TECHNICAL GUIDANCE

MAGMAX®
EGM5100C
Compact Electromagnetic Flowmeter

GENERAL

MAGMAX® EGM5100C is a combination of EGS5000 primary head with Ceramic measuring tube and converter EGC100.
EGM5100C with high durability and high anti-corrosive capability is widely applicable for chemical liquid, slurry and many other applications.
Improved self-diagnostic functions include empty pipe detection and conductivity monitoring.
2.5 to 100mm sizes are available.

FEATURES

- ❑ Combination of Ceramic tube and Platinum electrodes is adopted for high anti-corrosive, anti-erosion, and anti-penetration capability.
- ❑ Dimensionally stable measuring tube with excellent temperature resistance and long-term stability, no creep and no abrasion as is the case with plastic liners.
- ❑ Stainless steel housing is adopted.
- ❑ The newly designed reducing tube offers high accuracy and stability even for low velocity range and mechanical durability of measuring tube.
- ❑ High accuracy of ±0.5% of reading.
- ❑ High speed data processing for quick response. Suitable for batch process control and for pulsating flow.
- ❑ The extendable excitation system allows applications to much fluid noise such as slurry.
- ❑ The LCD with backlight provides 1 to 3 lines of versatile indication.
- ❑ Equipped with a quick setup function to readily respond to changed flow range, pulse rate, etc.
  The push buttons allow you to alter the settings without removing the cover of conversion section.
- ❑ 10kHz high-speed pulse output. Capable of responding to short batch processes.
- ❑ Bi-directional measurement, double ranges and status outputs including flow rate alarms are standardized.

STANDARD SPECIFICATION

General Specification

- ● Excitation : Square wave
- ● Nominal size : 2.5, 4, 6, 10, 15, 25, 40, 50, 80, 100mm
- ● Measuring range : Flow velocity Min. 0 to 0.3m/s
  Max. 0 to 12m/s
  Flow rate Min. 0 to 0.0054m³/h
  (Minimum flow at 2.5mm size)
  Max. 0 to 339m³/h
  (Maximum flow at 100mm size)
- ● Protection class : IP66/67 (IEC 60529)
- ● Body material
  - Primary head housing : Size 2.5 to 15mm : Stainless steel cast
    Size 25 to 100mm : Stainless steel
  - Converter housing : Aluminum alloy (*1)
  - Converter cover : Aluminum alloy (*1)
  - Indicator water protection sheet : Polyester
- ● Wetted part material
  - Measuring tube : Size 2.5 to 25mm
    Zirconia ceramics (ZrO_2)
    Size 40 to 100mm
    Alumina ceramics (Al_2O_3)
  - Electrode : Size 2.5 to 25mm ; Pt CERMET
    Size 40 to 100mm ; Platinum
  - Earth ring : Stainless steel/SS316 [Standard], Hastelloy® B, Hastelloy® C, Titanium, Tantalum (*2) (*3)
  - Gasket for earth ring (*3) : PTFE jacket type with joint sheet core or Fluorocarbon resin

(*1) Anti-corrosive painting
(*2) Tantalum earth ring is a combination of tantalum plate and PTFE jacket type gasket with Viton core.
(*3) Refer to "Operating range for the earth ring gaskets".

- Painting : Siloxane coating (*4)
- Color (*4) : Grey (Converter housing)
  Jade green (Converter cover)
- Cable entry : 2 × G1/2 female thread
  2 × 1/2 NPT female thread
  2 × M20 with watertight glands
  (Option : Watertight glands for G1/2)
- Supply voltage : 100 to 230V AC (85 to 253V AC)
  Option : 24V DC (11 to 31V)
- Supply frequency : 48 to 63Hz (AC)
- Power consumption : AC; approx. 8VA
  DC; approx. 4W
- Ambient temp. : –40 to +65°C (Fluid temp. ≤140°C)
  –40 to +70°C (For storage)
- Grounding : Grounding resistance must be less than 100Ω.
- Process connection : Wafer type
- Matching flanges : JIS10K/20K/30K/40K,
  ASME class 150/300, DIN PN16/40

(*4) Converter housing only, Stainless housing of primary head has no painting.

