

## SLIDE VANE FLOW METER

## SPECIFICATIONS

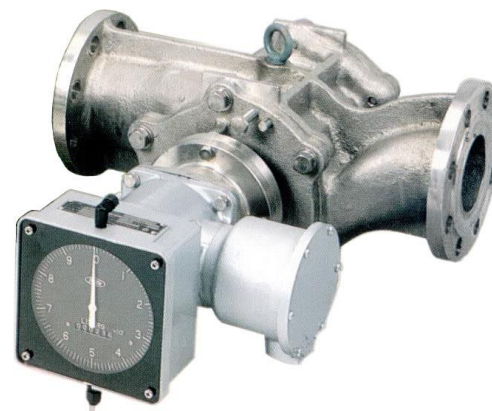
SSV20051 19.06

## 1. Outline

Slide vane flow meter is vane type positive displacement flow meter, creating high accuracy measurement and low pressure loss by decreasing rotation resistance. Solving the problem of noise, vibration and pulsation which are incidental to the large flow meters, it gives a stable performance. These meters are active in the fields of oil refinery, chemical, power and vessel.

## 2. Features

- Measurement in high accuracy is possible as rotor rotates at constant speed.
- Due to small revolution resistance, it gives large volume measurement with low pressure loss.
- It is less subject to temperature and viscosity, and possible the stable measurement with always high accuracy.
- Easy-to-read big indicator.
- Easy expansion with variety of pulse generators available for loading.



## 3. Specifications

## Specifications of measuring unit

|                              |  |       |                   |       |             |                |
|------------------------------|--|-------|-------------------|-------|-------------|----------------|
| Nominal size & volume symbol | 080  | 100   |                   | 150   |             |                |
|                              | B0   | A0    | B0                | A0    |             |                |
| Measured fluid               | Chemical solutions, petroleum, water, etc.   |       |                   |       |             |                |
| Nominal size                 | 80A  | 100A  |                   | 150A  |             |                |
| Liquid viscosity             | 0.4 ~ 500 mPa·s  |       |                   |       |             |                |
| Liquid temperature           | Normal temperature ~ 80°C (0 ~ 120°C (High temperature specification))   |       |                   |       |             |                |
| Liquid pressure              | 2.0 MPa or under (By flange standards)   |       |                   |       |             |                |
| Measuring accuracy           | Within ±0.5% or within ±0.2% (Counter symbol A0 only and liquid temperature 60 °C. or lower)                     |       |                   |       |             |                |
| Standard connection          | JIS10K, 20K, ANSI class 150 (For the details, see paragraph of "Process connection and face-to-face dimensions") |       |                   |       |             |                |
| Material                     | Symbol   | Body  | Measuring chamber | Rotor | Rotor shaft | Vane           |
|                              | FF   | FC200 | FC200             | AC3A  | SK4         | Special carbon |
|                              | S7   | SCS13 | SCS13             | SCS13 | SCS13       | Special carbon |
|                              | FC200:Cast iron, SCS13:Stainless steel casting, AC3A:Corrosion-resistant aluminum, SK4:Tool steel                |       |                   |       |             |                |
| Special specifications       | Article approved for high-pressure gas service: Only material symbol S7 is manufacturable (only size 80A).       |       |                   |       |             |                |

