TECHNICAL GUIDANCE

Battery Powered Electromagnetic Volume Totalizing Meter
ETM3070 Series

OUTLINE

The **ETM3070** Series is an eco-friendly electromagnetic volume totalizing meter with high level performance and reliability. It has a built-in battery that ensures up to 10 years of continuous measuring performance.
The measuring tube is lined with Rilsan® that is used to coat the sides of water supply pipes. The tube, configured in a concentric-reducing design, has increased the accuracy in the domain of low flow rate measuring.
The product can be used in a wide range of applications that utilize water resources.

FEATURES

- ❑ It has a built-in lithium battery that ensures up to 10 years of continuous measuring performance.
- ❑ The die-cast aluminum measuring tube with a Rilsan®-coated lining has excellent creep resistance against deformation caused by vacuum pressure.
- ❑ Concentric reducers used inside the measuring tube achieve high accuracy in the domain of low flow rate measuring and required lengths of upstream straight run: 3D (D: pipe diameter).
- ❑ Equipped with a grounding electrode, which eliminates the need for grounding rings.
- ❑ Having the setting function of an infrared touch sensor allows the user to switch the indication or set parameters from outside without removing the cover.
- ❑ High accuracy - ±0.5% of reading
- ❑ Empty pipe detection feature

STANDARD SPECIFICATIONS

- Excitation : Square wave
- Nominal size : 25, 40, 50, 65, 80, 100, 125, 150, 200 mm
- Process connection : Flange
- Installation posture on pipe : Horizontal (integrated type)
  Horizontal and vertical pipe (separate type primary head)
- Flanges : Equivalent to JIS 10K, ASME class 150, DIN PN16
- Measuring range : Flow velocity of 0 to 9 m/s (flow velocity inside pipe)
- Body materials
  - Measuring tube : Aluminum alloy (*1)
  - Primary head housing : Carbon steel (*2)
  - Primary head terminal box (separate type only) : Stainless steel
  - Converter housing : Polycarbonate

  (*1) Rilsan® coating (polyamide resin),
  (*2) corrosion-resistant coating (except wet area)
- Wet area materials
  - Lining : Rilsan® coating (polyamide resin)
  - Flange : Nominal size
    25 to 125 mm; stainless steel (316) (*2)
    150 to 200 mm; stainless steel (304) (*2)
  - O-ring flange seal : Silicone rubber (between flange and measuring tube)
  - Electrode : Stainless steel (304)
  - Grounding electrode : Stainless steel (304)
  - O-ring seals for electrodes and grounding electrodes : Fluorocarbon rubber

- Grounding : Grounding resistance must be 100 Ω or less (Class D)
- Standard coating on primary head : Polysiloxane epoxy resin coating
- Standard coating color : Gray (primary head)
- Battery : Dedicated lithium battery pack
  *For information on measurable time, refer to "Life of battery".
- Level of protection : Integrated type, separate type: IP66/68 (Equivalent to IEC60529/ JISC0920)
- Connector for output signal cables (IP68 class with waterproof caps) : Accessories: 5 m cable for output signal (with IP68 class connector)
  - Optional accessories : 10 m cable for output signals or 25 m cable with IP 68 class connector
- Connector for sensor cable (IP68 class) (separate type only) : 5 m, 10 m, or 25 m cable (with IP68 class connector)

Conditions of use

- Subject of measurement : Drinking water, tap water, clean water, agricultural water
- Conductivity : 50μS/cm or more
- Measuring range : Flow velocity of 0 to 9 m/s (flow velocity inside pipe)
- Pressure : 0 to 1.6 MPa max. (within flange rated pressure)
- Allowable vacuum pressure : 0 kPa (abs)
- Temperature
  - Fluid temperature : 0 to 70°C
  - Ambient temperature : -20 to +65°C
- Pressure loss (fluid: water) : Flow rate: Approximately 8 kPa at a flow velocity of 3 m/s

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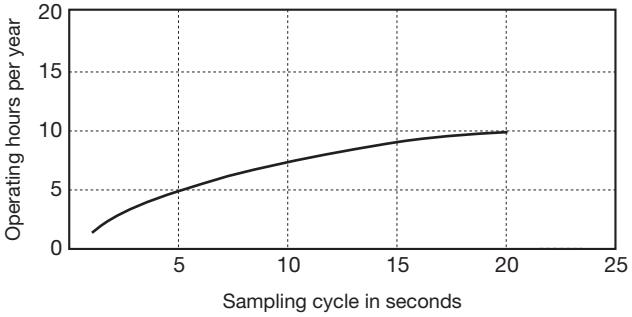
DISPLAY AND OUTPUT SPECIFICATIONS