Fluid Specification

- Temperature : –40 to +140°C
- Pressure : Size 2.5 to 80mm ; 0 Pa (abs) to 4 MPa
  Size 100mm ; 0 Pa (abs) to 1.6 MPa
- Conductivity : 10μ S/cm or more, however 20μ S/cm or more is required for water.
- Permissible : Temperature rising
  temperature change in 10 minutes ;
  ΔT≤150°C
  (for sudden change ; ΔT≤120°C)
  Temperature falling in 10 minutes ;
  ΔT≤100°C
  (for sudden change ; ΔT≤80°C)

Indication and Output Specification

- Indicator : Dot matrix LCD (With backlight)
  128 × 64 pixels (59 × 31mm)

  Indication function :
  Changeover (2 screens)
  One to three lines are displayed at one screen.
  Contents of indication ; Flow rate, velocity, total flow, Conductivity (Only nominal size 25 to 100 mm), and coil temperature
- Current output : 4 to 20mA DC (Max. 22mA at burn out error mode)
  Internal power supply : Less than 750ohms (Load resistance)
  External power supply : Less than 32V DC (External voltage)
- Pulse output

  Open collector output
  Rating : Less than 32V DC, 20mA (≤10kHz)
  Less than 100mA (≤100Hz)
  Residual voltage: Less than 1.5 VDC at 10 mA
  Leak current: Less than 0.5 mA at 24 VDC

  Pulse rate
  2 to 36,000,000 pulse/h (0.00056Hz to 10kHz)

  Pulse width
  One of the following selectable
  1) Automatic : Pulse width by which duty factor to be 50% at full scale
  2) Duty factor 1:1 fixed
  3) Free setting ; 0.05 to 2000ms
- Status output

  Open collector output
  Rating : 32V DC, 100mA Max.
  Residual voltage: Less than 1.5 VDC at 10 mA
  Leak current: Less than 0.5 mA at 24 VDC

  Contents of output
  One of the following selectable:
  1) No status output (Standard factory setting)
  2) Identification of flow direction
  3) Over range
  4) Error
  5) Flow alarm
  6) Identification of range (For double range measurement)
  7) Empty pipe detection (Only nominal size 25 to 100 mm)
- Description of input and output terminal

Terminal	Standard setup	Switchover by reprogramming
A (A, A+ / A–)	Current output	–
C (C, C–)	Status output	–
D (D, D–)	Pulse output	Status output

- Low flow cutoff
  Current output, Pulse output, Indicator (Separate setting is possible.)
  Setting value : 0.0 to 20.0% FS
  Setting value (Standard) :
  Current output, Pulse output ; ON 1%, OFF 2% FS
  Indicator ; Without low flow cutoff
- Damping time constant
  Current output, Pulse output, Indicator (Separate setting is possible.)
  Setting value : 0.0 to 100.0s
  Setting value (Standard) :
  Current output, Indicator ; 4s
  Pulse output ; Damping time constant 0
- Isolation of input and output
  Each circuit of power supply, electrode input, terminal A, terminal C, and terminal D are isolated.

Standard Functions

- Customer's free measuring unit setting function
  Volume (or mass) and time unit in 7 characters can be created.
- Automatic zero adjustment function
  Zero adjustment is automatically conducted at "ZERO ADJUST MODE" (Subject to zero flow)
- Bi-directional flow measurement function
  A flow-direction distinction signal is outputted in state output and current.
- Double range measurement function
  Possible range setting range ratio 1 : 20 to 1 : 1.25
  (Setting range of low range : 5 to 80% of high range)
  Range selection : Automatic
- Excitation current frequency switching function
  Standard mode :
  1/6 of supply frequency (Standard)
  Special frequency mode :
  1/50 to 1/2 times of supply frequency (*5)

(*5) It can be changed for every application, such as slurry and a pulsating flow.

- Self diagnosis function

  The following conditions are indicated by error message;
  Functional diagnosis :
  Coil disconnection, CPU, Memory, Software, Output module, and Output connection
  Status diagnosis :
  Empty pipe detection, Over range, Counter over flow, and Power fail detection

- Memory save function for power fail

  Operation parameters and totalization figures are stored for more than 10 years by EEPROM (Non volatile memory).

