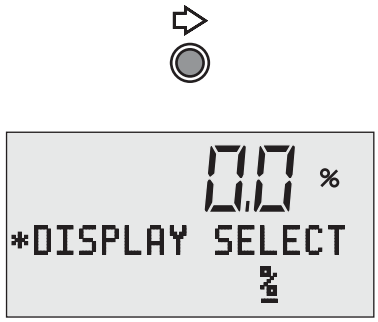
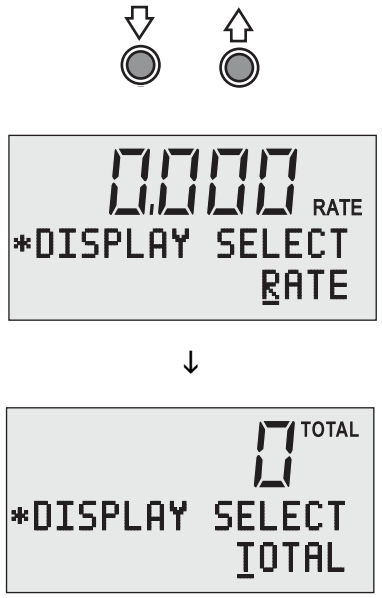
This function resets the current totalized value and saves it to memory.

Step	Screen/Button	Procedure
1	 	Enter OPERATOR'S MODE (see page 4-4). (The first screen in this mode is always the DAMPING screen.) Use the DOWN or UP button to cycle through the screens until the CNT-RESET screen appears. (The default value for the counter is 000000000 at power-up.)
2	 	Touch the RIGHT SHIFT button once to move the cursor to READY.
3	  ↓ 	Touch the UP button to select READY and reset the counter. READY changes to ON as the counter resets and then changes back to READY when it's done.
4		Touch the RIGHT SHIFT button until the cursor is back at the Mode Indicator.

Step	Screen/Button	Procedure
5	MODE 	Touch the MODE button and hold for three seconds to return to MEASUREMENT MODE to save the new value. ⚠ **CAUTION**: You must return to MEASUREMENT MODE within two minutes to save this new value before the system resets it to the previously saved value.

Flow Rate Indication

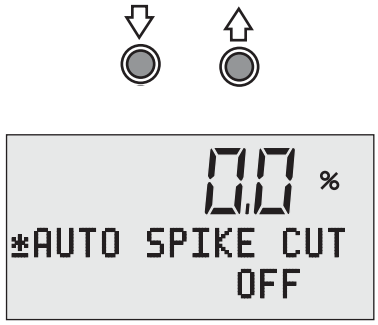
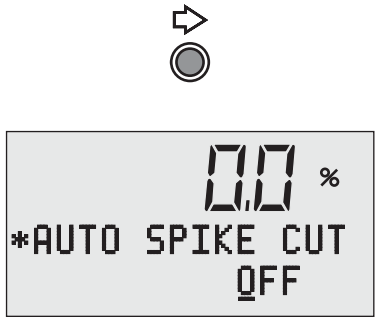
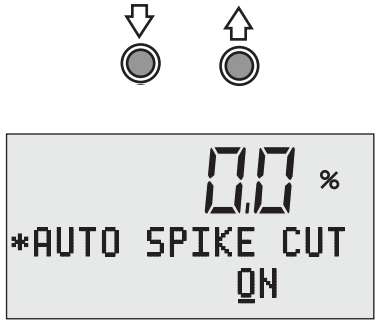
This function selects the Flow Rate Indication displayed on screen. The data can be displayed as a percent (%), the actual flow rate (RATE) or the totalized value (TOTAL).

Step	Screen/Button	Procedure
1		Enter OPERATOR'S MODE (see page 4-4). (The first screen in this mode is always the DAMPING screen.) Use the DOWN or UP button to cycle through the screens until the DISPLAY SELECT screen appears.
2		Touch the RIGHT SHIFT button once to move the cursor to the Flow Rate Indication value.
3		Touch the DOWN or UP button to scroll through the selections (%, RATE or TOTAL). Note that the Main Display changes as the different display selections appear. The current Flow Rate Indication value appears at the upper right in the Main Display.
4		Touch the RIGHT SHIFT button until the cursor is back at the Mode Indicator.

Step	Screen/Button	Procedure
5		Touch the MODE button and hold for three seconds to return to MEASUREMENT MODE to save the new value. ⚠ **CAUTION**: You must return to MEASUREMENT MODE within two minutes to save this new value before the system resets it to the previously saved value.

Auto Spike Cut Function

This function eliminates steep noise spikes in the flow rate.

Step	Screen/Button	Procedure
1		Enter OPERATOR'S MODE (see page 4-4). (The first screen in this mode is always the DAMPING screen.) Use the DOWN or UP button to cycle through the screens until the DISPLAY SELECT screen appears.
2		Touch the RIGHT SHIFT button once to move the cursor to OFF.
3		Touch the DOWN or UP button to change the selection to ON.
4		Touch the RIGHT SHIFT button until the cursor is back at the Mode Indicator.
5		Touch the MODE button and hold for three seconds to return to MEASUREMENT MODE to save the new value. ⚠ **CAUTION**: You must return to MEASUREMENT MODE within two minutes to save this new value before the system resets it to the previously saved value.

Engineering mode

The following screens appear in this order in ENGINEERING MODE.

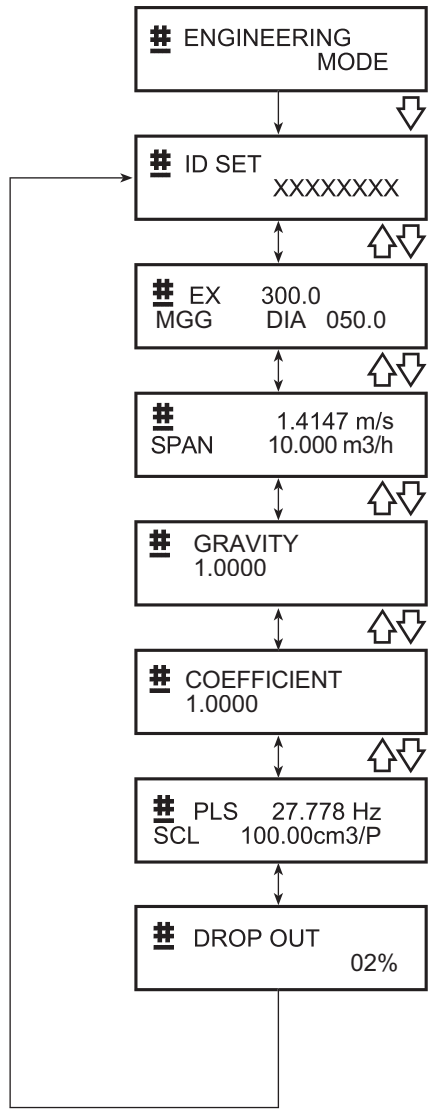
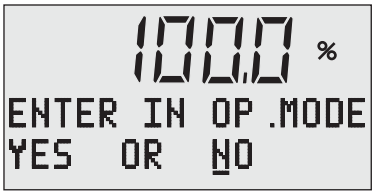
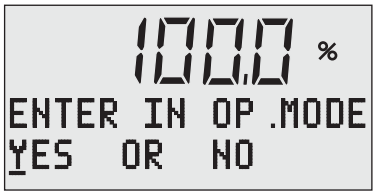
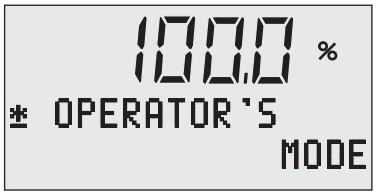
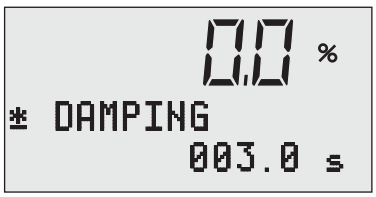
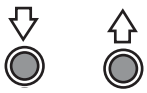
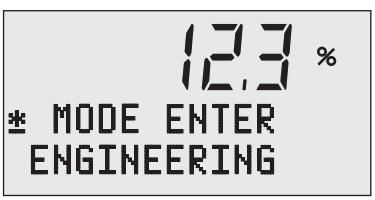
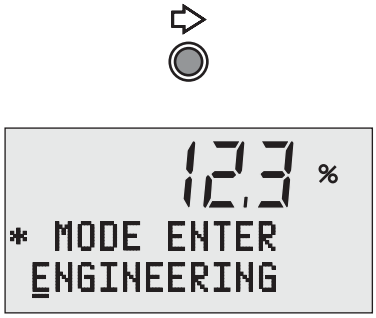
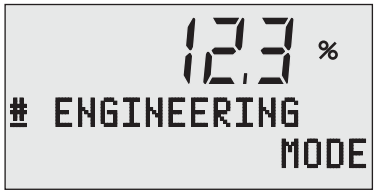


Figure 4-2 ENGINEERING MODE Screen Organization

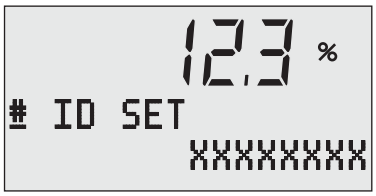
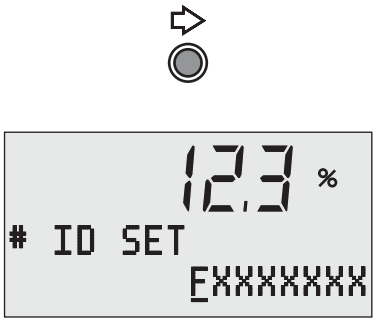
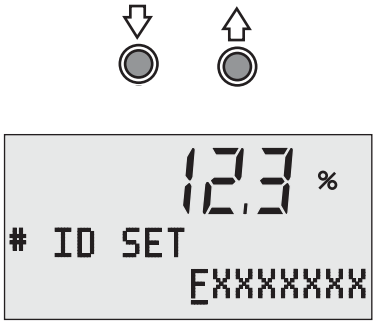
Entering ENGINEERING MODE

Step	Screen/Button	Procedure
1	MODE 	Touch the MODE button and hold for three seconds.
2		The MODE ENTER screen appears.
3	 	Touch the RIGHT SHIFT button twice to move the cursor to YES. (To exit without changing modes, move the cursor to NO.)
4		Touch the UP button once to make the selection.
5	 	The OPERATOR'S MODE screen appears for approximately two seconds followed by the DAMPING screen.
6	 	Use the DOWN or UP button to cycle through the screens until the MODE ENTER screen appears displaying ENGINEERING.

Step	Screen/Button	Procedure
7		Touch the RIGHT SHIFT button to move the cursor to ENGINEERING.
8		Touch the UP button to select.
9		The ENGINEERING MODE screen appears for approximately two seconds followed by the ID SET screen. Note that the Mode Indicator has changed to indicate ENGINEERING MODE (#). As long as the cursor remains under the Mode Indicator, touching the DOWN or UP button cycles through the screens available in this mode.

Setting the ID

This function sets the ID Code for the Flowmeter.

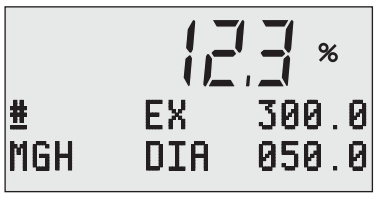
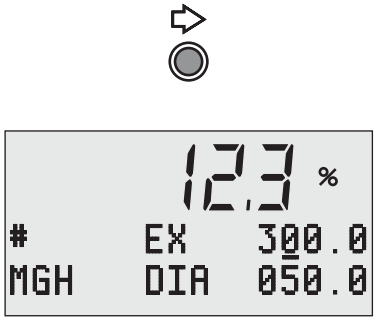
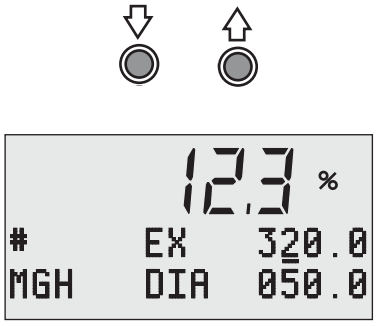
Step	Screen/Button	Procedure
1		Enter ENGINEERING MODE (see page 4-15). In ENGINEERING MODE, the ID SET screen is the first screen that appears.
2		Touch the RIGHT SHIFT button until the cursor is at the character to be changed. **Default Setting:** XXXXXXXX
3		Touch the DOWN or UP button to change the character. Cycle through the following alphanumeric characters to select the required one: ABCDEFGHIJKLMNOPQRSTUVWXYZ (SPACE) - / .0123456789
4		Use the RIGHT SHIFT button to choose another character and repeat Steps 3 and 4 until the entire ID Number is set.
5		Touch the RIGHT SHIFT button until the cursor is back at the Mode Indicator.
6		Touch the MODE button and hold for three seconds to return to MEASUREMENT MODE to save the new value. ⚠ **CAUTION**: You must return to MEASUREMENT MODE within two minutes to save this new value before the system resets it to the previously saved value.

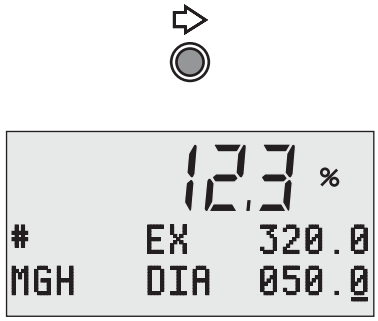
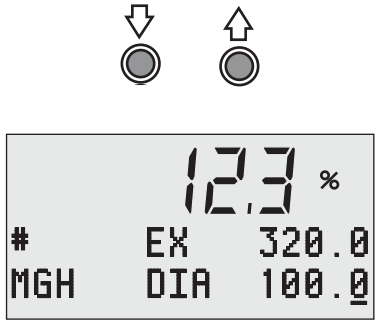
Detector Data

This function is used to select the constant, model and diameter of the Detector being used with this Converter. In this screen, two values can be changed: the Detector Constant (EX) and the Detector Diameter (DIA).

