

GENERAL

MAGMAX® EGM7300C adopts flat capacitance detection type electrodes which are located outside of measuring tube made of ceramics instead of the conventional liquid contacting metallic electrodes for detection of flow velocity.

Thanks to the capacitance detection and non-wetted electrode design, EGM7300C has achieved the stable measurement of very low conductivity liquids, highly concentrated slurries and adhesive liquids.

With the self-diagnosis function EGM7300C has intensified its reliability by monitoring status of primary head.

FEATURES

- Low conductivity liquid measurement down to 0.05 $\mu\text{S}/\text{cm}$
Organic solvents, demineralized water...Liquids which have not been measured by Electromagnetic flowmeters due to low conductivity are now in the range of measurement !
- High anti-corrosive capability, high durability against erosion...
The non-wetted electrodes and high-purity ceramics measuring tube have eliminated all existing problems such as corrosion, erosion and electrode troubles.
- Stable measurement even for highly concentrated slurry liquids
Free from noises generated when solid particles in slurry contacting to the electrodes thanks to non-wetted electrode design.
- Stable measurement of high adhesive liquids
Without liquid contact, non-wetted electrodes are very durable against adhesive liquids. Maintenance free !
- High anti-vibration capability
Flat capacitance electrodes and pre-amplifier are fully integrated on the outer surface of measuring tube by Microsystems Technology. Eliminating the vibration effects caused by internal wirings, EGM7300C with the rigid and fixed construction has reduced significantly fluctuations of indication effected by process vibration compared with the conventional capacitance type electromagnetic flowmeters.
- High accuracy of $\pm 0.5\%$ of reading
- Blue dot matrix LCD with back light
Versatile indications with 1 to 3 lines of display
- Quick and easy setting up when altering of flow rate range and pulse rate
A touch panel system by an infrared sensor allows you to alter the settings without removing the cover of the conversion section.
- 10 kHz high-speed pulse output
Capable of responding to short batch processes
- Compact design with high performance
Current and pulse output, bi-directional measurement, double range, status (alarm, etc.) output, control input...Full function provided in compact design.

STANDARD SPECIFICATION

- Excitation : Square wave
- Nominal size : 25, 40, 50, 80, 100 mm
- Measuring range : Flow velocity
Min. 0 to 0.3 m/s
Max. 0 to 12 m/s
- Flow rate
Min. 0 to 0.531 m³/h
(Minimum flow rate at size 25 mm)
Min. 0 to 339 m³/h
(Maximum flow rate at size 100 mm)

- Protection class : IP66/67 (IEC 60529)



- Housing material
 - Primary head : Stainless steel (SS304)
 - Converter : Aluminum alloy *1
- Wetted part material
 - Measuring tube : Size 25 mm : Zirconia ceramics (ZrO₂)
Size 40 to 100 mm : Alumina ceramics (99.7% Al₂O₃)
 - 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 equivalent to Valqua No. 7035 as standard or Fluorocarbon resin equivalent to Valqua No. 7020.
- Painting : Siloxane coating *4
- Color : Grey (Converter housing), Jade green (Converter cover / Terminal box cover)
- Cable entry : 2 × G1/2 female thread or
2 × 1/2 NPT female thread or
2 × M20 with water tight glands
(Option : Water tight glands for G1/2)
(Option : with 3 pieces of cable entries)
- Supply voltage : 100 to 230 V AC (85 to 253 V)
Option : 24 V DC (11 to 31 V)
- Supply frequency : 48 to 63 Hz
- Power consumption : AC : approx. 22 VA, DC : approx. 12W
- Ambient temperature : -40 to +65°C (Fluid temp. $\leq 100^\circ\text{C}$)
-50 to +70°C (For storage)
- Process connection : Wafer type (sandwiched between flanges)
- Flanges : equivalent to JIS10K/20K/30K/40K,
equivalent to ASME class 150/300, DIN PN16/40
- Grounding : Grounding resistance must be less than 100 Ω

*1 Anti-corrosive painting

*2 Tantalum earth ring is a combination of tantalum plate and Teflon PTFE jacket type gasket with Viton core.

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

*4 Converter housing only. No painting on the stainless steel primary head.