- Testing function

  Simulating output function for current, pulse output and status output are integrated.
  Current output test : Arbitrary output (0.0 to 22.0 mA)
  Pulse output test : Arbitrary output (1Hz to 10kHz)
  Status output test : On / Off

- Push button setting function

  The push buttons allow you to alter the settings without removing the cover of conversion section.

- HART communication

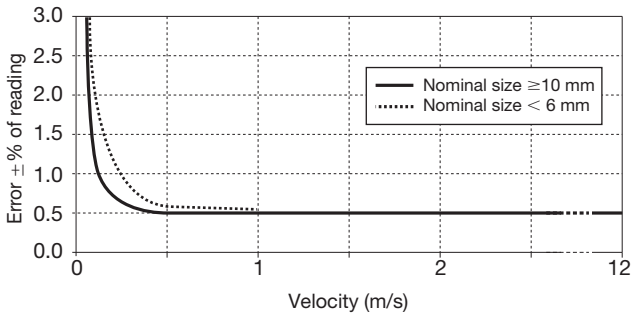
  Please confirm the specification to us.

Accuracy (*6)

- Indication and Pulse output

  (Nominal size: 2.5 mm to 6 mm)
  For velocity ≥1 m/s : ±0.5% of reading
  For velocity < 1m/s : ±0.4% of reading + velocity error ±0.001 m/s

  (Nominal size: 10 mm to 100 mm)
  For velocity ≥ 0.5 m/s : ±0.5% of reading
  For velocity < 0.5 m/s : ±0.3% of reading + velocity error ±0.001 m/s



- Current output :

  Additional error of ±0.01mA be added to the accuracy of indication or pulse output.

(*6) Basis condition

Fluid	: Water
Fluid temperature	: 10 to 30°C
Conductivity	: 150μS/cm or more
Supply voltage	: Rated voltage ±2%
Ambient temperature	: 18 to 28°C
Upstream / Downstream pipe length	: 10D / 2D (D: Diameter)
Warm-up time	: About 10 minutes
Measuring time	: 100s

Operating range for the earth ring gaskets

Gasket	Fluid pressure	Fluid temperature
PTFE jacket type with joint sheet core (equivalent to VALQUA No. N7035)	≤1.5MPa	≤140℃
Fluorocarbon resin (equivalent to VALQUA No. 7020)	≤4MPa	≤140℃
Tantalum earth ring (PTFE jacket type gasket with Viton core)	≤0.7MPa	≤140℃

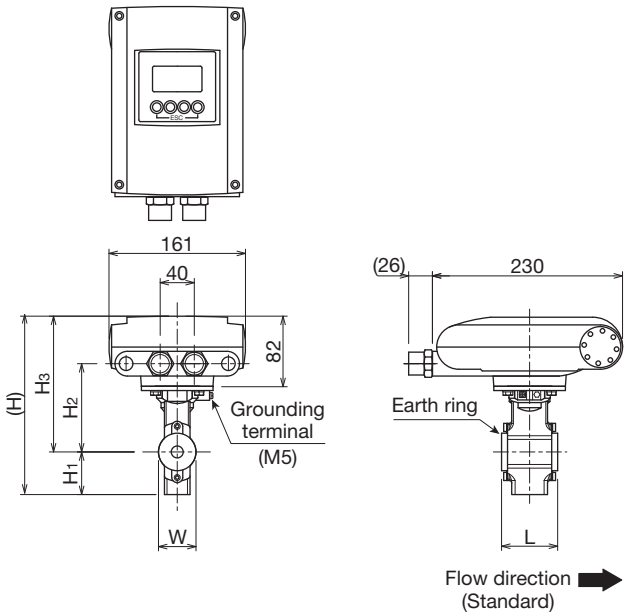
FLOW RANGE

Nominal size (mm)	Possible setting range (m³/h)	
	Min. (Flow velocity : 0 to 0.3 m/s)	Max. (Flow velocity : 0 to 12 m/s)
2.5	0 ~ 0.0054	0 ~ 0.212
4	0 ~ 0.0136	0 ~ 0.542
6	0 ~ 0.0306	0 ~ 1.22
10	0 ~ 0.0849	0 ~ 3.39
15	0 ~ 0.191	0 ~ 7.63
25	0 ~ 0.531	0 ~ 21.2
40	0 ~ 1.36	0 ~ 54.2
50	0 ~ 2.13	0 ~ 84.6
80	0 ~ 5.43	0 ~ 217
100	0 ~ 8.49	0 ~ 339