CAUTION

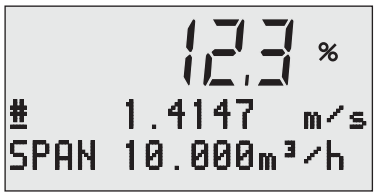
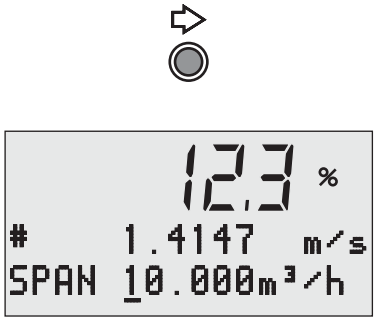
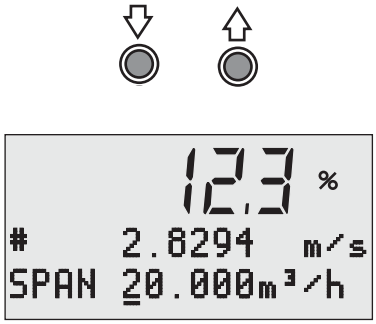
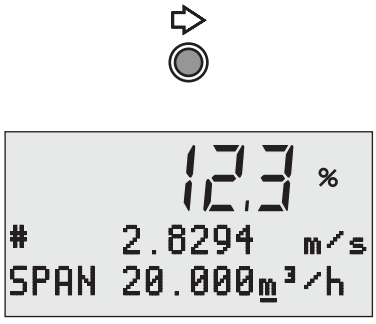
If the Converter and Detector are purchased together, the Converter contains the Detector data that was set during actual flow calibration. DO NOT change this data or the Flowmeter output will be incorrect.

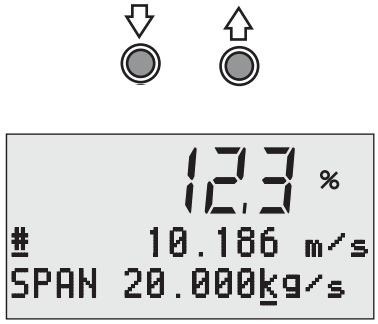
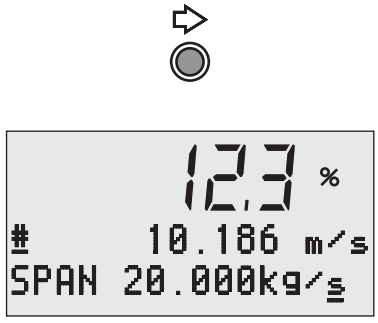
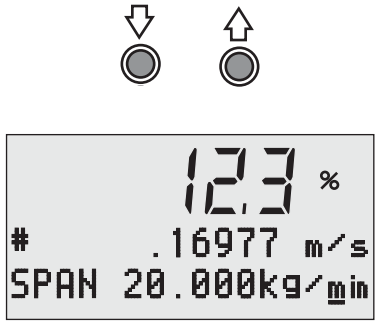
Step	Screen/Button	Procedure
1		Enter ENGINEERING MODE (see page 4-15). (The first screen in this mode is always the ID SET screen.) Use the DOWN or UP button to cycle through the screens until the DETECTOR DATA (EX/DIA) screen appears.
2		Touch the RIGHT SHIFT button until the cursor is at the Detector Constant (EX) to be changed. **Default Settings:** • EX: 300.0 • MGH • DIA: 050.0
3		Touch the DOWN or UP button to change the value.

Step	Screen/Button	Procedure
4		Use the RIGHT SHIFT button to move the cursor to the Detector Diameter value. The Converter works with the following Detector Diameters (in millimeters): • 40 • 50 • 80 • 100 • 150 • 200 • 250 • 300 • 350 • 400 • 450 • 500 • 600
5		Touch the DOWN or UP button to change the value.
6		Touch the RIGHT SHIFT button until the cursor is back at the Mode Indicator.
7		Touch the MODE button and hold for three seconds to return to MEASUREMENT MODE to save the new value. ⚠ **CAUTION**: You must return to MEASUREMENT MODE within two minutes to save this new value before the system resets it to the previously saved value.

Flow Rate Measurement Range

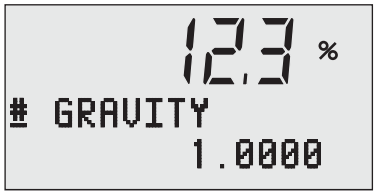
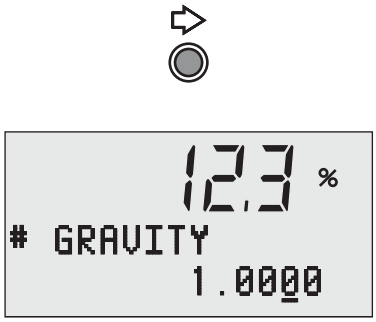
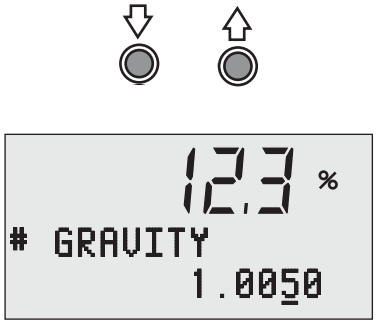
This function is used to set the Flow Rate Measurement Range (the value when the electromagnetic output reaches 100%). In this screen, three values can be changed: Flow Rate value, Flow Rate unit. and Time unit.

Step	Screen/Button	Procedure
1		Enter ENGINEERING MODE (see page 4-15). (The first screen in this mode is always the ID SET screen.) Use the DOWN or UP button to cycle through the screens until the SPAN (Range) screen appears.
2		Touch the RIGHT SHIFT button until the cursor is at the Flow Rate value to be changed. Values can range from 0.0001 to 99999.
3		Touch the DOWN or UP button to change the value.
4		Use the RIGHT SHIFT button to move the cursor to the Flow Rate unit.

Step	Screen/Button	Procedure
5		Touch the DOWN or UP button to change the unit. ⚠ **CAUTION**: If a weight unit is set, the Specific Gravity must also be set to avoid output errors. **Available Units:** m^3, l, cm^3, t, kg, g, BPH, KGPH, GPH, mGPH, lb.
6		Use the RIGHT SHIFT button to move the cursor to the Time unit.
7		Touch the DOWN or UP button to change the unit. **Available Units:** h, min., s, d
8		Touch the RIGHT SHIFT button until the cursor is back at the Mode Indicator.
9		Touch the MODE button and hold for three seconds to return to MEASUREMENT MODE to save the new value. ⚠ **CAUTION**: You must return to MEASUREMENT MODE within two minutes to save this new value before the system resets it to the previously saved value.

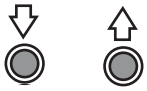
Specific Gravity

This function is used to set the specific gravity when selecting a weight unit (t, kg, g, lb) in the Flow Rate Measurement Range setting.

Step	Screen/Button	Procedure
1		Enter ENGINEERING MODE (see page 4-15). (The first screen in this mode is always the ID SET screen.) Use the DOWN or UP button to cycle through the screens until the GRAVITY screen appears.
2		Touch the RIGHT SHIFT button until the cursor is at the value to be changed. **Default Setting:** 1.0000 **Setting Range:** 0.1000 to 9.9999
3		Touch the DOWN or UP button to change the value.
4		Touch the RIGHT SHIFT button until the cursor is back at the Mode Indicator.
5		Touch the MODE button and hold for three seconds to return to MEASUREMENT MODE to save the new value. ⚠ **CAUTION**: You must return to MEASUREMENT MODE within two minutes to save this new value before the system resets it to the previously saved value.

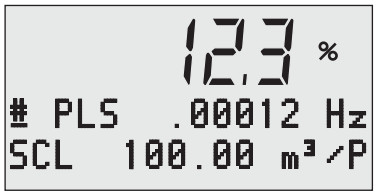
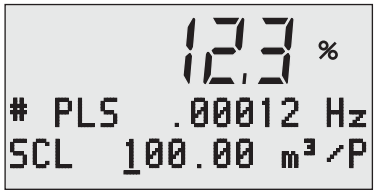
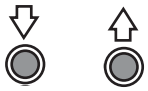
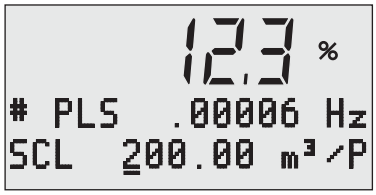
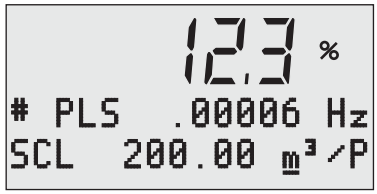
Coefficient of Compensation

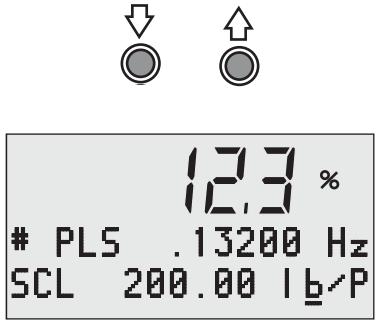
This function changes the Coefficient of Compensation, which multiplies the Output Flow Rate in the Main Display.

Step	Screen/Button	Procedure
1	12.3 % # COEFFICIENT 1.0000	Enter ENGINEERING MODE (see page 4-15). (The first screen in this mode is always the ID SET screen.) Use the DOWN or UP button to cycle through the screens until the COEFFICIENT screen appears.
2	 12.3 % # COEFFICIENT 1.0000	Touch the RIGHT SHIFT button until the cursor is at the value to be changed. **Default Setting:** 1.0000 **Setting Range:** 0.1000 to 9.9999
3	 12.3 % # COEFFICIENT 1.0050	Touch the DOWN or UP button to change the value.
4		Touch the RIGHT SHIFT button until the cursor is back at the Mode Indicator.
5	MODE	Touch the MODE button and hold for three seconds to return to MEASUREMENT MODE to save the new value. ⚠ **CAUTION**: You must return to MEASUREMENT MODE within two minutes to save this new value before the system resets it to the previously saved value.

Pulse Scale

This function is used to set the Pulse Scale value and Pulse Scale unit.

Step	Screen/Button	Procedure
1		Enter ENGINEERING MODE (see page 4-15). (The first screen in this mode is always the ID SET screen.) Use the DOWN or UP button to cycle through the screens until the PLS (Pulse Scale) screen appears.
2	 	Touch the RIGHT SHIFT button until the cursor is at the Pulse Scale value to be changed. Default Setting: 100.00 cm^3/P.
3	 	Touch the DOWN or UP button to change the value.
4	 	Use the RIGHT SHIFT button to move the cursor to the Pulse Scale unit.

Step	Screen/Button	Procedure
5		Touch the DOWN or UP button to change the unit. **Available Units:** m^3, ℓ, cm^3, t, kg, g, B, kG, G, mG, lb.
6		Touch the RIGHT SHIFT button until the cursor is back at the Mode Indicator.
7		Touch the MODE button and hold for three seconds to return to MEASUREMENT MODE to save the new value. ⚠ **CAUTION**: You must return to MEASUREMENT MODE within two minutes to save this new value before the system resets it to the previously saved value.

Maintenance mode

The following screens appear in this order in MAINTENANCE MODE.

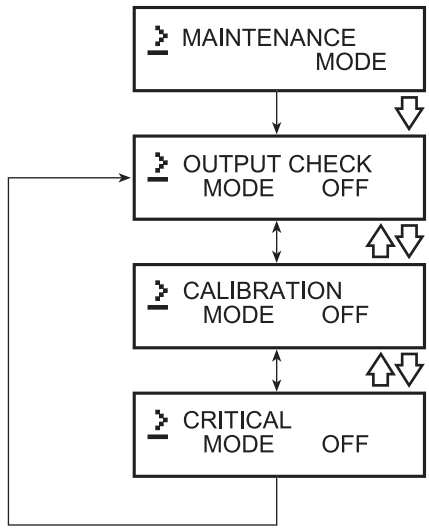
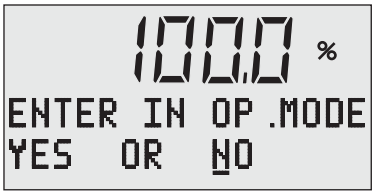
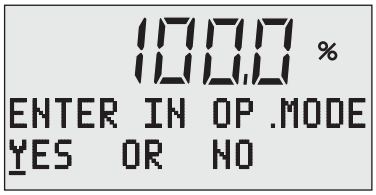
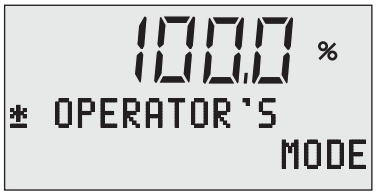
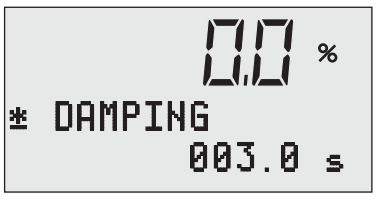
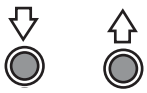
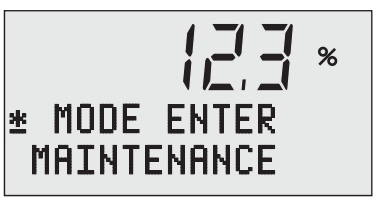
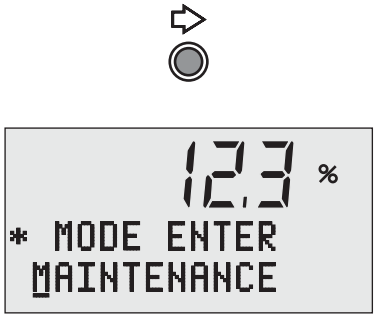


Figure 4-3 MAINTENANCE MODE Screen Organization

Entering MAINTENANCE MODE

Step	Screen/Button	Procedure
1	MODE 	Touch the MODE button and hold for three seconds.
2		The MODE ENTER screen appears.
3	 	Touch the RIGHT SHIFT button twice to move the cursor to YES. (To exit without changing modes, move the cursor to NO.)
4		Touch the UP button once to make the selection.
5	 	The OPERATOR'S MODE screen appears for approximately two seconds followed by the DAMPING screen.
6	 	Use the DOWN or UP button to cycle through the screens until the MODE ENTER screen appears displaying MAINTENANCE.

