TECHNICAL GUIDANCE

MAGMAX

EGM2010C

Compact Electromagnetic Flowmeter

GENERAL

MAGMAX EGM2010C is low cost, general purpose compact electromagnetic flowmeter suitable for water and sewage.
EGM2010C is a combination of flange type EGS2000F primary head with Polypropylene liner, Hard rubber liner and general-purpose / economical converter EGC010.
25 to 1000mm sizes are available.

FEATURES

- ❏ Polypropylene liner (Size : 25 to 150mm) achieved high-durability and high-heat resistance. Suitable for water, sewage and hot water for process temperature up to 90°C.
- ❏ Hastelloy C electrodes as standard.
- ❏ High accuracy of ±0.5% of reading.
- ❏ High speed data processing for quick response.
- ❏ Low power consumption of approx. 5VA.
- ❏ Independent output terminals for current, pulse and status (alarm, etc.) output.
- ❏ Forward/Reverse flow can be measured.

STANDARD SPECIFICATION

General Specification

- Excitation : Square wave
- Nominal size : 25, 40, 50, 65, 80, 100, 125, 150, 200, 250 300, 350, 400, 450, 500, 600, 700, 800, 900, and 1000mm
  (For size over 1000mm, consult TOKYO KEISO.)
- Measurement function : Flow rate
- Measuring range : Flow velocity
  Min. 0 to 0.3m/s
  Max. 0 to 12m/s
  Flow rate
  Min. 0 to 0.531m³/h
  (Minimum flow at 25mm size)
  Max. 0 to 33928m³/h
  (Maximum flow at 1000mm size)
- Protection class : IP67 (equivalent to NEMA6)
- Meter body material
  Measuring tube : Stainless steel (equivalent to SS304)
  Primary head housing : Carbon steel (*1) [Standard]
  [Option] Stainless steel/SS304
  Flanges : Carbon steel (*1) [Standard]
  [Option] Stainless steel/SS316L
  Converter housing : Aluminum alloy (*1)
  (Cover : Polyamide resin)

(*1) Anti-corrosive painting

- Wetted part material
  - Liner : [Standard]
    Size 25 to 150mm ; Polypropylene
    Size 200 to 1000mm ; Hard rubber
    [Option]
    Hard rubber (Size 25 to 150mm)
    * Refer to the "LINER MATERIAL AND FLANGE."
  - Electrode : Hastelloy C [Standard]
    [Option] Stainless steel/SS316
  - Earth ring : [Option] Stainless steel/SS316
- Painting : Polyurethane resin painting
- Color : Silver (Primary head)
  Jade green (Converter ; Cover excluded)
- 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 : 100V AC (85 to 110V)
  115V AC (100 to 130V)
  200V AC (170 to 220V)
  230V AC (200 to 260V)
  24V DC (18 to 32V)
  * ( ) indicates voltage range.
- Supply frequency : 48 to 63 Hz (AC supply voltage)
- Power consumption : AC : approx. 5VA, DC : approx. 4.5W
- Ambient temperature : –25 to +60˚C (Fluid temp. ≤90˚C)
  –50 to +70˚C (For storage)
- Grounding : Grounding resistance must be less than 100Ω
- Process connection : Flange connection
- Flanges : JIS10K/20K, ANSI class 150/300, DIN PN16/40/10
  * Refer to the "LINER MATERIAL AND FLANGE."

Fluid specification

- Temperature : –5 to +90˚C
- Pressure : To be within the applicable flange limitation.
  * Refer to "FLUID TEMPERATURE AND PRESSURE RANGE" table as details.
- Conductivity : To be more than 20μS/cm

Indication Specification

- Indicator : LCD 2 lines with illumination
  Line 1 : 8 digit numerical figures
  Line 2 : Alphabet for unit indication
  Flow rate or total flow volume indication selectable. Or alternative indication of these two items with approx. 10 sec, intervals.
  - Flow rate indication : By flow unit (m^3/h, L/s, or others) or % of full scale (Bar graph available)
  - Total flow volume : Forward total, reverse total or difference total of forward and reverse. (m^3, L, others)
  * Factory setting : Continuous indication of flow rate

Output Signal

- Current output : 4 to 20mA DC
  Load : Max. 500Ω
  Time constant : 0.2 to 99.9 s adjustable (0.1 s step)

- Pulse output
  Open collector output
  Rating : 5 to 30V DC, 150mA Max.

