# MagneW 3000 PLUS Smart Electromagnetic Flowmeter

# Converter with FOUNDATION™ fieldbus

## Model MGG14C

## OVERVIEW

The MagneW 3000 PLUS electromagnetic flowmeter is a high performance, microprocessor-based electromagnetic flowmeter.
The MagneW 3000 PLUS fully complies with the 31.25 kbps voltage mode Fieldbus of the Fieldbus Foundation™. Its built in AI control function block provides process variable for the regulatory control.

The MagneW 3000 PLUS passed the Interoperability Test Program developed by the Foundation to assure maximum interoperability with other Foundation Fieldbus devices, and is registered with the Foundation. As such, it can cooperate seamlessly with other registered field devices as well as host systems in a wide range of control applications.

(Remote converter)

## FEATURES

### Liquid crystal display with optional backlighting

- Backlighting improves readability in direct sunlight or in a dark room.
- Simultaneously displays flow volume in percentage, actual flow volume and totalized flow volume.
- Rotating display improves visibility of integral models mounted on pipes up to 90° degrees from standard.

### Setting parameters by optional infrared ray touch sensor

- Allows safe-setting, in severe environments, without opening the cover of the converter.
- Prevent unwilling operation through the infrared ray touch sensor via special security function.

### Broader range-of-pitch in cable connection port

- Allows incorporation of an all-purpose waterproofing gland.
- The pitch of the cable connection port has been significantly increased.

FOUNDTION™ is a trademark of the Fieldbus Foundation.

## APPLICATIONS

**Pulp and Paper**

Pulp liquids, chemicals, corrosive liquids, industrialwater, wastewater, etc.

**Petroleum/petrochemical/chemicals**

Corrosive liquids, dyestuffs, chemicals, industrial water, waste water, etc.

**Public utilities**

Water supply systems, sewage systems, community drainage, human waste, sludge, sediment slurry, regulation of total effluent, etc.

**Food**

Potable water, light, medium and high density fluids, industrial water, waste water, etc.

**Steel/nonferrous metals/ceramics**

Alumina slurry, cooling water, industrial water, corrosive liquids, wastewater, etc.

**Machinery/equipment/electric machinery**

Corrosive liquids, cooking water, circulating water, industrial water, waste water, etc.

**Construction**

Building material slurry, sediment slurry, cement slurry, industrial water, etc.

**Shipbuilding**

Sediment slurry, etc.

**Electric power**

Corrosive liquids, cooling water, industrial water, wastewater, etc.

**Gas**

Circulating water for air conditioning, etc.

## FUNCTIONAL SPECIFICATIONS

### Type of protection

JIS C 0920 Waterproof model
NEMA ICS6-110 TYPE4X
IEC PUBL 529 IP66

### Measurable electrical conductivity

(with detector of 2.5mm to 1100mm in diameter)
3μS/cm or more (consult your Yamatake engineer when conditions are 3μS/cm or less.)

### Input signal

**Flow signal**

Electromotive force from the detector

### Output signal

**Flow output**

Fieidbus output

### Unit of flow indication

Can be selected from between percentage, volume flow, mass flow, time.

**Indication of volume flow** : $m^3$, L, $cm^3$, G, mG, kG, B
**Indication of mass flow** : t, kg, g, lb
**Indication of time** : d, h, min, s

### Lightning protection

12kV, 1000A
Equipped with the lighting arrester in the power source and external input and output terminals.

### Power failure

An EEPROM retains data record of totalized flow volume when pulse output is used (retention period approximately 10 years).

### Power supply

AC100V, 110V, 115/120V±10%
AC200V, 220V, 230/240V±10%

### Frequency

50Hz or 60Hz, DC24V±10%

### Power consumption

Within 13W (17VA)

### Ambient temperature limits

-25 to +60°C

### Ambient humidity limits

5 to 100% RH

## Optional specifications

**Display Indication by LCD with backlighting**

**Main display**

7-segment, 6 digits

**Sub display**

16 digits, 2 lines

**Display contents**

Demonstrates three values simultaneously

- Flow volume in percentage
- Actual flow volume
- Totalized flow volume (when pulse output selected)

**Selection of main display and secondary display**

Main display is selectable from three values.

