



ALTI_{mass} Series
High-Performance Small Transmitter
(Rack-Mount)
MODEL: PA5K

GENERAL SPECIFICATION
GS.No.GEJ516E-4

■ GENERAL

The high-performance small transmitter is connectable to all ALTI_{mass} series sensors enabling mass flow measurement of wide variety of fluids in high accuracy and sensitivity.

It is a compact rack-mount model with a structure that is suitable for a limited space. Maintenance and inspection are also easy.

The transmitter is capable of analog output, pulse output, status input/output, and HART communication. The Modbus communication model is also available.



■ FEATURES

1. Compact: 48mm (width) and 165mm (depth).
2. Zero-adjustment can be executed via the push-button on the transmitter, status input, or communication.
3. Input/output signals: Pulse output, analog output (two simultaneous output), and status input/output
4. Compatible with HART or Modbus communication
5. Excellent maintenance functions equipped with two alarm indicators (red and green)
6. Self-diagnostic function via communication (piping vibration check, error logging function, gas-mixed multiphase flow alarm (SlugAlm.), etc.)

■ GENERAL SPECIFICATIONS

(For general specifications and performance of the sensor units, refer to the General Specification of the respective sensor type.)

Item		Description
Connectable sensor		Mass flowmeter ALTI _{mass} Type U, S, and B
Power supply		AD specifications: 100V – 240V 50/60Hz (allowable voltage range: AC 85V – 264V) DC specifications: 20V – 30V (recommended power supply capacity of DC specifications: 24VDC, 1A or higher)
Power consumption		Max. 21VA or Max. 7W
Ambient temperature		–20 to +50°C
Transmission distance		Type U: Max. 200m (CA00A, CA001: Max. 100m) Type S: Max. 100m (titanium), Max. 50m (stainless steel) Type B: Max. 50m (all items are connected with dedicated 9-core cable) *1
Explosionproof configuration		TIIS, ATEX, IECEx, KCs (Refer to Page 3 for details.)
Installation/Structure		Rack-mount type (installed in non-hazardous area)
Finish		Black
Approx. weight		0.8kg
Communication protocol	HART communication type (standard)	Superimposed on HART 7 analog output 1
	Modbus communication type	RS-485 Modbus protocol RTU or ASCII Baudrate: 9600bps, 19200bps, 38400bps (Standard) *Analog output 1 and 2 are not applicable to Modbus communication type.
Pulse output		Pulse output: 1 output • Output: 0.1 to 10,000Hz (maximum output: 11,000Hz) • Open drain output (Max. 30V, 50mAADC) * equivalent to open collector output • Voltage pulse "Low Level": 1.5V or lower, "High Level": 13V or higher • Output impedance: 2.2kΩ
Analog output	ANA 1	Current output: 2 outputs • 4 to 20mA, load resistance: 600Ω or smaller (when HART communication is used 250Ω or larger) 2 outputs among mass flow, volume flow, temperature, density and drive gain current output Additional damping: 0 – 200 seconds • 4-20mA status output can be assigned to Analog 2
	ANA 2	
Status input / Status output		Select one from status input or status output
		Input Contact input (a-contact) Close: 200Ω or smaller, Open: 100kΩ or larger Select from totalized value reset, zeroing and fixed output 0%
Display / Operation		Output Open drain output (equivalent to open collector output) [Max. 30V, 50mA] Select from error (standard), inflow direction, zeroing, High/Low alarm, no function
		LED for operating status display ... 2 (red) (green), zeroing button

*1: If signal transmission length exceeds the max. length, consult OVAL.

The operating temperature range of the dedicated cable (PVC: model code CBP2) is –15 to +80°C.

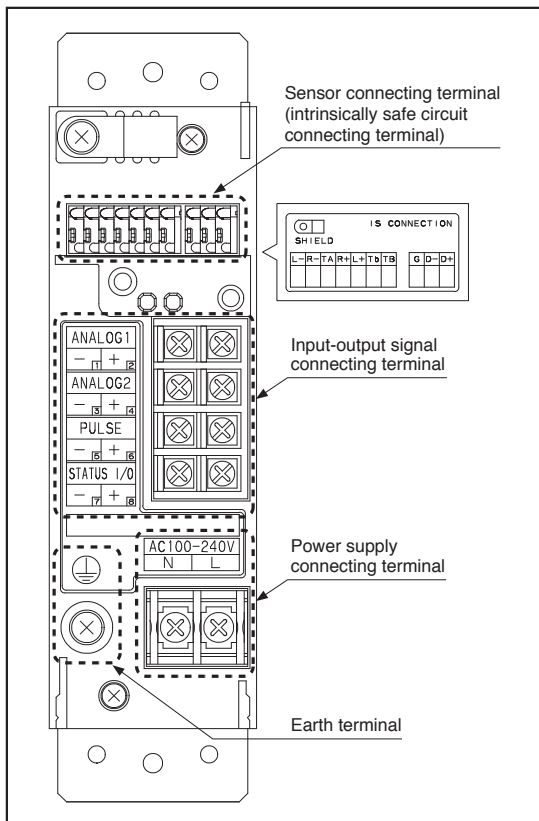
To use in an environment that exceeds the above temperature range, use dedicated cable (PTFE: model code CBT2) instead.

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■ TERMINAL IDENTIFICATION



● Sensor connecting terminal

Terminal	Color	Description
D+	BROWN	Flow tube driving output
D-	RED	
G	SHIELD	Connected to shield of cable
TB	ORANGE	Temperature sensor input
Tb	YELLOW	
L+	GREEN	Left sensor signal input
R+	BLUE	Right sensor signal input
TA	VIOLET	Temperature sensor input
R-	GRAY	Right sensor signal input
L-	WHITE	Left sensor signal input

● Input-output signal connecting terminal (standard type)

No.	Terminal name	Polarity	Description
1	ANALOG1	-	Analog 4 to 20mA output 1 maximum load resistance 600Ω, HART communication
2		+	
3	ANALOG2	-	Analog 4 to 20mA output 2 maximum load resistance 600Ω
4		+	
5	PULSE	-	Open drain pulse (equivalent to open collector pulse) Max. 30VDC, 50mA or power voltage pulse (L: 1.5V or lower H: 13V or higher output impedance 2.2kΩ) (※1)
6		+	
7	STATUS I/O	-	Status input or status output (switched by parameter) Input: contact input, ON width 300ms or wider, ON 200Ω or smaller, OFF 100kΩ or larger Output: open drain pulse (equivalent to open collector pulse) Max. 30VDC, 50mA
8		+	

Each output is insulated.

※1: The longest transmission distances of pulse output:
frequency 10kHz: 10m, frequency 1kHz: 100m, frequency 100Hz: 1km

● Input-output signal connecting terminal (Modbus communication type)

No.	Terminal name	Polarity	Description
1	HART	-	HART communication is used for maintenance.
2		+	
3	RS-485	-	Modbus (RS-485)
4		+	
5	PULSE	-	Open drain pulse (equivalent to open collector pulse) Max. 30VDC, 50mA or power voltage pulse (L: 1.5V or lower H: 13V or higher output impedance 2.2kΩ) (※1)
6		+	
7	STATUS I/O	-	Status input or status output (switched by parameter) Input: contact input, ON width 300ms or wider, ON 200Ω or smaller, OFF 100kΩ or larger Output: open drain pulse (equivalent to open collector pulse) Max. 30VDC, 50mA
8		+	

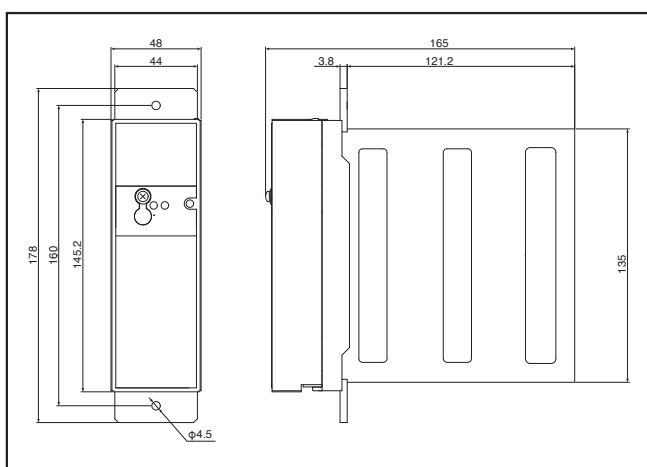
● Power supply connecting terminal

Specifications	Polarity	Description
AC power supply specifications	L	AC 100V – 240V 50/60Hz (allowable voltage range: AC 85 – 264V)
	N	
DC power supply specifications	+	DC 20V – 30V (recommended power supply capacity of DC specifications: 24VDC, 1A or higher)
	-	

