

**Models CA100S and 200S  
Capacitance Magnetic Flowmeter**

Manual Change No. 12-017E

**vigilantplant®**

Please use the attached sheets for the pages listed below in IM 1E8B0-01E (8th).

Page and Item	Contents of Correction
Page 2-1 2.2 Accessories	Deleted the accessory fuse.
Page 4-15 4.4.2 General Precautions	Changes of IEC standard for conformity. (from IEC 947 to IEC 60947)
Page 7-1 7.1.1 (1) Connecting BT 200 to Flow Converter	Added the important note.
Page 9-2 9.2 Fuse Replacement	Deleted the accessory fuse.
Page 10-4 10.3 Normal Operating Conditions	Deleted the description fuse.
Page 10-8 10.5 Optional Specifications	Changes of specifications in FM Approval and CSA Certification
Page 13-1 to 13-3 13.1 FM 13.2 CSA	Ditto

## 2. HANDLING PRECAUTIONS

This instrument has been already tested thoroughly at the factory. When the instrument is delivered, please check externals and make sure that no damage occurred during transportation.


In this chapter, handling precautions are described. Please read this chapter thoroughly at first. And please refer to the relative matter about other ones.

If you have any problems or questions, please make contact with Yokogawa sales office.

### 2.1 Checking Model and Specifications

The model and specifications are shown on the Data Plate of the flow converter. Please confirm the specifications between the instrument that was delivered and the purchase order (refer to the section 10.4 Model and Suffix Code).

Please let us know Model and Serial No. when making contact with Yokogawa sales office.

ADMAGCA		MAGNETIC FLOWMETER	
MODEL		PULSE	
SUFFIX		OUTPUT	30V DC 0.2 Amax.
		LINING	CERAMICS
STYLE		MATERIAL	
SIZE	mm	CURRENT	4 - 20mA
METER		OUTPUT	(0 - 750Ω)
FACTOR		FLUID TEMP.	-10~120 °C
SUPPLY	VDC---13W	FLUID PRESS	-0.1~ MPa
	VAC~47~63Hz 36VA 13W	AMB. TEMP.	-20~50 °C
FULL SCALE		No.	
		 <b>N200</b>	

YOKOGAWA ◆ Made In

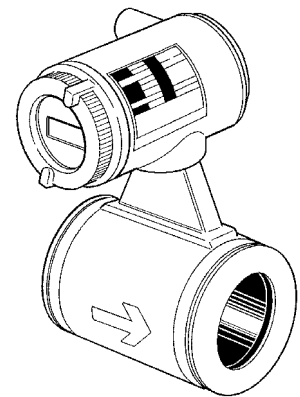


Figure 2.1 Data Plate

### 2.2 Accessories

When the flowmeter is delivered, make sure that the following accessories are in the package. Spare fuse can be applied only to this product.

- Data sheet (1-sheet)
- Unit labels (1-sheet)
- Centering device (1-set)
- Plug (for DC power supply only) (1-piece)
- Hexagonal Wrench (only for hazardous duty type instrument) (1-piece)

## 4.4.2 General Precautions



Observe the following when wiring ;

- (1) Do not connect cables outside when it is raining, to ensure insulation within the terminal box of the meter tube and to prevent failure due to moisture.
- (2) Power cables and signal wire ends are to be provided with round crimp-on terminal.
- (3) Power cables and output signal cables must be routed in steel conduit tubes separately.(except 4-core DC cable wiring)
- (4) When waterproof glands, union equipped waterproof glands are used, the glands must be properly tightened to keep the box watertight.
- (5) Please install a external switch or circuit breaker as a means of power off (capacitance:15A, conform to IEC 60947-1 and IEC 60947-3). The preferable location is either near the instrument or other places to easy operation. Furthermore, please indicate "power off equipment" on the those external switch or circuit breaker.
- (6) Please be sure to fully tighten the covers before the power is turned on.
- (7) Please be sure to turn off the power before opening the covers.
- (8) In case of DC Power Supply, a plug is attached. When 4-core cable is used, please put that plug into unused electrical connection port.