## Specifications of counter unit

|  |   |  |                |   |                                      |  |
|--|---|--|----------------|---|--------------------------------------|--|
| Nominal size & volume symbol   | 080   | 100  |                | 150   |                                      |  |
|  | B0  | A0   | B0             | A0  |                                      |  |
| Indication   | Direct-reading type (A0)                    | Pointer Dial plate   | Dial unit      | 10 L  |                                      |  |
|  |   |  | Volume/rev.    | 1 m <sup>3</sup>  |                                      |  |
|  |   | Total counter  | Dial unit      | x 1 m <sup>3</sup>  |                                      |  |
|  |   |  | No. of digits  | 6 (999,999 x 1m <sup>3</sup> )  |                                      |  |
|  | Digital zero-reset type (Z8)                | Zero-reset counter   | Dial unit      | x 10 L  |                                      |  |
|  |   |  | No. of digits  | 4 (9,999 x 100L)  |                                      |  |
|  |   | Continuous total counter                                   | Dial unit      | x 100 L   |                                      |  |
|  |   |  | No. of digits  | 7 (9,999,999 x 100L)  |                                      |  |
|  | With instantaneous flow rate indicator (IO) | Pointer Dial plate   | Dial unit      | 5 m <sup>3</sup> /h   | 10 m <sup>3</sup> /h                 |  |
|  |   |  | Full scale     | 100 m <sup>3</sup> /h   | 200 m <sup>3</sup> /h                |  |
|  |   | Total counter  | Dial unit      | x 10 L  |                                      |  |
|  |   |  | No. of digits  | 7 (9,999,999 x 10L)   |                                      |  |
| (Note) Select either one of (AO type, Z8 type, IO type) as type of indication.   |   |  |                |   |                                      |  |
| Output   | Pulse output                                | Unit pulse   | Type of signal | Either one of (1) voltage no-contact signal (high frequency type), or (2) reed switch contact signal. |                                      |  |
|  |   |  | Output unit    | No-contact pulse output   | See "No-contact pulse output" table. |  |
|  |   | Contact pulse output                                       |                | See "Contact pulse output" table.   |                                      |  |
|  | DA conversion pulse                         | No-contact pulse output possible.                          |                |   |                                      |  |
| (Note) No simultaneous output of unit pulse and DA conversion pulse can be made. |   |  |                |   |                                      |  |
| Analogue output  |   | Direct output impossible. (DA converter required outside.) |                |   |                                      |  |

|                      |   |  |
|----------------------|---|--|
| Power source         | The following external power source is required for outputting voltage no-contact signals: High frequency type pulse generator: 6~26.4VDC |  |
| Ambient temperature  | 0~60°C  |  |
| Explosion-protection | Flameproof enclosure type Exd II BT4  | Either one of high frequency pulse generator or reed switch pulse generator. |
| Material             | Aluminium die casting   |  |

Output pulse unit table (Optional)

Non-contact output pulse unit table (○: High frequency type)


| Nominal size & volume symbol | One rev. of pointer | Pulse unit |        |         |      |       |        |                    |
|------------------------------|---------------------|------------|--------|---------|------|-------|--------|--------------------|
|                              |                     | 1mL/P      | 10mL/P | 100mL/P | 1L/P | 10L/P | 100L/P | 1m <sup>3</sup> /p |
| 080B0                        | 100L                | —          | —      | ○       | ○    | —     | —      | —                  |
| 100A0                        | 1m <sup>3</sup>     | —          | —      | —       | ○    | ○     | —      | —                  |
| 100B0                        | 100L                | —          | —      | ○       | ○    | —     | —      | —                  |
| 150A0                        | 1m <sup>3</sup>     | —          | —      | —       | ○    | ○     | —      | —                  |

Contact output pulse unit table (○: Reed switch)

| Nominal size & volume symbol | One rev. of pointer | Pulse unit |        |         |      |       |        |                    |
|------------------------------|---------------------|------------|--------|---------|------|-------|--------|--------------------|
|                              |                     | 1mL/P      | 10mL/P | 100mL/P | 1L/P | 10L/P | 100L/P | 1m <sup>3</sup> /p |
| 080B0                        | 100L                | —          | —      | —       | ○    | ○     | ○      | —                  |
| 100A0                        | 1m <sup>3</sup>     | —          | —      | —       | —    | ○     | ○      | ○                  |
| 100B0                        | 100L                | —          | —      | —       | ○    | ○     | ○      | —                  |
| 150A0                        | 1m <sup>3</sup>     | —          | —      | —       | —    | ○     | ○      | ○                  |

● High frequency pulse generator (Symbol: M)

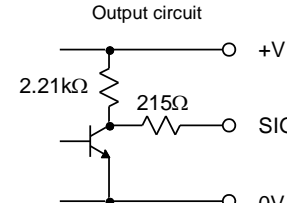
Output signal : Voltage no-contact pulse  
Approximate rectangular wave



H : 17V or more (10 kΩ load) (+V = 24VDC)  
H : 8V or more (10 kΩ load) (+V = 12VDC)  
L : 0.5V or less (10 kΩ load)

Output resistance : approx. 2.4kΩ

Output circuit



Max. generated pulse : 140P/sec  
Power source : 6 – 26.4VDC  
Power consumption : 23 mA or less (+V = 24VDC)  
17 mA or less (+V = 12VDC)