**Data setter**

Setting by infrared ray touch sensor

**Infrared ray touch sensor:** four key switches

**Functions of built-in counter**

**Totalizer**

According to pulse scale setting, it totals one count at a time, for normal and reverse flows.

**Empty-status detection**

When the detector is empty, the output is fixed at zero. Display is latched to zero.

**Certification of traceability**

The following three documents are provided.

**Tropicalization treatment (for transportation/ storage)**

Protects the electromagnetic flow meter in harsh environments during transportation and/or storage.
The following treatments can be applied corrosion protection, moisture prevention and mildew proofing.

**Indication other than SI units**

Units to be exported other than SI units. Those units are as follows

**Volume unit**

B (barrel), kG (kilo-gallon), G (gallon),
mG (milli-gallon)

**Mass unit**

lb

**Tag number on terminal box**

The designated tag numbers (maximum 16 characters) should be stamped on a plate, which is attached to the terminal box. One line can contain 8 characters, so if more characters must be written on two lines.
Characters can be upper-case English letters, numbers and hyphens (-).

**PT1/4 air purge hole**

One of the cable connection ports is a dedicated air purge hole with threads for a PT1/4 screw.

For additional specifications, please contact your Yamatake representative.

# PERFORMANCE SPECIFICATIONS

## Accuracy

in combination with a detector

<diameter 2.5 to 15mm>Upper limit value of Vs=set velocity range

| Vs(m/s) | Velocity during measurement≥Vs×40% | Velocity during measurement≤Vs×40% |
|---|---|---|
| 1.0≤Vs≤10 | ±0.5% of indicated value | ±0.2% of Vs |
| 0.1≤Vs≤1.0 | ±(0.1/Vs+0.4)% of the indicated value | ±0.4(0.1/Vs+0.4)% of Vs |

<diameter 25 to 600mm> Upper limit value of Vs=set velocity range

| Vs(m/s) | Velocity during measurement≥Vs×20% | Velocity during measurement≤Vs×20% |
|---|---|---|
| 1.0≤Vs≤10 | ±0.5% of indicated value | ±0.1% of Vs |
| 0.1≤Vs≤1.0 | ±(0.1/Vs+0.4)% of the indicated value | ±0.2(0.1/Vs+0.4)% of Vs |

<diameter 700 to 1100mm>Upper limit value of Vs=set velocity range

| Vs(m/s) | Velocity during measurement≥Vs×50% | Velocity during measurement≤Vs×50% |
|---|---|---|
| 1.0≤Vs≤10 | ±1.0% of indicated value | ±0.5% of Vs |
| 0.1≤Vs≤1.0 | ±(0.2/Vs+0.8)% of the indicated value | (0.1/Vs+0.4)% of Vs |

# PHYSICAL SPECIFICATION

## Finish

Standard Acrylic resin
Corrosion - resistant Acrylic resin
Corrosion - proof Epoxy resin

## Color

Light beige (Munsell 4Y7.2/1.3)

## Main body material

Aluminum alloy

## Display cover material

Tempered glass, 5mm thick Aluminum alloy

## Weight

3.7kg

# INSTALLATION

## Electrical Connection

G1/2 (PF1/2) internal threads CM20 internal threads, Pg 13.5 internal threads

## Mounting

Integral detector/converter
Wall mounting, 2inch pipe mounting

## Grounding

Resistance lower than 100 Ω

# FIELDBUS SPECIFICATIONS

## Blocks supported by the MagneW 3000

| Name of Block | Number | Explanation |
|---|---|---|
| Resource Block | 1 | The Resource Block(RB) maintains overall resources of the MagneW 3000. |
| Transducer Block | 1 | The Transducer Block(XB) interfaces with the sensing element of the MagneW 3000, converts the measured value in engineering units specified, and sends it to the AI Function Block. |
| AI Function Block | 1 | The AI Function Block(AI FB) accepts an analog input signal from the XB, scales it, detects alarm conditions, and provides it in a uniform format in the Fieldbus network. |