## 4.4.3 Power and Output Cables

Power cable	<ul style="list-style-type: none"> <li>* Crimp-on Terminal</li> <li>* 60°C heat resistance</li> <li>* Green/Yellow covered conductors shall be used only for connection to PROTECTIVE CONDUCTOR TERMINALS.</li> <li>* Conform to IEC 227 or IEC245 or equivalent national authorization.</li> </ul>
Output Cable	<ul style="list-style-type: none"> <li>• Please use Polyvinyl chloride insulated and sheathed control cables (JIS C3401) or Polyvinyl chloride insulated and sheathed portable power cables (JIS C3312) or equivalents.</li> </ul>
Outer Diameter	<ul style="list-style-type: none"> <li>• 6.5 to 12mm in diameter (10.5 or 11.5mm for waterproof gland/ ECG, /ECU)</li> </ul>
Nominal Cross Section	<ul style="list-style-type: none"> <li>• Single wire ; 0.5 to 2.5mm<sup>2</sup> , Stranded wire ; 0.5 to 2.5mm<sup>2</sup></li> </ul>

# 7. OPERATION VIA BRAIN TERMINAL

Products provided with optional code / BR come equipped with a BRAIN communication function which allows them to communicate with dedicated brain terminals (BT) or CENTUM-XL / CS. In the BRAIN - Series communications system, a  $\pm 2$  mA, 2.4 kHz modulated signal is superimposed onto the 4 to 20 mA DC analog signal for data transmission. Since the modulated wave is an AC signal, superimposing it on the analog signal will cause no error in the DC component of the analog signal. Thus, monitoring can be performed via communications while the ADMAG CA is online.

A BT200 can be connected to the terminals shown in Figure 7.1 on products that are not provided with a / BR (brain communication function).

## 7.1 Operation Via the BT200

This section describes the operation procedures using a brain terminal. For details on the functions of the ADMAG CA, see Chapter 6, "Function and Data Settings." And also, see the "BT200 Instruction Manual" (IM IC0A11-01E) for more detailed information.

### 7.1.1 BT200 Connections

#### (1) Connecting BT200 to Flow Converter

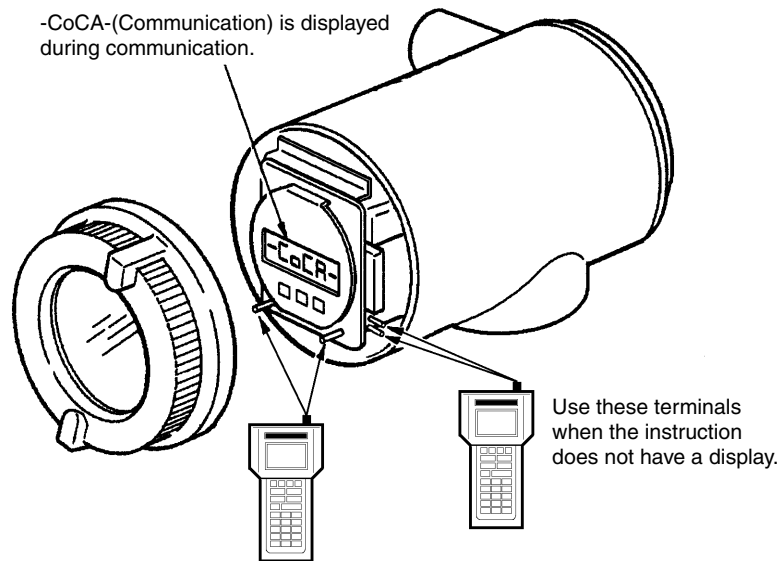


Figure 7.1 Connection of BT200 to Flow Converter

For products not provided with the /BR (BRAIN communication function), the terminals for BRAIN communication are provided on the circuit board. Please connect BT200 to the terminals on the circuit board directly.

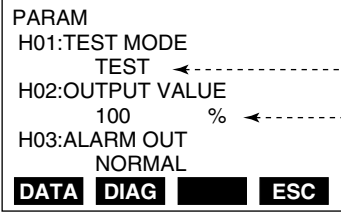


#### IMPORTANT

These terminals are used for a communication with the BT200 only. Thus, the communication error will occur via FieldMate when using these terminals. Please connect to the 4 to 20 mA DC transfer line when communicating via FieldMate.