- Fluid specification
 - Conductivity : 0.05 μ S/cm or more
(1 μ S/cm or more for water)
* Refer to "Minimum fluid conductivity" table.
 - Temperature : -40 to +100°C
 - Pressure : Size 25 to 80mm: 0 Pa (abs) to 4MPa
Size 100mm: 0 Pa (abs) to 1.6 MPa
 - Permissible temperature change :
Temperature rising in 10 minutes : $\Delta T \leq 125^\circ\text{C}$
for sudden change : $\Delta T \leq 120^\circ\text{C}$
 - Temperature falling in 10 minutes : $\Delta T \leq 100^\circ\text{C}$
for sudden change : $\Delta T \leq 80^\circ\text{C}$

Indication and Output Specification

- Indicator : Blue, dot matrix LCD with back light
128 × 64 pixels (59 × 31 mm)
- Display : Changeover of Max. 2 screens with 1 to 3 lines of display at one screen.
Flow rate, total flow volume, flow velocity and coil temperature are indicated.
- Current output : 4 to 20 mA DC (Max. 22 mA ; Scale out at error status)
When using internal power supply : Load resistance 1000 W or less
When using external power supply : External voltage 32 V DC or less
- Pulse output
 - Open collector output
 - Rating : 32 V DC or less, 20 mA or less (\leq 10 kHz)
100 mA or less (\leq 100 Hz)
 - Pulse rate : 2 to 36,000,000 pulse/h (0.00056 Hz to 10 kHz)
 - Pulse width
 - One of the following selectable :
 - 1) AUTO : Pulse width by which duty factor to be 50% at full scale
 - 2) Duty factor 1: 1 fixed
 - 3) Free setting : 0.05 to 2000 ms
- Status output
 - Open collector output
 - Rating : 32 V DC or less, 100 mA or less
 - 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 flow detection
- Control input
 - Voltage input
 - Low : 0 to 2.5 V DC, High: 19 to 32 V DC
 - Contents
 - One of the following selectable :
 - 1) No control input (Standard factory setting)
 - 2) Signal hold
 - 3) Signal lock to 0%
 - 4) Total counter reset
 - 5) Error reset
 - 6) Range selection (For double range measurement)
- Description of input and output terminal

Terminals	Standard settings	Changeover by setting
A (A, A+ / A-)	Current output	—
B (B, B-)	Status output	Control input
C (C, C-)	Status output	—
D (D, D-)	Pulse output	Status output

- Low flow cut off
 - Capable of individual setting of current output, pulse output, indication
 - Setting value : 0.0 to 20.0 % F.S.
 - Standard setting values
 - Current output, pulse output : ON 1%, OFF 2 % F.S.
 - Indication : No low cut-off
- Damping time constant :
 - Capable of individual setting of current output, pulse output, indication
 - Setting value : 0.0 to 100.0 seconds
 - Standard setting values
 - Current output, indication : 4 seconds
 - Pulse output : 0 second
- Isolation of input and output
 - Each circuit of power supply, electrode input, exciting current output, terminal A, terminal B, terminal C, terminal D is isolated.

Standard Functions

- Customer's free measuring unit setting function
 - Volume (or mass) and time units in 7 characters can be created.
 - Available any flow measuring units for indication.
- 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 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 : By automatic or external signal (Control Input)
- Excitation current frequency switching function
 - Standard mode : 1/6 of power supply frequency
 - Special mode : 1/50 to 1/2 of power supply frequency *5
- Self-diagnosis function
 - Following major error messages are indicated
 - Functional diagnosis : Coil disconnection, CPU, Memory, Soft ware, Output module, Output connection
 - Status diagnosis : Velocity distribution, Linearity, Exciting current/ frequency, Over range, Counter over flow, 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
 - Simulation tests for current, pulse, status outputs are available.
 - Current output : any value between 0.0 to 22.0 mA
 - Pulse output : any value between 1 Hz to 10 kHz
 - Status output : On/Off
- Setting by touch sensor with infrared
 - Four infrared sensors allow you to alter settings from outside without removing cover.
- HART Communication : Standardized

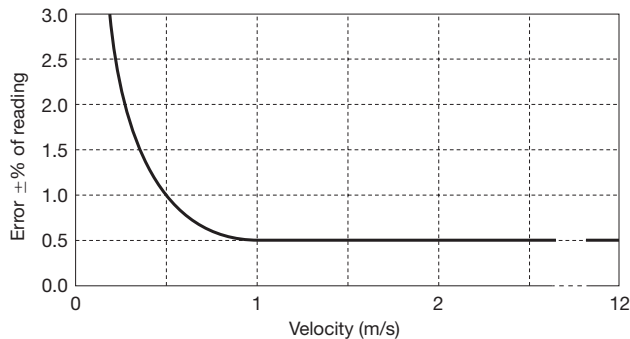
*5 The excitation current frequency can be altered according to an application such as pulsation flow or etc.