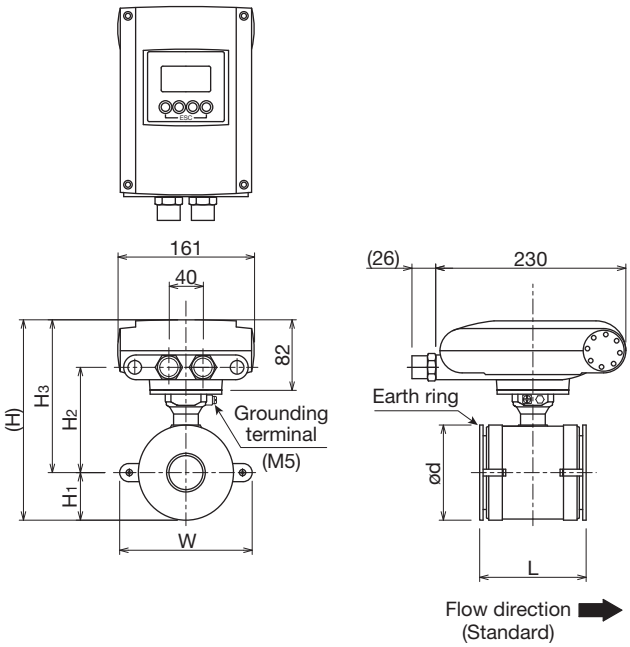
DIMENSIONS

Version 1 type

Nominal size: 2.5 to 15mm

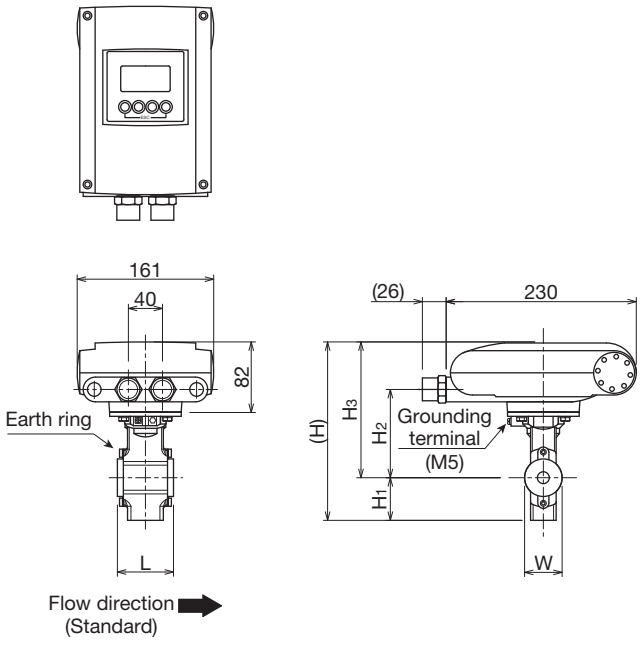


Nominal size: 25 to 100mm

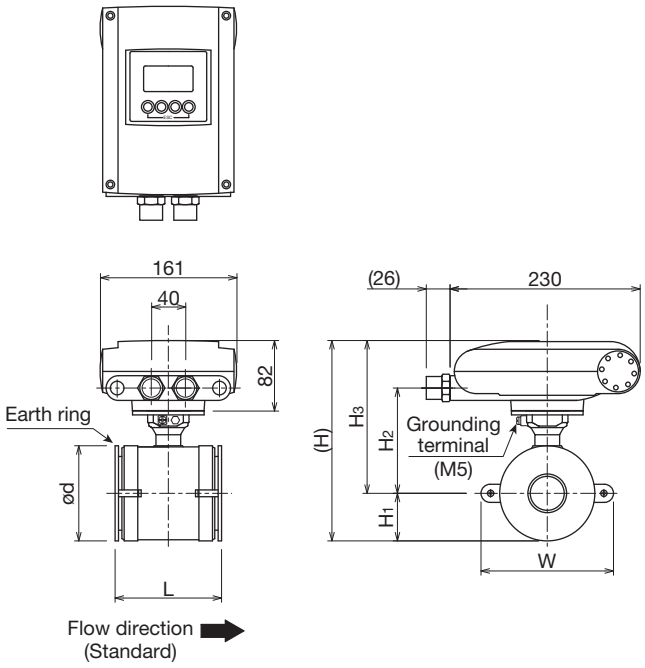


Version 2 type

Nominal size: 2.5 to 15mm



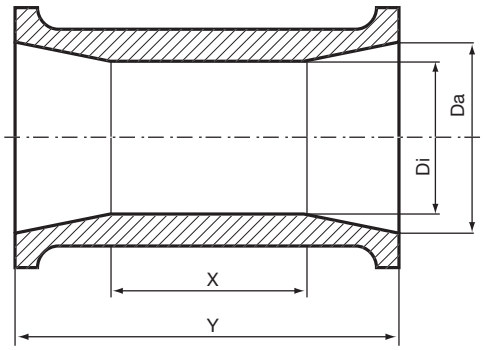
Nominal size: 25 to 100mm



Nominal size (mm)	Dimensions (mm)							Mass (kg)
	L*	(H)	H_1	H_2	H_3	W	d	
2.5 ~ 15	68	211	51	105	160	44	–	4
25	69	198	34	109	164	102	68	4
40	94	213	42	116	171	117	84	5
50	114	231	51	125	180	136	102	6
80	164	263	67	141	196	168	134	9
100	214	288	79	154	209	193	158	11

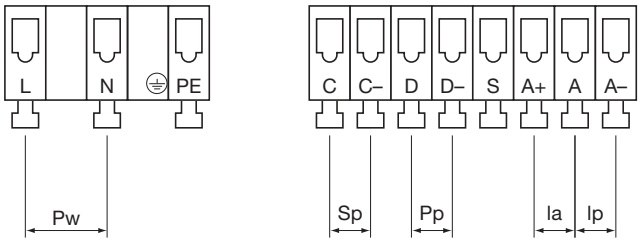
*1 Dimension L is for with PTFE jacket type gaskets for earth rings.
Dimension L is shorter by 2mm in case of Fluorocarbon resin gaskets for earth rings.
*2 Dimension L is shorter by 5mm (size 2.5 to 15mm) or 1mm (size 25 to 100mm) in case of Tantalum earth rings.

DIMENSIONS FOR CERAMIC TUBE



Nominal size (mm)	Dimensions (mm)			