● Earth terminal

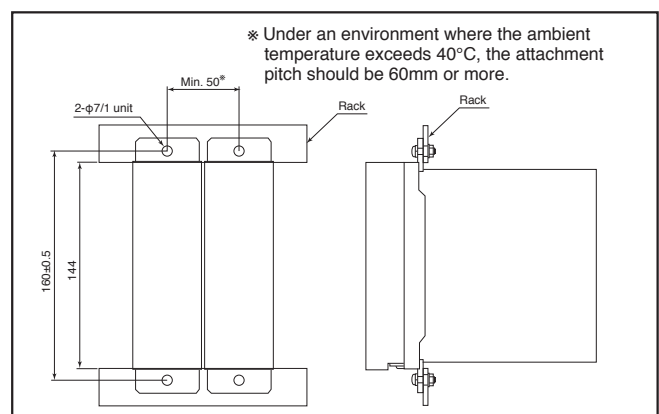
Specifications	Description
Explosionproof	Class A grounding
Non-explosionproof	Class D grounding (protective earth terminal)

■ DIMENSIONS [Unit: mm]



■ INSTALLATION CONDITIONS [Unit: mm]

- (1) Select a place where there is few mechanical vibration and corrosive gas.
- (2) Select a place where the humidity is low and the temperature is close to room temperature.
- (3) If installing multiple transmitters under the environment where the ambient temperature around transmitter exceeds 40°C, the mounting pitch should be at least 60mm.
- (4) Install the product at a place where you can carry out the maintenance easily.
- (5) Install the transmitter with the mounting dimensions shown in the figure below.



■ EXPLOSIONPROOF SPECIFICATION

TIIS, KCs

● Rackmount transmitter Explosionproof specifications

- Transmitter explosionproof symbol: [Ex ib] IIC
- Transmitter and Sensor ambient temperature: -20°C to +50°C

● Sensor Explosionproof

[Type U]

- Sensor explosionproof symbol: Ex ib IIB/IIC T1, T2, T3, T4, T5
- * Section without any description of temperature range are not supported.

	Temperature class	T1		T2	T3	T4	T5
	Group	IIB	IIC	IIC	IIC	IIC	IIC
Model Ambient temp./ Fluid temp.	CA00A	—	—		-40°C to +60°C/ -40°C to +150°C	-40°C to +60°C/ -40°C to +80°C	—
	CA001	—	—				—
	CA003	—	—	-20°C to +60°C/ -20°C to +200°C	-20°C to +60°C/ -20°C to +150°C	-20°C to +60°C/ -20°C to +90°C	—
	CA006/CA010	—	—	-20°C to +60°C/ -40°C to +200°C	-40°C to +60°C/ -40°C to +150°C	-40°C to +60°C/ -40°C to +80°C	—
	CA015	—	—				—
	CA025	-20°C to +60°C/ -20°C to +350°C	—				-20°C to +50°C/ -200°C to +50°C
	CA040/CA050		—				
	CA080	—	-20°C to +60°C/ -20°C to +350°C				
	CA100/CA150	—	—				
	CA15H/CA200	—	—				
CA20H/CA250	—	—					

[Type S Titanium Tube Type]

- Sensor explosionproof symbol: Ex ib IIB T3, T4

	Temperature class	T3	T4
	Group	IIB	IIB
Model Ambient temp./ Fluid temp.	CS010	-40°C to +60°C/ -40°C to +130°C	-40°C to +60°C/ -40°C to +80°C
	CS015		
	CS025		
	CS040		
	CS050		
	CSR50		

[Type B]

- Sensor explosionproof symbol: Ex ib IIB T3, T4

	Temperature class	T3	T4
	Group	IIB	IIB
Model Ambient temp./ Fluid temp.	CB006/CB010	-40°C to +60°C/ -40°C to +125°C	-40°C to +60°C/ -40°C to +80°C
	CB015		-40°C to +60°C/ -40°C to +70°C
	CB025	-40°C to +60°C/ -40°C to +80°C	
	CB040/CB050	-20°C to +60°C/ -20°C to +125°C	-20°C to +60°C/ -20°C to +80°C

[Type S Stainless Tube Type]

- Sensor explosionproof symbol: Ex ib IIB T3, T4

	Temperature class	T3	T4
	Group	IIB	IIB
Model Ambient temp./ Fluid temp.	CS010	-40°C to +60°C/ -40°C to +130°C	-40°C to +60°C/ -40°C to +80°C
	CS015		
	CS025		
	CS040		
	CS050		
	CS080	-20°C to +60°C/ -20°C to +130°C	-20°C to +60°C/ -20°C to +80°C

[Super High Pressure Type (CA004)]

- Sensor explosionproof symbol: Ex IIC T4

	Temperature class	T4
	Group	IIC
Model Ambient temp./ Fluid temp.	CA004	-40°C to +60°C/ -40°C to +80°C

ATEX, IECEx

●Rackmount transmitter Explosionproof specifications

- Transmitter explosionproof symbol: II (2) G [Ex ib Gb] IIC
- Transmitter and Sensor ambient temperature: -20°C to +50°C

●Sensor Explosionproof

[Type U]

- Sensor explosionproof symbol: Ex ib IIC T1, T2, T3, T4, T5
- * Section without any description of temperature range are not supported.

	Temperature class	T1	T2	T3	T4	T5
	Group	IIC	IIC	IIC	IIC	IIC
Model Ambient temp./ Fluid temp.	CA00A	—	—	-40°C to +60°C/ -40°C to +150°C	-40°C to +60°C/ -40°C to +80°C	—
	CA001	—	—			—
	CA003	—	-20°C to +60°C/ -40°C to +200°C			—
	CA006/CA010	—				—
	CA015	—				—
	CA025	-20°C to +60°C/ -20°C to +350°C				-20°C to +50°C/ -200°C to +50°C
	CA040/CA050					
	CA080					
	CA100/CA150					
	CA15H/CA200	—				
CA20H/CA250	—					

[Type S Titanium Tube Type]

- Sensor explosionproof symbol: Ex ib IIB T3, T4

	Temperature class	T3	T4
	Group	IIB	IIB
Model Ambient temp./ Fluid temp.	CS010/CS015	-40°C to +60°C/ -40°C to +130°C	-40°C to +60°C/ -40°C to +80°C
	CS025		
	CS040		
	CS050/CSR50		

[Type B]

- Sensor explosionproof symbol: Ex ib IIB T3, T4

	Temperature class	T3	T4
	Group	IIB	IIB
Model Ambient temp./ Fluid temp.	CB006/CB010	-40°C to +60°C/ -40°C to +125°C	-40°C to +60°C/ -40°C to +80°C
	CB015		-40°C to +60°C/ -40°C to +70°C
	CB025		-40°C to +60°C/ -40°C to +80°C
	CB050	-20°C to +60°C/ -20°C to +125°C	-20°C to +60°C/ -20°C to +80°C

[Type S Stainless Tube Type]