Explosionproof

- ATEX Explosionproof [in preparation]

Accuracy *6

- Indication and pulse output
 - For velocity ≥ 1 m/s : $\pm 0.5\%$ of reading
 - For velocity < 1 m/s : Velocity error of ± 0.005 m/s



- Current output: Additional error of ± 0.01 mA is added onto the accuracy of indication and pulse output.

*6 Reference condition

- Fluid : Water
- Fluid temperature : 10 to 30°C
- Conductivity : 150 $\mu\text{S}/\text{cm}$ or more
- Power supply voltage : Rated voltage $\pm 2\%$
- Ambient temperature : 18 to 28°C
- Upstream and downstream straight runs : 10 D and 2 D (D: Inside diameter)
- Warm up time : about 10 minutes
- Measuring time : 100 seconds

Operating range for the earth ring gaskets

Gasket	Fluid pressure	Fluid temperature
PTFE jacket type with joint sheet core (equivalent to VALQUA No.N7035)	$\leq 1.5\text{MPa}$	$\leq 100^\circ\text{C}$
Fluorocarbon resin (equivalent to VALQUA No.7020)	$\leq 4\text{MPa}$	$\leq 100^\circ\text{C}$
Tantalum earth ring (Teflon PTFE jacket type gasket with Viton core)	$\leq 0.7\text{MPa}$	$\leq 100^\circ\text{C}$

Minimum fluid conductivity

Nominal size (mm)	Type of liquid and minimum conductivity ($\mu\text{S}/\text{cm}$)	
	Pure water (mm)	Other than pure water
25	1.0 (5.0)	0.05 (0.5)
40	1.0 (5.0)	0.05 (0.5)
50	1.0 (2.5)	0.05 (0.2)
80	1.0 (2.5)	0.05 (0.2)
100	1.0 (2.5)	0.05 (0.2)

Remark : Figures in () indicates minimum recommended liquid conductivity for process control purpose which requires short time response.

It will be required to set relatively long time constant in case the conductivity of the liquid is lower than indicated value in ().

Suggestions and cautions for low conductivity liquid measurement

1. Straight runs

Flow noise may affect measurement in case of low conductivity liquid with low viscosity such as pure water and alcohol.

The following straight runs for upstream and downstream are needed.

Type of liquid	Upstream		Down stream
Low viscosity and Low conductivity (Pure water, alcohol etc.)	Reducers Elbows, Tees Fully opened gate valves	10D	2D
	Expansions Control valves Half opened gate valves	20D	
Other liquids than above	Reducers Elbows, Tees Fully opened gate valves	5D	2D
	Expansions Control valves Half opened gate valves	10D	

[D : Nominal diameter (mm)]

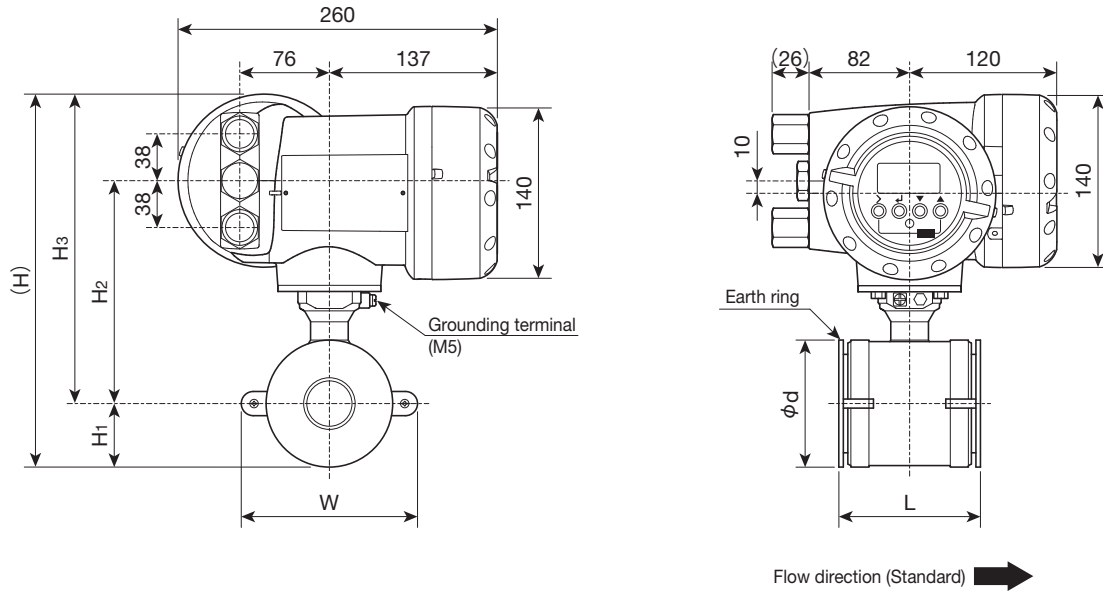
2. Control valves and half-opened gate valves are recommended to install downstream of flowmeter.
3. More than 30D straight run is recommended in case a pump is installed.