- LCD display : Displays both the 8-digitvalue and the remaining battery level
  - Values displayed : Totalized volumes in m^3 or instantaneous flow rates in (m^3/h) are continuously displayed. These values can be manually changed by a touch sensor. Totalized forward-direction volume, totalized reverse-direction volume or totalized differential volume can be selected and displayed.
- Measurement sampling cycle
  - Setup value : Selectable from 5, 10, 15 (standard setting), and 20 s
    * Depending on the sampling cycle, the maximum possible measuring time will be limited by the battery. *For details, refer to "Life of battery".
- Flow Low Cutoff
  - Setup value : Selectable from 0, 5, and 10 mm/s (standard setting) The standard setting of 10 mm/s prevents counting of totalized volumes when the zero point is unstable due to subtle movements of the fluid during flow stoppages.
- Pulse outputs
  Open collector outputs (2 outputs)
  - Load rating : 2.7 to 24 VDC, 10 mA or less (Power consumption: Max. 100 mW)
  - Pulse rate : 0.001 to 10 m^3/pulse
    Max. output frequency: 500 Hz or lower
  - Pulse width : Selectable from 5, 10, 20, 50, 100, and 200 ms
- Status output
  Open collector outputs (2 outputs)
  - Load rating : 2.7 to 24 VDC, 10 mA or less (Power consumption: Max. 100 mW)
    Used to detect instrument malfunctions or for low battery level alarm output.

Life of Battery

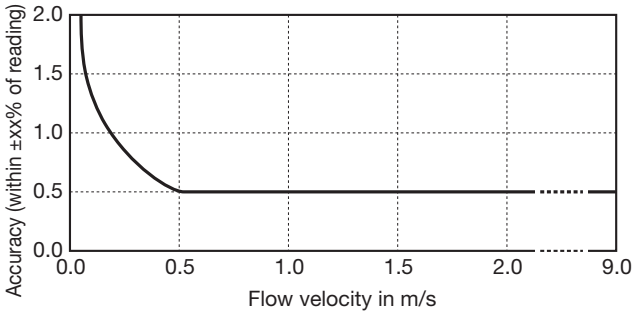
Dedicated lithium battery pack
Ambient temperature: 25°C



Note: Lower ambient temperatures will reduce the battery performance.

Accuracy(*3)

- Display
  When flow velocity inside pipe is above 0.5 m/s: ±0.5% of reading
  When flow velocity inside pipe is less than 0.5 m/s: ±0.2% of reading plus velocity error of ±0.0015 m/s



*3 Reference conditions
- Fluid : Water
- Fluid temperature : 20°C
- Conductivity : 50μS/cm or more
- Upstream straight pipe length : 5D (D: pipe diameter)