Step	Screen/Button	Procedure
7		Touch the RIGHT SHIFT button to move the cursor to MAINTENANCE.
8		Touch the UP button to select.
9		The MAINTENANCE MODE screen appears for approximately two seconds followed by the OUTPUT CHECK screen. Note that the Mode Indicator has changed to indicate MAINTENANCE MODE (>). As long as the cursor remains under the Mode Indicator, touching the DOWN or UP button cycles through the screens available in this mode.

Checking the excitation current

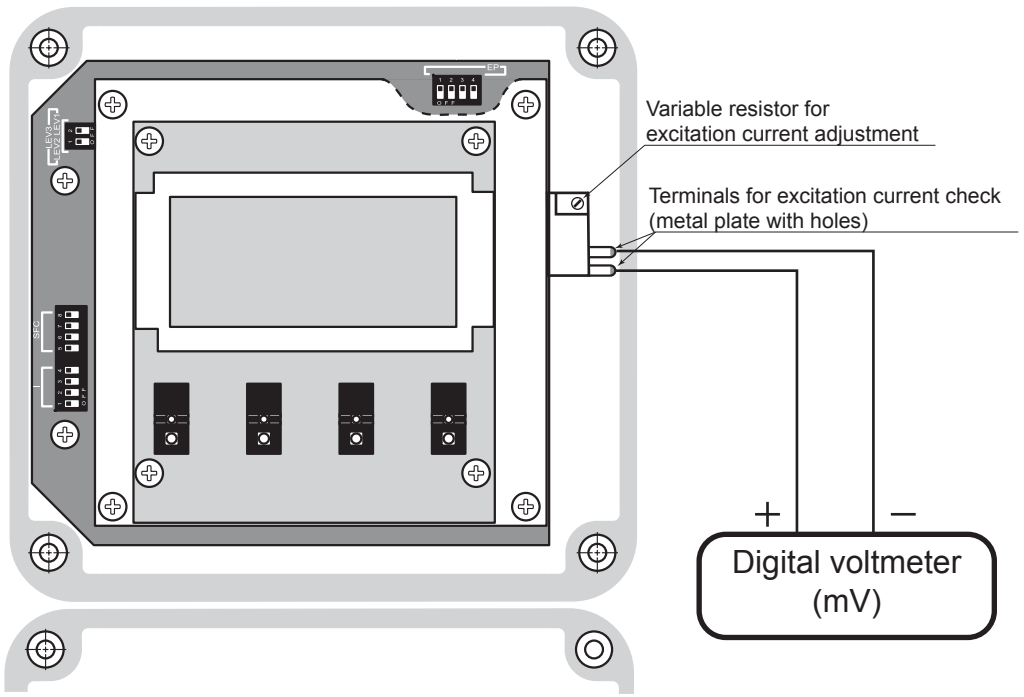


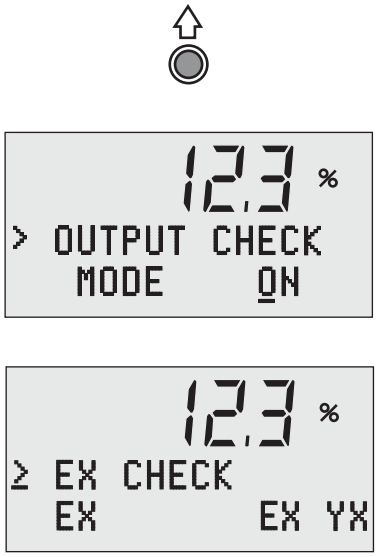
Figure 4-4 Excitation current check terminals

(Preparation)

Connect a digital voltmeter between terminals of the power unit as shown in Figure 4-4.

This function checks the excitation current value that flows into the coil in the Detector. This test is not available for integral models.

Step	Screen/Button	Procedure
1	12.3 % > OUTPUT CHECK MODE OFF	Enter MAINTENANCE MODE (see page 4-27). In MAINTENANCE MODE, the OUTPUT CHECK screen is the first screen that appears.
2	 12.3 % > OUTPUT CHECK MODE OFF	Touch the RIGHT SHIFT button until the cursor is at OFF.

Step	Screen/Button	Procedure
3		Touch the UP button to initiate output checking. The value changes to ON and the first check screen is for the EX CHECK screen.
		Verify absolute value of the digital voltmeter is 225mV.
4		Touch the UP button until the cursor is back at the Mode Indicator.

Calibration mode

To calibrate the excitation current

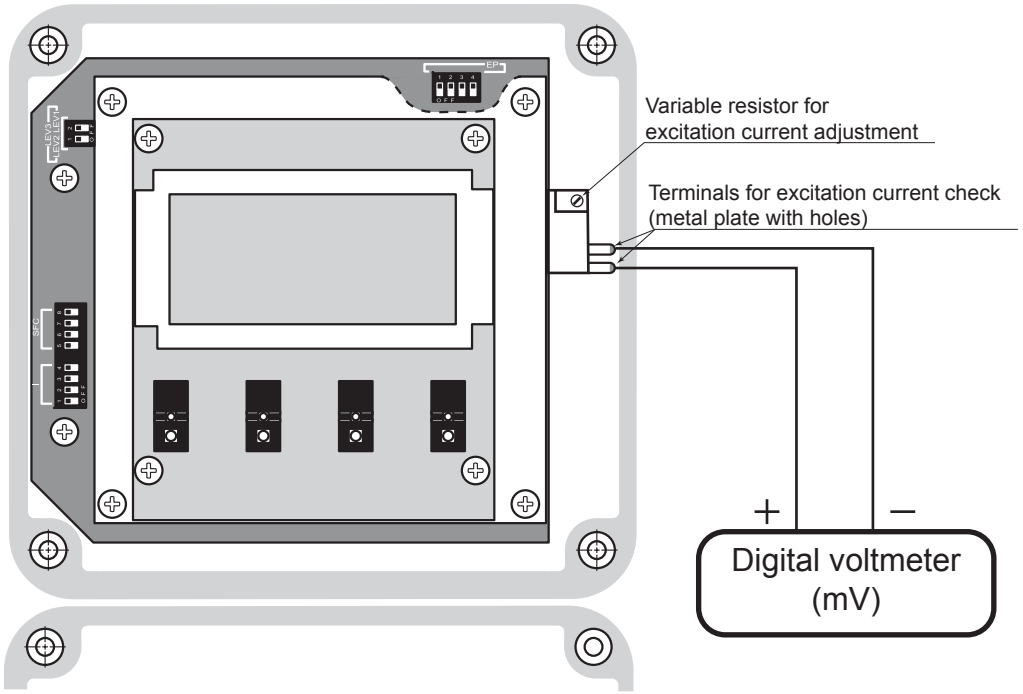
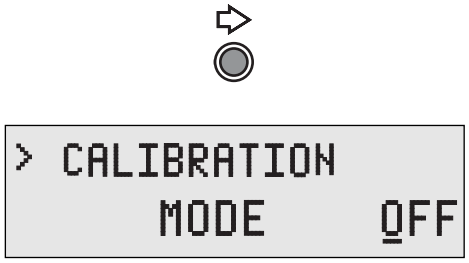
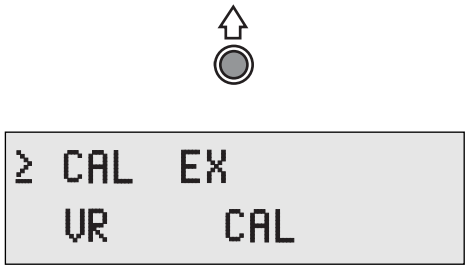
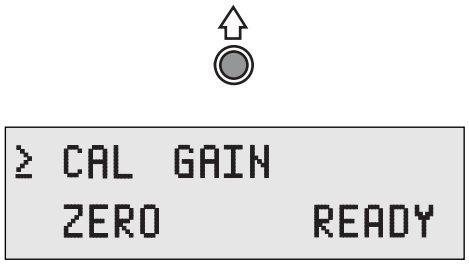


Figure 4-5 Excitation current check terminal

(Preparation)

Connect a digital voltmeter between terminals of the power unit as shown in Figure 4-5.

Step	Screen/Button	Comments
1	> MAINTENANCE MODE 2 sec. later ↓ > OUTPUT CHECK MODE OFF	For the procedure to set to the MAINTENANCE MODE, see page 4-27.
2	⇧ > CALIBRATION MODE OFF	

Step	Screen/Button	Comments
3		
4		While in this display, calibrate by tuning the variable resitor (Figure 4-5) until the digital voltmeter reads 225.0 mV.
5		

To calibrate the internal gain

The calibration of "ZERO" internal gain coefficient

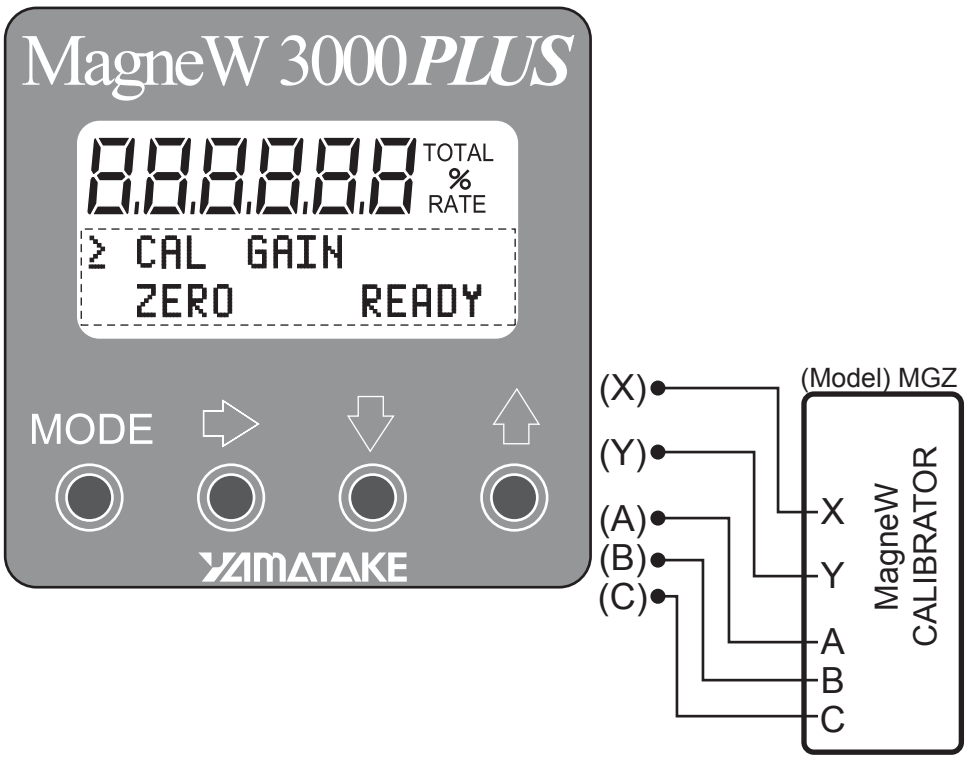
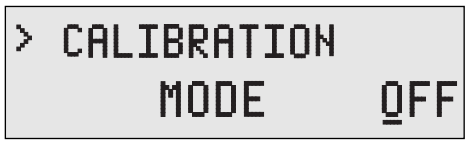
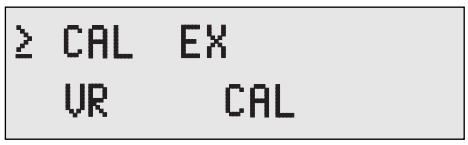


Figure 4-6 Internal gain calibration

(Preparation)

Connect a MagneW calibrator as shown in Figure 4-6.

Step	Screen/Button	Comments
1	> MAINTENANCE MODE 2 sec. later ↓ > OUTPUT CHECK MODE OFF	For the procedure to set to the MAINTENANCE MODE, see page 4-27.
2	⇧ > CALIBRATION MODE OFF	

Step	Screen/Button	Comments
3	 	
4	 	
5	 	
6	 	Input “zero (0m/s)” from MagneW calibrator
7	  20 sec. later ↓ 	The calibration of “zero (0m/s)” starts by ⇧ operation. The calibration of “zero (0m/s)” point has completed.

