Electronic Positive Displacement Flow Meter
Flow Eye ®

NITTOSEIKO
Taking new steps forward together

SPECIFICATIONS

1. Outline

Flow Eye is a flow meter loading an electronic indicating & counting unit on the rotary piston type simplest construction among positive displacement flow meters.

This electronic positive displacement flow meter is equipped with a "user setting function" which enables the user to make setting easily in the field, and can be used for a wide variety of applications.
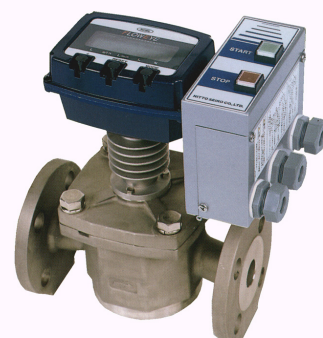
2. Features

- Realized high durability and high reliability with rotor only as movable part
- Setting mode in the field is possible by button operation on the counting unit.
- Easy maintenance in the field by simulation output
- No need of any external power supply in the case of the field indication only
- Available placing the batch system only with valve (Batch type only)

3. Specifications

3.1.1 Measuring unit

Nominal size and Volume symbol		020A0	025A0	040A0
Measured liquid		Chemical liquid, water, petroleum, etc.		
Nominal size		20A	25A	40A
Liquid viscosity		0.5～10,000mPa・s		
Liquid temperature		-10～80℃		
Liquid pressure		1.0MPa or less		
Permissible Pressure		1.0MPa （Liquid Temp.80℃ or less）		
Measuring accuracy		Within ±0.5%		
Standard connection		JIS10K RF Flange		
Material	Material symbol　S2	Body, Body cover：SCS14 Stainless steel casting, Rotor：PPS Special plastic, Eccentric bearing：Carbon		
	SCS14 : Stainless steel casting, PPS : Special plastic, GC : Carbon			

3.1.2 Counting unit

Nominal size and Volume symbol				020A0	025A0	040A0
Kind of type				Field indication type, Pulse & alarm output type, Analog output type, Batch type (For AC or 24V DC)		
Indication	Display unit			Numerical indication：7-segment LCD 5W x 10H, 8 digits, mode and alarm indication：LCD 2H		
	Article	Total Value		Total value：8 digits "MODE1"		
				For Field indication type, Pulse & alarm output type, and Analog output type	Resettable total value：8 digits "MODE4"	
				For batch type	Batch counter：6 digits "MODE4"	
			Min. unit	0.01L～1m³	0.1L～1m³	0.1L～1m³
		Flow rate		Flow rate (/h)：4 1/2 digits "MODE2", Flow rate (/min)：4 1/2 digits "MODE3" Flow rate (%)：4 digits "MODE5"		
			Min. unit /h	0.1L/h～0.01m³/h	1L/h～0.1m³/h	1L/h～0.1m³/h
			Min. unit /min	0.01L/min～1L/min	0.01L/min～1L/min	0.01L/min～1L/min
		Note 1: Either one of "/h" or "/min" can be indicated by setting				
		Alarm		Upper limit alarm "HIGH", Lower limit alarm "LOW", Battery alarm "BATT"※1		
		Note 2: Both total value and flow rate cannot be indicated simultaneously.				
		Note 3: Article can be changed by pressing the [MODE] button located on the front of the counting unit.				
Output	Field indication type	output		Without		
	Pulse & alarm output type	No. of output		2 points		
		Output assignment		To each of SIG1 and SIG2, one is selected and assigned from among the respective outputs of Unit pulse, Unitless pulse, Upper limit alarm, Lower limit alarm Upper and lower limit alarm and Battery alarm ※1		
		Kind of signal		Voltage no-contact output or open collector output		
				Voltage no-contact：	Open collector：	
				Signal level H: Approx. equal to voltage of external power (at no load)	Voltage & current：27V DC, 30mA	
				(Approx. 24V DC for Batch type)	Voltage at ON：0.5V or less	
				L:0.5V or less (at no load)		
				Output resistance：Approx. 2.3kΩ (short circuit protection resistance：Approx. 100Ω)		
		Electronic logic		Positive or negative logic		
				Positive logic：Logic 1 at H(Transistor：OFF)　　Negative logic：Logic 1 at L(Transistor：ON)		
		Unit pulse		0.01L/P ～ 1 m³/P	0.1L/P ～ 1m³/P	0.1L/P ～ 1m³/P
		Unitless pulse		9.6mL	35.1mL	87.9mL
		Pulse signal width		0.5～20ms or 5～200ms (STD:5ms)		
	Analog output type	No. of output		1 point		
		Output assignment		Flow rate		
		Kind of signal		4 ～ 20mA DC		
		Conversion accuracy		±0.5% (Full scale)		
		Resolution		1/1000		
		Allowable load resistance		500Ω or less		