- Sensor explosionproof symbol: Ex ib IIB T3, T4

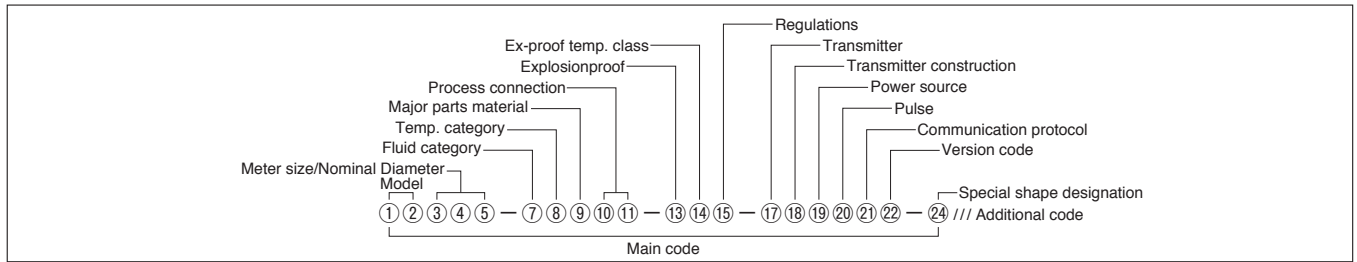
	Temperature class	T3	T4
	Group	IIB	IIB
Model Ambient temp./ Fluid temp.	CS010	-40°C to +60°C/ -40°C to +130°C	-40°C to +60°C/ -40°C to +80°C
	CS015		
	CS025		
	CS040		
	CS050		
	CS080	-20°C to +60°C/ -20°C to +130°C	-20°C to +60°C/ -20°C to +80°C

[Super High Pressure Type (CA004)]

- Sensor explosionproof symbol: Ex IIC T3, T4

	Temperature class	T3	T4
	Group	IIC	IIC
Model Ambient temp./ Fluid temp.	CA004	-40°C to +60°C/ -40°C to +150°C	-40°C to +60°C/ -40°C to +80°C

PRODUCT CODE EXPLANATION (Type U)



●Main code (CA00A to CA080)

○: Compatible, ×: Not applicable, △: Request inquiries

① ② Model		Selector Chart											
C	A	ALTI _{mass} Type U											
③ ④ ⑤ Meter size/Nominal Diameter													
		JIS Flange	ASME-JPI Flange	DIN Flange	Ferrule	Screw							
0	0	A				R1/4							
0	0	1				R1/4							
0	0	3	10mm	1/2"	DN 15	10A	Rc3/8						
0	0	6	10mm	1/2"	DN 15	10A	Rc3/8						
0	1	0	15mm	1/2"	DN 15	15A	Rc3/8						
0	1	5	15mm	1/2"	DN 15	15A	Rc3/4						
0	2	5	25mm	1"	DN 25	25 (ISO), IDF 1S							
0	4	0	40mm	1"-1/2"	DN 40	38 (ISO), IDF 1.5S							
0	5	0	50mm	2"	DN 50	51 (ISO), IDF 2S							
0	8	0	80mm	3"	DN 80	76.1 (ISO), IDF 3S							
0	8	0	100mm	4"	DN 100								
⑥													
⑦ Fluid category													
L	Liquid												
G	Gas												
⑧ Temp. category *1													
2	Standard (200°C and lower)												
3	High temp. (350°C and lower)												
4	Low temp. explosionproof (-200°C to +50°C)												
⑨ Major parts material													
S	SUS316L												
M	SUS316L+Alloy C												
H	Alloy C *2												
P	Alloy C (High Pressure) *3												
⑩ ⑪ Process connection													
J	1	JIS10K (Standard nominal size *5)											
J	2	JIS20K (Standard nominal size *5)											
J	3	JIS30K (Standard nominal size *5)											
J	4	JIS40K (Standard nominal size *5)											
J	6	JIS63K (Standard nominal size *5)											
A	1	ASME150 (Standard nominal size *5)											
A	3	ASME300 (Standard nominal size *5)											
A	6	ASME600 (Standard nominal size *5)											
P	1	JPI150 (Standard nominal size *5)											
P	3	JPI300 (Standard nominal size *5)											
P	6	JPI600 (Standard nominal size *5)											
D	1	DIN PN10 *4 (Standard nominal size *5)											
D	B	DIN PN16 *4 (Standard nominal size *5)											
D	3	DIN PN25 *4 (Standard nominal size *5)											
D	4	DIN PN40 *4 (Standard nominal size *5)											
K	1	JIS10K (Expanded nominal size *6, *7)											
K	2	JIS20K (Expanded nominal size *6, *7)											
K	3	JIS30K (Expanded nominal size *6, *7)											
B	1	ASME150 (Expanded nominal size *6, *7)											
B	3	ASME300 (Expanded nominal size *6, *7)											
B	6	ASME600 (Expanded nominal size *6, *7)											
Q	1	JPI150 (Expanded nominal size *6, *7)											
Q	3	JPI300 (Expanded nominal size *6, *7)											
Q	6	JPI600 (Expanded nominal size *6, *7)											
E	1	DIN PN10 *4 (Expanded nominal size *6, *7)											
E	B	DIN PN16 *4 (Expanded nominal size *6, *7)											
E	3	DIN PN25 *4 (Expanded nominal size *6, *7)											
E	4	DIN PN40 *4 (Expanded nominal size *6, *7)											
T	T Screw (Male)												
T	C Screw (Female)												
H	S ISO Ferrule												
Z	9 Special												

*1: Explosionproof specifications are restricted depending on the temp. class.
 *2: When "H" is chosen for "Major parts material", CA003 are always threaded connection, and CA006 to CA080 are loose flange type.
 *3: When "P" for high pressure is chosen as "Major parts material", threaded connection is always applied.
 *4: DIN flange is applied only when "S" and "M" are chosen for "Major parts material".

⑫	—	
⑬ Explosionproof		
0	Non-explosionproof	
1	TIS	
2	ATEX, IECEx	
3	KCs	
⑭ Ex-proof temp. class		
0	Non-explosionproof	
1	T1	
2	T2	
3	T3	
4	T4	
5	T5	
⑮ Regulations		
0	Standard	
G	High Pressure Gas Safety Act (Approved product)	w/Material test certificate
H	High Pressure Gas Safety Act (Individual test)	w/Material test certificate
J	High Pressure Gas Safety Act (Completion inspection)	w/Material test certificate
M	Gas Business Act	w/Material test certificate
T	Fire Service Act	w/Material test certificate
F	w/Material test certificate	
⑯	—	
⑰ Transmitter		
3	Rack-mount transmitter	
⑱ Transmitter construction *8		
2	Remote-mount (Terminal box materials: ADC12)	
3	Remote-mount (Terminal box materials: SCS13A)	
⑲ Power source		
1	20 to 30VDC	
2	100 to 240VAC 50/60Hz	
⑳ Pulse		
B	Voltage	
G	Open drain (open collector output equivalent) (Standard)	
㉑ Communication protocol		
1	HART communication (HART protocol version 7, Bell202)	
4	Modbus communication (RS-485 Modbus protocol)	
㉒ Version code		
A	Version code: A (CA003 only)	
B	Version code: B	
㉓	—	
㉔ Special shape designation		
0	Standard	
Z	Special shape (including polishing, long neck)	

*5: The standard nominal size of each model is as follows.

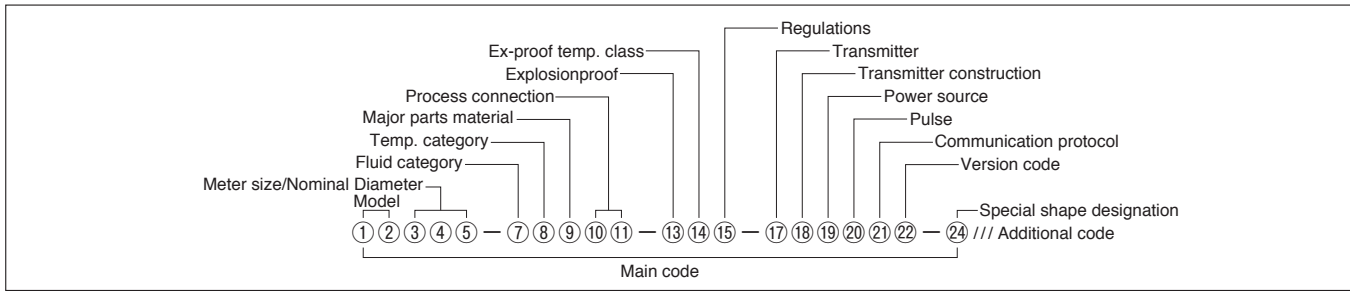
Model	JIS Flange	ASME-JPI Flange	DIN Flange
CA003	10mm	1/2"	DIN15
CA006	10mm	1/2"	DIN15
CA010	15mm	1/2"	DIN15
CA015	15mm	1/2"	DIN15
CA025	25mm	1"	DIN25
CA040	40mm	1-1/2"	DIN40
CA050	50mm	2"	DIN50
CA080	80mm	3"	DIN80

*6: The expanded nominal size of each model is as follows.