Step	Screen/Button	Comments
8	 > CAL GAIN ZERO READY To be continued ↓	

The calibration of 0.4m/s internal gain coefficient

Step	Screen/Button	Comments
1	> CAL GAIN ZERO READY	
2	 > CAL GAIN 1 00.40 m/s READY	
3	 > CAL GAIN 1 00.40 m/s READY	Input “0.4m/s” signal from MagneW Calibrator.
4	 > CAL GAIN 1 00.40 m/s ON 12 sec. later ↓ > CAL GAIN 1 00.40 m/s READY	The calibration of “0.4m/s” gain starts by ⇧ operation. The calibration of “0.4m/s” gain has completed.
5	 > CAL GAIN 1 00.40 m/s READY To be continued ↓	

The calibration of 1.2m/s internal gain coefficient

Step	Screen/Button	Comments
1	> CAL GAIN 1 00.40 m/s READY	
2	 > CAL GAIN 2 01.20 m/s READY	
3	 > CAL GAIN 2 01.20 m/s READY	Input “1.20 m/s” signal from MagneW Calibrator.
4	 > CAL GAIN 2 01.20 m/s ON 12 sec. later ↓ > CAL GAIN 2 01.20 m/s READY	The calibration of “1.20 m/s” gain starts by ⇧ operation. The calibration of “1.20 m/s” gain has completed.
5	 > CAL GAIN 2 01.20 m/s READY To be continued ↓	

The calibration of 3.6m/s internal gain coefficient

Step	Screen/Button	Comments
1	≥ CAL GAIN 2 01.20 m/s READY	
2	 ≥ CAL GAIN 3 03.60 m/s READY	
3	 > CAL GAIN 3 03.60 m/s READY	Input “3.60 m/s” signal from MagneW Calibrator.
4	 > CAL GAIN 3 03.60 m/s ON 12 sec. later ↓ > CAL GAIN 3 03.60 m/s READY	The calibration of “3.60 m/s” gain starts by ⇧ operation. The calibration of “3.60 m/s” gain has completed.
5	 ≥ CAL GAIN 3 03.60 m/s READY To be continued ↓	

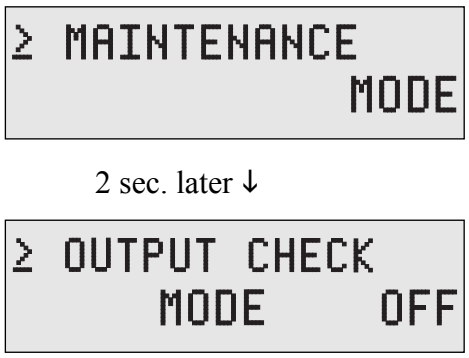
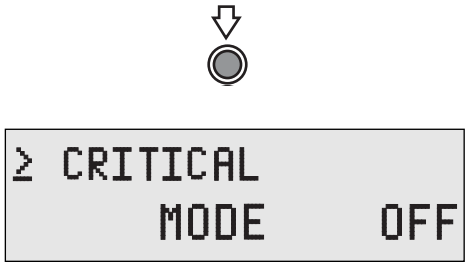
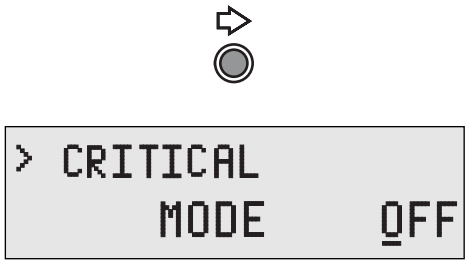
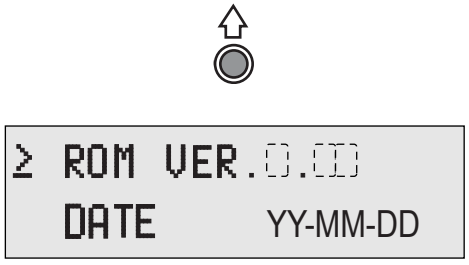
The calibration of 10m/s internal gain coefficient

Step	Screen/Button	Comments
1	> CAL GAIN 3 03.60 m/s READY	
2	 > CAL GAIN 4 10.00 m/s READY	
3	 > CAL GAIN 4 10.00 m/s READY	Input “10.00 m/s” signal from MagneW Calibrator.
4	 > CAL GAIN 4 10.00 m/s ON 12 sec. later ↓ > CAL GAIN 4 10.00 m/s READY To be continued ↓	The calibration of “10.00 m/s” gain starts by ⇧ operation. The calibration of “10.00 m/s” gain has completed.

To return to the MEASURING MODE: Press the MODE  key.

To continue setting: Move the cursor with the  key and then select other displays with the  and  keys.

To check PROM version

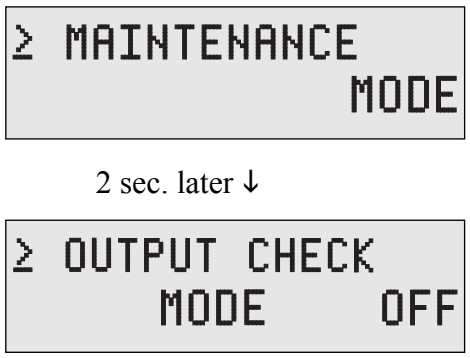
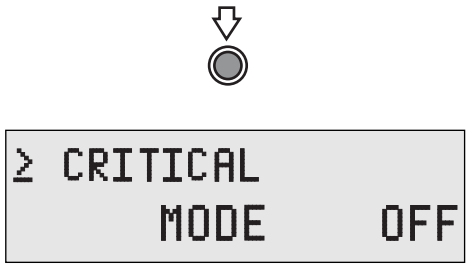
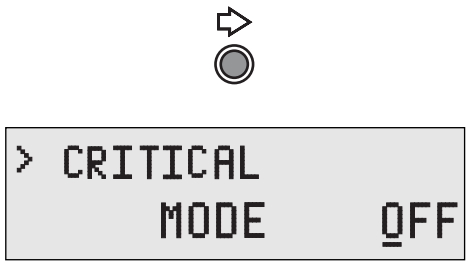
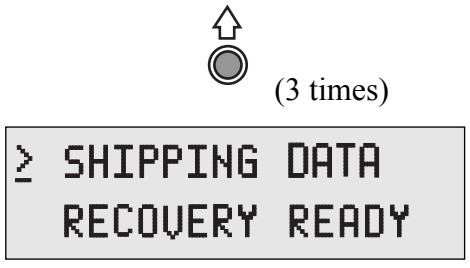
Step	Screen/Button	Comments
1		For the procedure to set to the MAINTENANCE MODE, see page 4-27.
2		
3		
4		

To return to the MEASURING MODE: Press the MODE key.

To continue setting: Move the cursor with the key and then select other displays with the and keys.

To recover the shipping data

Using this “SHIPPING DATA RECOVERY” function, all of the converter internal data can be changed to the shipping data of Yamatake.

Step	Screen/Button	Comments
1		For the procedure to set to the MAINTENANCE MODE, see page 4-27.
2		
3		
4		
5		

Step	Screen/Button	Comments

6	 (more than 8 sec.)
	`> SHIPPING DATA`
	`  RECOVERY  ON`
	1 sec. later ↓
	`- SELF CHECK`
	`  MODE`
	5 sec. later ↓
	`- MEASURING`
	`  MODE`
	1 sec. later ↓
	`%`
	`  SPAN  0.000 m³/h`
		After the execution of this function, the mode is automatically changed to “Measuring Mode”.

Mode for emergency (data broken, etc.)

This mode is used in the event that normal operation can not be recovered even ofter proper coutermeasures are taken.

CAUTION

After executing this function, re-calibration is necessary.

Step	Screen/Button	Comments
1	> MAINTENANCE MODE 2 sec. later ↓ > OUTPUT CHECK MODE OFF	For the procedure to set to the MAINTENANCE MODE, see page 4-27.
2	⇩ ◉ > CRITICAL MODE OFF	
3	⇨ ◉ > CRITICAL MODE OFF	
4	⇧ ◉ (4 times) > INITIAL DATA RECOVERY READY	

Step	Screen/Button	Comments
5	 > INITIAL DATA RECOVERY READY	
6	 (more than 8 sec.) - SELF CHECK MODE 5 sec. later ↓ - MEASURING MODE 1 sec. later ↓ % SPAN 0.000 m³/h	After the execution of this function, the mode is automatically changed to “Measuring Mode”.

Chapter 5: Using the FOUNDATION™ fieldbus

Introduction

The FOUNDATION™ fieldbus is a process control network that provides communications and programmability for a single or multiple Flowmeter system.

Configuring the Fieldbus

This section describes the basic parameter setup procedure to connect the model MGH14C MagneW3000 PLUS Flowmeter to a Fieldbus network. An example of block configurations is included.

To set up Fieldbus communications:

1. Locate the LAS (Link Active Scheduler) device on the network and set the network parameters according to the table below. Note that, since all the devices on the Fieldbus network use the same value, the values that the slowest device on the network can accommodate should be set to the LAS.

Table 5-1 • Network Parameters

Symbol	Parameter Name	Range of Values
V(ST)	Slot Time	5 to 100
V(MID)	Minimum Interframe Gap	10 to (V(MRD)-1) × V(ST), smaller than 120 inclusive
V(MRD)	Maximum Response Delay	V(MRD) × V(ST) shall be greater than 20 and V(MRD) shall be smaller than 11, inclusive
T1	SM Step Timer	96000 (3 seconds)
T2	SM Set Address Sequence Timer	1920000 (60 seconds)
T3	SM Set Address Wait Timer	480000 (15 seconds)

Note: An LAS requires parameters other than those listed here to operate. Please refer to the user's manual that came with the LAS.

2. If necessary, restart the LAS and make sure that the model MGH14C appears on the Fieldbus network with one of the default addresses (0×F8 through 0×FB). If not, recheck the parameters above and cable connections to the model MGH14C before calling for technical support. (For technical support, contact your Yamatake sales representative in your area.)

~ Note *If more than one new Fieldbus device is attached to the network at the same time, up to four of them appear on the network with the addresses 0×F8 through 0×FB.*

3. From your Fieldbus configurator, assign the PD_TAG and the NODE_ADDRESS to the model MGH14C. The default values of these parameters are shown in the table below. If they are set correctly, the model MGH14C will now be able to

communicate via the Fieldbus.

Table 5-2 • Default Parameter Values

Symbol	Parameter Name	Default Values
PD_TAG	Physical Device Tag	None (32 spaces)
NODE_ADDRESS	Node Address	0×F8

~ Note *PD_TAG and NODE_ADDRESS must be unique among all devices on the same Fieldbus network. If the same NODE_ADDRESS is assigned to two devices, on will automatically change its address to a default address (0×F8 through 0×FB).*

Configuration Example

1. Change the mode of the AI FB to O/S, if necessary.
2. Set the L_TYPE parameter according to the application.
3. Change the RB, TB and AI FB modes to AUTO, in the order presented here.

Fieldbus Operation

The following values are used during typical Flowmeter operation:

Flow Rate - available in the OUT parameter of the AI Function Block.

Flow Velocity - available in the SENSOR_VALUE parameter of the Transducer Block.

Operational Status - available in the MEASUREMENT_STATUS parameter of the Transducer Block.

Simulate Function

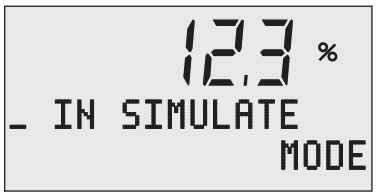
Simulate function is provided in AI function block.

Simulate function is used for loop check, sequence check, and fail-safe check, etc.

In order to use simulate function, position of switch #2 of S101 shown on page 2-19 must be OFF. (Figure 2-21)

Change simulate parameter of the AI function block to enable.

When simulate function activates, the screen displays the following.



After using simulate function, position of switch #2 of S101 shown on page 2-19 must be turned ON for operation. (Figure 2-20)

Block Parameter Descriptions

The model MGH14C implements the Resource Block, Transducer Block and AI Function Block. Blocks other than the Transducer Block are standard.

The conventions used in this section to define block parameters are contained in the table below.

Item	Description
Parameter	A standard parameter name as stipulated by the Fieldbus Foundation. Parameters that are unique to Yamatake are assigned unique names.
Description	Describes the corresponding parameter.
Subparameter	Some parameters have a hierarchical structure. Parameters at a lower level are shown as subparameters.
Access attributes	The following symbols are used to indicate attributes related to parameter access. S: Static data - Indicates that the parameter value cannot be overwritten during the execution of a block to which it belongs. (Data such as fixed data for individual device types and various configuration data) D: Dynamic data - Indicates that the parameter value can be modified by the block itself or by the user during the execution of a block to which it belongs. These are parameters that are changed occasionally or continuously according to the system state, device, or process that is in progress. These values are lost if a power outage occurs. (Data such as process measurement values and device execution status parameters) N: Nonvolatile data - These parameters, like dynamic data, may change during system operation. However, they are stored in nonvolatile memory and their most recent value is not lost if a power outage occurs. (This includes data such as PID setpoint values that must be restarted from the most recent value after a power outage occurs.) R: Parameters can only be read out. R/W: Parameters can be read out and be configurable.
Size	Indicates the size of the block in bytes.
Range	Range (upper limit, lower limit) of values that can be taken by each parameter. Note that these values are for the standard specifications, and are not all the values that can be taken at any time according to the state of the device or block. Rather, these are values that may be subject to other limitations within these ranges.
Initial value	Indicates the initial value when shipped from the factory.
Unit	The engineering units for the parameter. When a parameter name, e.g. “PV”, is entered in this column, it indicates that the units follow those of the indicated parameter.