## VCR Structure

The MagneW 3000 has 16 VCRs (Virtual Communication Relationships), of which the first one is dedicated to the SMIB/NMIB defined by the Foundation Fieldbus specifications. The rest of the VCRs are fully configurable. Their default configurations are shown below:

| VCR No. | Configuration | VCR No. | Configuration |
|---|---|---|---|
| 1 | QUB(Server) for NIMIB/SNIB | 9 | QUU(Source) |
| 2 | BNU(Subscriber) | 10 | QUU(Source) |
| 3 | BNU(Subscriber) | 11 | QUU(Source) |
| 4 | BNU(Subscriber) | 12 | QUB(Server) |
| 5 | BNU(Subscriber) | 13 | QUB(Server) |
| 6 | BNU(Subscriber) | 14 | QUB(Server) |
| 7 | BNU(Subscriber) | 15 | QUB(Server) |
| 8 | QUU(Source) | 16 | QUB(Server) |

## Network Parameters

The following table show the key parameter values that affect interoperability of the Fieldbus devices. The LAS need be configured to satisfy these parameters. If other devices on the same Fiedlbus network require a greater number for them, the greater number must be used. This will degrade network performance, though.

| Symbol | Parameter name | Range of Values |
|---|---|---|
| V(ST) | Slot Time | 4 to 100 |
| V(MID) | Minimum Interframe Gap | 10 to (V (MRD) -1) x V (ST), smaller than 120 inclusive. |
| V(MRD) | Maximum Response Delay | V (MRD) x (V (ST) shall be greater than 20 and V (MRD) shall be smaller than 11, inclusive. |
| T1 | SM Step Tuner | 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 comes with your LAS device.

Note: The T3 need be set between 15 seconds and 60 seconds.

# MODEL SELECTION

MagneW 3000 PLUS (Fieldbus model) (Converter/Integral Type)

Basic Model No.

| MGG14C | Selections | | | | - | Optional selections | | | | - | Options |
|---|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Power supply | AC100V 50/60Hz | A | | | |
| | AC110V 50/60Hz | B | | | |
| | AC115/120V 50/60Hz | C | | | |
| | AC200V 50/60Hz | D | | | |
| | AC220V 50/60Hz | E | | | |
| | AC230/240V 50/60Hz | F | | | |
| | DC24V AC Noise filter 50Hz | G | | | |
| | DC24V AC Noise filter 60Hz | H | | | |
| Output signal/ Communication | Fieldbus | | F | | |
| Electrical connection/ Watertight gland | G1/2 internal thread/Without watertight gland | | | 1 | |
| | G1/2 internal thread/With brass(Ni-plated) watertight gland | | | 2 | |
| | G1/2 internal thread/With plastic watertight gland | | | 3 | |
| | 1/2NPT internal thread/Without watertight gland | | | 4 | |
| | CM20 internal thread/Without watertight gland | | | 5 | |
| | Pg13.5 internal thread/Without watertight gland | | | 6 | |
| | Others | | | □ | |
| Installation/ Wiring direction | Integral model | Horizontal piping mounting/Upstream side | | | A |
| | | Horizontal piping mounting/Downstream side | | | B |
| | | Horizontal piping mounting/Left side viewed from upstream | | | C |
| | | Horizontal piping mounting/Right side viewed from upstream | | | D |
| | | Vertical piping mounting/Downstream side (Flow direction :Downstream to upstream) | | | E |
| | | Others | | | □ |

| | | |
|---|---|---|
| X | Finish | Standard finish |
| 1 | | Corrosion-resistant finish |
| 2 | | Corrosion-proof finish |

0

| | | |
|---|---|---|
| X | Display with data setting device | None |
| A | | With display and data setting device |

| | | |
|---|---|---|
| X | Contact in-puts/output | None |

| | | |
|---|---|---|
| X | Approval | None |

| | |
|---|---|
| A | Empty-pipe detection |
| C | Certification of traceability |
| E | Tropicalization treatment |
| H | Indication other than SI units |
| J | Attachment of the TAG number to the terminal box |
| Y | Yamatake Version (must be selected) |
| □ | Others |

# MagneW 3000 PLUS (General) (Converter/Remote Type)

Basic Model No.