Model	JIS Flange	ASME-JPI Flange	DIN Flange
CA015 (Request inquiries)	25mm	1"	DIN25
CA025 (Request inquiries)	40mm	1-1/2"	DIN40
CA080	100mm	4"	DIN100

*7: Expanded nominal size is applied only when "S" and "M" are chosen for "Major parts material".

*8: When "3" is chosen for "Transmitter construction" following limitations apply:
 Code ⑧ Only "Standard" available
 Code ⑰ Only "Rack-mount transmitter" available



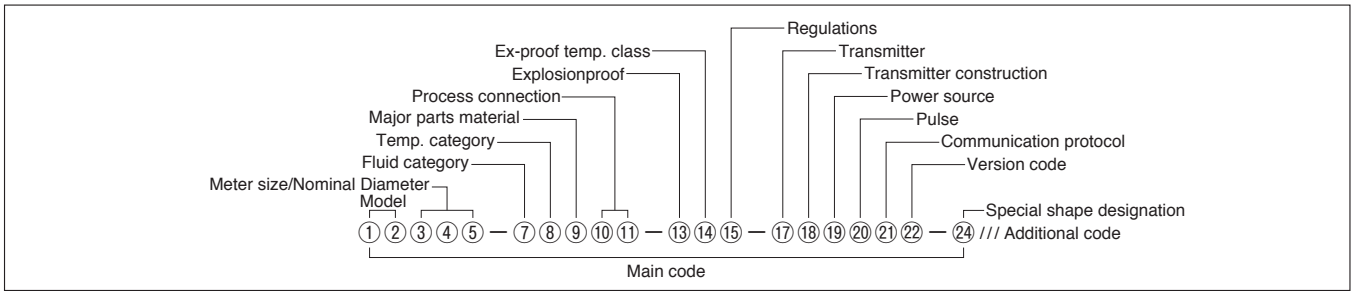
●Main code (CA100 to CA250)

①	②	Model						
C	A	ALTI _{mass} Type U						
③	④	Meter size/Nominal Diameter			CA100, CA150, CA15H, CA200, CA20H, CA250	High temp. service: CA100, CA150	Low temp. explosionproof service: CA100, CA150, CA15H, CA200, CA20H, CA250	
		JIS Flange	ASME-JPI Flange	DIN Flange				
1	0	0	100mm	4"				DN 100
1	5	0	150mm	6"				DN 150
1	5	H	150mm	6"				DN 150
2	0	0	200mm	8"				DN 200
2	0	H	200mm	8"	DN 200			
2	5	0	250mm	10"	DN 250			
⑥	—							
⑦	Fluid category							
L	Liquid			○	○	○		
⑧	Temp. category *1							
2	Standard (200°C and lower)			○	×	×		
3	High temp. (350°C and lower)			×	○	×		
4	Low temp. explosionproof (-200°C to +50°C)			×	×	○		
⑨	Major parts material							
S	SUS316L			○	○	○		
⑩	⑪	Process connection						
J	1	JIS10K			○	○	○	
J	2	JIS20K			○	○	○	
J	3	JIS30K			○	○	○	
A	1	ASME150			○	○	○	
A	3	ASME300			○	○	○	
A	6	ASME600			○	○	○	
P	1	JPI150			○	○	○	
P	3	JPI300			○	○	○	
P	6	JPI600			○	○	○	
D	1	DIN PN10			○	○	○	
D	B	DIN PN16			○	○	○	
D	3	DIN PN25			○	○	○	
D	4	DIN PN40			○	○	○	
Z	9	Special			○	○	○	

*1: Explosionproof specifications are restricted depending on the temp. class.

*2: When "3" is chosen for "Transmitter construction ⑱" following limitations apply:
Code ⑧ Only "Standard" available
Code ⑰ Only "Rack-mount transmitter" available

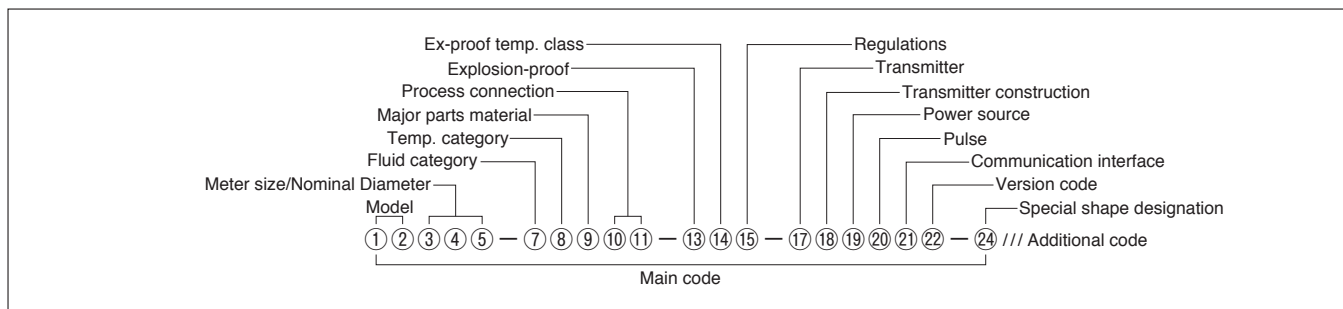
⑫	—	
⑬	Explosion-proof	
0	Non-explosionproof	
1	TIIS	
2	ATEX, IECEx	
3	KCs	
⑭	Ex-proof temp. class	
0	Non-explosionproof	
1	T1	
2	T2	
3	T3	
4	T4	
5	T5	
⑮	Regulations	
0	Standard	
G	High Pressure Gas Safety Act (Approved product) CA100 and CA150 only	*w/Material test certificate
H	High Pressure Gas Safety Act (Individual test)	*w/Material test certificate
J	High Pressure Gas Safety Act (Completion inspection)	*w/Material test certificate
M	Gas Business Act	*w/Material test certificate
T	Fire Service Act	*w/Material test certificate
F	w/Material test certificate	
⑯	—	
⑰	Transmitter	
3	Rack-mount transmitter	
⑱	Transmitter construction *2	
2	Remote-mount (Terminal box materials: ADC12)	
3	Remote-mount (Terminal box materials: SCS13A)	
⑲	Power source	
1	20 to 30VDC	
2	100 to 240VAC 50/60Hz	
⑳	Pulse	
B	Voltage	
G	Open drain (open collector output equivalent) (Standard)	
㉑	Communication protocol	
1	HART communication (HART protocol version 7, Bell202)	
4	Modbus communication (RS-485 Modbus protocol)	
㉒	Version code	
B	Version code: B	
㉓	—	
㉔	Special shape designation	
0	Standard	
Z	Special shape	



Additional code

Category of High Pressure Gas			
H	P	0	Other than High Pressure Gas
H	P	1	Toxic gas and flammable gas
H	P	2	Toxic gas
H	P	3	Flammable gas
H	P	4	Other than toxic or flammable gas
Density calibration			
M	0	0	Density calibration
Special test (instrumental error)			
A	1	0	Taxed custody transfer
A	2	0	By certified measurer
A	9	9	Designation of instrumental error test method Addition of one (1) test point, etc.
Flow direction			
F	L	0	L→R
F	R	0	R→L
F	D	0	B→T Electric conduit at the bottom
Designated special paint on body			
B	X	0	Customer designation
Cleansing			
T	W	0	Non-oil and non-water treatment
T	F	0	Food cleansing