Resource Block Parameters (Block Index:306)

Index no.	Parameter	Description	Sub-parameter	Access attribute	Size (bytes)	Range	Initial value	Units
1	ST_REV	Indicates the revision number of the static data that belongs to the block. If a parameter for which the access attribute is "S-" is modified, it is incremented by 1 (0×0001) each modification.	---	S-R	2	0~0×FFFF	0	Absolute No.
2	TAG_DESC	Tag name for the user-defined resource block. This is used for reference by the host, and is unrelated to the operation or execution of the resource block itself.	---	S-R/W	32	----	32 space characters	Absolute No.
3	STRATEGY	An arbitrary group number for the resource block. (This parameter is unrelated to device operation. It is provided so that the different types of blocks can be grouped arbitrarily so that they can be identified more easily in later database search operations.)	---	S-R/W	2	0~0×FFFF	0	Absolute No.
4	ALERT_KEY	Identification number for the related plant-internal devices. (This parameter is unrelated to device operation. It is provided so that the different types of blocks can be grouped arbitrarily so that they can be identified more easily in later database search operations.)	---	S-R/W	1	1~0×FF	0	Absolute No.
5	MODE_BLK	Resource block mode parameter set. MODE_BLK has the following structure. • Target: Parameter for the mode set by the host. • Actual: Indicates the value of the current mode. • Permitted: Indicates the value of the mode used by the resource block. • Normal: Indicates the value of the mode that should be the normal state.	Target	N-R/W	1	0×10: AUTO 0×02: IMAN (Actual mode only) 0×01: OS	.	Absolute No
			Actual	D-R	1			
			Permitted	S-R/W	1			
			Normal	S-R/W	1			
6	BLOCK_ERR	Indicates the error status concerning the resource block.	Bit string	D-R	2	0×8000: Other 0×4000: Block Configuration 0×2000: Link Configuration 0×1000: Simulation Active 0×0400: Device Fault State 0×0200: Device Maintenance 0×0100: Input Failure 0×0040: Memory Failure 0×0020: Lost Static Data 0×0010: Lost NV Data 0×0004: Maintenance Need 0×0002: Power Up 0×0001: Out of Service		Absolute No.

Index no.	Parameter	Description	Sub-parameter	Access attribute	Size (bytes)	Range	Initial value	Units
7	RS_STATE	Indicates the device operating state.	Unsigned 8	D-R	1	0=Undefined (undefined) 1=Start/Restart (start processing in progress) 2=Initialization (initialization in progress) 3=Online Linking (connection confirmation in progress) 4=Online (operating) 5=Standby (standby state) 6=Failure (A failure occurred)		Absolute No.
8	TEST_RW	Parameter used for applicability testing of communication software. This parameter is not used by users.	---	D-R/W	112	----	Arbitrary	Absolute No.
9	DD_RESOURCE	(Unused)	---	S-R	32	----	-----	Absolute No.
10	MANUFAC_ID	Unique identification number for manufacturers registered with the Fieldbus Foundation.	---	S-R	4	----	0×000DFC96 (YAMATAKE)	Absolute No.
11	DEV_TYPE	Identification number that indicates the model of the device as defined by the manufacturer.	---	S-R	2	0~0×FFFF	0×0C01 (MGH)	Absolute No.
12	DEV_REV	Revision number of the device as defined by the manufacturer.	---	S-R	1	0~0×FF	Differs depending on the device.	Absolute No.
13	DD_REV	Revision number of the DD file that applies to this device.	---	S-R	1	0~0×FF	Differs depending on the device.	Absolute No.
14	GRANT_DENY	Parameter that enables/disables access to the parameters in this block from the human interface or the host. Whether or not this parameter is used depends on settings in the host.	Grant (Enable)	D-R/W	1	0 or 1	All bits set to 0.	Absolute No.
			Deny (Disable)	D-R/W	1	0 or 1	All bits set to 0.	Absolute No.
15	HARD_TYPES	Indicates the type of the hardware in which this resource block exists.	---	S-R	2	Fixed at 0×8000 (scalar Input)	0×8000	Absolute No.
16	RESTART	Restarts the device manually. In the specifications, there are several types of restart which the user can select from.	---	D-R/W	1	1: RUN 2: Restart resource 3: Restart with defaults 4: Restart processor		Absolute No.

Index no.	Parameter	Description	Sub-parameter	Access attribute	Size (bytes)	Range	Initial value	Units
17	FEATURES	Indicates the current operating state based on the content set with FEATURE_SEL in the option settings for device usage.	---	S-R	2	0×8000: Unicode 0×4000: Reports 0×1000: Software write lock	0×F500	Absolute No.
18	FEATURE_SEL	Sets the device usage options.	---	S-R/W	2		0	Absolute No.
19	CYCLE_TYPE	Indicates the current operating state based on the content set with CYCLE_SEL for the function block execution method. (The model MGH14C only supports “scheduled” Function.)	---	S-R	2	0×8000: Scheduled (Follows the LAS schedule) 0×4000: Completion of block (When the block that was executing immediately before completes) 0×2000: Manufacturer specific	0×8000	Absolute No.
20	CYCLE_SEL	Sets the function block execution method.	---	S-R/W	2	As above	0	Absolute No.
21	MIN_CYCLE_T	Indicates the minimum period for which a function block can be executed.	---	S-R	4	$0 \sim 2^{32}-1$	32000 (1sec)	1/32 msec
22	MEMORY_SIZE	Indicates a memory capacity that enables the addition of function blocks as a guideline. (Unused)	---	S-R	2	0~65535		Kbytes
23	NV_CYCLE_T	Indicates the minimum required time to write “N-” type parameters to nonvolatile memory.	---	S-R	4	$0 \sim 2^{32}-1$	0	1/32 msec
24	FREE_SPACE	Indicates a memory capacity that enables the configuration addition as a guideline. (Unused)	---	D-R	4	0~100.0	0	%
25	FREE_TIME	Indicates the load state as how much available time there is compared with the function block execution time. (Unused)	---	D-R	4	0~100.0	0	%
26	SHED_RCAS	Sets the write timeout time for a setpoint value change (SPC) from the host connected by the RCAS_IN parameter when the function block mode is RCAS. If the write of the setpoint value is not performed within the time specified by this parameter, the function block automatically switches to the mode set in advance with the SHED_OPT parameter in the function block.	---	S-R/W	4	0 or a positive value	640000 (20sec)	1/32 msec
27	SHED_ROUT	Sets the write timeout time for a output value change (DDC) from the host connected by the ROUT_IN parameter when the function block mode is ROUT.If the write of the output value is not performed within the time specified by this parameter, the function block automatically switches to the mode set in advance with the SHED_OPT parameter in the function block.	---	S-R/W	4	0 or a positive value	640000 (20sec)	1/32 msec
28	FAULT_STATE	Indicates the current fault state (the output state when a fault has occurred in the function block) in the AO block. The value of this parameter can be set either in PID block execution or from the SET_FSTATE parameter of the next item.	---	N-R	1	1: Clear (The normal state) 2: Active (The abnormal state)	1	Absolute No.

Index no.	Parameter	Description	Sub-parameter	Access attribute	Size (bytes)	Range	Initial value	Units
29	SET_FSTATE	Forcibly sets the AO block to the fault state. The FAULT_STATE parameter is set to Active.	---	D-R/W	1	1: Off, 2: Set	1	Absolute No.
30	CLR_FSTATE	Clears the FAULT_STATE parameter. The FAULT_STATE parameter is cleared as long as there are no specific conditions for transitioning to the fault state in a SET_FAULT state parameter or function block execution.	---	D-R/W	1	1: Off, 2: Clear	1	Absolute No.
31	MAX_NOTIFY	In alert transmission operations due to an alert object, indicates the maximum capacity of the device in terms of the maximum number of alarms that can be sent when confirmations are not performed by the host.	---	S-R	1	0~3	3	Absolute No.
32	LIM_NOTIFY	Limit value for the actual use of the alert transmissions described above as stipulated by user settings.	---	S-R/W	1	0~3	3	Absolute No.
33	CONFIRM_TIME	The maximum wait time for a confirmation for an alert transmission from a device. The alert will be resent if this time is exceeded without receiving a confirmation.	---	S-R/W	4	$0 \sim 2^{32}-1$	640000 (20sec)	1/32 msec.
34	WRITE_LOCK	This parameter disables writes to all parameters within the device other than this parameter itself.	---	S-R/W	1	1: Unlocked (write enabled), 2: Locked (Write disabled)	1	Absolute No.
35	UPDATE_EVT	Alert parameter issued when a change occurs in resource block fixed data (items that have an access attribute of "S-" or "N-"). It has the following structure. • Unacknowledged: The acknowledgement state • Update state: The update state • Time stamp: The time changed • Static revision: The revision number after the update Relative index: Parameter identification number for the parameter changed	Unacknowledged	D-R	1	"Unacknowledged": 0=Undefined (no change) 1=Acknowledged (acknowledged) 2=Unacknowledged (unacknowledged) "Update state": 0=Undefined (no change) 1=Update reported (The update was reported.) 2=Update not reported (The update was not reported.)		Absolute No.
			Update State	D-R	1			
			Time stamp	D-R	8			
			Static Revision	D-R	2			
			Relative Index	D-R	2			
36	BLOCK_ALM	Parameter that indicates the configuration of the resource block and error states during execution. It has the following structure. • Unacknowledged: Occurrence verification state • Alarm state: State in which an alarm has occurred • Time stamp: Time of alarm occurrence/recovery • Subcode: Alarm content subcode Value: Alarm value	Unacknowledged	D-R/W	1			Absolute No.
			Alarm State	D-R	1			
			Time stamp	D-R	8			
			Subcode	D-R	2			
			Value	D-R	1			

Index no.	Parameter	Description	Sub-parameter	Access attribute	Size (bytes)	Range	Initial value	Units
37	ALARM_SUM	Parameter that summarizes the state of the resource block BLOCK_ALM • Current: The currently occurring state • Unacknowledged: Alarm verification state • Unreported: The state of reporting to the host. • Disabled: Alarm detection disablement state	Current	D-R	2	In the resource block, only the state of the block alarm is the object of this parameter.		Absolute No.
			Unac-knowl-edged	D-R	2			
			Unre-ported	D-R	2			
			Disabled	S-R/W	2			
38	ACK_OPTION	Enables or disables automatic confirmation on the occurrence of a block alarm (BLOCK_ALM) for a resource block. Automatic confirmation refers to confirmation over the communication system without any operator actions, and is seen as equivalent.	---	S-R/W	2	0: Disabled, 1: Enabled	0×0000	Absolute No.
39	WRITE_PRI	Defines the priority of the warning issued when a WRITE_LOCK is set to the write enabled (unlocked) state.	---	S-R/W	1	0~15	0	Absolute No.
40	WRITE_ALM	Alarm parameter that is issued when the resource block WRITE_LOCK parameter is unlocked.	Unac-knowl-edged	D-R/W	1			Absolute No.
			Alarm State	D-R	1			
			Time stamp	D-R	8			
			Subcode	D-R	2			
			Value	D-R	1			
41	ITK_VER	Version number of the mutual operability test tool.	---	S-R	1		4	Absolute No.

AI Function Block (Block Index: 1000)

Index No.	Parameter	Description	Sub-parameter	Access attribute	Size (bytes)	Range	Initial value	Units
1	ST_REV	Indicates the revision number of the static data that belongs to the function block. If a parameter for which the access attribute is "S-" is modified, it is incremented by 1 (0×0001) each modification.	---	S-R	2	0~0×FFFF	0	Absolute No.
2	TAG_DESC	Tag name for the user-defined function block. This is used for reference by the host, and is unrelated to the operation or execution of the function block itself.	---	S-R/W	32	----	32 space characters	Absolute No.
3	STRATEGY	An arbitrary group number for the function block. (This parameter is unrelated to block operation. It is provided so that the different types of blocks can be grouped arbitrarily so that they can be identified more easily in later database search operations.)	---	S-R/W	2	0~0×FFFF	0	Absolute No.
4	ALERT_KEY	Identification number for the related plant-internal devices. (This parameter is unrelated to block operation. It is provided so that the different types of blocks can be grouped arbitrarily so that they can be identified more easily in later database search operations.)	---	S-R/W	1	1~0×FF	0	Absolute No.
5	MODE_BLK	Function block mode parameter set. MODE_BLK has the following structure. • Target: Parameter for the mode set from the host. • Actual: Indicates the value of the current mode. • Permitted: Indicates the value of the mode used by the function block. • Normal: Indicates the value of the mode that should be the normal state.	Target	N-R/W	1	Auto, MAN or O/S		Absolute No.
			Actual	D-R	1			
			Permitted	S-R/W	1			
			Normal	S-R/W	1			
6	BLOCK_ERR	Indicates the error status for the function block.	---	D-R	2	0×8000: Other 0×4000: Block Configuration 0×2000: Link Configuration 0×1000: Simulation Active 0×0400: Device Fault State 0×0200: Device Maintenance 0×0100: Input Failure 0×0040: Memory Failure 0×0020: Lost Static Data 0×0010: Lost NV Data 0×0004: Maintenance Need 0×0002: Power Up 0×0001: Out of Service		Absolute No.
7	PV	A value that has had its input range changed and its square root calculated by XD_SCALE and then is converted into engineering units and digitally filtered by OUT_SCL. If the MODE is Auto, the output value is the same as the PV value which is the readback value after being converted to engineering units set by PV_SCALE.	Status	D-R	1	Good: Good value, Uncertain: Unknown, Bad: Unusable		Absolute No.
			Value	D-R	4	OUT_SCALE +/-10%		PV