※1："Battery alarm" is only for the flow meter with battery

Nominal size and Volume symbol			020A0	025A0	040A0
Output	Batch type	No. of output	4 points		
		Output assignment	SIG1、SIG2:To each of SIG1 and SIG2, one is selected and assigned from among the respective outputs of Unit pulse, Unitless pulse, Upper limit alarm, Lower limit alarm, and Upper and lower limit alarm. Control output: Metering signal 1, Met		
		Kind of signal	Pulse output, alarm signal: Refer to kind of signal at article of pulse & alarm signal		
			Control output: AC type	Control output: 24V DV type	
			Metering signal 1: Voltage no-contact, Triac	Metering signal 1: Voltage contact	
			Output voltage Approx. equal to external power voltage	Output voltage Approx. equal to external power voltage	
			Metering signal 2: No-voltage contact	Metering signal 2: No-voltage contact	
			Contact capacity 250V AC 2A, 30V DC 2A	Contact capacity 250V AC 2A, 30V DC 2A	
	Note 4: Either one of "Pulse & alarm output" or "Analog output" is available. Please select type when placing order.				
	Note 5: All output type and batch type require external power supply.				
Power	Field indication type (without output signal)		Built-in lithium battery (3.6V DC：Service life 5 years) Vary from use conditions.		
	Pulse & alarm output type		External power supply is required. Voltage 12～24V DC±10% Current consumption Approx. 25mA (at 12V DC) / Approx. 38mA (at 24V DC)		
	Analog output type		External power supply is required. Voltage 24V DC±10%, Current consumption Approx. 22mA		
	Batch type		AC type：External power supply is required, Voltage 100～220V AC±10% 50/60Hz, Current consumptoin Approx.50mA (Except for current consumption of Metering signal 1)		
			24V DC type：External power supply is required Voltage 24V DC±10%, Current consumption Approx. 120mA (Except for current consumption of Metering signal 1)		
Ambient temperature			-10～60℃		
Explosion proof			Non-explosion proof		
Water proof			JIS C 0920 water proof (Except for Batch type)		
Material			Aluminum die casting (Except for Batch type)		