Document			
D	S	J	DWG and specifications for approval (Japanese)
D	S	E	DWG and specifications for approval (English)
D	R	0	Re-submission of DWG with specifications
D	C	J	Final DWG (Japanese)
D	C	E	Final DWG (English)
D	P	J	Calculation sheet (Japanese)
D	P	E	Calculation sheet (English)
S	E	J	Instrumental error test report (Japanese)
S	E	E	Instrumental error test report (English)
S	T	J	Pressure test report (Japanese)
S	T	E	Pressure test report (English)
S	A	J	Airtight test report (Japanese)
S	A	E	Airtight test report (English)
D	D	J	Dimensional check record (Japanese)
D	D	E	Dimensional check record (English)
S	P	J	Penetrant test report (Japanese) Welded part of pressure resistant vessel
S	P	E	Penetrant test report (English) Welded part of pressure resistant vessel
S	R	J	Radiographic inspection (Japanese) Welded part of pressure resistant vessel
S	R	E	Radiographic inspection (English) Welded part of pressure resistant vessel
S	X	J	PMI test report (Japanese)
S	X	E	PMI test report (English)
S	S	J	Impact test report (Japanese) Manifold only
S	S	E	Impact test report (English) Manifold only
D	Y	J	WPS/PQR (Japanese)
D	Y	E	WPS/PQR (English)
D	9	J	Photo (Japanese)
D	9	E	Photo (English)
D	T	J	Inspection procedure (Japanese)
D	T	E	Inspection procedure (English)
C	A	J	Inspection certificate: A set Only Japanese
C	B	J	Inspection certificate: B set Only Japanese
C	C	J	Inspection certificate: C set Only Japanese
C	D	J	Inspection certificate: D set Only Japanese
Witnessed by customer			
V	1	0	Required

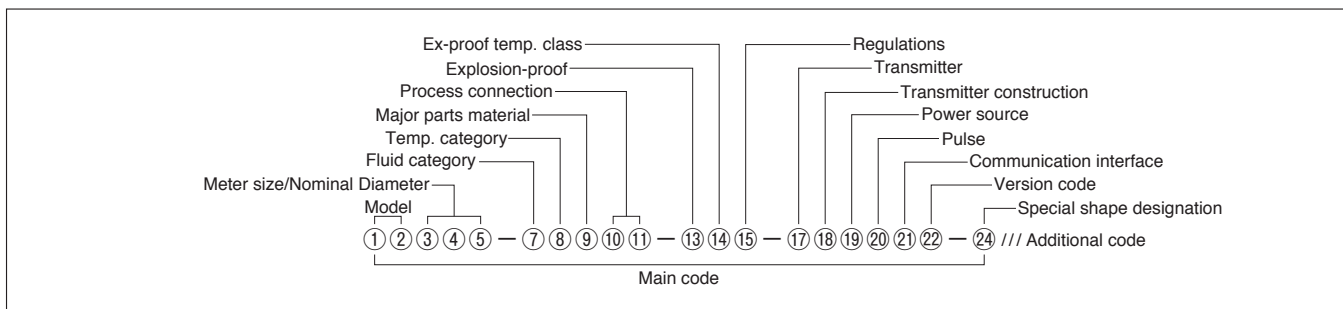


●Main code (CA004)

①	②	Model	
C	A	ALTI ^{mass} Type U	
③	④	⑤	Meter size/Nominal Diameter
0	0	4	9/16"
⑥	—		
⑦	Fluid category		
L	Liquid		
G	Gas		
⑧	Temp. category *1		
2	Standard (200°C and lower)		
⑨	Major parts material		
X	XM-19		
⑩	⑪	Process connection	
X	0	High-press. Cone & Thread	
Z	9	Special	
⑫	—		
⑬	Explosion-proof		
0	Non-explosionproof		
1	TIIS		
2	ATEX, IECEx		
3	KCs		
⑭	Ex-proof temp. class		
0	Non-explosionproof		
3	T3		
4	T4		
⑮	Regulations		
0	Standard		
H	High Pressure Gas Safety Act (Individual test)	*w/Material test certificate (Designed on PO issued)	
J	High Pressure Gas Safety Act (Completion inspection)	*w/Material test certificate	
T	Fire Service Act	*w/Material test certificate	
F	w/Material test certificate		

⑯	—
⑰	Transmitter
3	Rack-mount transmitter
⑱	Transmitter construction *2
2	Remote-mount
⑲	Power source
1	20 to 30VDC
2	100 to 240VAC 50/60Hz
⑳	Pulse
B	Voltage pulse
G	Open drain pulse (equivalent to open collector pulse) (standard)
㉑	Communication interface
1	HART communication (HART protocol version 7, Bell202)
4	Modbus communication (RS-485 Modbus protocol)
㉒	Version code
B	Version code: B
㉓	—
㉔	Special shape designation
0	Standard
Z	Special shape

*1: Explosionproof specifications are restricted based on temperature class.
 *2: Fluids of temperature up to 130°C can be measured, though the maximum operating pressure is lowered.

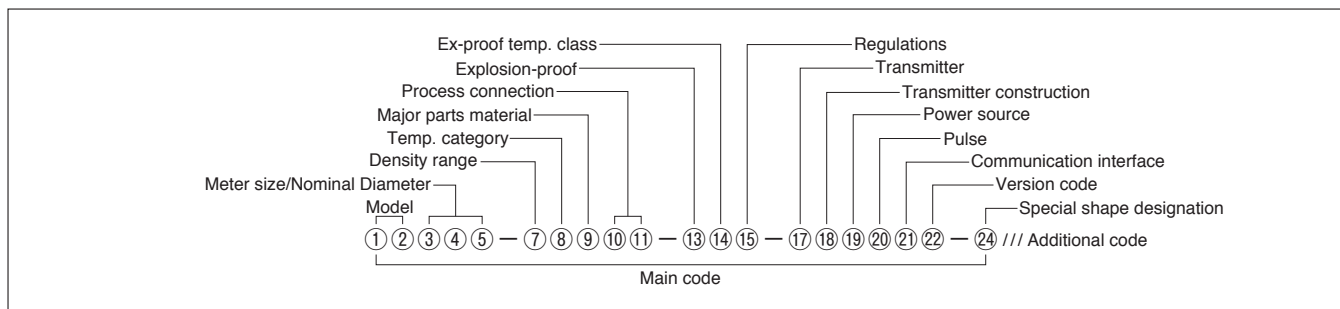


●Additional code

Category of High Pressure Gas		
H	P	0 Other than High Pressure Gas
H	P	1 Toxic gas and flammable gas
H	P	2 Toxic gas
H	P	3 Flammable gas
H	P	4 Other than toxic or flammable gas
Density calibration		
M	0	0 Density calibration
Special test (instrumental error)		
A	2	0 By certified measurer
A	9	9 Designation of instrumental error test method Addition of one (1) test point, etc.
Flow direction		
F	L	0 L→R
F	R	0 R→L
F	D	0 B→T Electric conduit at the bottom
Designated special paint on body		
B	X	0 Customer designation
Cleansing		
T	W	0 Non-oil and non-water treatment

Document		
D	S	J DWG and specifications for approval (Japanese)
D	S	E DWG and specifications for approval (English)
D	R	0 Re-submission of DWG with specifications
D	C	J Final DWG (Japanese)
D	C	E Final DWG (English)
D	P	J Calculation sheet (Japanese)
D	P	E Calculation sheet (English)
S	E	J Instrumental error test report (Japanese)
S	E	E Instrumental error test report (English)
S	T	J Pressure test report (Japanese)
S	T	E Pressure test report (English)
S	A	J Airtight test report (Japanese)
S	A	E Airtight test report (English)
S	B	J Airtight test report (Japanese) - over 40MPa
S	B	E Airtight test report (English) - over 40MPa
S	C	J Airtight test report (Japanese) - over 70MPa
S	C	E Airtight test report (English) - over 70MPa
D	D	J Dimensional check record (Japanese)
D	D	E Dimensional check record (English)
S	P	J Penetrant test report (Japanese) Welded part of pressure resistant vessel
S	P	E Penetrant test report (English) Welded part of pressure resistant vessel
S	R	J Radiographic inspection (Japanese) Welded part of pressure resistant vessel
S	R	E Radiographic inspection (English) Welded part of pressure resistant vessel
S	X	J PMI test report (Japanese)
S	X	E PMI test report (English)
D	Y	J WPS/PQR (Japanese)
D	Y	E WPS/PQR (English)
D	9	J Photo (Japanese)
D	9	E Photo (English)
D	T	J Inspection procedure (Japanese)
D	T	E Inspection procedure (English)
C	A	J Inspection certificate: A set Only Japanese
C	B	J Inspection certificate: B set Only Japanese
C	C	J Inspection certificate: C set Only Japanese
C	D	J Inspection certificate: D set Only Japanese
Witnessed by customer		
V	1	0 Required