| Basic Model No. | Selections | | | | | Optional selections | | | | | Options |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MGG14C | | | | | - | | | | | - | |

| | | | |
|---|---|---|---|
| Power supply | AC100V 50/60Hz | A | |
| | AC110V 50/60Hz | B | |
| | AC115/120V 50/60Hz | C | |
| | AC200V 50/60Hz | D | |
| | AC220V 50/60Hz | E | |
| | AC230/240V 50/60Hz | F | |
| | DC24V AC Noise filter 50Hz | G | |
| | DC24V AC Noise filter 60Hz | H | |
| Output signal/ Communication | Fieldbus | | F |
| Electrical connection/ Watertight gland | G1/2 internal thread/Without watertight gland | | 1 |
| | G1/2 internal thread/With brass(Ni-plated) watertight gland | | 2 |
| | G1/2 internal thread/With plastic watertight gland | | 3 |
| | 1/2NPT internal thread/Without watertight gland | | 4 |
| | CM20 internal thread/Without watertight gland | | 5 |
| | Pg13.5 internal thread/Without watertight gland | | 6 |
| | Others | | □ |
| Installation/ Wiring direction | Remote model | Wall mounting/With standard bracket | G |
| | | 2 in. pipe mounting/With standard bracket | H |
| | | Others | □ |

| | | |
|---|---|---|
| A | Empty-pipe detection | |
| B | Pulse output(Open collector) | |
| C | Certification of traceability | |
| E | Tropicalization treatment | |
| H | Indication other than SI units | |
| J | Attachment of the TAG number to the terminal box | |
| Y | Yamatake Version (must be selected) | |
| □ | Others | |

| | | |
|---|---|---|
| X | Finish | Standard finish |
| 1 | | Corrosion-resistant finish |
| 2 | | Corrosion-proof finish |

| | | |
|---|---|---|
| X | Display with data setting device | None |
| A | | With display and data setting device |

| | | |
|---|---|---|
| X | Contact in-puts/output | None |

| | | |
|---|---|---|
| X | Approval | None |

## Converter Terminal Correspondence Table

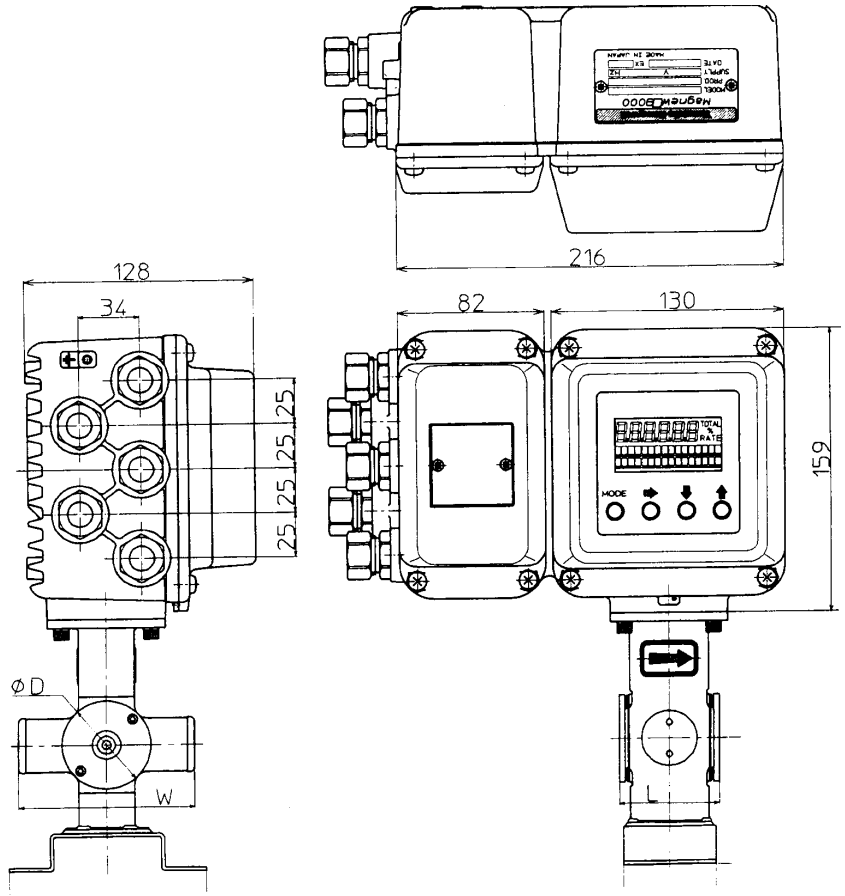
| Symbol | | Description |
|---|---|---|
| A | | Flow rate signal input |
| B | | |
| C | | |
| SA | | |
| SB | | |
| FIELDBUS | + | Fieldbus output |
| | - | |
| X | | Excitation output |
| Y | | |
| POWER AC | L | Power supply |
| | N | |
| E | | Not used |
| ⏚ | | Grounding resistance lower than 100Ω |