● Reed switch pulse generator (Symbol: R)

| Type  | Output signal            | Max. voltage | Max. current | Switch capacity | Contact resistance | Max. generated pulse |
|-------|--------------------------|--------------|--------------|-----------------|--------------------|----------------------|
| DRR-5 | No-voltage contact pulse | 200V AC·DC   | 1A           | 25W             | 0.06Ω              | 5P/sec               |
| MR506 | No-voltage contact pulse | 50VDC        | 250mA        | 15W             | 0.1Ω               | 5P/sec               |

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

Accuracy: ± 0.5%

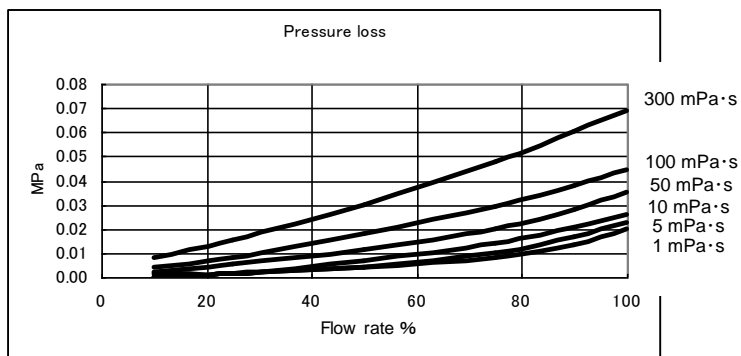
| Nominal size & volume symbol | Working condition | Water (Normal temperature) | 0.4mPa·s~ | 2mPa·s~ | 5mPa·s~ | 10mPa·s~ | 50~500mPa·s |
|------------------------------|-------------------|----------------------------|-----------|---------|---------|----------|-------------|
| 080B0                        | Continuous        | 10~60                      | 12~60     | 10~80   | 8~80    | 5~80     | 3~60        |
| 100A0                        | Intermittent      | 10~80                      | 12~80     | 10~100  | 8~100   | 5~100    | 3~80        |
| 100B0                        | Continuous        | 20~120                     | 24~120    | 20~160  | 16~160  | 10~160   | 6~120       |
| 150A0                        | Intermittent      | 20~160                     | 24~160    | 20~200  | 16~200  | 10~200   | 6~150       |

Accuracy: ± 0.2% (Counter symbol A0 only and liquid temperature 60 °C. or lower)

| Nominal size & volume symbol | Working condition | Water (Normal temperature) | 0.4mPa·s~ | 2mPa·s~ | 5mPa·s~ | 10mPa·s~ | 50~500mPa·s |
|------------------------------|-------------------|----------------------------|-----------|---------|---------|----------|-------------|
| 080B0                        | Continuous        | 20~60                      | 24~60     | 20~80   | 16~80   | 10~80    | 6~60        |
| 100A0                        | Intermittent      | 20~80                      | 24~80     | 20~100  | 16~100  | 10~100   | 6~80        |
| 100B0                        | Continuous        | 40~120                     | 50~120    | 40~160  | 30~160  | 20~160   | 12~120      |
| 150A0                        | Intermittent      | 40~160                     | 50~160    | 40~200  | 30~200  | 20~200   | 12~150      |

- Notes : 1. "Continuous" refers to a case where the daily operating time exceeds 8 hours, while "Intermittent" expresses a case where the daily operating time is no more than 8 hours.  
2. When selecting a model of flow meter, please select it so that normal flow rate is 40~60% of its max. flow.

5. Pressure loss



Flow rate 100%

| Nominal size & volume symbol | Flow rate 100%        |
|------------------------------|-----------------------|
| 080B0, 100A0                 | 100 m <sup>3</sup> /h |
| 100B0, 150A0                 | 200 m <sup>3</sup> /h |

6. Process connection and face-to-face dimensions (mm)

| Nominal size & volume symbol | Material symbol | JIS |     | ANSI     |
|------------------------------|-----------------|-----|-----|----------|
|                              |                 | 10K | 20K | Class150 |
| 080B0                        | F F             | 440 | --  | 440      |
|                              | D D             | 440 | 448 | 440      |
|                              | S 7             | 440 | 448 | 452      |
|                              | S 2             | 440 | 448 | 452      |
| 100A0                        | F F             | 440 | --  | 440      |
|                              | D D             | 440 | 448 | 440      |
|                              | S 7             | 440 | 452 | 452      |
|                              | S 2             | 440 | 452 | 452      |
| 100B0                        | F F             | 600 | --  | 600      |
|                              | D D             | 600 | 608 | 600      |
|                              | S 7             | 600 | --  | 612      |
|                              | S 2             | 600 | --  | 612      |
| 150A0                        | F F             | 600 | --  | 600      |
|                              | D D             | 600 | 612 | 600      |
|                              | S 7             | 600 | --  | 607      |
|                              | S 2             | 600 | --  | 607      |

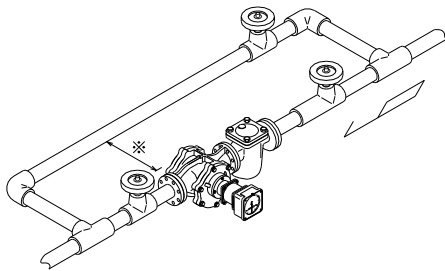
Note) Process connection for which no numerical value is indicated on the table cannot be manufactured.

**7. Piping method**

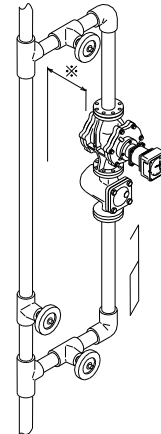
- Install a strainer on the inlet side of the flow meter without fail. To avoid outflow to the downstream side due to damage of internal component parts, install a strainer also on the outlet side of the flow meter. (Note) The standard mesh of the strainer element is 60 meshes.
- Install a bypass piping. In designing this bypass piping, take account of protection of the inner elements of the flow meter against the influences of flushing in the early period of operation or discharge of air in the piping as well as ease of maintenance and inspection work.
- Secure a space necessary for inspection, disassembling, etc. of the flow meter in the piping arrangement. Especially, secure a space for enabling disassembling of the measuring chamber of the flow meter.

Examples of piping installation

Horizontal piping  
(Vertical installation)



Vertical piping

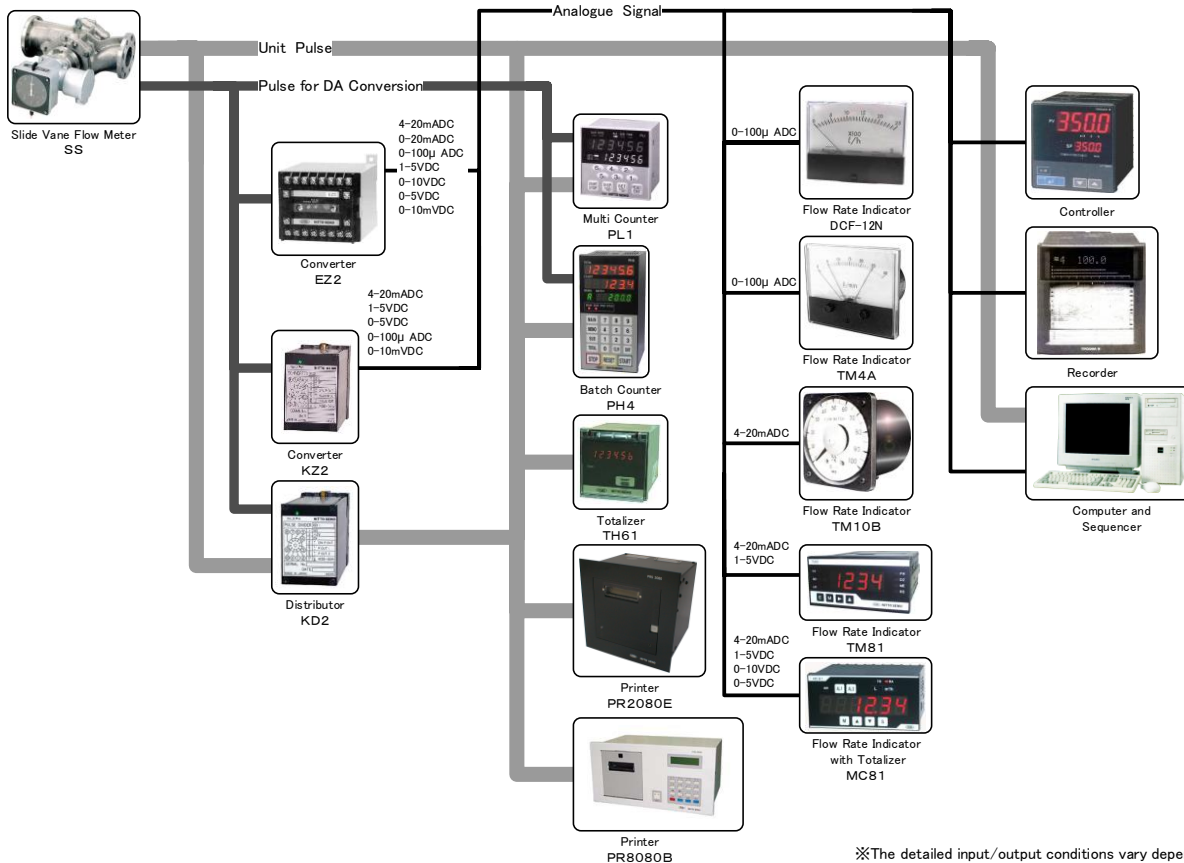


The mark ※ indicates a space necessary for disassembling and inspection. Install the piping in a way to secure a dimension no small than the figures indicated on the table below.

| Unit (mm)                    |              |              |
|------------------------------|--------------|--------------|
| Nominal size & volume symbol | 080B<br>100A | 100B<br>150A |
| ※Dimension                   | 120          | 160          |

Note) Flow direction top to bottom is unavailable.

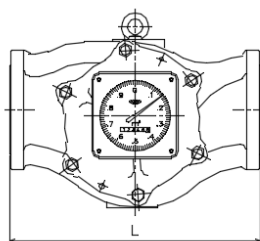
**8. Remote measurement system**



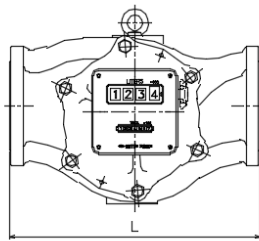
※The detailed input/output conditions vary depending on the specifications of the respective converter and receivers. Check with the specification sheet of the respective instruments.

9. External dimensions (mm)

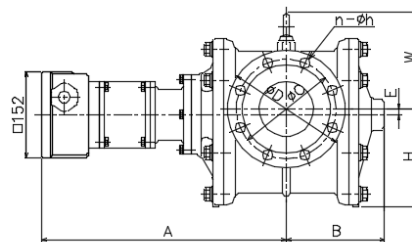
● Direct-reading type



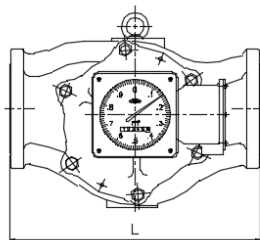
(A0 Register)



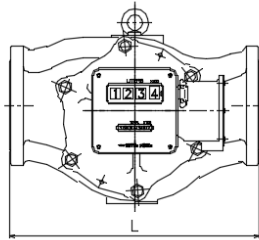
(Z8 Register)



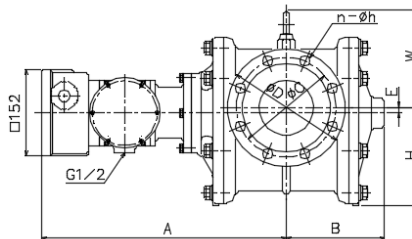
● Pulse generator type



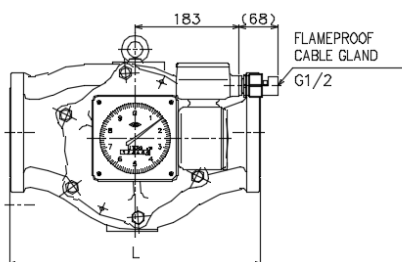
(A0 Register)



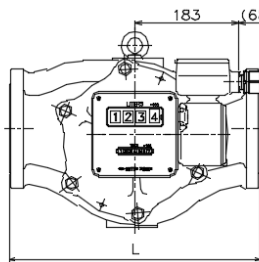
(Z8 Register)



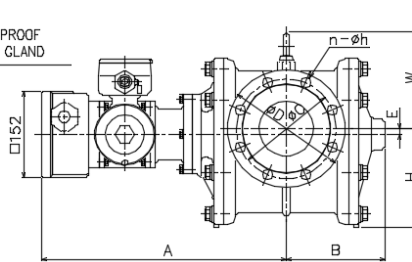
● Explosion-protection type



(A0 Register)