4. Flow range (Unit: L/h)

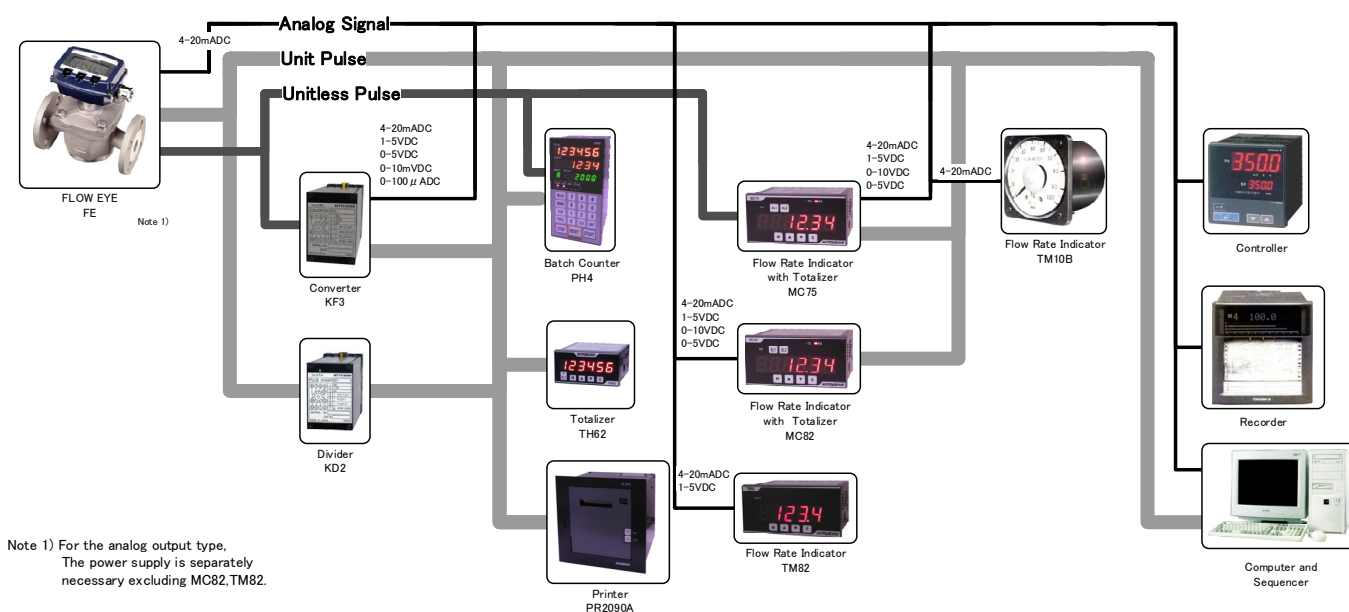| Viscosity (mPa·s)	Example of liquid	Flow range		
		020A0	025A0	040A0
	Water	100～ 700	300～2,100	650～4,500
0.5～	Gasoline	130～ 850	380～2,500	850～5,500
1～	Kerosene	100～ 850	300～2,500	650～5,500
4～	Light oil	70～1,000	200～3,000	450～6,500
10～	Heavy oil A	40～1,000	120～3,000	260～6,500
50～	Heavy oil B	25～1,000	75～3,000	160～6,500
100～	Heavy oil C	15～1,000	45～3,000	100～6,500
500～		15～ 800	45～2,400	100～5,200
1,000～		15～ 600	45～1,800	100～3,900
5,000～10,000		15～ 300	45～ 900	100～2,000

Note: When selecting a model of flow meter, please select it so that normal flow range is 40～60% of its Max. flow.

5. Pressure loss

020A0 Pressure loss

025A0 Pressure loss

040A0 Pressure loss

MPa

0.030
0.025
0.020
0.015
0.010
0.005
0.000

50mPa·s
15mPa·s
1mPa·s
0.3mPa·s

0   1,000 2,000 3,000 4,000 5,000 6,000

Flow rate L/h
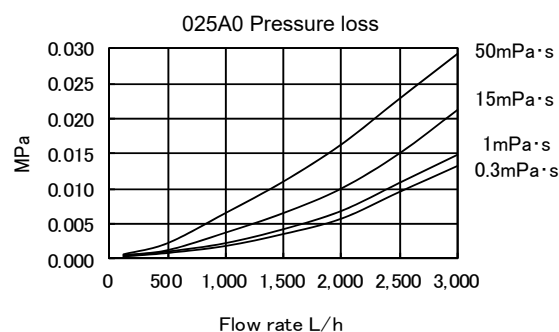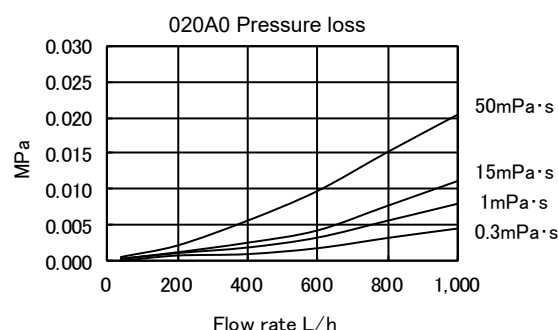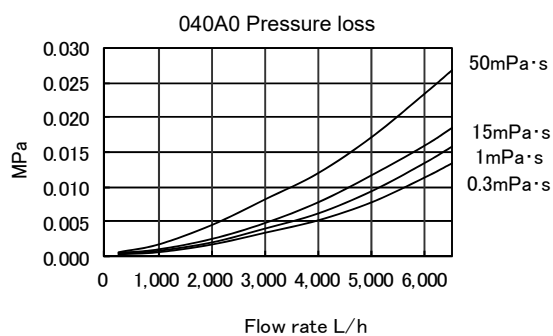
6. Remote measurement system

Analog Signal
4–20mADC
Unit Pulse
Unitless Pulse

FLOW EYE
FE
Note 1)