Index No.	Parameter	Description	Sub-parameter	Access attribute	Size (bytes)	Range	Initial value	Units
8	OUT	The AI block output that is output to a transducer block. The units are the same as those used by the corresponding transducer block.	Status	N-R	1	Good: Good value, Uncertain: Unknown, Bad: Unusable		Absolute No.
			Value	N-R/W	4	OUT_SCALE +/-10%		OUT
9	SIMULATE	Manually sets the output from the AI function block for the transducer block that exists downstream from the AI function block. • Simulate status: Status of the manual setpoint value. • Simulate value: The manual setpoint value. • Transducer status: Input value status within the transducer block. • Transducer value: Input value within the transducer block. • Enable/disable: Control switch for the simulation function. (enable/disable)	Simulate Status	D-R/W	1	Good: Good value, Uncertain: Unknown, Bad: Unusable		Absolute No.
			Simulate Value	D-R/W	4	Same as transducer block		XD
			Transducer Status	D-R	1	Good: Good value, Uncertain: Unknown, Bad: Unusable		Absolute No.
			Transducer Value	D-R	4	Same as Transducer block		XD
			Enable/disable	S-R/W	1	1: Disable 2: Enable	1	Absolute No.
10	XD_SCALE	Range used for conversion to engineering units for downstream transducer blocks. The specified value becomes the 0.0 to 100.0% range.	EU_100	S-R/W	4		100	XD
			EU_0	S-R/W	4		0	XD
			Unit Index	S-R/W	2		%	Absolute No.
			DP	S-R/W	1	0 to 255	0	Absolute No.
11	OUT_SCALE	Scaling parameter for the OUT output. The specified value becomes the 0.0 to 100% range.	EU_100	S-R/W	4		100	OUT
			EU_0	S-R/W	4		0	OUT
			Unit Index	S-R/W	2		%	Absolute No.
			DP	S-R/W	1	0 ~ 255	0	Absolute No.
12	GRANT_DENY	Parameter that enables/disables access to the parameters in this block from the human interface or the host. Whether or not this parameter is used depends on settings in the host. This parameter has no effect on block operation.	Grant	D-R/W	1	0 or 1	All bit set to 0	Absolute No.
			Deny	D-R/W	1	0 or 1	All bit set to 0	Absolute No.
13	IO_OPTS	Parameter that sets the options for an input function.	---	S-R/W	2	0 or 1 See "IO_OPTS Parameter"	All bit set to 0	
14	STATUS_OPTS	Sets the options provided in connection with the OUT (and the IN) parameter status information.	---	S-R/W	2	0: Disable 1: Enable See "STATUS_OPTS Parameter"	All bit set to 0	Absolute No.
15	CHANNEL	Parameter that specifies, as a channel number, which hardware I/O channel to connect to.	---	S-R/W	2	1	1	Absolute No.
16	L_TYPE	Parameter that specifies the status of changing the input range and linearization.	---	S-R/W	1	0: (invalid) 1: Direct (linear, w/o range conversion)	0	Absolute No.
17	LOW_CUT	When “Low Cutoff” is selected in the IO_OPTS options settings for the function block, the output value is cut off if its post-scaling value is smaller than the value of the LOW_CUT parameter.	---	S-R/W	4	0 or a positive value	0	OUT

Index No.	Parameter	Description	Sub-parameter	Access attribute	Size (bytes)	Range	Initial value	Units
18	PV_FTIME	Specifies the time constant for the PV primary filter.	---	S-R/W	4	0 or positive value	0	Sec
19	FIELD_VAL	Expressed as the percentage of the output value of XD_SCALE which processes input range and square change root calculation. Digital filter processing has not been done.	Status	D-R	1	Good: Good value, Uncertain: Unknown, Bad: Unusable		Absolute No.
			Value	D-R	4			%
20	UPDATE_EVT	Alert parameter issued when a change occurs in function block fixed data (items that have an access attribute of "S-"). It has the following structure. • Unacknowledged: Occurrence verification state • Alarm state: State in which an alarm has occurred • Time stamp: Time of alarm occurrence/recovery • Subcode: Alarm content subcode • Value: Alarm value	Unacknowledged	D-R	1	"Unacknowledged": 0=Undefined (no change) 1=Acknowledged (acknowledged) 2=Unacknowledged (unacknowledged) "Update state": 0=Updefined (no change) 1=Update reported (The update was reported) 2=Update not reported (The update was not reported.)		Absolute No.
			Alarm State	D-R	1			
			Time Stamp	D-R	8			
			Static Revision	D-R	2			
			Relative Index	D-R	2			
21	BLOCK_ALM	The block alarm parameter indicates the occurrence of faults in the hardware, configuration, connection, and other aspects of the block. Faults that are detected with this parameter are issued as alarms.	Unacknowledged	D-R/W	1			Absolute No.
			Alarm State	D-R	1			
			Time Stamp	D-R	8			
			Subcode	D-R	2			
			Value	D-R	1			
22	ALARM_SUM	Record format parameter that shows a summary of alarms to give an overview of the status of the 16 alarms within the block.	Current	D-R	2	Bit1: High high alarm bit2: High alarm bit3: Low low alarm bit4: Low alarm bit5: Deviation high alarm bit6: Deviation low alarm bit7: Block alarm		Absolute No.
			Unacknowledged	D-R	2			
			Unreported	D-R	2			
			Disabled	S-R/W	2			
23	ACK_OPTION	Setting for automatically asking the operator for confirmation for the various alarms.	---	S-R/W	2	0: Automatic confirmation disabled. 1: Enabled.	0×0000	Absolute No.
24	ALARM_HYS	Setting of the hysteresis (difference) for recovery from the alarm state as a percent of the PV span when a HI_HI, HI, LO, or LO_LO upper or lower limit alarm has occurred.	---	S-R/W	4	0 to 50%	0.5%	%
25	HI_HI_PRI	Number in the range 0 to 15 that indicates the priority of the corresponding HI_HI upper or lower limit alarms. Higher priorities are expressed as higher values.	---	S-R/W	1	0 to 15	0	Absolute No.
26	HI_HI_LIM	Parameters that indicate the HI_HI upper and lower limit alarm setpoint values.	---	S-R/W	4	PV_SCALE, +∞		PV
27	HI_PRI	Number in the range 0 to 15 that indicates the priority of the corresponding HI upper or lower limit alarms. Higher priorities are expressed as higher values.		S-R/W		0 to 15		Absolute No.

Index No.	Parameter	Description	Sub-parameter	Access attribute	Size (bytes)	Range	Initial value	Units
28	HI_LIM	Parameters that indicate the HI upper and lower limit alarm setpoint values.	---	S-R/W	4	PV_SCALE, +∞		PV
29	LO_PRI	Number in the range 0 to 15 that indicates the priority of the corresponding LO upper or lower limit alarms. Higher priorities are expressed as higher values.		S-R/W	1	0 to 15	0	Absolute No.
30	LO_LIM	Parameters that indicate the LO upper and lower limit alarm setpoint values.	---	S-R/W	4	-∞ , PV_SCALE		PV
31	LO_LO_PRI	Number in the range 0 to 15 that indicates the priority of the corresponding LO_LO upper or lower limit alarms. Higher priorities are expressed as higher values.		S-R/W	1	0 to 15	0	Absolute No.
32	LO_LO_LIM	Parameters that indicate the LO_LO upper and lower limit alarm setpoint values.	---	S-R/W	4	-∞ , PV_SCALE		PV
33	HI_HI_ALM	Parameters that indicate the status and time of occurrence of the HI_HI, HI, LO, LO_LO, DV_HI, and DV_LO upper and lower limit alarms.	Unacknowledged	D-R/W	1			Absolute No.
34	HI_ALM		Alarm State	D-R	1			
35	LO_ALM		Time Stamp	D-R	8			
36	LO_LO_ALM		Subcode	D-R	2			
			Value	D-R	4			PV

Transducer Block Parameters (Block Index: 400)

Index No.	Parameter	Description	Sub-parameter	Access attribute	Size (bytes)	Range	Initial value	Units
1	ST_REV	The revision level of the static data associated with a block.	---	S-R	2	0 to 65535	0	None
2	TAG_DESC	User specified sescriptions of the intended application of the block. The RB does not check this parameter.	---	S-R/W	32	(octer string)	NULL	None
3	STRATEGY	An arbitrary number to identify grouping of blocks. The TB does not check this parameter	---	S-R/W	2	0 to 65535	0	None
4	ALERT_KEY	An arbitrary number used to identify the plant unit. THe TB does not check this parameter.	---	S-R/W	1	1 to 255	0	None
5	MODE_BLK	The actual, target, permitted, and normal modes of the TB.	Target	N-R/W	1	Auto or O/S	O/S	None
			Actual	D-R	1		O/S	
			Permitted	S-R/W	1		O/S, AUTO	
			Normal	S-R/W	1		Auto	
6	BLOCK_ERR	An enumeration of error status associated with the hardware or software components of the TB (Not supported by model MGH14C)	---	D-R	2		0	None
7	UPDATE_EVT	An alert generated by the TB to report any changes to its static data. The alert contains its acknowledged status, time stamp, a new static revision number, and a relative index of an updated static data.	Unacknowledged	D-R	1	"Unacknowledged": 0=Undefined (no change) 1=Acknowledged (acknowledged) 2=Unacknowledged (unacknowledged) "Update state": 0=Undefined (no change) 1=Update reported (The update was reported.) 2=Update not reported (The update was not reported.)	0	None
			Update status	D-R	1		0	
			Time Stamp	D-R	8		0	
			Static Revision	D-R	2		0	
			Relative Index	D-R	2		0	
8	BLOCK_ALM	An alarm generated by the TB to report any configuration failures, hardware failures, communication disconnection, or system failures.	Unacknowledged	D-R	1		0	None
			Alarm Status	D-R	1		0	
			Time Stamp	D-R	8		0	
			Subcode	D-R	2		0	
			Value	D-R	1		0	
9	TRANSDUCER_DIRECTORY	The directory of the number and starting indices of the transducers in this TB.	---	N-R	4			None
10	TRANSDUCER_TYPE	Defines the sensor type used with this device.	---	N-R	2	Fixed (104)	104	None
11	XD_ERR	Error codes generated by the TB (Not supported by model MGH14C)	---	D-R	1		0	None
12	COLLECTION_DIRECTORY	The directory of the number, starting indices, and DD Item IDs of the data collections in each transducer within the TB.	---	N-R	16		1	None

Index No.	Parameter	Description	Sub-parameter	Access attribute	Size (bytes)	Range	Initial value	Units
13	PRIMARY_VALUE_TYPE	The type of measurement.	---	S-R	2	Fixes (101)	101	None
14	PRIMARY_VALUE	The sensor value and status.	Status	D-R	1		0	
			Value	D-R	4		0.0	PVR
15	PRIMARY_VALUE_RANGE	Indicates the high and low range limits of flow rate, the engineering unit code, and the decimal point position of the primary value.	EU_100	N-R	4	See page 5-19	100	PVR
			EU_0	N-R	4	Fixed (0)	0	PVR
			Unit Index	N-R	2	See Table 5-3	1349 (m^3/b)	None
			Decimal Point	N-R	1	Fixed (2)	2	None
16	CAL_POINT_HI	The highest calibrated value.	---	S-R	4	Fixed (10.0)	10.0	CAL
17	CAL_POINT_LO	The lowest calibrated value.	---	S-R	4	Fixed (0.0)	0.0	CAL
18	CAL_MIN_SPAN	The minimum calibration span.	---	N-R	4	Fixes (10.0)	10.0	CAL
19	CAL_UNIT	The unit code for calibration value.	---	S-R	2		1061(m/s)	None
20	SENSOR_TYPE	Defines the type of sensor.	---	S-R	2	Fixed (102)	102	None
21	SENSOR_RANGE	Specifies the high and low range limits, the engineering unit code, and the decimal point position of the sensor value.	EU_100	N-R	4	Fixed (100)	100	SENSOR
			EU_0	N-R	4	Fixed (0)	0	SENSOR
			Unit Index	N-R	2	Fixed (1061)(m/sec)	1061(m/s)	None
			Decimal Point	N-R	1	Fixed (2)	2	None
22	SENSOR_SN	Defines the sensor serial number.	---	N-R	32	(visible string)	NULL	None
23	SENSOR_CAL_METHOD	The method of last sensor calibration.	---	S-R	1		0	None
24	SENSOR_CAL_LOCK	The location of last sensor calibration.	---	S-R/W	32	(visible string)	NULL	None
25	SENSOR_CAL_DATE	The date of last sensor calibration.	---	S-R/W	7	(date)	0	None
26	SENSOR_CAL_WHO	The name of the person responsible for the last sensor calibration.	---	S-R/W	32	(visible string)	NULL	None
27	LIN_TYPE	The linearization type.	---	S-R	1	Fixed (1): Linear with input	1	None
28	SECONDARY_VALUE	The secondary value. (Not supported by the model MGH14C.)	Status	D-R	1		0	
			Value	D-R	4		0.0	SENSOR
29	SECONDARY_VALUE_UNIT	The unit code for secondary value. (Not supported in the model MGH14C.)	---	S-R	2		0	None
30	XD_SOFTWARE_VERSION	THe software version number of the sensor board of the model MGH14C. It does not relate to Fieldbus communications.	---	S-R	4	XYZ	May vary	None