  Pulse rate (Output pulse at full scale)
  20 to 36,000,000 Pulse/h
  0.0056Hz to 10kHz (full scale)

  Pulse width
  One of the following selectable :
  1) Automatic : Pulse width shall be duty 50% in full scale frequency
  2) Duty factor 1:1 (Constant)
  3) Setup of arbitrary value : 0.01 to 1.00 s (0.01 s step)

- Status output
  Open collector output
  Rating : 5 to 30V DC, 150mA Max.
  Contents of output
  One of the following selectable :
  1) No status output (Factory setting)
  2) Flow direction identification
  3) Error
  4) Flow alarm (1 point)

- Low flow cutoff
  Effective for current output and pulse output
  0 to 19% of full scale adjustable
  (1% step, factory set 1%)

Standard Functions

- Customer's free measuring unit
  Volume (or mass) unit in 5 characters and time unit in 3 characters can be created.

- Automatic zero adjustment
  Zero adjustment is automatically conducted at "ZERO ADJUST MODE" (Subject to zero flow)

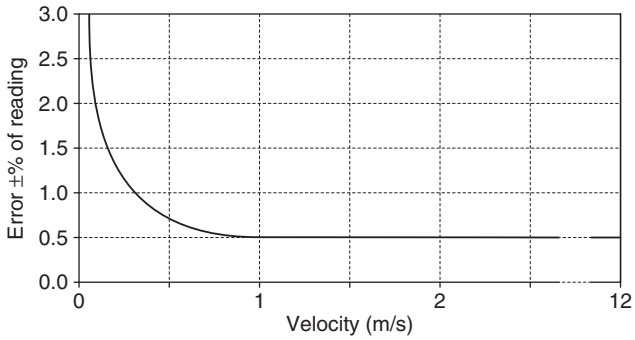
- Self diagnosis function
  The following ERROR MESSAGE is indicated when applicable :
  • Internal error
  • A/D converter error
  • Wrong setting
  • Power fail detection
  • Output over ranged
  • Total counter overflow

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

- Testing function
  Current and pulse dummy output function provided, loop check can be conducted without calibrator.
  * Current and pulse output correspond to 0, ±10, ±50, ±100, and ±110% of full scale.

Accuracy (*2)

- Pulse output
  For velocity ≥1.0m/s : ±0.5% of reading
  For velocity <1.0m/s :
  $$\pm(0.3\% \text{ of reading} + 0.2\% \times \frac{1}{\text{Velocity (m/s)}})$$



- Current output
  Additional error of ±0.05% of full scale to be added onto above pulse output accuracy

(*2) Basis condition

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

FLUID TEMPERATURE AND PRESSURE RANGE

Fluid Temperature

Liner	**Nominal size** (mm)	**Temperature**
Polypropylene	25 to 150	–5 to +90˚C
Hard rubber	25 to 1000	–5 to +80˚C

Maximum Pressure

Liner	**Nominal size** (mm)	**Pressure MPa** *
Polypropylene	25 to 80 (Except 65mm)	4.0
	65, 100 to 150	1.6
Hard rubber	25 to 1000	15

* Maximum operating pressure must be within the flange rating pressure.
The value on this table indicates maximum pressure which can be manufactured.
Consult TOKYO KEISO for details.

Permissible Vacuum Load

∗ : Vacuum not acceptable – : Not applicable

Liner	**Nominal size** (mm)	**Minimum pressure kPa** (abs) / **Fluid temp.**			
		40˚C	60˚C	80˚C	90˚C
Polypropylene	25 to 150	25	40	40	∗
Hard rubber	25 to 300	25	40	40	–
	350 to 1000	50	60	60	–

FLOW RANGE

Nominal size (mm)	**Possible setting range** (m^3/h)		**Nominal size** (mm)	**Possible setting range** (m^3/h)	
	Min. (Velocity : 0 to 0.3 m/s)	**Max.** (Velocity : 0 to 12 m/s)		**Min.** (Velocity : 0 to 0.3 m/s)	**Max.** (Velocity : 0 to 12 m/s)
25	0 to 0.531	0 to 21.2	300	0 to 76.4	0 to 3053
40	0 to 1.36	0 to 54.2	350	0 to 104	0 to 4156
50	0 to 2.13	0 to 84.8	400	0 to 136	0 to 5428
65	0 to 3.59	0 to 143	450	0 to 172	0 to 6870
80	0 to 5.43	0 to 217	500	0 to 213	0 to 8482
100	0 to 8.49	0 to 339	600	0 to 306	0 to 12214
125	0 to 13.3	0 to 530	700	0 to 416	0 to 16624
150	0 to 19.1	0 to 763	800	0 to 543	0 to 21714
200	0 to 34.0	0 to 1357	900	0 to 688	0 to 27481
250	0 to 53.1	0 to 2120	1000	0 to 849	0 to 33928

LINER MATERIAL AND FLANGE

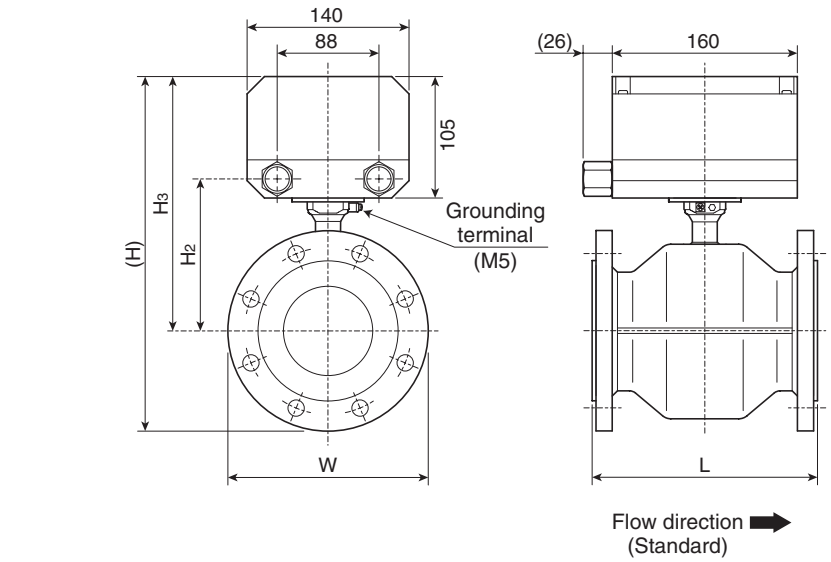
◎: Standard ○: Option –: Not applicable

Flange rating	Liner	Nominal size (mm)																			
		25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000
JIS10K *	Polypropylene	◎	◎	◎	◎	◎	◎	◎	◎	–	–	–	–	–	–	–	–	–	–	–	–
	Hard rubber	○	○	○	○	○	○	○	○	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
JIS20K	Polypropylene	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Hard rubber	–	–	–	–	–	–	–	–	○	○	○	○	○	○	○	○	–	–	–	–
ANSI class 150	Polypropylene	◎	◎	◎	◎	◎	◎	◎	◎	–	–	–	–	–	–	–	–	–	–	–	–
	Hard rubber	○	○	○	○	○	○	○	○	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
ANSI class 300	Polypropylene	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Hard rubber	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	–	–	–	–
DIN PN10	Hard rubber	–	–	–	–	–	–	–	–	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
DIN PN16	Polypropylene	–	–	–	◎	–	◎	◎	◎	–	–	–	–	–	–	–	–	–	–	–	–
	Hard rubber	–	–	–	○	–	○	○	○	○	○	○	○	○	○	○	○	–	–	–	–
DIN PN25	Polypropylene	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Hard rubber	–	–	–	○	–	○	○	○	○	○	○	○	○	○	○	○	–	–	–	–
DIN PN40	Polypropylene	◎	◎	◎	–	◎	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Hard rubber	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	–	–	–	–

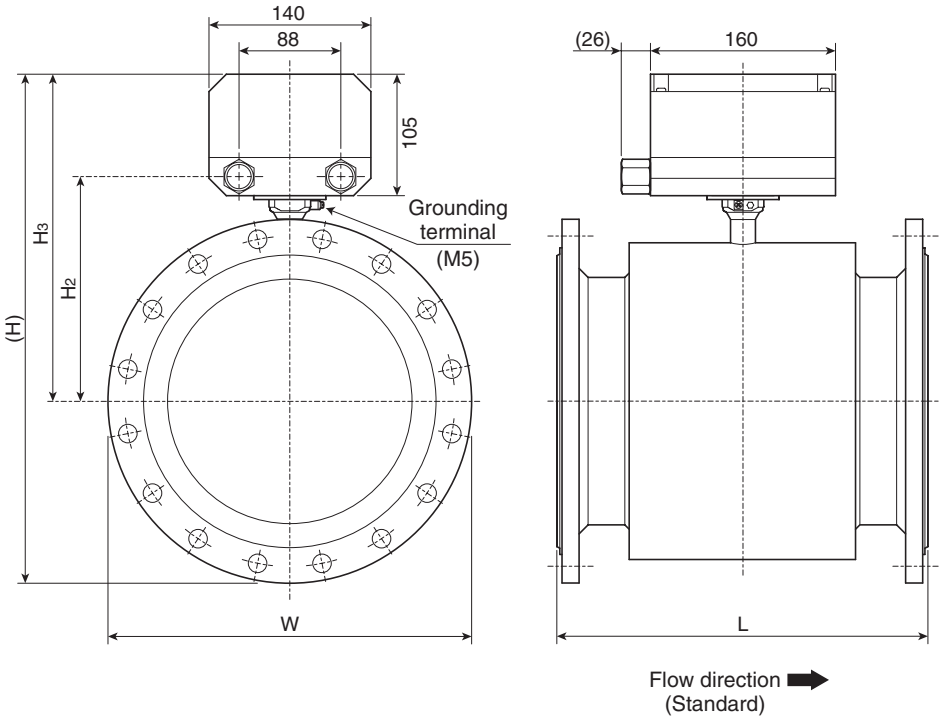
* JIS20K flange is provided for nominal size 25 and 40mm as standard.
(Installation dimensions of JIS20K flange are equal to JIS10K flange thickness.)

DIMENSIONS

Nominal size: 25 to 150mm



Nominal size: 200 to 1000mm



Nominal size (mm)	Dimensions (mm)							Mass (kg)	
	L *1		(H)		H_2	H_3	W *2		
	JIS 10K	ANSI 150	JIS 10K	ANSI 150				JIS 10K	ANSI 150
25	150	150	251	243	101	189	90	9	10
40	150	150	266	260	108	196	105	10	11
50	200	200	285	284	120	208	120	10	11
65	200	200	294	295	124	210	140	12	13
80	200	200	307	309	126	214	150	14	15
100	250	250	337	346	144	232	175	17	20
125	250	250	371	373	158	246	210	21	24
150	300	300	402	401	174	262	240	24	28
200	350	350	457	463	204	292	291	36	45
250	400	400	513	516	225	313	331	50	66
300	500	500	560	579	250	338	381	60	97
350	500	700	605	626	272	360	428	80	131
400	600	800	666	684	298	386	483	100	168
450	600	800	721	728	323	411	533	119	188
500	600	800	775	786	349	437	585	130	225
600	600	800	890	898	404	492	694	166	308
700	700	–	1003	–	463	551	812	247	–
800	800	–	1117	–	519	607	922	330	–
900	900	–	1219	–	571	659	1026	427	–
1000	1000	–	1329	–	623	711	1132	509	–

*1 1) Dimension L does not include earth rings thickness.

2) Total overall length (L') with earth rings is as follows.

L' = L+2 × (3+t) mm

t : Gasket thickness between the liner and earth ring *

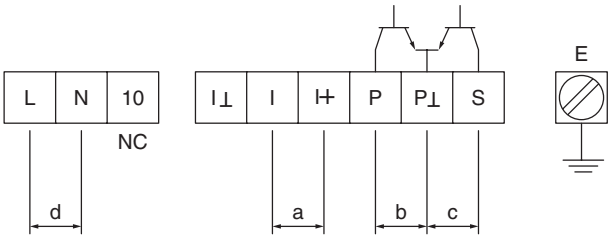
* The earth rings are not fixed onto the primary head flanges. They are to be installed between primary head and connection flanges on installation.

In case of install the earth ring, gaskets are also needed between the primary head liner side and earth ring. Total 4 pieces of gasket are needed including for connection flanges.

3) Dimension L is for JIS10K and ANSI class150 flange. Consult TOKYO KEISO for other flanges.

*2 Dimension W indicates external dimension of housing

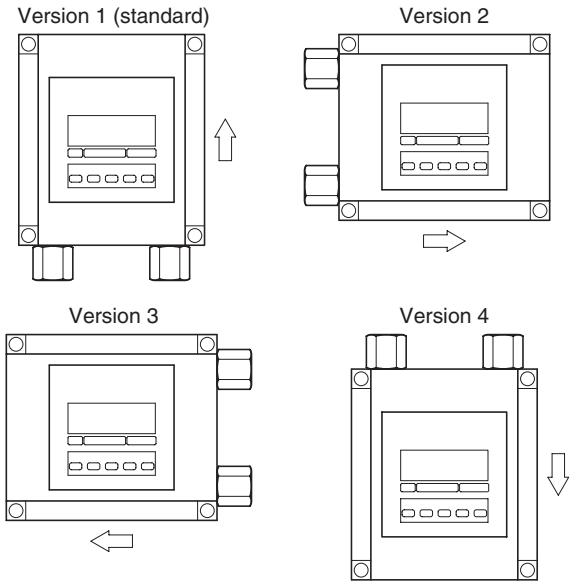
ELECTRICAL CONNECTION



Mark	Terminal symbol	Polarity		Description
a	I+	+		Current output (4 to 20mA DC)
	I	−		
b	P	+		Pulse output (Open collector)
	P⊥	−		
c	S	+		Status output (Open collector)
	P⊥	−		
d	L (L+)	AC	(+)	Power supply ( ) indicates DC type
	N (L−)		(−)	
E	−	−		Grounding

- Terminal type : Plug-in type screw terminal
- Connection capacity : 0.5 to 2.5 mm^2

Mounting position of LCD display



* The arrow indicates standard flow direction.
Flow direction can be changed by data setting.

MODEL AND SPECIFICATION CODE

● Nominal size : 25 to 150mm

Model : EGM2010C

Primary head Spec. code	V N 1 4	4		0	1 1			1		0	0 0	0		0 2 0 0 0 0 0 0		Description	Standard
Primary head code	V N 1 4															Flange type	○
(Fixed code)		4														always 4	○
Nominal size			4													25mm	○
			6													40mm	○
			7													50mm	○
			8													65mm	
			A													80mm	○
			B													100mm	○
			C													125mm	
			D													150mm	○
Flange				3												DIN PN16	
				4												DIN PN25	
				5												DIN PN40	
				A												ANSI class 150	
				B												ANSI class 300	
				M												JIS 20K	
				N												JIS10K (For size 50mm or more) *1	○
				9												Others	
(Fixed code)					0											always 0	○
Type						1 1										Compact version (EGC010 Converter)	○
Liner							5									Hard rubber	
							T									Polypropylene	○
Electrode material								1								Stainless steel (SS316)	
								3								Hastelloy C4	○
Construction of electrode									1							Fixed mounting	○
Primary head housing / Flange material										1						Carbon steel / Carbon steel	○
										3						Carbon steel / Stainless steel (SS316L)	
Protection class											0					IP67	○
(Fixed code)												0 0				always 00	○
Calibration													0			Standard calibration	○
Earth ring														0		None	○
														H		Stainless steel (SS316) *2	
														9		Others *2	
(Fixed code)															0 2 0 0 0 0 0 0	always 02000000	○
Special feature															(Blank)	None	○
															/Z	Involved *3	

Converter Spec. code	V 3 1 1	4	4			0	6		2 0 0 0		Description	Standard
Converter code	V 3 1 1										Type: EGC010 (square housing)	○
(Fixed code)		4									always 4	○
Type			4								LCD indication / current and pulse output	○
Supply voltage				2							100V AC (85 to 110V)	○
				4							24V DC (18 to 32V)	
				8							115V AC (100 to 130V)	
				B							200V AC (170 to 220V)	
				C							230V AC (200 to 260V)	
Cable entry					3						1/2 NPT female thread	
					4						G1/2 female thread	○
					5						M20 with watertight glands	
Additional function						0					None	○
(Fixed code)							6				always 6	○
Mounting position of LCD display								1			Version 1	○
								2			Version 2	
								3			Version 3	
								4			Version 4	
(Fixed code)									2 0 0 0		always 2000	○
Special function										(Blank)	None	○
										/Z	Involved *3	

Refer to drawing "Mounting position of LCD display" on page 8.

*1 JIS20K flange is provided for nominal size 25 and 40mm as standard.
(Installation dimensions of JIS20K flange are equal to JIS10K except the flange thickness.)
Select JIS20K flange (Code:M) for size 25 or 40mm.

*2 The earth rings are not fixed onto the primary head flanges.
They are to be installed between primary head and connection flanges on installation.
(Refer to the remarks for "DIMENSIONS" table)

*3 In case that special feature are involved, put [/Z] at the end of spec. code and specify the details.
It is recommended to consult TOKY O KEISO for such availability before ordering.

● Nominal size : 200 to 600mm
Model : EGM2010C

Primary head Spec. code	**V N 1 5**	**4**			**0**	**1 1**	**0**		**1**		**0**	**0 0**	**0**		**0 2 0 0 0 0 0 0**		**Description**	**Standard**
Primary head code	V N 1 5																Flange type	○
(Fixed code)		4															always 4	○
Nominal size			E														200mm	○
			F														250mm	○
			G														300mm	○
			H														350mm	
			K														400mm	
			L														450mm	
			M														500mm	
			N														600mm	
Flange				2													DIN PN10	
				3													DIN PN16	
				4													DIN PN25	
				5													DIN PN40	
				A													ANSI class 150	
				B													ANSI class 300	
				M													JIS 20K	
				N													JIS 10K	○
				9													Others	
(Fixed code)					0												always 0	○
Type						1 1											Compact version (EGC010 Converter)	○
Liner							0										Hard rubber	○
Electrode material								1									Stainless steel (SS316)	
								3									Hastelloy C4	○
Construction of electrode									1								Fixed mounting	○
Primary head housing / Flange material										1							Carbon steel / Carbon steel	○
										3							Carbon steel / Stainless steel (SS316L)	
Protection class											0						IP67	○
(Fixed code)												0 0					always 00	○
Calibration													0				Standard calibration	○
Earth ring														0			None	○
														H			Stainless steel (SS316) *2	
														9			Others *2	
(Fixed code)															0 2 0 0 0 0 0 0		always 02000000	○
Special feature																(Blank)	None	○
																/Z	Involved *3	

Converter Spec. code	**V 3 1 1**	**4**	**4**			**0**	**6**		**2 0 0 0**		**Description**		**Standard**
Converter code	V 3 1 1										Type: EGC010 (square housing)		○
(Fixed code)		4									always 4		○
Type			4								LCD indication / current and pulse output		○
Supply voltage				2							100V AC (85 to 110V)		○
				4							24V DC (18 to 32V)		
				8							115V AC (100 to 130V)		
				B							200V AC (170 to 220V)		
				C							230V AC (200 to 260V)		
Cable entry					3						1/2 NPT female thread		
					4						G1/2 female thread		○
					5						M20 with watertight glands		
Additional function						0					None		○
(Fixed code)							6				always 6		○
Mounting position of LCD display								1			Version 1	Refer to drawing "Mounting position of LCD display" on page 8.	○
								2			Version 2		
								3			Version 3		
								4			Version 4		
(Fixed code)									2 0 0 0		always 2000		○
Special function										(Blank)	None		○
										/Z	Involved *3		

*2 The earth rings are not fixed onto the primary head flanges.
They are to be installed between primary head and connection flanges on installation.
(Refer to the remarks for "DIMENSIONS" table)

*3 In case that special feature are involved, put [/Z] at the end of spec. code and specify the details.
It is recommended to consult TOKY O KEISO for such availability before ordering.

● Nominal size : 700 to 1000mm
Model : EGM2010C

Primary head Spec. code	**V N 1 6**	**4**		**0**	**1 1**	**0**		**1**		**0**	**0 0**	**0**		**0 2 0 0 0 0 0 0**		**Description**	**Standard**
Primary head code	V N 1 6															Flange type	○
(Fixed code)		4														always 4	○
Nominal size			P													700mm	
			R													800mm	
			S													900mm	
			T													1000mm	
Flange				2												DIN PN10	
				A												ANSI class 150	
				N												JIS 10K	○
				9												Others	
(Fixed code)					0											always 0	○
Type					1 1											Compact version (EGC010 Converter)	○
Liner						0										Hard rubber	○
Electrode material							1									Stainless steel (SS316)	
							3									Hastelloy C4	○
Construction of electrode								1								Fixed mounting	○
Primary head housing / Flange material									1							Carbon steel / Carbon steel	○
									3							Carbon steel / Stainless steel (SS316L)	
Protection class										0						IP67	○
(Fixed code)											0 0					always 00	○
Calibration												0				Standard calibration	○
Earth ring													0			None	○
													H			Stainless steel (SS316) *2	
													9			Others *2	
(Fixed code)														0 2 0 0 0 0 0 0		always 02000000	○
Special feature															(Blank)	None	○
															/Z	Involved *3	

Converter Spec. code	**V 3 1 1**	**4**	**4**			**0**	**6**		**2 0 0 0**		**Description**	**Standard**
Converter code	V 3 1 1										Type: EGC010 (square housing)	○
(Fixed code)		4									always 4	○
Type			4								LCD indication / current and pulse output	○
Supply voltage				2							100V AC (85 to 110V)	○
				4							24V DC (18 to 32V)	
				8							115V AC (100 to 130V)	
				B							200V AC (170 to 220V)	
				C							230V AC (200 to 260V)	
Cable entry					3						1/2 NPT female thread	
					4						G1/2 female thread	○
					5						M20 with watertight glands	
Additional function						0					None	○
(Fixed code)							6				always 6	○
Mounting position of LCD display								1			Version 1	○
								2			Version 2	
								3			Version 3	
								4			Version 4	
(Fixed code)									2 0 0 0		always 2000	○
Special function										(Blank)	None	○
										/Z	Involved *3	

*2 The earth rings are not fixed onto the primary head flanges.
They are to be installed between primary head and connection flanges on installation.
(Refer to the remarks for "DIMENSIONS" table)

*3 In case that special feature are involved, put [/Z] at the end of spec. code and specify the details.
It is recommended to consult TOKY O KEISO for such availability before ordering.

STANDARD ACCESSORIES

- Parameter sheet : 1
- Instruction manual : 1

OPTION

- G1/2 watertight glands for cable entry : 1 set [Symbol : WG]
- No converter data (parameter) setting [Symbol : NS]
  We will supply with standard data setting in case you have no request.
  Please set the data of flow range, pulse rate and flow direction etc. that required to operate.

ORDERING INSTRUCTIONS

Specify the following when ordering :

1. Model and spec. code
   Example : Model : EGM2010C
   Primary head spec. code :
   VN1447N011T3110000H02000000
   Converter spec. code : V31144240612000
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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