	Da	Di	X	Y
2.5	6	2	20	50
4	7	3	20	50
6	9	5	20	50
10	12	7	20	50
15	14	12	20	50
25	24	20	26	55
40	37	30	36	80
50	49	40	51	100
80	78	60	70	150
100	98	80	103	200

ELECTRICAL CONNECTION

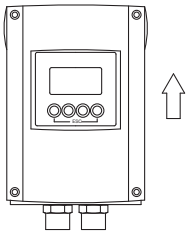


Mark	Terminal	Polarity	Description
Ip	A	+	Current output when power is supplied externally.
	A–	–	
Ia	A	–	Current output when power is supplied internally.
	A+	+	
Sp	C	+	Status output by open collector
	C–	–	
Pp	D	+	Pulse output by open collector
	D–	–	
Pw	L (L+)	(+)	AC or DC power supply The ( ) show DC power.
	N (L–)	(–)	
	PE (FE)		Grounding for power supply. The (FE) shows DC power.
	S		Grounding for shielded wire

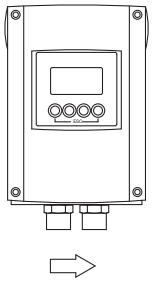
- Terminal type : Spring clamp terminal
- Applicable core size : 0.5 to 2.5mm²

Mounting direction of indicator

Version 1 type (Standard)



Version 2 type



The flow directions can be set in the opposite direction by changing the setting data.