■ PRODUCT CODE EXPLANATION (Type S)



●Main code

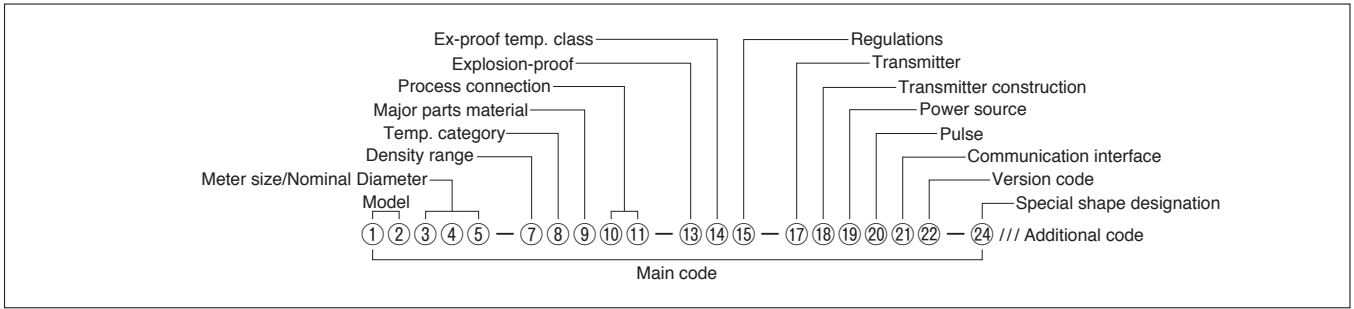
①	②	Model			
C	S	ALTI _{mass} Type S			
③	④	⑤	Meter size/Nominal Diameter		
			JIS flange		
			ASME-JPI flange		
			Ferrule		
0	1	0	15mm	1/2"	15A
0	1	5	15mm	1/2"	15A
0	2	5	25mm	1"	38 (ISO), IDF 1.5S
0	4	0	40mm	1-1/2"	51 (ISO), IDF 2S
0	5	0	50mm	2"	63.5 (ISO), IDF 2.5S
0	8	0	80mm	3"	*Consult with OVAL
⑥	—				
⑦	Density range				
1	Low density liquids (0.5 to 1.0g/mL)				
2	Ordinary density liquid (0.7 to 1.3g/mL)				
3	High density liquid (1.0 to 1.5g/mL)				
⑧	Temp. category *1				
1	Standard (130°C and lower)				
⑨	Major parts material				
S	SUS316L				
⑩	⑪	Process connection			
J	1	JIS10K			
J	2	JIS20K			
A	1	ASME150			
P	1	JPI150			
H	S	ISO Ferrule			
Z	9	Special			
⑫	—				
⑬	Explosion-proof				
0	Non-explosionproof				
1	TIIS				
2	ATEX, IECEx				
3	KCs				
⑭	Ex-proof temp. class				
0	Non-explosionproof				
3	T3				
4	T4				

⑮	Regulations	
0	Standard	
G	High Pressure Gas Safety Act (Approved product) *2	*w/Material test certificate
H	High Pressure Gas Safety Act (Individual test) *2	*w/Material test certificate (Designed on PO issued)
J	High Pressure Gas Safety Act (Completion inspection) *2	*w/Material test certificate
T	Fire Service Act	*w/Material test certificate
F	w/Material test certificate	
⑯	—	
⑰	Transmitter	
3	Rack-mount transmitter	
⑱	Transmitter construction *3	
2	Remote-mount (Terminal box materials: ADC12)	
3	Remote-mount (Terminal box materials: SCS13A)	
⑲	Power source	
1	20 to 30VDC	
2	100 to 240VAC 50/60Hz	
⑳	Pulse output type	
B	Voltage pulse	
G	Open drain pulse (equivalent to open collector pulse) (standard)	
㉑	Communication interface	
1	HART communication (HART protocol version 7, Bell202)	
4	Modbus communication (RS-485 Modbus protocol)	
㉒	Version code	
A	Version code: A	
㉓	—	
㉔	Special shape designation	
0	Standard	
Z	Special shape (including polishing)	

*1: Explosionproof specifications are restricted based on temperature class.

*2: CS080 is not conform to (the Japan) High Pressure Gas Act.

*3: When "3" is chosen for "Transmitter construction ⑱" following limitations apply:
 Code ③ Only "Standard" available
 Code ⑰ Only "Rack-mount transmitter" available

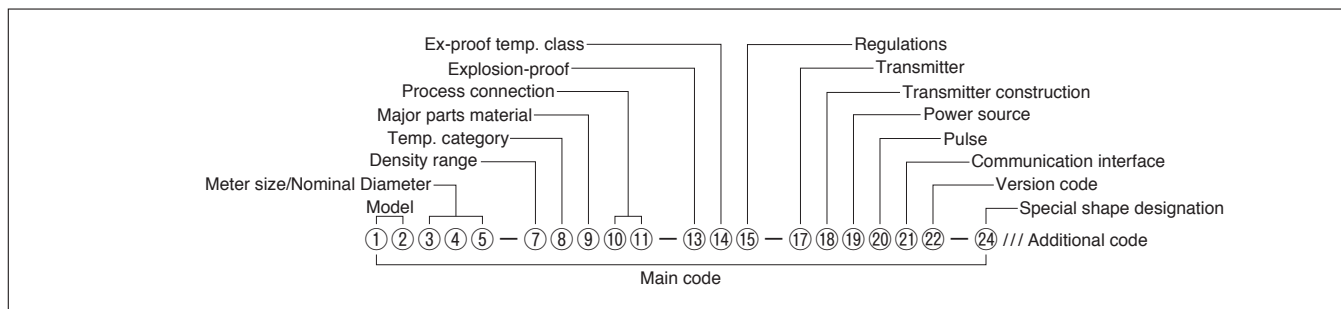


●Additional code

Category of High Pressure Gas		
H P	0	Other than High Pressure Gas
H P	1	Toxic gas and flammable gas
H P	2	Toxic gas
H P	3	Flammable gas
H P	4	Other than toxic or flammable gas
Special test (instrumental error)		
A 2	0	By certified measurer
A 9	9	Designation of instrumental error test method Addition of one (1) test point, etc.
Flow direction		
F L	0	L→R
F R	0	R→L
F D	0	B→T Electric conduit at the bottom
Designated special paint on body		
B X	0	Customer designation
Cleansing		
T W	0	Non-oil and non-water treatment
T F	0	Food cleansing

Document		
D S	J	DWG and specifications for approval (Japanese)
D S	E	DWG and specifications for approval (English)
D R	0	Re-submission of DWG with specifications
D C	J	Final DWG (Japanese)
D C	E	Final DWG (English)
D P	J	Calculation sheet (Japanese)
D P	E	Calculation sheet (English)
S E	J	Instrumental error test report (Japanese)
S E	E	Instrumental error test report (English)
S T	J	Pressure test report (Japanese)
S T	E	Pressure test report (English)
S A	J	Airtight test report (Japanese)
S A	E	Airtight test report (English)
D D	J	Dimensional check record (Japanese)
D D	E	Dimensional check record (English)
S P	J	Penetrant test report (Japanese) Welded part of pressure resistant vessel
S P	E	Penetrant test report (English) Welded part of pressure resistant vessel
S R	J	Radiographic inspection (Japanese) Welded part of pressure resistant vessel
S R	E	Radiographic inspection (English) Welded part of pressure resistant vessel
S X	J	PMI test report (Japanese)
S X	E	PMI test report (English)
D Y	J	WPS/PQR (Japanese)
D Y	E	WPS/PQR (English)
D 9	J	Photo (Japanese)
D 9	E	Photo (English)
D T	J	Inspection procedure (Japanese)
D T	E	Inspection procedure (English)
C A	J	Inspection certificate: A set Only Japanese
C B	J	Inspection certificate: B set Only Japanese
C C	J	Inspection certificate: C set Only Japanese
C D	J	Inspection certificate: D set Only Japanese
Witnessed by customer		
V 1	0	Required