FLOW RANGE

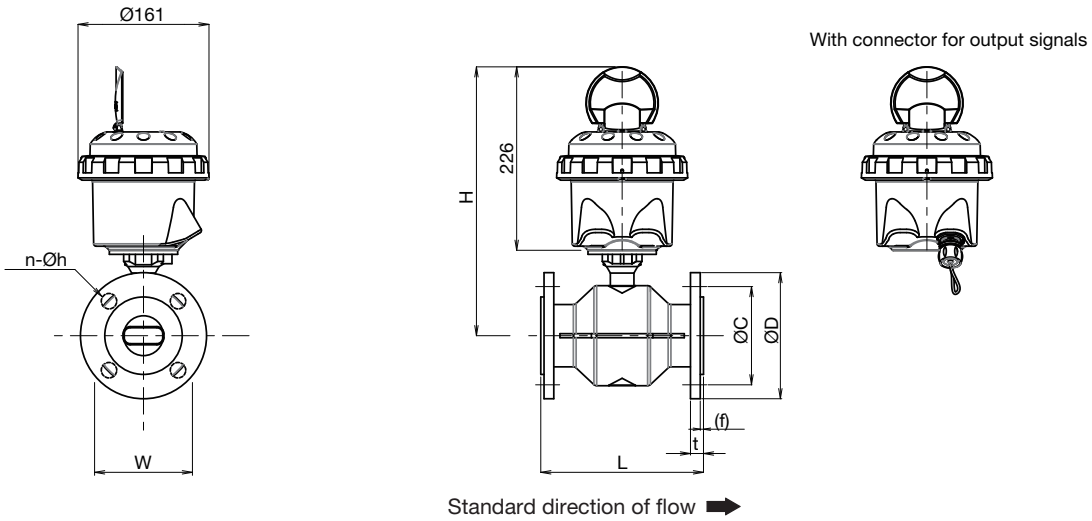
Unit of flow velocity: m^3/h

Nominal size in mm	Lower limit of flow rate Flow velocity inside pipe: 0.0225 m/s	Accuracy: Minimum flow rate of ±0.5% of reading	Maximum flow rate Flow velocity inside pipe: 9 m/s
25	0.04	0.9	15.9
40	0.10	2.3	40.7
50	0.16	3.6	63.6
65	0.27	6.0	107
80	0.42	9.1	162
100	0.64	14.2	254
125	1.00	22.1	397
150	1.44	31.9	572
200	2.55	56.5	1017