MODEL AND SPECIFICATION CODE

- Nominal size : 2.5 to 100mm

Model : EGM5100C

Primary head Spec. code	V N 1 8	4		N	0	1 3	0		0	0	0 0	0	0 2 0 0 0 0 0		Description			Standard
Primary head code	V N 1 8														Wafer / Ceramic type / Platinum electrodes			○
(Fixed code)		4													always 4	Connection flange size		○
Nominal size			1												2.5mm	10 or 15A	1/2"	○
			2												4mm			○
			3												6mm			○
			5												10mm			○
			6												15mm	15A	1/2"	○
			8												25mm	25A	1"	○
			B												40mm	40A	1-1/2"	○
			C												50mm	50A	2"	○
			E												80mm	80A	3"	○
			F												100mm	100A	4"	○
Process connection				N											Wafer type			○
(Fixed code)					0										always 0			○
Type						1 3									Compact version (EGC100 Converter)			○
(Fixed code)							0								always 0			○
Earth ring / Gasket for earth ring *1								1							Stainless steel (SS316) / PTFE			○
								2							Hastelloy® C/ PTFE	Fluid pressure : 1.5MPa or less		
								3							Hastelloy® B/ PTFE			
								6							Titanium / PTFE			
								K							Stainless steel (SS316) / Fluorocarbon resin	Fluid pressure : 4MPa or less		
								L							Hastelloy® C/ Fluorocarbon resin			
								R							Hastelloy® B/ Fluorocarbon resin			
								S							Titanium / Fluorocarbon resin			
								T							Tantalum with PTFE gaskets	Fluid pressure : 0.7MPa or less		
								9							Others			
Electrode material									0						Standard			○
Protection class										0					IP66/67			○
(Fixed code)											0 0				always 00			○
Calibration												0			Standard calibration			○
(Fixed code)													0 2 0 0 0 0 0		always 0200000			○
Special feature														(Blank)	None			○
														/Z	Involved *2			

Converter Spec. code	V N 3 1	4	4		0		6 0 0	1		2	1	0 0 0 0 0		Description		Standard
Converter code	V N 3 1													Type: EGC100		○
(Fixed code)		4												always 4		○
Type			4											Compact type (EGC100 Converter 0° type)		○
Power supply				1										24V DC (11 to 31V)		
				A										100 to 230V AC (85 to 253V)		○
(Fixed code)					0									always 0		○
Cable entry						4								1/2 NPT female thread		
						5								G1/2 female thread		○
						6								M20 with watertight glands		
(Fixed code)							6 0 0							always 600		○
Housing								1						Standard		○
Mounting position of LCD display									1					Version 1	Refer to the drawing MOUNTING DIRECTION OF INDICATOR.	○
									2					Version 2		
(Fixed code)										2				Always 2		○
Output type											1			Standard (Current output + Pulse output + Status output)		○
(Fixed code)												0 0 0 0 0		always 00000		○
Special feature													(Blank)	None		○
													/Z	Involved *2		

*1 Refer to "Operating range for the earth ring gaskets".

*2 Add code "/Z" to a series of above mentioned codes with explanation for the other requirements not mentioned above code table.
Do not hesitate to consult TOKYO KEISO Co., Ltd. before ordering for such requirements.

STANDARD ACCESSORIES

- Parameter sheet : 1
- Instruction manual : 1

OPTION

- Bolt and nut for piping : 1 set [Symbol : BN]
  Material : SUS304, for JIS10K flange
- PTFE jacket type gaskets for piping : 2 pcs [Symbol : FG]
  VALQUA No. N7030, for JIS10K flange
  Note: Please inform us of the flange rating other than JIS 10K if you place an optional order with bolts, nuts and gaskets for installation.
- G1/2 watertight glands for cable entry : 1 set [Symbol : WG]

ORDERING INSTRUCTIONS

Specify the following when ordering :

1. Model and spec. code
   Example : Model : EGM5100C
   Primary head spec. code :
   VN1848N01301000000200000
   Converter spec. code : VN3144A05600112100000
2. Flow range (Full scale) (Unnecessary when option is NS.)
3. Option (Specify if necessary.)
   Specify the symbol with reference to the option.
4. Fluid name

* Specification is subject to change without notice.

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