Index No.	Parameter	Description	Sub-parameter	Access attribute	Size (bytes)	Range	Initial value	Units
31	MEASUREMENT_STATUS	Indicates the model MGH14C's online self diagnostic information. Byte1 contains fatal error and may not always be available using the Fieldbus.	Byte1	D-R	1	bit0=1: A/D failure bit1=1: ROM failure bit2=1: RAM failure bit3=1: NVM failure bit4=1: AC power loss bit5=Reserved bit6=Reserved bit7=Reserved		
			Byte2	D-R	1	bit0=Reserved bit1=1: Contact rest bit2=Reserved bit3=Reserved bit4=Reserved bit5=Reserved bit6=Reserved bit7=Reserved		
			Byte3	D-R	1	bit0=Reserved bit1=Reserved bit2=1: Pulse weight error bit3=Reserved bit4=Reserved bit5=Reserved bit6=Reserved bit7=1: Empty pipe failure		
32	DETECTOR_TYPE	The type of the detector to be used with this converter.	---	S-R/W	1	3: MGH Fixed (3)	3	None
33	EX_FACTOR	Unique factor for detector.	---	S-R/W	4		300.0	None
34	DETECTOR_DUMMY	The number of dummy detectors used with this converter.	---	S-R/W	1	Fixes (0)	0	None
35	PRIMARY_VALUE_RANGE_SET	A set of parameters that characterize the primary value.	See page 5-19					
		Specifies the diameter of the detector.	PIPE_INSIDE_DIAMETER	S-R/W	4	See page 5-19	100	mm
		Specifies the high range limit of the primary value. This parameter is also available in EU_100 of the PRIMARY_VALUE_RANGE.	FLOW_RANGE	S-R/W	4	See page 5-19	100	PVR
		Specifies the engineering unit of the primary value. This parameter is also available in the Unit Index of the PRIMARY_VALUE_RANGE.	FLOW_UNIT	S-R/W	2	See page 5-19	1349 (m^3/h)	None
		Specifies the specific gravity of the fluid to obtain mass flow.	SPECIFIC_GRAVITY	S-R/W	4	See page 5-20	1	None
		SPecifies the unit code of pulse weight.	PULSE_WEIGHT_UNIT	S-R/W	2	See page 5-20	1036 (cm^3)	None
		Specifies the value of pulse weight.	PULSE_WEIGHT_VALUE	S-R/W	4	See page 5-20	500	PWU
36	SENSOR_VALUE	Measured flow velocity in m/s.	Float	D-R	4		0.0	

Index No.	Parameter	Description	Sub-parameter	Access attribute	Size (bytes)	Range	Initial value	Units
37	AUTO_SPIKE_CUT	Enable or disable the Auto SPike Cut Function.	---	S-R/W	1	0 or 1	0	None
38	PRIMARY_VALUE_DAMPING	The primary value damping factor.	---	S-R/W	4	0.5-199.9	3	sec
39	COUNT_VALUE	The totalized flow.	---	D-R	4	0-19999999999	0	None
40	COUNT_RESET	Preset or reset values of the COUNT_VALUE	---	S-R/W	4	0-19999999999	0	None
41	AUTO_ZERO_CMD	The command for automatic zero calibration.	---	D-R/W	1	0 or 1	0	None
42	AUTO_ZERO_STATUS	The status of automatic zero calibration.	---	D-R	1	0: succeeded 1: in progress 2: failed	0	None
43	CAL_CMD	Calibration commands	Command	D-R/W	1	0:None 1: cal 0.0m/s 2: cal 0.4m/s 4: cal 1.2m/s 6: cal 3.6m/s 8: cal 10m/s	0	None
			Value	D-R/W	4		0.0	CAL
44	CAL_STATUS	Calibration status as a result of CAL_CMD operations	---	D-R	1	0: succeeded 1: in progress 2: failed 4: input too high 8: input too low 16: zero input too high 32: zero input too low	0	None

STATUS_OPTS Parameter

Bit	Function	Description (When set to 1: True)	AI	AO	PID
3	Propagate Fault Forward	This is an option that causes the block to not issue an alarm but rather to propagate the fault to the down-stream function block for fault states such as sensor input errors, sensor faults, and faults in the field device itself. For example, in a system where the control loop is formed from only field devices and the assumption is that faults will be reported with, for example, block alarms, this function can be effective in cases where the AI blocks will be used as structural elements in the control loop and alarms will be reported through downstream PID blocks.	✔		
6	Uncertain if Limited	Sets the OUT parameter status to Uncertain of a range is exceeded by an input parameter or an intermediate value in a calculation.	✔		
7	BAD if Limited	Sets the OUT parameter status to BAD of a range is exceeded by an input parameter or an intermediate value in a calculation.	✔		
8	Uncertain in Man mode	Sets the status of the OUT parameter to Uncertain if the MODE (Actual) is Manual.	✔		

IO_OPTS Parameter

Bit	Function	Description (When set to 1: True)	AI	AO
10	Low cutoff	Enables the AI block low cutoff (constant flow cutoff) function.	✔	

Changing System Settings

This section contains configuration options available for the model MGH14C.

~ Note *The commands and responses that the model MGH14C recognizes are numerals. If your configurator supports DD (Device Description) and is capable of displaying descriptions in DD, they appear on screen as well. They are listed in brackets () after each numeric value.*

Damping Time Constant

From the Fieldbus configurator, set an appropriate vale for the PRIMARY_VALUE_DAMPING parameter of the Transducer Block. Refer to the Transducer Block Configuration Parameters for the valid ranges.

Auto Spike Cut

The Auto Spike Cut function eliminates steep noise shapes that can be generated when particle/solids hit the electrodes.

From the Fieldbus configurator, set the AUTO_SPIKE_CUT parameter of the Transducer Block. A value of 1 enables the function and 0 disables it.

Preset Value of the Built-In Flow Counter

From the Fieldbus configurator, set the target totalized value to the COUNT_RESTART parameter of the Transducer Block. A value of 0 resets the parameter. Refer to the Transducer Block Operational Parameters for the valid range of this parameter.

Detector Type

From the Fieldbus configurator, set the detector type in the DETECTOR_TYPE to 3 (MGH).

Primary Value Range

Some of the configuration parameters characterizing the primary value are interrelated and cannot be set independently. Therefore, they are grouped under the PRIMARY_VALUE_RANGE_SET so that the values of the grouped parameters are consistent. If these values are not consistent, an error response will be returned.

The key parameter is the Flow Velocity, whose upper limit cannot exceed 12 m/sec. Which a given Detector, Flow Rate Range is affected by its engineering unit as the diameter of the detector times Flow Velocity results in Flow Rate.

~ Note *Do not set the PRIMARY_VALUE_RANGE parameter to set Flow Rate Range.*

Detector Diameter

From the Fieldbus configurator, set the appropriate value for the PIPE_INSIDE_DIAMETER parameter of the Transducer Block. The diameter value must be one of the following: 40, 50, 80, 100, 150, 200, 250, 300, 350, 400, 450, 500, or 600.

Flow Rate Range and Flow Rate Unit

From the Fieldbus configurator, set the upper range value to the FLOW_RANGE subparameter and set the required engineering unit code to the FLOW_RANGE subparameter of FLOW_UNIT of the Transducer Block. The engineering unit codes are shown in the table below.

Table 5-3 • Engineering Unit Codes

Engineering Unit	Code	Engineering Unit	Code
g/s (gram per second)	1318	L/s (liters/second)	1351
g/min (gram per minute)	1319	L/min (liters per min)	1352
g/h (gram per hour)	1320	L/h (liters per hour)	1353
g/d (gram per day)	1321	L/d (liters per day)	1354
kg/s (kilogram per second)	1322	gal/s (gallons per second)	1362
kg/min (kilogram per minute)	1323	GPM (gallons per minute)	1363
kg/h (kilogram per hour)	1324	gal/h (gallons per hour)	1364
kg/d (kilogram per day)	1325	gal/d (gallons per day)	1365
t/s (metric ton per second)	1326	bbl/s (barrel per second)	1371
t/min (metric ton per minute)	1327	bbl/min (barrel per minute)	1372
t/h (metric ton per hour)	1328	bbl/h (barrel per hour)	1373
t/d (metric ton per day)	1329	bbl/d (barrel per day)	1374
lb/s (pounds per second)	1330	mgal/s (milligallon per second)	1449
lb/m (pounds per minute)	1331	mgal/m (milligallon per minute)	1453
lb/h (pounds per hour)	1332	mgal/h (milligallon per hour)	1457
lb/d (pounds per day)	1333	mgal/d (milligallon per day)	1461
m^3/s (meters cubed per second)	1347	kgal/s (kilogallon per second)	1450
m^3/min (meters cubed per min)	1348	kgal/m (kilogallon per minute)	1454
m^3/hour (meters cubed per hour)	1349	kgal/h (kilogallon per hour)	1458
m^3/day (meters cubed per day)	1350	kgal/d (kilogallon per day)	1462

Specific Gravity

If mass flow is selected for the primary value, the Specific Gravity of the fluid must be specified.

From the Fieldbus configurator, set the SPECIFIC_GRAVITY parameter to the specific gravity of the fluid. The valid range for this parameter is 0.1000 to 9.9999.

Pulse Scale Unit and Pulse Weight

The Pulse Scale Unit and Pulse Weight parameters are used to define the practical operation of the built-in accumulator. For example, in the case of one pint milk cartons, specify Gallon as the Pulse Scale Unit and 0.25 as the Pulse Weight. The accumulator indicates the number of milk cartons packed.

From the Fieldbus configurator, set the PULSE_WEIGHT_UNIT subparameter in the PRIMARY_VALUE_RANGE_SET parameter of the Transducer Block with a code from the following table.

Table 5-4 • Pulse Scale Unit Codes

Pulse Scale Unit	Code
m^3 (cubic meters)	1034
cm^3 (cubic centimeters)	1036
L (liter)	1038
gal (gallon)	1048
bbl (barrel)	1051
kg (kilogram)	1088
g (gram)	1089
t (metric ton)	1092
lb (pound)	1094

To set the Pulse Weight, enter the value for the PULSE_WEIGHT VALUE subparameter in the PRIMARY_VALUE_RANGE_SET parameter of the Transducer Block.

EX Factor

CAUTION

The EX Factor parameter is Detector dependent. The value that matches your Detector must be set or correct measurements cannot be made.

From the Fieldbus configurator, set the EX_FACTOR subparameter in the PRIMARY_VALUE_RANGE_SET parameter of the Transducer Block with the correct value. Values range between 200.0 and 699.9, inclusive.

Chapter 6: Maintenance

This chapter contains the maintenance and inspection procedures for the Flowmeter. The model MGH14C requires regular calibration and the Excitation Current should be checked regularly to spot any possible problems.

~ Note *The 250V, 3A fuse cannot be replaced by the customer.*

Cleaning

Clean the outside of the Converter and Detector using a soft cloth and commercially available cleaner as needed.

Checking Connections

To ensure uninterrupted operation of the system, terminal connections should be checked at least once every six months. If the Converter is installed in an area with possible vibration, they should be checked more often.

Calibration

Although the model MGH14C is designed to provide stable operation over time, periodic calibration is advised to ensure accurate measurement.

⚠ CAUTION

Before zeroing the Flowmeter, make sure the Detector is properly grounded (grounding resistance must be less than 100 Ω), that the Detector is filled with the fluid to be measured and that the fluid is standing still. Zero adjustment is possible with a flow speed of 0.2 m/s (.656 ft./s) or less, but the flow speed should be 0.0 m/s (0.0 ft./s) for accurate adjustment. Output errors can result from improper zeroing.

Using the Data Panel

Calibration can be done using the Data Panel. See “Auto Zero” on page 4-7.

Using the Fieldbus

~ Note *The commands and responses that the model MGH14C recognizes are numerals. If your configurator supports DD (Device Description) and is capable of displaying descriptions in DD, they appear on screen as well. They are listed in brackets () after each numeric value.*

To manually adjust to zero:

1. Completely fill the Detector with static (no flow velocity) fluid.
2. From the Fieldbus configurator, change the value of the AUTOZERO_CMD parameter of the Transducer block to 1 (CAL_ZERO).
3. From the configurator, read the value of the AUTOZERO_STSTUS parameter of the Transducer Block. The value is 1 (In Progress) while the Zero Calibration is in progress.
4. When calibration is complete, the value of the AUTOZERO_STATUS parameter becomes 0 (Success) or 2 (Failed). If the system fails calibration, contact technical support for assistance. (For technical support, contact your Yamatake sales representative in your area.)

Using a Simulated Signal

When trouble occurs with the Flowmeter use this method to judge whether the Detector or the Converter is responsible for the problem.

You can use a dedicated calibrator to generate the same signal as the flow rate signal from the Detector. The Converter function can be checked using this simulated signal.

You will need the value of the measuring range to perform this test. Calibrate the Flowmeter according to the Calibrator's Operating Manual (#CM2-MGZ100-2001).

Checking the Excitation Current

The Excitation Current should be checked periodically. See "Checking the excitation current" on page 4-30.

Chapter 7: Troubleshooting

If a problem occurs during start-up or operation, the following three causes should be considered:

- Inconsistency between the Flowmeter's specifications and the actual operating conditions
- Incorrect settings or operation of the Flowmeter
- Flowmeter malfunction

This chapter provides troubleshooting information for system startup, operation, and error codes that can appear on screen.

Errors at Startup

When a problem occurs at start-up, perform the procedures listed in the following table. If the problem persists, the Flowmeter may be damaged and you should contact technical support. (For technical support, contact your Yamatake sales representative in your area.)