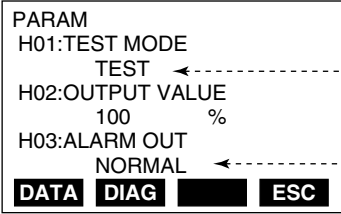
### 9.1.2 Test Output Setting Via the BT200

#### (1) Current Output (Corresponding to Flow Rate, Pulse and Totalization Display)

Display	Description						
	<p>Select Test mode in parameter number "H01"</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>NORMAL</td> <td>Normal operation</td> </tr> <tr> <td>TEST</td> <td>Test output</td> </tr> </tbody> </table> <p>Display "H02:OUTPUT VALUE" and set the value to be output in % of the span. (The figure shows a 100% setting.) Setting range: -8 to 108%</p>	Code	Description	NORMAL	Normal operation	TEST	Test output
Code	Description						
NORMAL	Normal operation						
TEST	Test output						


\* These functions must be returned to their original status during flow rate measurements.

#### (2) Contact Output (Alarm Output)

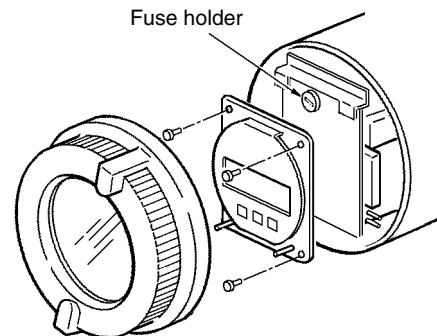
Display	Description														
	<p>Call up the setting mode and display "H1" (test mode) and set "01".</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Content</th> </tr> </thead> <tbody> <tr> <td>NORMAL</td> <td>Normal operation</td> </tr> <tr> <td>TEST</td> <td>Test output</td> </tr> </tbody> </table> <p>Select the mode of status to be output in "H03".</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Content</th> </tr> </thead> <tbody> <tr> <td>NORMAL</td> <td>Normal operation</td> </tr> <tr> <td>CLOSED(ON)</td> <td>Transistor contact (ON)</td> </tr> <tr> <td>OPEN(OFF)</td> <td>Transistor contact (OFF)</td> </tr> </tbody> </table>	Code	Content	NORMAL	Normal operation	TEST	Test output	Code	Content	NORMAL	Normal operation	CLOSED(ON)	Transistor contact (ON)	OPEN(OFF)	Transistor contact (OFF)
Code	Content														
NORMAL	Normal operation														
TEST	Test output														
Code	Content														
NORMAL	Normal operation														
CLOSED(ON)	Transistor contact (ON)														
OPEN(OFF)	Transistor contact (OFF)														


\* These functions must be returned to their original status during flow rate measurements.

## 9.2 Fuse Replacement

	<p><b>WARNING</b> This instrument must be installed by expert engineer or skilled personnel. Fuse replacement is not permitted for operators.</p>
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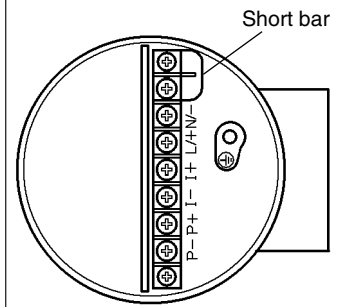
The fuse holder is located under the display which has to be removed to allow fuse replacement.



	<p><b>CAUTION</b> Before replacing the fuse, make sure to turn OFF the power supply and disconnect the power source. Use only specified fuses which should be obtained from your nearest Sales &amp; service Office. The use of other fuses might cause fire.</p>
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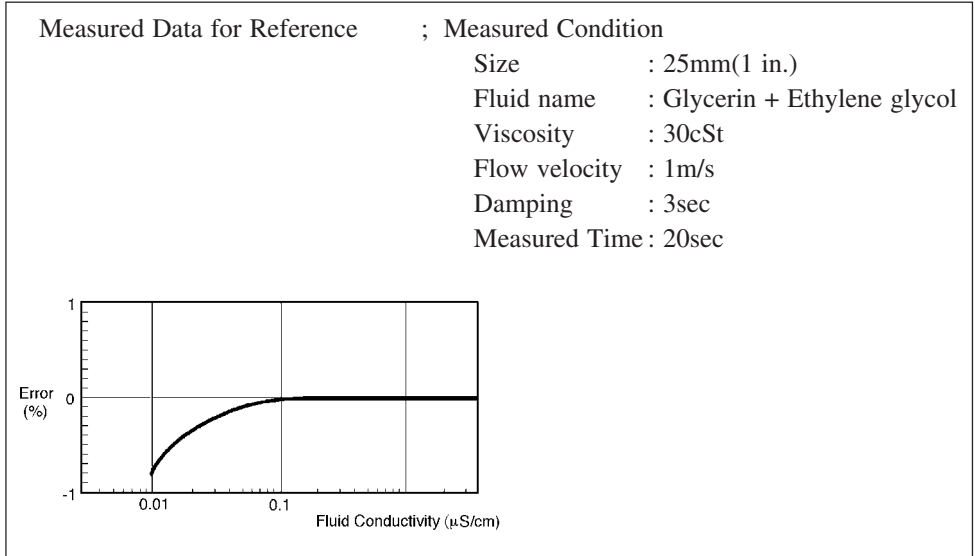


When performing the Voltage Breakdown Test, Insulation Resistance Test, or any unpowered electrical test, wait 10 seconds after the power supply is turned off before removing the housing cover. Be sure to remove the Short Bar at terminal "G". After testing, return the Short Bar to its correct position. Please be sure to use resistance when discharging. Screw tightening torque should be 12kgf.cm (0.88ft-lb) or more, because the G-terminal is thought as a protective grounding and should conform to the Safety Requirements.



### 10.3 Normal Operating Conditions

- **Ambient Temperature** : -20 to 50°C (-4 to 122°F)
- **Ambient Humidity** : 5 to 80%RH (no condensation)
- **Power Supply** : Range 80 to 264 V AC / 100 to 130 V DC, Range 20.4 to 28.8 V DC
- **Power Supply Frequency for Power Supply**: 47 to 63 Hz
- **Measurable Fluid Conductivity** :
  - Size 15 to 100mm (0.5 to 4 in): 0.01μS/cm or more
  - Size 150, 200mm (6,8 in): 1μS/cm or more
  - \* In case of size 5 to 100mm (0.5 to 4 in) for fluid of which conductivity is from 0.01μS/cm to 0.1μS/cm, refer to accuracy in the figure below.