4–20mADC
1–5VDC
0–5VDC
0–10mVDC
0–100μADC

Converter
KF3

Divider
KD2

Batch Counter
PH4

Totalizer
TH62

Printer
PR2090A

4–20mADC
1–5VDC
0–10VDC
0–5VDC

4–20mADC
1–5VDC

Flow Rate Indicator
with Totalizer
MC75

Flow Rate Indicator
with Totalizer
MC82

Flow Rate Indicator
TM82

4–20mADC
1–5VDC
0–10VDC
0–5VDC

4–20mADC

Flow Rate Indicator
TM10B

Controller

Recorder

Computer and
Sequencer

Note 1) For the analog output type,
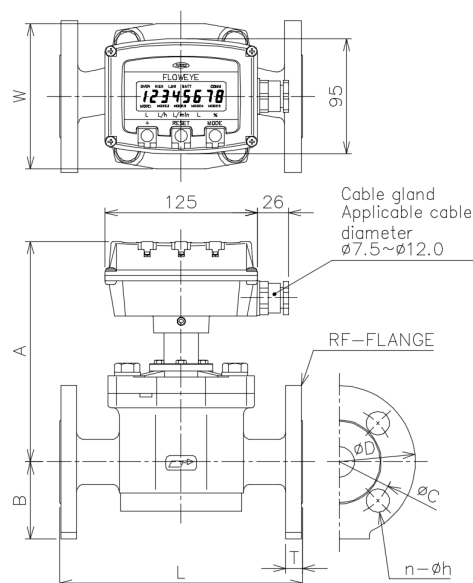The power supply is separately
necessary excluding MC82,TM82.

※The detailed input/output conditions vary depending
on the specifications of the respective converter and
receivers. Check with the specification sheet of the
respective instruments.

7. External dimensions (Unit: mm)
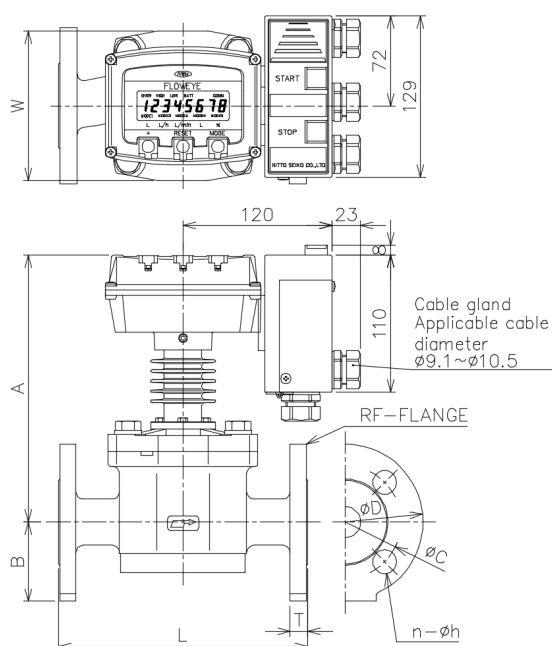
Field indication type
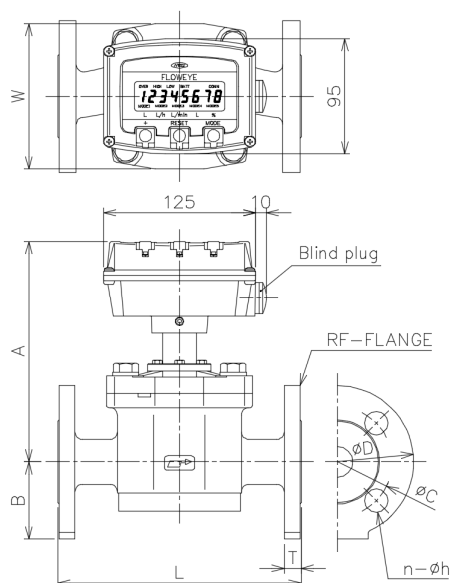
Pulse, & alarm output, and analog output type

Nominal size & symbol	Nominal size	Flange standard	L	A	B	W	D	T	C	n	h	Weight (kg)
020A0	20A	JIS10K	160	167	51	90	100	14	75	4	15	5
025A0	25A	JIS10K	200	182	64	120	125	15	90	4	19	9
040A0	40A	JIS10K	230	209	71	150	140	18	105	4	19	16

Batch type

Nominal size & symbol	Nominal size	Flange standard	L	A	B	W	D	T	C	n	h	Weight (kg)
020A0	20A	JIS10K	160	199	51	90	100	14	75	4	15	6
025A0	25A	JIS10K	200	214	64	120	125	15	90	4	19	10
040A0	40A	JIS10K	230	241	71	150	140	18	105	4	19	17

8. Operation

8.1 Common operation

● Flow rate

Measure the time required for one turn of the rotor of the flow meter, calculates the flow rate and indicate the momentary flow rate.

● Total value

Integrally indicates the pulse signals from measuring unit in specified unit.

● Alarm

HIGH　Indicated when flow exceed upper limit. ※2

LOW　Indicated when flow is less than lower limit. ※2

BATT　Indicated when battery capacity is low. Battery should be changed to new battery.

Activate only in case of flow meter with battery.

※2 : Limit of alarm is canged by data setting.

8.2. Field indication type

● Operation

It indicates flow rate, total value and alarm operating by battery. It does not output pulse, alarm or analog signal.

8.3. Pulse & alarm output type

● Battery, external power supply

・Flow meter without battery type does not indicate flow rate, total value, or alarm without external power supply.

・Flow meter with battery type indicate flow rate, total value, and alarm without external power supply. However, It cannot output pulse or alarm signal without external power supply.

Battery power is not consumed while supply external power. It makes the battery life lengthen.

● Button operation

・The mode change as shown in figure below with pressing of the [MODE] button.
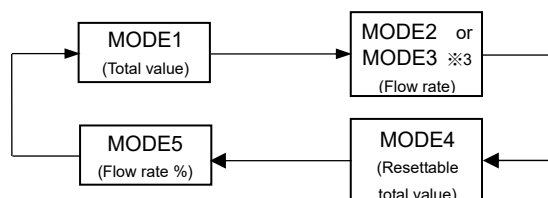
※3 : Depending on the setting, "MODE2 (/h)" or "MODE3 (/min)" is indicated.

● Reset operation

While indicating "MODE4" (Resettable total value), pressing [RESET] button makes total value reset to zero.

● Pulse output ※4

Unitless pulse output : Output pulse signal from measuring unit without any calculation.

Unit pulse output : Output specified unit of pulse signal.

● Alarm output ※4

Signal is output when reaching respective alarm point.

● Simulation output

Unit pulse or alarm output (except for battery alarm) is experimentally output.

※4 : Output signal can be changed by data setting.

8.4 Analog output type

● Battery, external power supply

・Flow meter without battery type does not indicate flow rate, total value, or alarm without external power supply.

・Flow meter with battery type indicate flow rate, total value, and alarm without external power supply.

However, It cannot output analog signal without external power supply.

Battery power is not consumed while supply external power. It makes the battery life lengthen.

● Button operation

Refer to article of Pulse & alarm output type

● Reset operation

Refer to article of Pulse & alarm output type

● Analog signal output

Output flow rate as 4-20mA DC

● Simulation output

Analog signal is experimentally output.

8.5 Batch type

● External power supply

Both signal output and batch operation are unavailable without external power supply.

● Batch method

Subtract method

● Operation switch

[START], [STOP], [RESET]

● Setting of batch counter

Digits shift [RESET], Number change [+], Entry [MODE]

● Pulse output

Refer to article of Pulse & alarm output type

● Alarm output

Refer to article of Pulse & alarm output type

● Simulation output

Refer to article of Pulse & alarm output type

● Counting method

No-count of excessive volume method

Counter starts counting by pressing [START] button and subtract batch counter. Measuring is stopped when batch counter become zero. Also [STOP] or [RESET] operation can stop measuring.

Count of excessive volume method

Counter starts counting by pressing [START] button and subtract batch counter, and [RESET] function can stop measuring. However, in case of flowing the liquid after even if batch counter become zero, or after even if operation of [STOP], it keeps measuring. In case of becoming zero, it counts up.
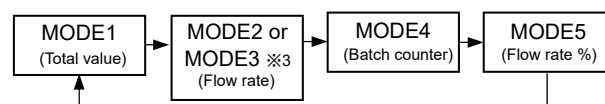
● Reset method

Automatic reset

Automatically reset when batch counter become zero.

Manual reset

Not reset though batch counter becomes zero. Reset by [RESET] button.

● Button operation

The mode change as shown in figure below with pressing of the [MODE] button.

9. Terminal arrangement and wiring diagram

9.1 Terminal arrangement for pulse & alarm output

TB1

No.	Signal name
1	SIG1 Pulse output or alarm output
2	SIG2 Pulse output or alarm output
3	+12～24V
4	0V

TB2

No.	Signal name
1	Connect in case of batch type. Do not connect in case of other type.
2	
3	

9.2 Terminal arrangement for analog output

TB1

No.	Signal name
1	+ Analog output 4～20mA DC
2	−

9.3 Terminal arrangement for batch type

TB3

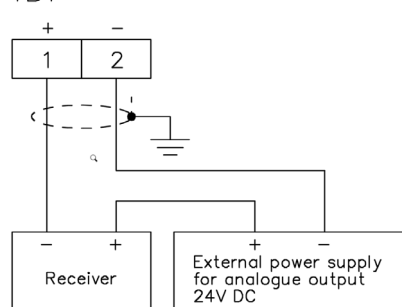| No.	Signal name	
1	Earth ground	
2	(+) Power	AC type 100～220V AC
3	(-)	24V DC type 24V DC
4	(+) Metering signal 1	
5	(-)	
6		
7		Metering signal 2
8		

TB4

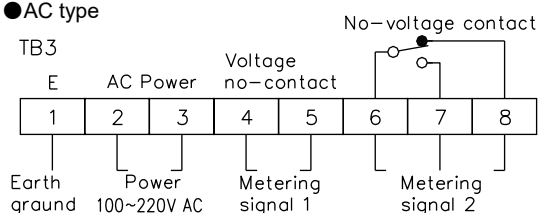| No.	Signal name
1	SIG1 Pulse output or alarm output
2	SIG2 Pulse output or alarm output
3	0V

9.4 Wiring diagram for pulse & alarm output type
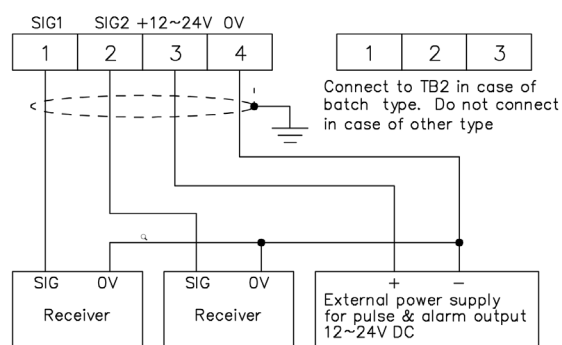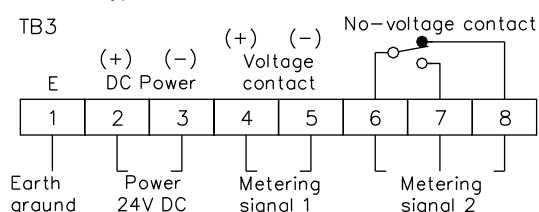

9.5 Wiring diagram for analog output type
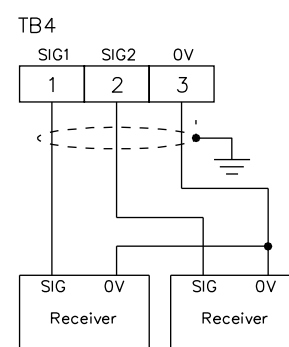

9.6 Wiring diagram for batch type

●AC type

●24V DC type
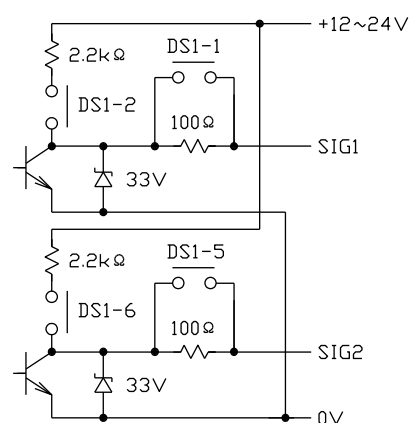

●Common of AC type and 24V DC type

9.7 Circuit for pulse output and alarm output

Output signal Switch Kind of output signal	Pulse & alarm output SIG1		Pulse & alarm output SIG2	
	DS1-1	DS1-2	DS1-5	DS1-6
Voltage no-contact	OFF	ON	OFF	ON
Open collector	ON	OFF	ON	OFF

Output terminal No. Name	Pulse & alarm output TB1Terminal No.	Batch type TB4Terminal No.
SIG1	1	1
SIG2	2	2
+12～24V	3	—
0V	4	3

10. Product code and specification code

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FE  □  □  □  □  □  □ — □
```

Electronic positive displacement flow meter Flow Eye

— Counting unit
— Nominal size & volume symbol
— Material symbol
— Output type and supplement for counting unit
— Supplement
— Connection end
— Auxiliary symbol (entered by the manufacturer)
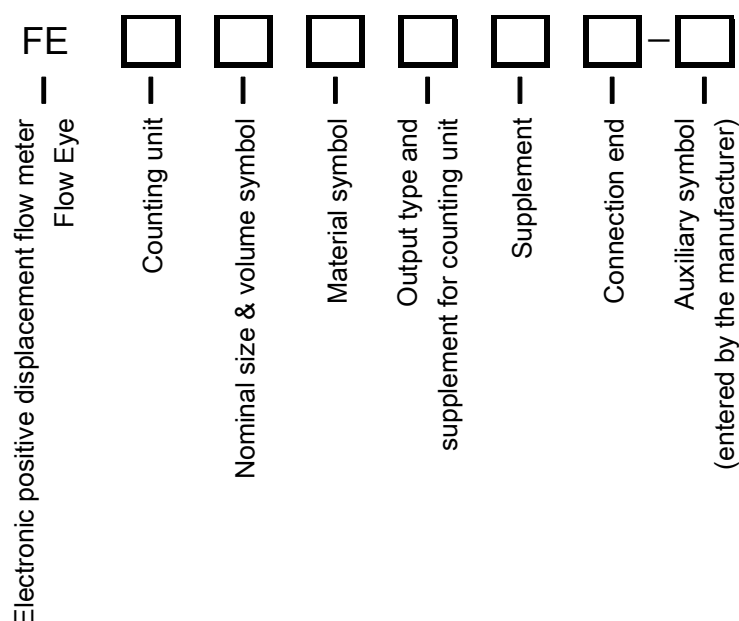
●：Standard；○：Manufacturable；×：Unavailable

Type	Specification code			Specification			025A0	025B0	040A0
FE				Electronic positive displacement flow meter Flow Eye			●	●	●
Counting unit	3E			Electronic indication			●	●	●
Nominal size & volume symbol		020A0		Nominal size：20A			●		
		025A0		Nominal size：25A				●	
		040A0		Nominal size：40A					●
Material symbol		S2		Body,Body cover：SCS14			●	●	●
Output type and supplement for counting unit			12345	Field indication type (without output signal)	Non-explosion proof	With battery	●	●	●
			P0345	Pulse & alarm output ※5	Non-explosion proof	No battery	●	●	●
			P00B0			With battery	○	○	○
			A0345	Analog output	Non-explosion proof	No battery	●	●	●
			A00B0			With battery	○	○	○
			PB345	Batch: AC ※5	Non-explosion proof	No battery	●	●	●
			PC345	Batch: 24V DC ※5	Non-explosion proof	No battery	●	●	●
Supplement			0	No Supplement.			●	●	●
			1	When selecting batch type			○	○	○
Connection end			010R	JIS10K RF Flange			●	●	●

※5 SIG1 and SIG2 output of standard article are delivered with the following setting.

SIG1 output： Kind of signal   Voltage no-contact

            Electronic logic   Positive logic

            Pulse output   Unitless pulse output

SIG2 output： Kind of signal   Voltage no-contact

            Electronic logic   Positive logic

            Pulse output   Unit pulse output

11. Strainer

To prevent foreign matters mixed in the liquid from penetrating into the flow meter to cause troubles, it is necessary to install a strainer immediately before the flow meter or at a point as close as possible to the inflow side.(Element mesh:60～100 mesh)

◆◆◆◆◆◆◆ Matters to be specified at the time of ordering ◆◆◆◆◆◆◆

1. Type and specification code.

2. Name of measured liquid, viscosity, temperature.

3. Flow direction of fluid, mounting position.

▼The contents given here are subject to change without notice.

NITTOSEIKO CO.,LTD.

Control System Division Global Sales Section
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【Website】　　【Inquiry Form】