■ PRODUCT CODE EXPLANATION (Titanium Tube Type)



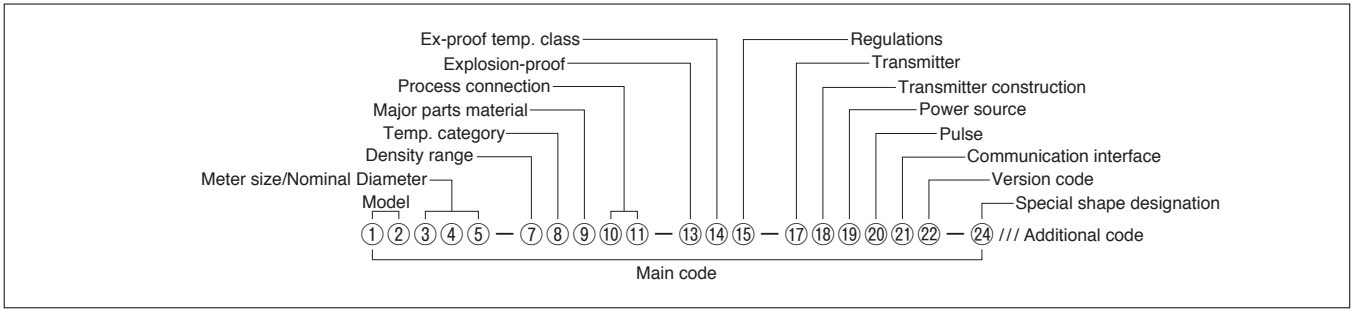
●Main code

①	②	Model		
C	S	ALTI ^{mass} Type S		
③	④	⑤	Meter size/Nominal Diameter	
			JIS flange	ASME-JPI flange
0	1	0	10mm	1/2"
0	1	5	15mm	1/2"
0	2	5	25mm	1"
0	4	0	40mm	1-1/2"
0	5	0	50mm	2"
R	5	0	80mm	3"
⑥	—			
⑦	Density range			
1	Low density liquids (0.5 to 1.0g/mL)			
2	Ordinary density (0.7 to 1.3g/mL)			
3	High density liquid (1.0 to 1.5g/mL)			
⑧	Temp. category *1			
1	Standard (130°C and lower)			
⑨	Major parts material			
T	SB338 Grade-9 + TB480H			
⑩	⑪	Process connection		
J	1	JIS10K		
J	2	JIS20K		
A	1	ASME150		
P	1	JPI150		
H	S	ISO Ferrule		
Z	9	Special		
⑫	—			
⑬	Explosion-proof			
0	Non-explosionproof			
1	TIIS			
2	ATEX, IECEx			
3	KCs			

⑭	Ex-proof temp. class		
0	Non-explosionproof		
3	T3		
4	T4		
⑮	Regulations		
0	Standard		
E	EHEDG (CS025, CS040, CS050) + w/Material test certificate		
T	Fire Service Act *w/Material test certificate		
F	w/Material test certificate		
⑯	—		
⑰	Transmitter		
3	Rack-mount transmitter		
⑱	Transmitter construction *2		
2	Remote-mount (Terminal box materials: ADC12)		
3	Remote-mount (Terminal box materials: SCS13A)		
⑲	Power source		
1	20 to 30VDC		
2	100 to 240VAC 50/60Hz		
⑳	Pulse		
B	Voltage pulse		
G	Open drain pulse (equivalent to open collector pulse) (standard)		
㉑	Communication interface		
1	HART communication (HART protocol version 7, Bell202)		
4	Modbus communication (RS-485 Modbus protocol)		
㉒	Version code		
A	Version code: A		
㉓	—		
㉔	Special shape designation		
0	Standard		
Z	Special shape (including polishing, long neck)		

*1: Explosionproof specifications are restricted based on temperature class.

*2: When "3" is chosen for "Transmitter construction ⑱" following limitations apply:
 Code ⑧ Only "Standard" available
 Code ⑰ Only "Rack-mount transmitter" available

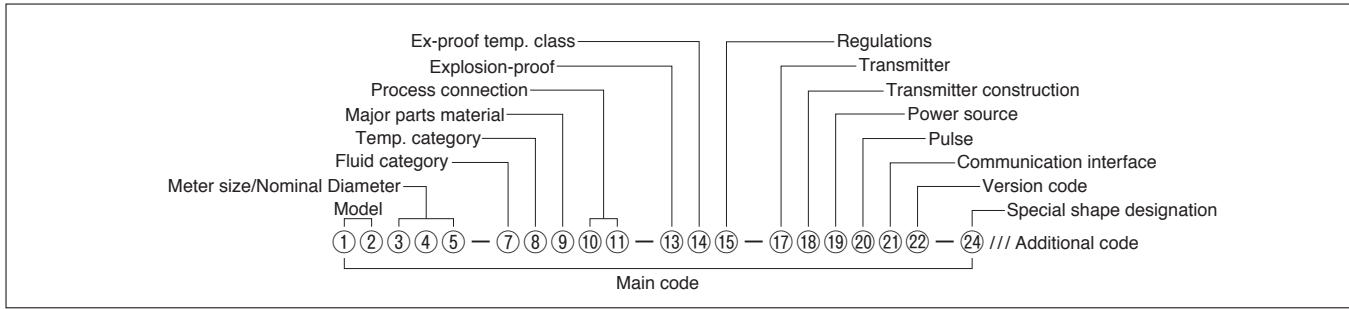


●Additional code

Density calibration			
M	0	0	Density calibration
Special test (instrumental error)			
A	2	0	By certified measurer
A	9	9	Designation of instrumental error test method Addition of one (1) test point, etc.
Flow direction			
F	L	0	L→R
F	R	0	R→L
F	D	0	B→T Electric conduit at the bottom
Designated special paint on body			
B	X	0	Customer designation
Cleansing			
T	W	0	Non-oil and non-water treatment
T	F	0	Food cleansing

Document			
D	S	J	DWG and specifications for approval (Japanese)
D	S	E	DWG and specifications for approval (English)
D	R	0	Re-submission of DWG with specifications
D	C	J	Final DWG (Japanese)
D	C	E	Final DWG (English)
D	P	J	Calculation sheet (Japanese)
D	P	E	Calculation sheet (English)
S	E	J	Instrumental error test report (Japanese)
S	E	E	Instrumental error test report (English)
S	T	J	Pressure test report (Japanese)
S	T	E	Pressure test report (English)
S	A	J	Airtight test report (Japanese)
S	A	E	Airtight test report (English)
D	D	J	Dimensional check record (Japanese)
D	D	E	Dimensional check record (English)
S	P	J	Penetrant test report (Japanese) Welded part of pressure resistant vessel
S	P	E	Penetrant test report (English) Welded part of pressure resistant vessel
S	R	J	Radiographic inspection (Japanese) Welded part of pressure resistant vessel
S	R	E	Radiographic inspection (English) Welded part of pressure resistant vessel
S	X	J	PMI test report (Japanese)
S	X	E	PMI test report (English)
D	9	J	Photo (Japanese)
D	9	E	Photo (English)
D	T	J	Inspection procedure (Japanese)
D	T	E	Inspection procedure (English)
C	A	J	Inspection certificate: A set Only Japanese
C	B	J	Inspection certificate: B set Only Japanese
C	C	J	Inspection certificate: C set Only Japanese
C	D	J	Inspection certificate: D set Only Japanese
Witnessed by customer			
V	1	0	Required

■ PRODUCT CODE EXPLANATION (Type B)