## 10.5 Optional Specifications

A : Available N : Not available


ITEM	Specification	Use			Code
		General Purpose	Ex.Proof		
		CA***SG	CA***SC	CA***SN	
Waterproof Gland	Waterproof Glands are attached to Power and signal wiring ports. For JIS G1/2 only.	A	N	N	/ECG
Waterproof Gland with Union Joint	Waterproof Glands(union joint) are attached to Power and signal wiring ports. For JIS G1/2 only.	A	N	N	/ECU
Gasket for PVC pipe (Note 4)	Gaskets are attached between earth ring and flow tube.	A	A	A	/FRG
Lightning Protector	Built-in Lightning Protector(Only for 24VDC version)	A	A	A	/A
BRAIN Communication	Digital communication with BRAIN protocol	A	A	A	/BR
Epoxy Coating	Coating is changed to Epoxy coating.	A	A	A	/EPF
High Anti-corrosion Coating	Coating is changed to three-layer coating (Urethane coating on two-layer epoxy coating)	A	A	A	/X2
Material Certificate	Reproduced material certificate for earth ring.	A	A	A	/M01
Bolt & Nut Assembly (Note 1)	Carbon steel bolts/nuts and chloroprene gaskets assembly.	A	A	A	/BCC
	Carbon steel bolts/nuts and non-asbestos PTFE-wrapped gaskets assembly.	A	A	A	/BCF
	Stainless steel bolts(SUS304)/nuts(SUS403) and chloroprene gaskets assembly.	A	A	A	/BSC
	Stainless steel bolts(SUS304)/nuts(SUS403) and non-asbestos PTFE-wrapped gaskets assembly.	A	A	A	/BSF
TIIS(JIS) Flameproof (Note 2) (Note 3)	TIIS(JIS) Flameproof type	N	Note3	N	/JF3
Flameproof Packing Adapter for JIS Flameproof(Note 3)	One Flameproof Packing Adapter and a blind plug are attached.	N	Note3	N	/G11
	Two Flameproof Packing Adapters are attached.	N	Note3	N	/G12
FM Approval (Note 2)	FM Explosionproof	N	N	A	/FF11
CSA Certification (Note 2)	CSA Explosionproof	N	N	A	/CF11
Mirror Finished Ceramics	Mirror Finishing on the inside of ceramic tube (Rmax. <= 1micro-meter)	A	A	A	/MRR
180deg. Rotate Converter	180deg. rotate converter for reversed flow direction	A	A	A	/CRC
Oil-prohibited Use	Degreased cleansing treatment	A	A	A	/K1
Oil-prohibited Use with Dehydrating Treatment	Degreased cleansing treatment; Packing with desiccant	A	A	A	/K5
Hydrostatics Test Certificate	Test pressure depends on process connection (Test duration 10minutes) Test result is full in NOTE of QIC.	A	A	A	/T01
Calibration Certificate	Level2: Declaration and Calibration Equipment List	A	A	A	/L2
	Level3: Declaration and Primary Standard List	A	A	A	/L3
	Level4: Declaration and YOKOGAWA Measuring Instruments Control System	A	A	A	/L4

Note 1: It is available only for JIS 10K wafer, JIS 20K wafer or ANSI 150 wafer type.

2: It is available only for size 15 to 100mm (0.5 to 4 in).

3: Select optional code /JF3 with /G11 or /G12 in case of requirement of JIS Flameproof type.

/G11 is selectable only for DC power supply and 4-conductor cable use.

4:  Users must consider the characteristics of selected wetted parts material and the influence of process fluids. The use of inappropriate materials can result in the leakage of corrosive process fluids and cause injury to personnel and/or damage to plant facilities. It is also possible that the instrument itself can be damaged and that fragments from the instrument can contaminate the user's process fluids.

Be very careful with highly corrosive process fluids such as hydrochloric acid, sulfuric acid, hydrogen sulfide, sodium hypochlorite, and high-temperature steam (150°C [302°F] or above).

Contact Yokogawa for detailed information of the wetted parts material.

# 13. HAZARDOUS DUTY TYPE INSTRUMENT



## WARNING

- In this section, further requirements and differences for explosion proof type instrument are described. For explosion proof type instrument, the description in this chapter is prior to other description in this Instruction Manual.
- The terminal box cover and display cover are locked by special screw. In case of opening the terminal box cover, please use the Hexagonal Wrench attached.
- Be sure to lock the cover with the special screw using the Hexagonal Wrench attached after tightening the cover.

## 13.1 FM (Only for sizes 15 to 100 mm (0.5 to 4 in))

### (1) Technical Data

#### Optional code /FF11

**Applicable Standard:** FM 3600, FM 3615, FM 3810, ANSI/NEMA 250

Explosion proof for Class I, Division 1, Groups A, B, C & D.

Dust-ignitionproof for Class II/III, Division 1, Groups E, F & G.

Temp. Code: T6

Ambient Temp.: -20°C to +50°C (-4 to 122°F)

Maximum power supply voltage : 240 Vac/ 120 Vdc

Enclosure: TYPE 4X

### (2) Installation



## WARNING

- Installation shall be in accordance with the manufacturer's instructions and the National Electric Code, ANSI/NFPA-70
- In hazardous locations, wiring to be in conduit as shown in the figure.

### (3) Operation



## WARNING

- Open circuit before opening the covers and seal all conduits with in 18 inches in hazardous locations.
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous locations.

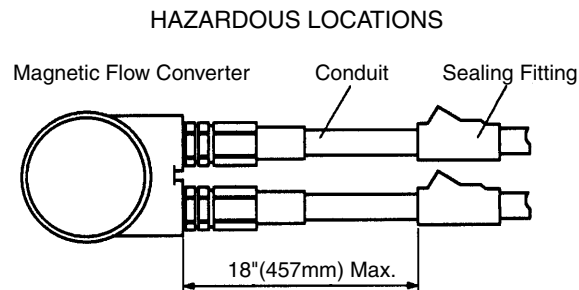


#### (4) Maintenance and Repair



#### WARNING

The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void the approval of Factory Mutual Research Corporation.



### 13.2 CSA (Only for sizes 15 to 100 mm(0.5 to 4 in))

#### (1) Technical Data

**Optional code /CF11**

**Applicable Standard:** CSA Standard C22.2  
No.0, No.0.4, No.0.5, No.25, No.30, No.94, No.61010-1

**Certificate:** 1500865

Explosion proof for Class I, Groups B, C and D; Class II, Groups E, F and G; Class III

Temp. Code: T6 T5 T4

Process Temp.: 70 85 120°C

Ambient Temp.: -20°C to +50°C (-4 to 122°F)

Maximum power supply voltage: 240 Vac/ 120 Vdc

Enclosure: TYPE 4X

#### (2) Installation




#### WARNING

All wiring shall comply with Canadian Electrical Code Part I and Local Electrical Codes.


In hazardous location, wiring shall be in conduit as shown in the figure.

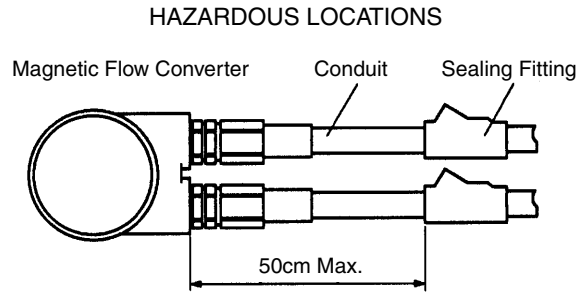
CAUTION : SEAL ALL CONDUITS WITHIN 50cm OF THE ENCLOSURE'  
UN SCELLEMENT DOIT ÊTRE INSTALLÉ À MOINS DE  
50cm DU BOÎTIER.

(3) Operation


 <b>WARNING</b>	<p>CAUTION : OPEN CIRCUIT BEFORE REMOVING COVER.                  OUVRIER LE CIRCUIT AVANT D'ENLEVER LE COUVERCLE.</p> <p>Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous location.</p>
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(4) Maintenance and Repair

 <b>WARNING</b>	<p>The instrument modification or parts replacement by other than authorized representative of YOKOGAWA Electric Corporation or YOKOGAWA Corporation of AMERICA is prohibited and will void Canadian Standards Explosionproof Certification.</p>
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### 13.3 TIIS(JIS) (Only for sizes 15 to 100 mm(0.5 to 4 in))

 <b>WARNING</b>	<p>Care should be taken to install, wiring, piping to keep safety. This instrument is restricted to maintenance and repair. Please read "INSTALLATION AND OPERATING PRECAUTIONS FOR JIS INTRINSICALLY SAFE EQUIPMENT" in the end of this manual.</p>
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(1) Technical Data

- Certificate:
 

Size (mm)	Certificate	Size (mm)	Certificate
15	TC13644	50	TC13647
25	TC13645	80	TC13648
40	TC13646	100	TC13649
- Construction: Exde II CT4
  - : Converter; Flameproof
  - Flow Tube; Increased Safety
  - : Ignition and Explosion Class of gas or vapour; II CT4
- Ambient Temperature: -20 to 50°C
- Fluid Temperature: 120°C or less
- Maximum power supply voltage: 250V AC/130V DC
- Grounding: JIS Class C(10Ω or less) or JIS Class A(10Ω or less)

 <b>WARNING</b>	<p>Maintenance and repair of the converter should be done in nonhazardous location after turning off.</p>
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