Flow range

Nominal size (mm)	Possible setting range (m^3/h)	
	Min. (Flow velocity: 0 to 0.3 m/s)	Max. (Flow velocity: 0 to 12 m/s)
25	0 to 0.531	0 to 21.2
40	0 to 1.36	0 to 54.2
50	0 to 2.13	0 to 84.8
80	0 to 5.43	0 to 217
100	0 to 8.49	0 to 339

DIMENSIONS

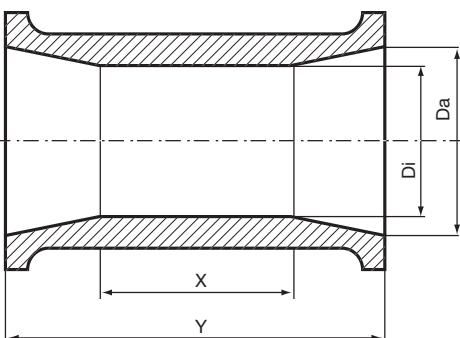
Nominal size 25 to 100 mm



Nominal size (mm)	Dimensions (mm)							Mass (kg)
	L *1	(H)	H ₁	H ₂	H ₃	W	d	
25	69	271	34	167	237	102	68	6
40	94	286	42	174	244	117	84	7
50	114	304	51	183	253	136	102	8
80	164	336	67	199	269	168	134	11
100	214	361	79	212	282	193	158	13

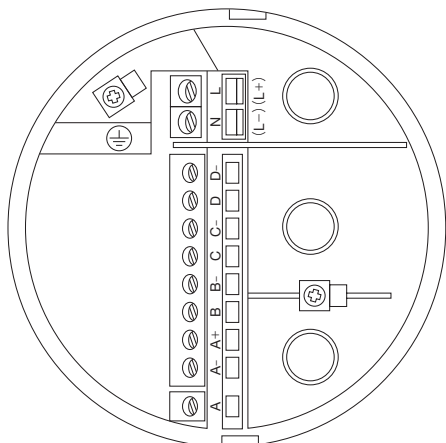
*1 (1) Face to face dimension of the flowmeter in which PTFE jacket type gasket is used for earth ring, is the same as "L" mm.
 Face to face dimension of the flowmeter in which fluorocarbon resin type gasket is used for earth ring, is "L-2" mm.
 (2) Face to face dimension of flowmeter in which tantalum type is used for earth ring is, "L-5" mm for the size 2.5 to 15 mm, and "L-1" mm for the size 25 to 100 mm.

DIMENSIONS FOR CERAMIC TUBE

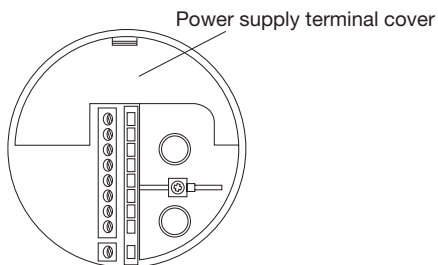


Nominal size (mm)	Dimensions (mm)			
	Da	Di	X	Y
25	24	20	26	55
40	37	30	36	80
50	49	40	51	100
80	78	60	70	150
100	98	80	103	200

ELECTRICAL CONNECTION



A protection cover is provided for power supply terminals



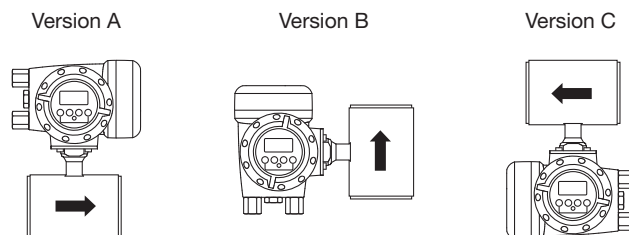
Terminals	Description
L/L+	AC power/DC power L+(+)·L-(-)
N/L-	
⊕	Grounding

Terminals	Description	Polarity	
D-	Pulse output or Status output	-	
D		+	
C-	Status output	-	
C		+	
B-	Status output or Control input	-	
B		+	
A+	Current output (4 to 20 mA/ HART: internal power supply)	+	
A-	Current output (4 to 20 mA/ HART: external power supply)		-
A		-	+

- Terminal type : Plug-in type screw terminal
- Applicable core size : 0.5 to 2.5 mm²

Mounting positions of display

The orientation of the display in contrast to flow direction can be changed as follows.