●Main code

①	②	Model		
C	B	ALTI ^{mass} Type B		
③	④	⑤	Meter size/Nominal Diameter	
			JIS flange	ASME-JPI flange
0	0	6	10mm	1/2"
0	1	0	15mm	1/2"
0	1	5	15mm	1/2"
0	2	5	25mm	1"
0	4	0	40mm	1-1/2"
0	5	0	50mm	2"
⑥	—			
⑦	Fluid category			
L	Liquid			
⑧	Temp. category *1			
1	Standard (130°C and lower)			
⑨	Major parts material			
S	SUS316L			
⑩	⑪	Process connection		
J	1	JIS10K		
J	2	JIS20K		
J	3	JIS30K		
A	1	ASME150		
A	3	ASME300		
A	6	ASME600		
P	1	JPI150		
P	3	JPI300		
P	6	JPI600		
H	S	ISO Ferrule		
Z	9	Special		
⑫	—			
⑬	Explosion-proof			
0	Non-explosionproof			
1	TIIS			
2	ATEX, IECEx			
3	KCs			
⑭	Ex-proof temp. class			
0	Non-explosionproof			
3	T3			
4	T4			

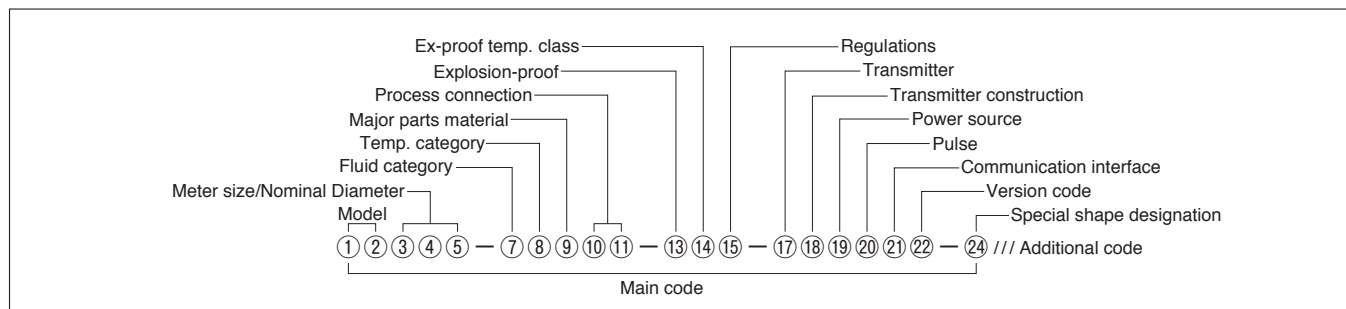
⑮	Regulations		
0	Standard		
T	Fire Service Act	*w/Material test certificate	
F	w/Material test certificate		
⑯	—		
⑰	Transmitter		
3	Rack-mount transmitter		
⑱	Transmitter construction *2		
2	Remote-mount (Terminal box materials: ADC12)		
3	Remote-mount (Terminal box materials: SCS13A)		
⑲	Power source		
1	20 to 30VDC		
2	100 to 240VAC 50/60Hz		
⑳	Pulse		
B	Voltage pulse		
G	Open drain pulse (equivalent to open collector pulse) (standard)		
㉑	Communication interface		
1	HART communication (HART protocol version 7, Bell202)		
4	Modbus communication (RS-485 Modbus protocol)		
㉒	Version code		
B	Version code: B		
㉓	—		
㉔	Special shape designation		
0	Standard		
Z	Special shape		

*1: Explosionproof specifications are restricted based on temperature class.

*2: When "3" is chosen for "Transmitter construction ⑱" following limitations apply:

Code ⑧ Only "Standard" available

Code ⑰ Only "Rack-mount transmitter" available



●Additional code

Density calibration		
M	0	Density calibration
Special test (instrumental error)		
A	2	By certified measurer
A	9	Designation of instrumental error test method Addition of one (1) test point, etc.
Flow direction		
F	L	L→R
F	R	R→L
F	D	B→T Electric conduit at the bottom
Designated special paint on body		
B	X	Customer designation
Cleansing		
T	W	Non-oil and non-water treatment
T	F	Food cleansing

Document		
D	S	J DWG and specifications for approval (Japanese)
D	S	E DWG and specifications for approval (English)
D	R	0 Re-submission of DWG with specifications
D	C	J Final DWG (Japanese)
D	C	E Final DWG (English)
D	P	J Calculation sheet (Japanese)
D	P	E Calculation sheet (English)
S	E	J Instrumental error test report (Japanese)
S	E	E Instrumental error test report (English)
S	T	J Pressure test report (Japanese)
S	T	E Pressure test report (English)
S	A	J Airtight test report (Japanese)
S	A	E Airtight test report (English)
D	D	J Dimensional check record (Japanese)
D	D	E Dimensional check record (English)
S	P	J Penetrant test report (Japanese) Welded part of pressure resistant vessel
S	P	E Penetrant test report (English) Welded part of pressure resistant vessel
S	R	J Radiographic inspection (Japanese) Welded part of pressure resistant vessel
S	R	E Radiographic inspection (English) Welded part of pressure resistant vessel
S	X	J PMI test report (Japanese)
S	X	E PMI test report (English)
S	S	J Impact test report (Japanese) Manifold only
S	S	E Impact test report (English) Manifold only
D	Y	J WPS/PQR (Japanese)
D	Y	E WPS/PQR (English)
D	9	J Photo (Japanese)
D	9	E Photo (English)
D	T	J Inspection procedure (Japanese)
D	T	E Inspection procedure (English)
C	A	J Inspection certificate: A set Only Japanese
C	B	J Inspection certificate: B set Only Japanese
C	C	J Inspection certificate: C set Only Japanese
C	D	J Inspection certificate: D set Only Japanese
Witnessed by customer		
V	1	0 Required

■ PLEASE SUPPLY THE FOLLOWING INFORMATION WHEN YOU INQUIRE.

(Fill in the form below to the extent possible. Further details will be finalized in later consultation.)

· Fill in the blanks. Tick the boxes that apply.

1. Model		
2. Process fluid (*1)	Name: _____ SP. gr : _____ Viscosity : _____ Concentration : _____ %	
3. Flow range	Max. _____ Normal _____ Full scale _____ <input type="checkbox"/> kg/h <input type="checkbox"/> Others _____	
4. Fluid temperature	Max. _____ °C Normal _____ °C Min. _____ °C	
5. Operating pressure	Max. _____ MPa Normal _____ MPa Min. _____ MPa	
6. Ambient temperature	Max. _____ °C Min. _____ °C	
7. Fluid flow direction	<input type="checkbox"/> Left→Right <input type="checkbox"/> Right→Left <input type="checkbox"/> Bottom→Top (<input type="checkbox"/> Top→Bottom)	
8. Nominal size	_____ mm or _____ inch	
9. Required accuracy	± _____ % of reading ± _____ % of full scale	
10. Process connection	<input type="checkbox"/> Flanged connection (Flange rating) _____ <input type="checkbox"/> Ferrule connection <input type="checkbox"/> Screw connection	
11. Explosionproof		
12. Power supply	_____ V <input type="checkbox"/> AC <input type="checkbox"/> DC	
13. Output specifications	Pulse output	<input type="checkbox"/> Volt. pulse: [0]: 1.5V [1]: 13VDC min. Out. impedance: 2.2k Ω
		<input type="checkbox"/> Open drain (equivalent to open collector) [Min. 10V to Max. 30V, 50mADC, ON resistance 0.6 Ω or less]
		<input type="checkbox"/> Output frequency: Any point from 0.1 to 10000Hz at full scale
	Analog output	4 to 20mADC Max. load: 600 Ω 2 outputs from instant. flow rate (mass, volume), temp. or density (option)
Additional damping	0 to 200s. (variable)	
14. Communication protocol	<input type="checkbox"/> HART <input type="checkbox"/> Modbus (Address: _____)	
15. Receiver	<input type="checkbox"/> Totalizer <input type="checkbox"/> Indicator <input type="checkbox"/> Recorder <input type="checkbox"/> Flow controller <input type="checkbox"/> Batch controller	
	<input type="checkbox"/> Density computer <input type="checkbox"/> Computer <input type="checkbox"/> Others	
16. Transmission length	Sensor unit (_____) m Transmitter (_____) m Receiving instrument	
17. Exclusive cable length		
18. No. of units required		
19. Application		
20. Other considerations		

*1: Special fluids, such as of high viscosity or slurries, should be stated precisely and in detail.

The specification as of May, 2020 is stated in this GS Sheet. Specifications and design are subject to change without notice.

Sales Representative: