

## Electronic Flow Meter for Water

Aqua Eye<sup>®</sup>

## SPECIFICATIONS

SST40351 25.07

## 1. Outline

Electronic flow meter for water is a flow meter for water realized by loading an electronic indicating & counting unit on the measuring unit of an impeller type flow meter for water.

This electronic flow meter for water 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.

This flow meter is available for measuring and control of cold water and hot water such as water for cooling & heating, supply water to boilers, service water for various plants, etc.



## 2. Features

- Simple construction with only measuring unit as mechanical structure
- 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

## Measuring unit

Nominal size symbol		025		040		050	
Volume symbol		A0	B0	A0	B0	A0	B0
Measured liquid		Water, hot water, etc.					
Nominal size		25A		40A		50A	
Liquid viscosity		1mPa·s or equivalent					
Liquid temperature		0~80°C (Up to 110°C for high temperature specification)					
Liquid pressure		2.0MPa or less (By flange standards)					
Measuring accuracy		Within ±1.0%					
Standard connection		JIS10K, JIS20K FF, RF				JIS10K FF, RF JIS20K RF	
Material	Material symbol	FB	Main body: FCD450, Head cover : SCS14, Inner structure:SCS13※1, Fan wheel:C5191P				
	F7	Main body: FCD450, Head cover : SCS14, Inner structure:SCS13※2, Fan wheel:SUS304					
	S7	Main body: SCS13, Head cover : SCS14, Inner structure:SCS13, Fan wheel:SUS304					
	Note: The nominal size & volume symbol 50B is manufactured only an article of symbol FB or F7. ※1 It is CAC406 in case of the nominal size and volume symbol 50B. ※2 It is SUS304 in case of the nominal size and volume symbol 50B.						
FCD450 : Ductile cast iron, SCS13、SCS14 : Stainless steel casting, C5191P : Phosphor bronze, SUS304 : Stainless steel, CAC406 : Cast bronze							
Material & Permissible Pressure		Nominal Pressure	Flange standard	Material symbol	Permissible Pressure (Liquid Temp.~110°C) MPa		
		10K	JIS10K	FB/F7/S7	1.0		
		20K	JIS20K		2.5		

## Counting unit

Nominal size symbol		025		040		050		
Volume symbol		A0	B0	A0	B0	A0	B0	
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"			Resettable total value: 8 digits "MODE4"		
			For Field indication type, Pulse & alarm output type, and Analog output type			Batch counter: 6 digits "MODE4"		
			For batch type					
		Min. unit	0.1L~1m <sup>3</sup>			1L~1m <sup>3</sup>		
		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	1L/h~0.1m <sup>3</sup> /h			0.01m <sup>3</sup> /h~1m <sup>3</sup> /h			
	Min. unit /min	0.01L/min~1L/min			0.1L/min~0.01m <sup>3</sup> /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"※3							
	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.							

Nominal size symbol		025		040		050		
Volume symbol		A0	B0	A0	B0	A0	B0	
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. ※3					
		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) (Approx. 24V DC for Batch type) L:0.5V or less (at no load)			Voltage & current : 27V DC, 30mA Voltage at ON : 0.5V or less		
		Electronic logic	Positive or negative logic Positive logic : Logic 1 at H (Transistor : OFF)      Negative logic : Logic 1 at L (Transistor : ON)					
		Unit pulse	0.1L/P~ 1m <sup>3</sup> /P			1L/P~ 1m <sup>3</sup> /P		
	Unitless pulse	13.6mL	26.2mL	29.7mL	79.5mL	113.3mL		
	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						
	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, Metering signal 2					
		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 DC 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					
Load current 0.5A			Load current 2A					
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 24VDC)						
	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 consumption 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°C							
Explosion proof	Non-explosion proof							
Water proof	JIS C 0920 water proof (Except for Batch type)							
Material	Aluminum die casting (Except for Batch type)							

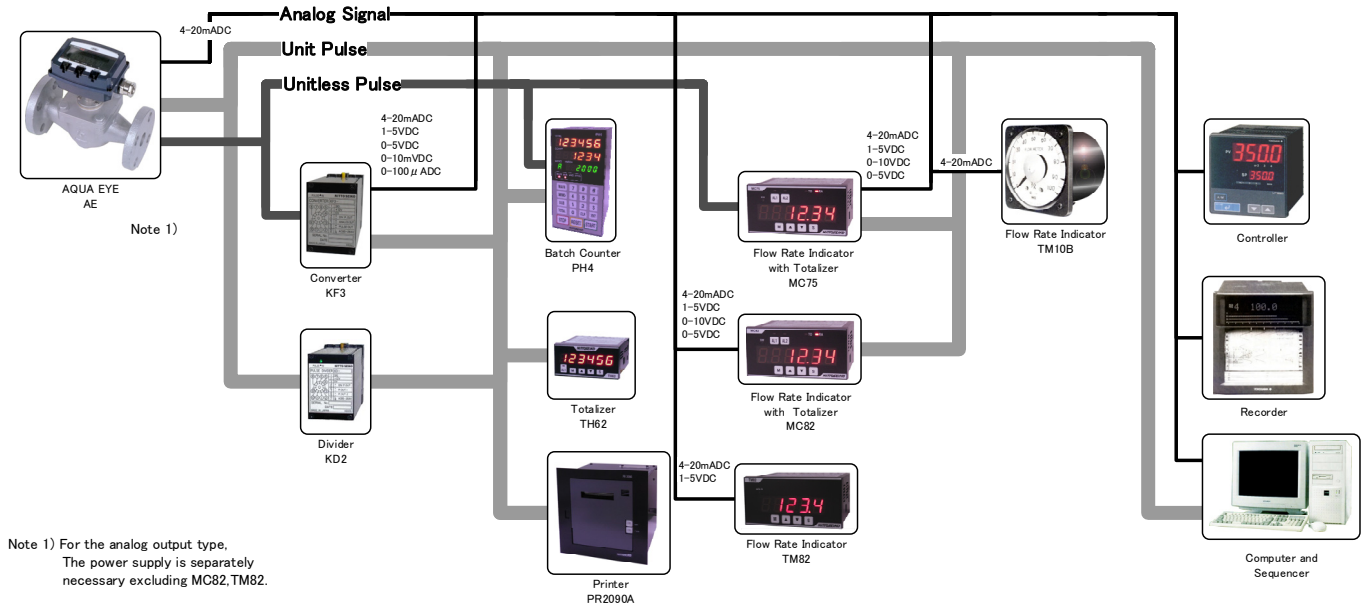
※3: "Battery alarm" is only for the flow meter with battery

#### 4. Flow range (Unit: m<sup>3</sup>/h)

Nominal size & volume symbol	Flow range
025A0	0.5~ 2.5
025B0	1.0~ 5.0
040A0	1.5~ 7.0
040B0	3.0~ 15.0
050A0	3.0~ 15.0
050B0	6.0~ 25.0

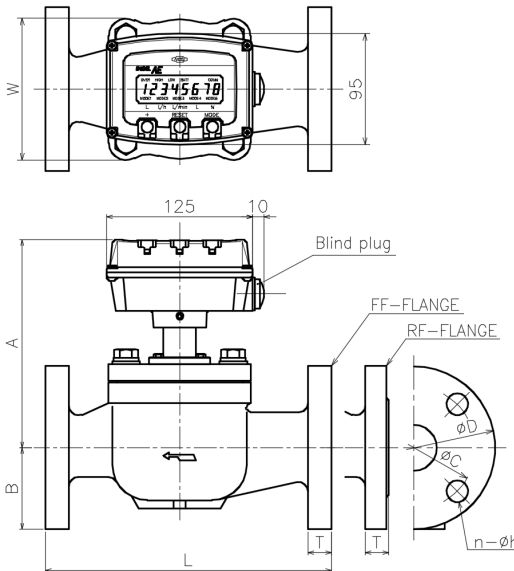
Note: When selecting a model of flow meter, please select it so that normal flow range is 40~60% of its Max. flow.

5. Remote measurement system

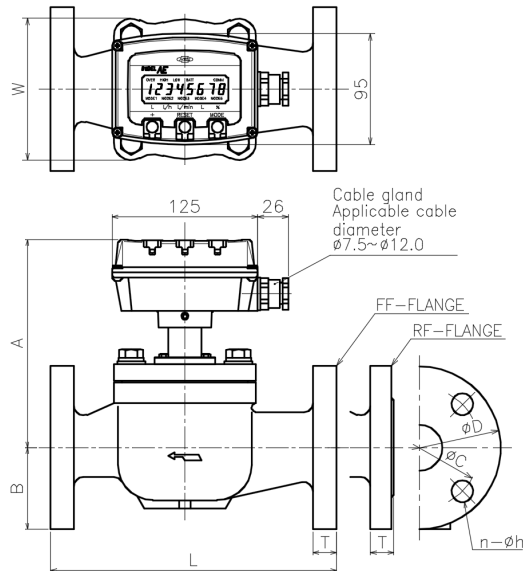


6. External dimensions (Unit: mm)

Field indication type



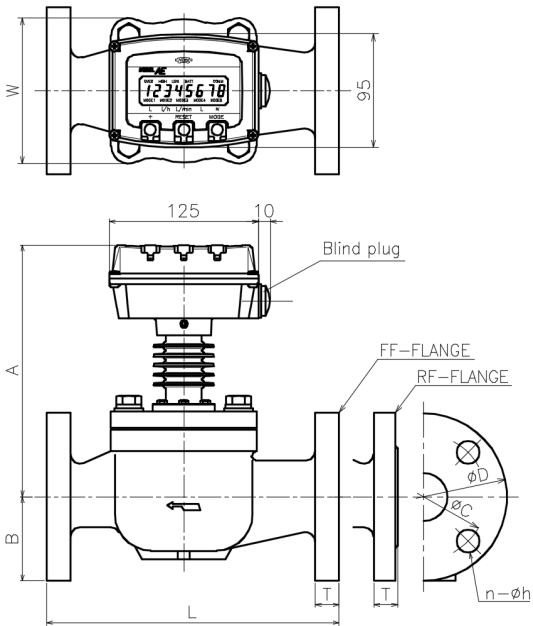
Pulse, & alarm output, and analog output type



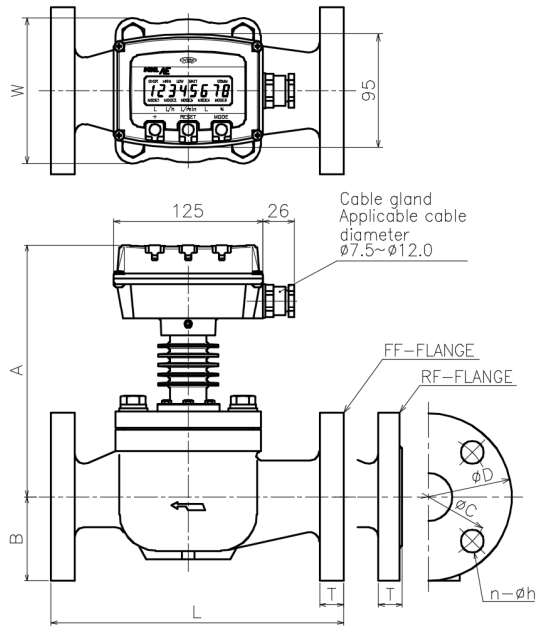
Nominal size & volume symbol	Nominal size	Flange standard	L	A	B	W	D	T		C	n	h	Weight (kg)
								FCD	SCS				
025A0 025B0	25A	JIS10K	225	170	62.5	98	125	20	16	90	4	19	8.5
040A0 040B0	40A	JIS10K	245	179	70	122	140	20	18	105	4	19	11.6
050A0	50A	JIS10K	245	179	77.5	122	155	20	18	120	4	19	13.3
050B0*	50A	JIS10K	250	182.5	77.5	122	155	20	—	120	4	19	14.4

\*The nominal size & volume symbol 50B is manufactured only material symbol FB or F7.  
This table of weight indicates the case of material symbol FB.

**Field indication type**  
(for high temperature specification)



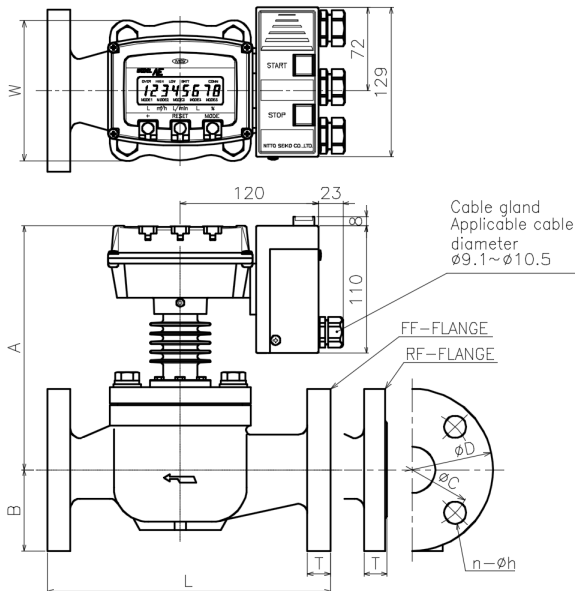
**Pulse, & alarm output, and analog output type**  
(for high temperature specification)



Nominal size & volume symbol	Nominal size	Flange standard	L	A	B	W	D	T		C	n	h	Weight (kg)
								FCD	SCS				
025A0 025B0	25A	JIS10K	225	202	62.5	98	125	20	16	90	4	19	8.9
040A0 040B0	40A	JIS10K	245	211	70	122	140	20	18	105	4	19	12.0
050A0	50A	JIS10K	245	211	77.5	122	155	20	18	120	4	19	13.7
050B0*	50A	JIS10K	250	214.5	77.5	122	155	20	—	120	4	19	14.8

\*The nominal size & volume symbol 50B is manufactured only material symbol FB or F7.  
This table of weight indicates the case of material symbol FB.

**Batch type**



Nominal size & volume symbol	Nominal size	Flange standard	L	A	B	W	D	T		C	n	h	Weight (kg)
								FCD	SCS				
025A0 025B0	25A	JIS10K	225	202	62.5	98	125	20	16	90	4	19	9.5
040A0 040B0	40A	JIS10K	245	211	70	122	140	20	18	105	4	19	12.6
050A0	50A	JIS10K	245	211	77.5	122	155	20	18	120	4	19	14.3
050B0*	50A	JIS10K	250	214.5	77.5	122	155	20	—	120	4	19	15.4

\*The nominal size & volume symbol 50B is manufactured only material symbol FB or F7.  
This table of weight indicates the case of material symbol FB.

## 7. Operation

### 7.1 Common operation

- **Flow rate**  
Measure the time required for one turn of the fan wheel 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. ※4
  - LOW Indicated when flow is less than lower limit. ※4
  - BATT Indicated when battery capacity is low. Battery should be changed to new battery.

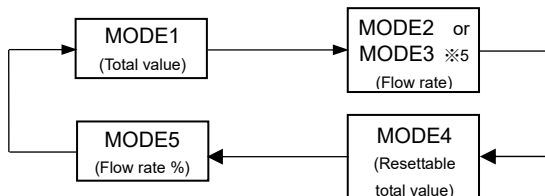
Activate only in case of flow meter with battery.  
※4 : Limit of alarm is changed by data setting.

### 7.2. Field indication type

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

### 7.3. 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.



※5 : 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 ※6**  
Unitless pulse output : Output pulse signal from measuring unit without any calculation.  
Unit pulse output : Output specified unit of pulse signal.
- **Alarm output ※6**  
Signal is output when reaching respective alarm point.
- **Simulation output**  
Unit pulse or alarm output (except for battery alarm) is experimentally output.  
※6 : Output signal can be changed by data setting.

### 7.4 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.

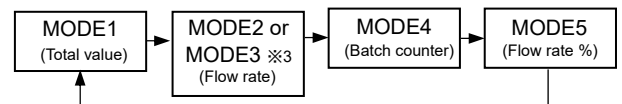
However, It cannot output analog signal without external power supply.

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.

### 7.5 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.



## 8. Terminal arrangement and wiring diagram

### 8.1 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	

### 8.2 Terminal arrangement for analog output

TB1

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

### 8.3 Terminal arrangement for batch type

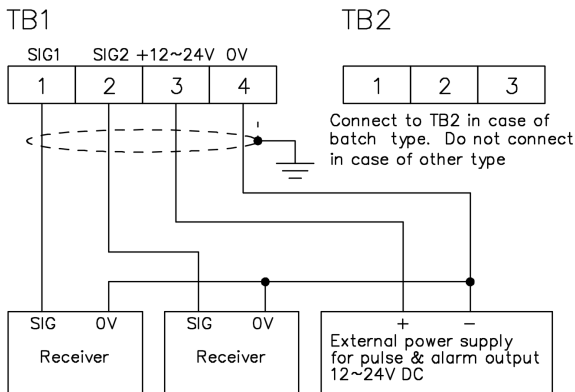
TB3

No.	Signal name
1	Earth ground
2	(+) Power
3	(-) Power
4	(+) Metering signal 1
5	(-) Metering signal 1
6	No-voltage contact
7	
8	Metering signal 2

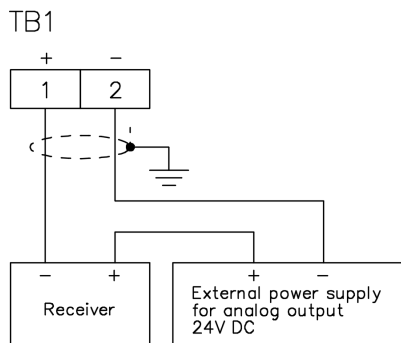
TB4

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

### 8.4 Wiring diagram for pulse & alarm output type

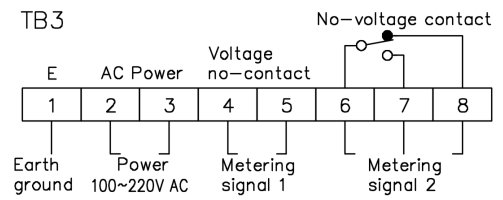


### 8.5 Wiring diagram for analog output type

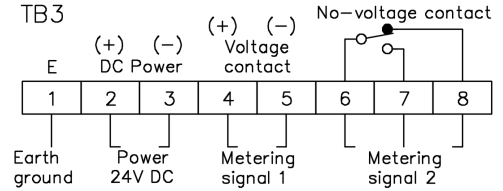


### 8.6 Wiring diagram for batch type

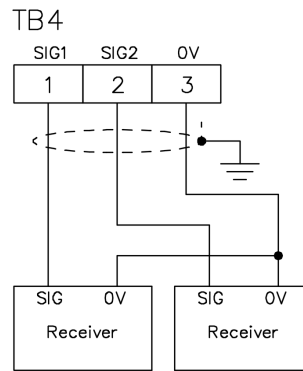
● AC type



● 24V DC type

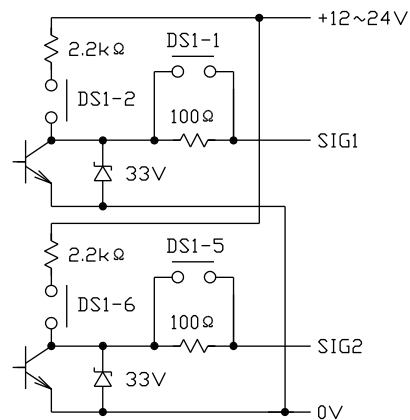


● Common of AC type and 24V DC type



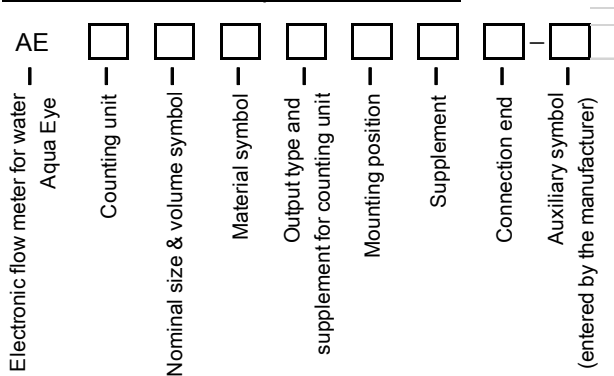
### 8.7 Circuit for pulse output and alarm output

Output signal Switch	Pulse & alarm output SIG1		Pulse & alarm output SIG2	
	DS1-1	DS1-2	DS1-5	DS1-6
Kind of output signal	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 TB1 Terminal No.	Batch type TB4 Terminal No.
SIG1	1	1
SIG2	2	2
+12~24V	3	-
0V	4	3

9. Product code and specification code



●: Standard; ○: Manufacturable; ×: Unavailable

Type	Specification code	Specification	025A0	025B0	040A0	040B0	050A0	050B0
AE		Electronic flow meter for water Aqua Eye	●	●	●	●	●	●
Counting unit	3E	Electronic indication	●	●	●	●	●	●
Nominal size & volume symbol	025A0	Nominal size: 25A Max flow rate: 2.5m <sup>3</sup> /h	●					
	025B0	Nominal size: 25A Max flow rate: 5.0m <sup>3</sup> /h		●				
	040A0	Nominal size: 40A Max flow rate: 7.0m <sup>3</sup> /h			●			
	040B0	Nominal size: 40A Max flow rate: 15m <sup>3</sup> /h				●		
	050A0	Nominal size: 50A Max flow rate: 15m <sup>3</sup> /h					●	
	050B0	Nominal size: 50A Max flow rate: 25m <sup>3</sup> /h ※7						●
Material symbol	FB	Body: FCD450, Inner structure: SCS13 ※8, Fan wheel: C5191P	●	●	●	●	●	●
	F7	Body: FCD450, Inner structure: SCS13 ※9, Fan wheel: SUS304	○	○	○	○	○	○
	S7	Body: SCS13, Inner structure: SCS13, Fan wheel: SUS304	○	○	○	○	○	×
Output type and supplement for counting unit	1234	Field indication type (without output signal)	●	●	●	●	●	●
	P034	Pulse & alarm output ※10	Non-explosion proof		●	●	●	●
	P00B		With battery		○	○	○	○
	A034	Analog output	Non-explosion proof		●	●	●	●
	A00B		With battery		○	○	○	○
	PB34	Batch: AC ※10	Non-explosion proof		●	●	●	●
PC34	Batch: 24V DC ※10	Non-explosion proof		●	●	●	●	
Mounting position	H	Horizontal piping horizontal installation	●	●	●	●	●	●
	V	Horizontal piping vertical installation or vertical piping	○	○	○	○	○	○
Supplement	0	Max. temperature 80°C	●	●	●	●	●	●
	1	Max temperature 110°C (High temp. type) or in case of batch type	○	○	○	○	○	○
Connection end	010F	JIS10K FF Flange	●	●	●	●	●	●
	010R	JIS10K RF Flange	○	○	○	○	○	○
	020F	JIS20K FF Flange	○	○	○	○	○	×
	020R	JIS20K RF Flange	○	○	○	○	○	○

※7 : The nominal size & volume symbol 50B is manufactured only a material symbol FB or F7.

※8 : The nominal size & volume symbol 50B is manufactured inner structure by CAC406.

※9 : The nominal size & volume symbol 50B is manufactured inner structure by SUS304.

※10 : 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

◆◆◆◆◆◆◆◆ 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.

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