Please specify your requirements. We are ready to deliver the flowmeters accordingly.

The arrow indicates the direct flow direction as standard. The reverse flow direction can be set by altering setting data if required so.

MODEL AND SPECIFICATION CODE

● Nominal size : 25 to 100 mm

Model: EGM7300C

Primary head Spec. code	V	N	1	9	4	N	1	C	0	0	0	0	0	0	0	0	2	0	0	0	0	Description			Standard
Primary head code	V	N	1	9	4																	Wafer / Ceramic, Capacitance detection type		○	
(Fixed code)	V	N	1	9	4																	always 4	Connection flange size		○
Nominal size					8																	25 mm	25A	1"	○
					B																	40 mm	40A	1-1/2"	○
					C																	50 mm	50A	2"	○
					E																	80 mm	80A	3"	○
					F																	100 mm	100A	4"	○
Process connection					N																	Wafer type (sandwiched between flanges)		○	
Use purpose					0																	General purpose (Non explosionproof)		○	
Type							1	C														Compact version (EGC300/CAP converter)		○	
(Fixed code)							0															always 0		○	
Earth ring / Gasket for earth ring *1																						Stainless steel SS316 / PTFE	Max. press. : 1.5MPa		
																						Hastelloy® C / PTFE			
																						Hastelloy® B / PTFE			
																						Titanium / PTFE			
																						Stainless steel SS316Ti / Fluorocarbon resin	Max. press. : 4MPa		
																						Hastelloy® C / Fluorocarbon resin			
																						Hastelloy® B / Fluorocarbon resin			
																							Titanium / Fluorocarbon resin		
																							Tantalum with PTFE gaskets	Max. press. : 0.7MPa	
																						Others			
(Fixed code)																						always 0		○	
Protection class									0													IP66 / IP67		○	
(Fixed code)											0	0										always 00		○	
Calibration																						Standard calibration		○	
(Fixed code)																						always 0200000		○	
Special feature																						(Blank) None		○	
																						/Z Involved *2		○	

Converter Spec. code	V	N	3	0	4	5			2	0	0	1	2	1	0	0	0	0	0	Description			Standard	
Converter code	V	N	3	0	4																	Type : EGC300/CAP (cylindrical housing)		○
(Fixed code)	V	N	3	0	4																	always 4		○
Type					5																	with LCD display		○
Power supply					1																	24 V DC (11 to 31 V)		○
					A																	100 to 230 V AC (85 to 253 V)		○
Use purpose					0																	General purpose (Non explosionproof)		○
Cable entry					4																	1/2 NPT female thread		○
					5																	G1/2 female thread		○
					6																	with M20 watertight cable gland		○
(Fixed code)								2	0	0											always 200		○	
Housing													1									Aluminum alloy as standard		○
(Fixed code)													2									always 2		○
Outputs														1								Current output + pulse output + control input + status output as standard		○
(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 In case that Special feature are involved, put [/ Z] at the end of spec. code and specify the details.
It is recommended to consult TOKYO KEISO for such availability before ordering.

STANDARD ACCESSORIES

- Parameter sheet : 1
- Instruction manual : 1

OPTION

- Bolts and nuts for mounting on pipe : 1 set [Symbol : BN]
Material : Stainless steel SUS 304 for JIS10K flange
- PTFE jacket gaskets for mounting on pipe 2 pieces [Symbol : FG]
VALQUA No. N7030 for JIS10K flanges
Note : Suitable size of bolts, nuts and gaskets matching mating flanges will be provided. Please specify the flange rating and size other than JIS10K if those fittings are requested.
- G1/2 water tight glands for cable entry : [Symbol : WG]
- Number of cable entries : 3 pieces [Symbol : 3G]

ORDERING INSTRUCTIONS

1. Model and specification codes

Example

Model : EGM7300C

Primary head spec. code

: VN1948N01C01000000200000

Converter spec. code

: VN3045A0520012100000

2. Full scale flow range

3. Optional requirements will be added using above mentioned symbols if required.

4. Fluid name

* Specification is subject to change without notice.

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