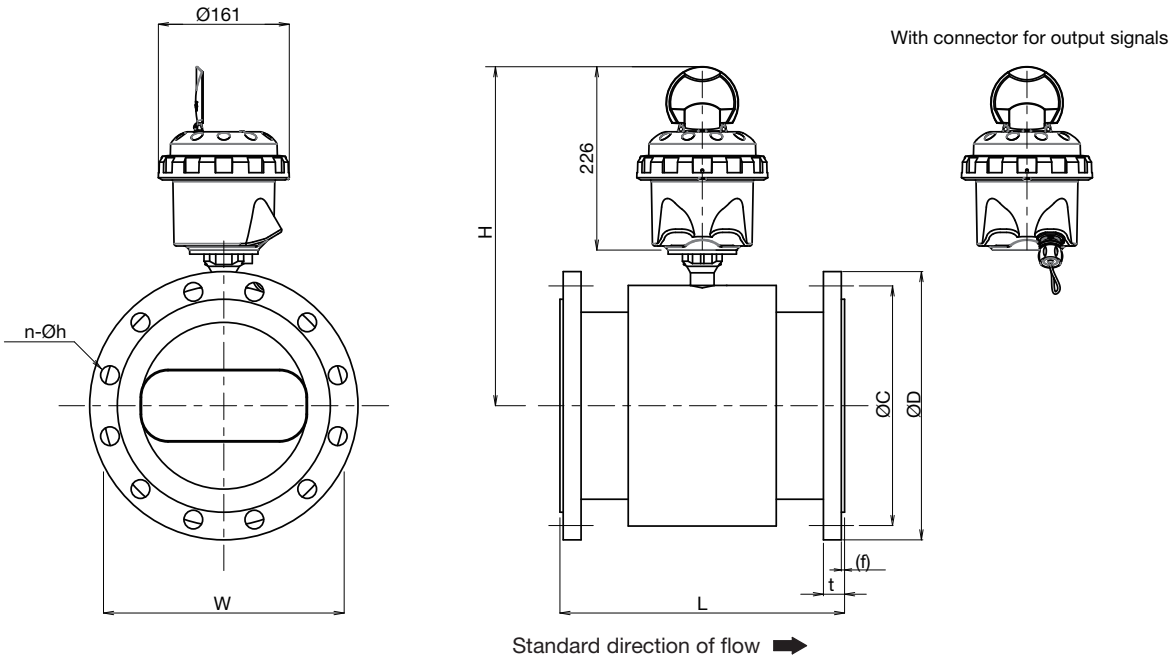
EXTERNAL DIMENSIONS

● Integrated type

Nominal size: 25 to 150 mm



Nominal size: 200 mm



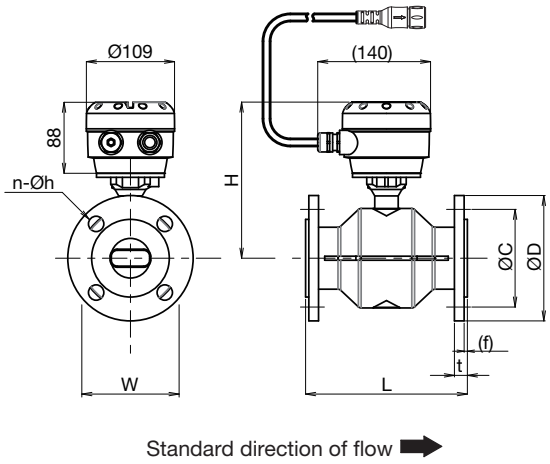
Nominal size in mm	Dimension in mm			Connection size (A)	Flange dimension in mm					Mass (approximate) (kg)
	L	H	W *1		D	C	n-øh	t	(f)	
25	150	311	90	25	125	90	4-19	16	1	5
40	150	318	105	40	140	105	4-19	18	2	6
50	200	331	120	50	155	120	4-19	16	2	7
65	200	335	140	65	175	140	4-19	18	2	9
80	200	337	150	80	185	150	8-19	18	2	9
100	250	354	175	100	210	175	8-19	18	2	12
125	250	368	210	125	250	210	8-23	20	2	17
150	300	384	240	150	280	240	8-23	22	2	22
200	350	417	291	200	330	290	12-23	22	2	35

*1: W indicates the outer dimension of the housing (external sleeve).

*2: Mass is for JIS 10K flange.

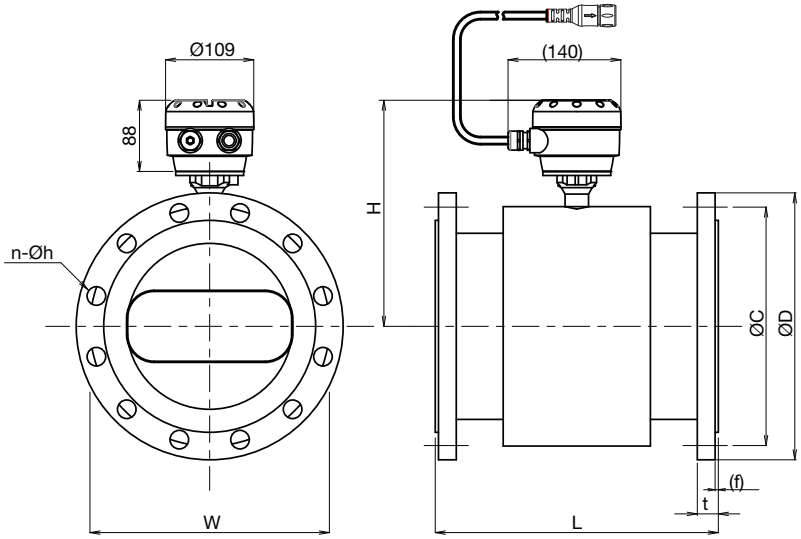
● Separate type
Primary head

Nominal size: 25 to 150 mm



Standard direction of flow

Nominal size: 200 mm



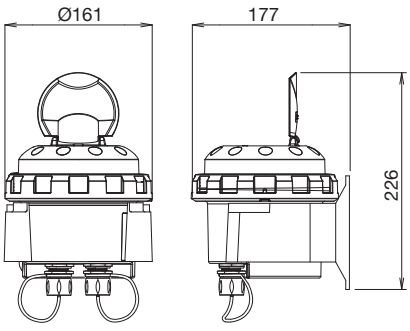
Standard direction of flow

Nominal size in mm	Dimension in mm			Connection size (A)	Flange dimension in mm					Mass (approximate) (kg)
	L	H	W *1		D	C	n-øh	t	(f)	
25	150	173	90	25	125	90	4-19	16	1	5
40	150	180	105	40	140	105	4-19	18	2	6
50	200	191	120	50	155	120	4-19	16	2	7
65	200	197	140	65	175	140	4-19	18	2	9
80	200	199	150	80	185	150	8-19	18	2	9
100	250	216	175	100	210	175	8-19	18	2	12
125	250	230	210	125	250	210	8-23	20	2	17
150	300	246	240	150	280	240	8-23	22	2	22
200	350	279	291	200	330	290	12-23	22	2	35

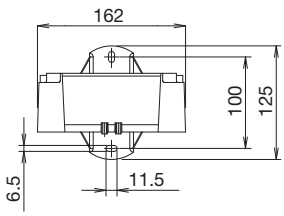
*1: W indicates the outer dimension of the housing (external sleeve).

*2: Mass is for JIS 10K flange. Sensor cable not included.

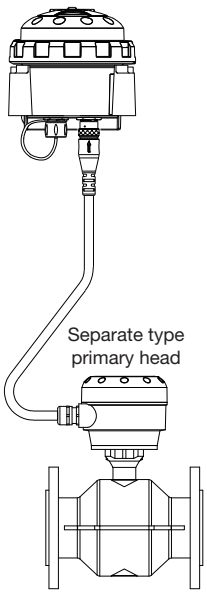
Converter



Wall mount holder

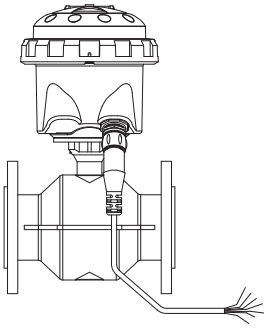


Separate type



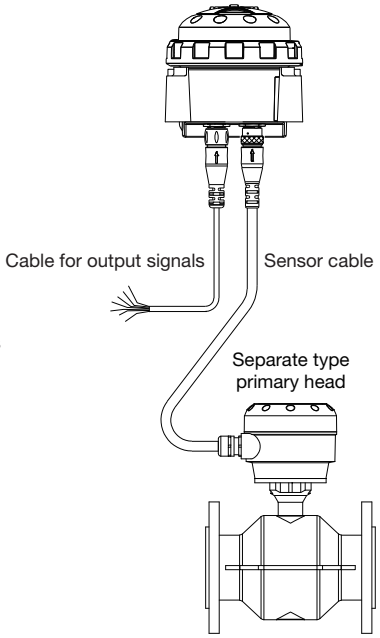
WIRING DIAGRAMS OF OUTPUT SIGNAL CABLES

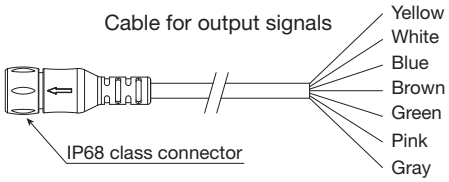
Integrated type



Cable for output signals

Wiring diagrams of separate type primary head and converter





Wire color	Description
Yellow	Status output 1
White	Status output 2
Blue	COM
Brown	Pulse output A
Green	Pulse output B
Pink	External battery, positive side
Gray	External battery, negative side

MODEL AND SPECIFICATION CODE

Model: Integrated type ETM3070C

Primary head spec code	V N		4			0	1	7	0	C	1	1	2	0	0	0	0	0	2	0	0	0	0	3	0	0		0		Description	Standard
Primary head code	V N	A C																												Flange connection type, nominal size: 25, 40, 50, 65, 80, 100, 125, 150 mm	○
	V N	A D																												Flange connection type, nominal size: 200 mm	○
(Fixed code)			4																											Always 4	○
Nominal size				4																										25 mm	○
				6																										40 mm	○
				7																										50 mm	○
				8																										65 mm	○
				A																										80 mm	○
				B																										100 mm	○
				C																										125 mm	○
				D																										150 mm	○
				E																										200 mm	○
Flange					3																									Equivalent to DIN PN16	
					A																									Equivalent to ASME 150 class	
					N																									Equivalent to JIS 10K	○
(Fixed code)						0																								Always 0	○
Type							1	7																						Integrated type	○
Lining									0																					Rilsan® coating (polyamide resin)	○
Material of electrode										C	1																			Stainless steel (SS304)	○
Material of primary head housing												1																		Carbon steel	○
Level of protection													2																	IP68	○
(Fixed code)														0	0															Always 00	○
Calibration																0														Standard calibration	○
(Fixed code)																	0	0	2	0	0	0	0	3	0	0				Always 0020000300	○
Material of flange																											2			Stainless steel (304): nominal size 150 and 200 mm	○
																											3			Stainless steel (316): Nominal size 125 mm or less	○
(Fixed code)																												0		Always 0	○
Special specifications																													(Blank)	Not provided	○
																													/Z	Provided*1	

Converter spec code	V N C A	4	8	H	0		6	0	0	0	2	1	0	0	0	0	3	0	0	0	0	0		Description	Standard
Converter code	V N C A																							Converter: ETC070	○
(Fixed code)		4																						Always 4	○
Type			8																					Integrated type	○
(Fixed code)				H	0																			Always H 0	○
Connector for output signal cables (with waterproof caps)						F																		With IP68 class connector and 5 m cable	○
						G																		With IP68 class connector and 10 m cable	
						L																		With IP68 class connector and 25 m cable	
							6	0																Always 60	○
Process diagnostics									0															Standard	○
Material of converter housing										0														Polycarbonate	○
(Fixed code)											2													Always 2	○
Output												1												Two pulse outputs and 2 status outputs	○
(Fixed code)													0	0	0	0	3	0	0	0	0	0		Always 0000300000	○
Special specifications																							(Blank)	Not provided	○
																							/Z	Provided *1	

*1 If there are any additional special requirements, please indicate the details and append /Z to the end of the relevant code. (Do not hesitate to consult us in advance about the possibility of production matching your requirements.)