Note) When the power supply is 24 VDC, "POWER AC" should read "POWER 24 V DC"

## DIMENSIONS

**Integral Type**

(Unit:mm)

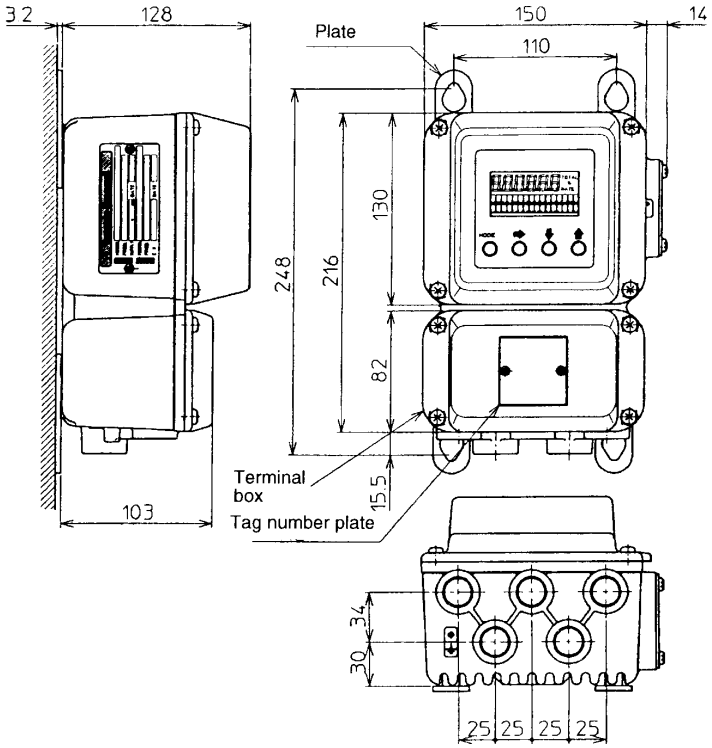



Note: The weight of an integral detector is 100g less than the mass of remote detectors.

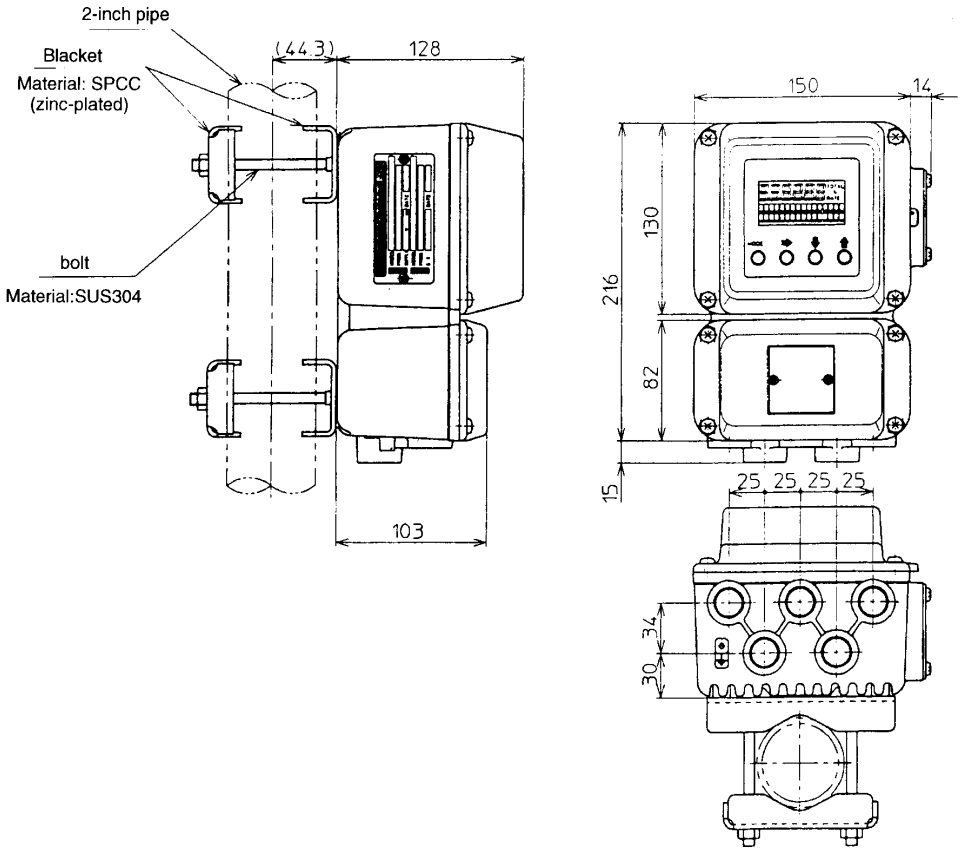
Remote type

(Unit:mm)

**Wall mounting**

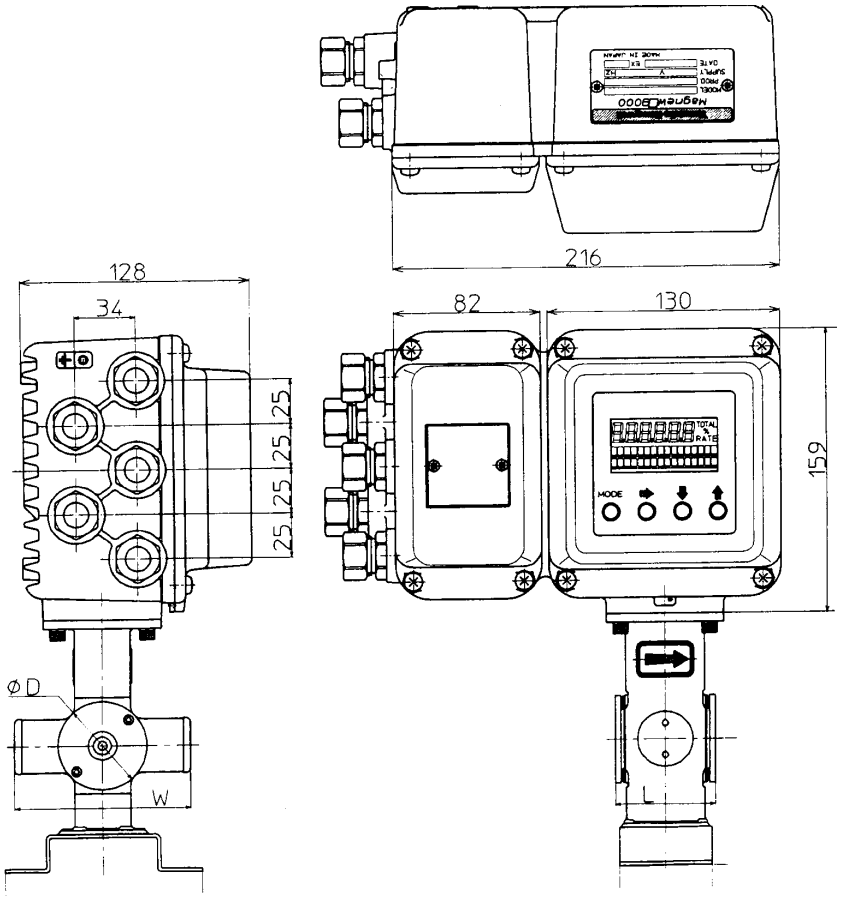



**2-inch pipe mounted**



**Integral Type**

(Unit:mm)




Note: The weight of an integral detector is 100g less than the mass of remote detectors.

# *Note*

# *Note*

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