Table 7-1 • Startup Errors

Symptom	Check Points and Treatment
Nothing on the Display Panel at power-up.	• Check the Converter power supply specification and ensure that the power supply being used meets these requirements. • Make sure the ambient temperature is not below -25 °C (13 °F).
No power at power-up.	• Verify that the signal line is correctly connected. • Verify the position of the switches on the Fieldbus Switch on the Main Card. See "Wiring the Fieldbus" on page 2-14.

Operation Errors

When a problem occurs during operation:

First, read the MEASUREMENT_STATUS of the operational parameter of transducer block. Then check against the table on this page for symptoms of the error. If found, perform the steps indicated in the table. If the problem persists, the Flowmeter may be damaged and you should contact technical support. (For technical support, contact your Yamatake sales representative in your area.)

Table 7-2 • Operation Errors

Symptom	Check Points and Treatment
MEASUREMENT_STATUS indicates errors.	• Check to see if Byte2:bit1 is set (all values reset to the factory default values). If necessary, reconfigure the Converter. • Check to see if Byte3:bit2 is set (Flow Velocity exceeds 12 m/s). If so, check that the Detector Diameter is set correctly (or if dummy detectors are used, that the number of dummies is set correctly). • Check to see if Byte3:bit2 is set (Flow Velocity exceeds 12 m/s). If so, and the Detector Diameter is not the problem, increase the range or change the engineering unit in the PRIMARY_VALUE_RANGE_SET parameter. • Check to see if Byte3:Bit7 is set (empty pipe failure detected). If so, check that the Detector is filled with fluid to measure.
Output fluctuates excessively beyond the estimated Flow Rate range.	• Verify that the Detector is properly grounded. • Verify that the Converter is properly grounded. • Verify the Damping Time Constant is set correctly. If not, set the PRIMARY_VALUE_DAMPING constant using the Fieldbus. • Clean the electrodes.
Flow Rate exceeds the Flow Range	• Check the Flow Range setting and make sure it is set to match the Detector and process flow. If not, set the RANGE parameter in the PRIMARY_VALUE_RANGE_SET parameter in the Transducer block using the Fieldbus. • Check that the Flowmeter has been zeroed. If not, calibrate the Flowmeter.
Output exceeds 100%.	• Verify the Set Range is set correctly. • Verify the Span is set correctly. • Verify the Zero Point is correctly adjusted. • Verify the Converter is correctly calibrated.

Table 7-2 • Operation Errors

Symptom	Check Points and Treatment
Output remains 0%.	• The pipe may be empty. Use the MEASUREMENT_STATUS parameter to check whether or not the pipe is empty. (If it is empty, the Empty Detection Function will be functioning.) • Verify that the Signal Cable is correctly connected. • Verify the valves are open on the upper and lower sides. • Verify the Span is set correctly. • Verify the Converter is not in the Constant Current mode. • Verify the Flow Rate is not in the Low Flow Cutoff range. • Check to see if the Flowmeter is in simulation mode using the SIMULATE parameter of the AI FB. It should be set to 1 (Disable). • Make sure the Resource Block is in AUTO mode. • Make sure the AI FB is in AUTO mode. • Make sure the L_TYPE parameter of the AI FB is set to DIRECT.

Error Messages

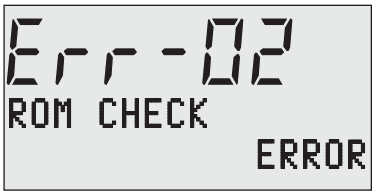
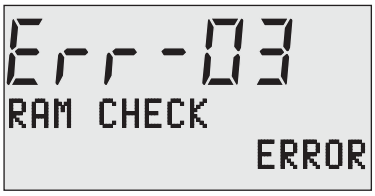
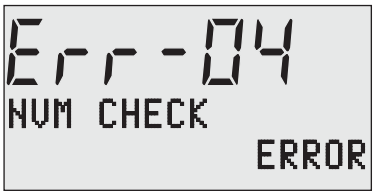
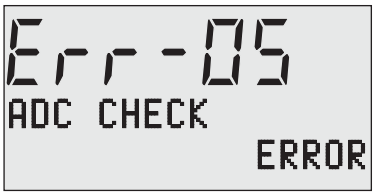
Error messages are grouped by the severity of the problem. There are messages for minor problems and for serious problems.

Error Codes for Serious Problems

Serious problems can obstruct Flowmeter operation and ultimately damage the flowmeter if not corrected. When serious trouble occurs during operation, an error message appears on the converter's Display Panel and the Flowmeter continues to output the preset value in the abnormality treatment (fail-safe) direction. The error message and the self-diagnostic results are visible on the display panel or can be checked by reading the MEASUREMENT_STATUS parameter of the Transducer Block.

The following table shows the possible error codes for serious problems and what to do. If the problem persists after trying these solutions, contact technical support. (For technical support, contact your Yamatake sales representative in your area.)

Table 7-3 • Serious Errors

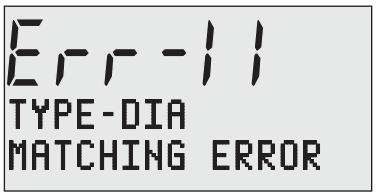
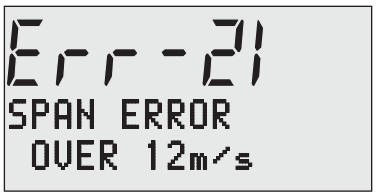
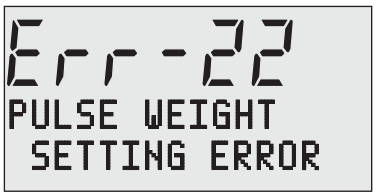
Error Screen	Error	Solution
	ROM Check Error	• Restore power. • Replace the ROM. • Replace the Main Card.
	RAM READ AFTER WRITE Error	• Restore power. • Replace the Main Card.
	NVM READ AFTER WRITE Error	• Restore power. • Replace the Main Card.
	ADC Error A/D Change Error	• Restore power. • Replace the Main Card.

Error Codes for Minor Problems

Minor problems do not seriously obstruct Flowmeter operation. When an error occurs during operation and is regarded by the system as a minor problem, the Flowmeter continues to output the flow rate.

The following table shows the possible error codes for minor problems and what to do. If the problem persists after trying these solutions, contact technical support. (For technical support, contact your Yamatake sales representative in your area.)

Table 7-4 • Minor Errors

Error Screen	Error	Solution
	Detector type and diameter do not match.	• Check the setting for the Detector Diameter and enter the correct diameter.
	The Span setting is greater than 12 m/s.	• Check the SPAN setting. • Check the DIA setting. • Check the TYPE setting • Check the DUMMY setting.
	The Pulse Frequency is either too high or too low.	• Check the Pulse Scale setting. • Check the Pulse Frequency setting.

Chapter 8: Replacement Parts

The figure below and the following table show all the available replacement parts for the MGH14C FOUNDATION™ fieldbus model. Refer to the part number when ordering.

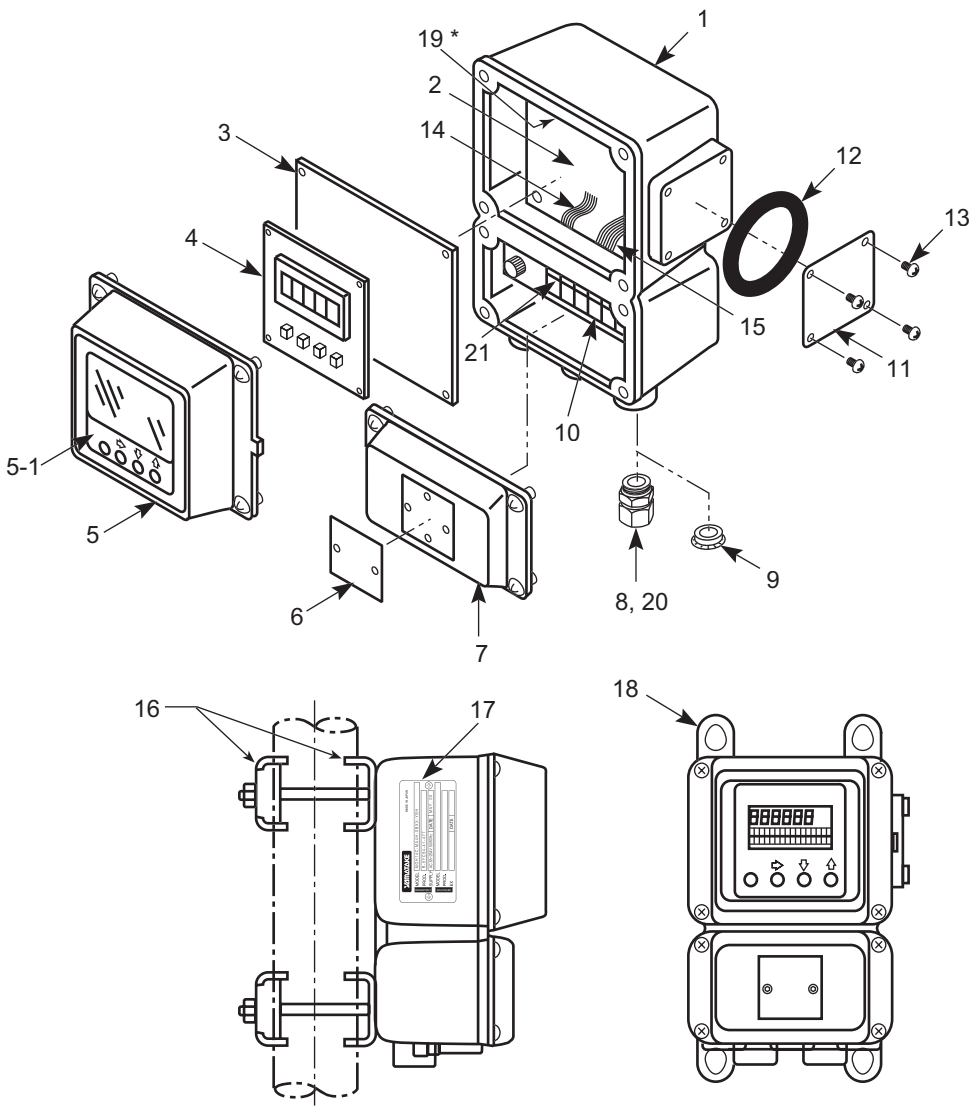


Figure 8-1 Replacement Parts

* Power unit is located behind No.2

Table 8-1 • Replacement Parts

Key No.	Description	Quantity	Part Number
1	Converter Main Body (Standard finish) (Corrosion-resistant finish) (Corrosion-proof finish)	 1 1 1	 80382026-001 80382026-101 80382026-201
2	Main Card		80382001-004
3	Display Control Card / Fieldbus Interface Card	1	80381265-002
4	Display Panel	1	80381043-001
5	Display Cover Assembly (W/ LCD) Horizontal and Integral Model (Standard finish) (Corrosion-resistant finish) (Corrosion-proof finish) Display Cover Assembly (W/O LCD) Horizontal and Integral Model (Standard finish) (Corrosion-resistant finish) (Corrosion-proof finish) Display Cover Assembly (W/ LCD) Vertical and Integral, or Remote Model (Standard finish) (Corrosion-resistant finish) (Corrosion-proof finish) Display Cover Assembly (W/O LCD) Vertical and Integral, or Remote Model (Standard finish) (Corrosion-resistant finish) (Corrosion-proof finish)	 1 1 1 1 1 1 1 1 1 1 1 1	 80381164-061 80381164-161 80381164-261 80381164-071 80381164-171 80381164-271 80381164-062 80381164-162 80381164-262 80381164-072 80381164-172 80381164-272
5-1	Glass (W/ LCD) (W/O LCD)	 1 1	 80381165-001 80381165-002
6	Tag No. Plate	1	80381014-001
7	Terminal Box Cover (Standard finish) (Corrosion-resistant finish) (Corrosion-proof finish)	 1 1 1	 80381010-001 80381010-101 80381010-201
8	Watertight Gland (Ni plated brass) (Plastic) (SUS304)	 1 1 1	 80356020-101 80352997-001 80356020-001
9	Plug (W/ Air-purge hole) (W/O Air-purge hole)	 1 1	 80381089-001 80381052-001

Table 8-1 • Replacement Parts

Key No.	Description	Quantity	Part Number
10	Terminal Assembly (100 to 120 V / 200 to 240V AC) (24V DC)	 1 1	 80381015-004 80381015-005
11	Cover	1	80381073-001
12	O-Ring	1	80020935-807
13	Screw	4	HS311250-001
14	ABC Cable (Signal Cable)	1	80381050-001
15	XY Cable (Excitation Cable)	1	80381046-001
16	Pipe Mounting Kit (for 2 Inch Pipe) (SPCC) (SUS304)	 1 1	 80279935-002 80381130-002
17	Name Plate (MGH14C)	1	80381003-001
18	Wall Mounting Kit (SPCC) (SUS304)	 1	 80279935-001 80381130-001
19	Power unit (100V AC) (110/115V AC) (120V AC) (200V AC) (220V AC) (230/240V AC) (24V DC/50Hz) (24V DC/60Hz)	 1 1 1 1 1 1 1 1	 80381220-101 80381220-102 80381220-103 80381220-201 80381220-202 80381220-203 80381220-301 80381220-302
20	Adaptor Assembly (1/2NPT) (CM20) (Pg13.5)	1	 80381077-001 80381077-002 80381077-003
21	Terminal mark (for remote style)	1	 80381017-005

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