MODEL AND SPECIFICATION CODE

Model: Separate type primary head ETS3000F

Primary head spec code	V	N			4			0	C	8	0	C	1	1	2			0	0		2 0 0 0 0 3 0 0		0		Description	Standard
Primary head code	V	N	A	C																					Flange connection type, nominal size: 25, 40, 50, 65, 80, 100, 125, 150 mm	○
	V	N	A	D																					Flange connection type, nominal size: 200 mm	○
(Fixed code)					4																				Always 4	○
Nominal size						4																			25 mm	○
						6																			40 mm	○
						7																			50 mm	○
						8																			65 mm	○
						A																			80 mm	○
						B																			100 mm	○
						C																			125 mm	○
						D																			150 mm	○
						E																			200 mm	○
Flange							3																		Equivalent to DIN PN16	
							A																		Equivalent to ASME 150 class	
							N																		Equivalent to JIS 10K	○
(Fixed code)								0																	Always 0	○
Type / Sensor cable connecting port									C	8															Separate type / IP68 class connector	○
Lining											0														Rilsan® coating (polyamide resin)	○
Material of electrode												C	1												Stainless steel (SS304)	○
Material of primary head housing														1											Carbon steel	○
Level of protection															2										IP68 (connection box: stainless steel)	○
Sensor cable length																0	0								5 m cable attached to separate type primary head	○
																0	1								10 m cable attached to separate type primary head	
																0	4								25 m cable attached to separate type primary head	
Calibration																		0							Standard calibration	○
(Fixed code)																			0						Always 0	○
Finishing on primary head housing																				0					Standard coating	○
																				3					Off-shore coating	
																				5					Coating on underground burial type	
(Fixed code)																					2 0 0 0 0 3 0 0				Always 20000300	
Material of flange																						2			Stainless steel (304): Nominal size 150 and 200 mm	○
																						3			Stainless steel (316): Nominal size 125 mm or less	○
(Fixed code)																							0		Always 0	○
Special specifications																								(Blank)	Not provided	○
																								/Z	Provided *1	

*1 If there are any additional special requirements, please indicate the details and append /Z to the end of the relevant code. (Do not hesitate to consult us in advance about the possibility of production matching your requirements.)

Model: Separate type converter ETC070F

Converter spec code	V N C A	4	U	H 0		6 0	0	0	2	1	0 0 0 0 3 0 0 0 0 0		Description	Standard
Converter code	V N C A												Converter: ETC070	○
(Fixed code)		4											Always 4	○
Type			U										Separate type	○
(Fixed code)				H 0									Always H 0	○
Connector for sensor cable and connector for output signal cable (with waterproof caps)					F								With IP68 class connector and 5 m cable for output signal	○
					G								With IP68 class connector and 10 m cable for output signal	
					L								With IP68 class connector and 25 m cable for output signal	
(Fixed code)						6 0							Always 60	○
Process diagnostics							0						Standard	○
Material of converter housing								0					Polycarbonate	○
(Fixed code)									2				Always 2	○
Output										1			Two pulse outputs and 2 status outputs	○
(Fixed code)											0 0 0 0 3 0 0 0 0 0		Always 0000300000	○
Special specifications												(Blank)	Not provided	○
												/Z	Provided *1	

*1 If there are any additional special requirements, please indicate the details and append /Z to the end of the relevant code. (Do not hesitate to consult us in advance about the possibility of production matching your requirements.)

STANDARD ACCESSORIES

- Parameter sheet : 1
- Instruction manual : 1
- Removal tool for lock rings on the converters : 1

ORDERING INSTRUCTIONS

1. Model and specification code
   Example) Model: ETM3070C
   Primary head spec code: VNAC47N0170C112000002000030030
   Converter spec code: VNCA48H0F6000210000300000
2. Full-scale flow rate
3. Name of fluid

* Specification is subject to change without notice.

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