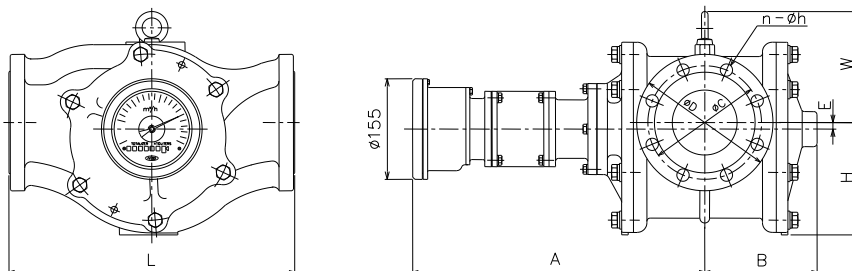
(Z8 Register)



| Nominal size & volume symbol | Nominal size | Flange standard | L   |     |     | A   | B   | W   | H   | E  | D   | C   | n  | h  | Weight (kg) |
|------------------------------|--------------|-----------------|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|----|----|-------------|
|                              |              |                 | FC  | FCD | SCS |     |     |     |     |    |     |     |    |    |             |
| 080B0                        | 80           | JIS10K          | 440 | 440 | 440 | 431 | 173 | 167 | 166 | 10 | 185 | 150 | 8  | 19 | 74          |
|                              |              | JIS20K          | -   | 448 | 448 |     |     |     |     |    | 200 | 160 | 8  | 23 | 76          |
| 100A0                        | 100          | JIS10K          | 440 | 440 | 440 | 431 | 173 | 171 | 173 | 10 | 210 | 175 | 8  | 19 | 76          |
|                              |              | JIS20K          | -   | 448 | 452 |     |     |     |     |    | 225 | 185 | 8  | 23 | 78          |
| 100B0                        | 100          | JIS10K          | 600 | 600 | 600 | 495 | 234 | 192 | 180 | 0  | 210 | 175 | 8  | 19 | 115         |
|                              |              | JIS20K          | -   | 608 | -   |     |     |     |     |    | 225 | 185 | 8  | 23 | 117         |
| 150A0                        | 150          | JIS10K          | 600 | 600 | 600 | 495 | 234 | 192 | 180 | 0  | 280 | 240 | 8  | 23 | 127         |
|                              |              | JIS20K          | -   | 612 | -   |     |     |     |     |    | 305 | 260 | 12 | 25 | 132         |

Note) Shown weight is for the counter symbol (A0) with material code FF (JIS 10K) and DD (JIS 20K). Add 2kg for signal output type, and add 5kg for explosion proof type.

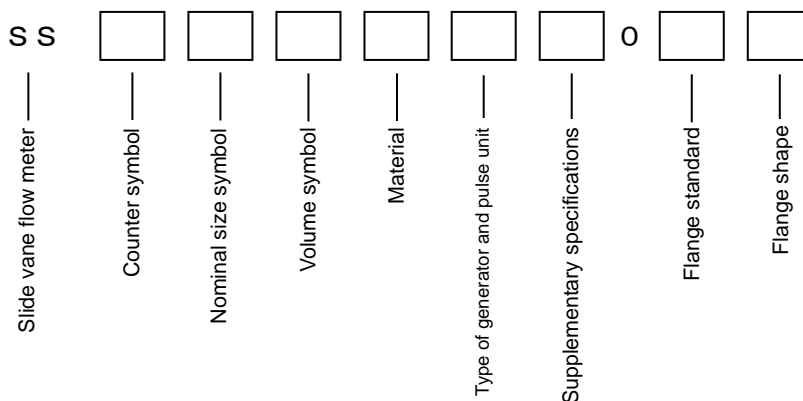
● Instantaneous flow rate indicator type



| Nominal size & volume symbol | Nominal size | Flange standard | L   |     |     | A   | B   | W   | H   | E  | D   | C   | n  | h  | Weight (kg) |
|------------------------------|--------------|-----------------|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|----|----|-------------|
|                              |              |                 | FC  | FCD | SCS |     |     |     |     |    |     |     |    |    |             |
| 080B0                        | 80           | JIS10K          | 440 | 440 | 440 | 453 | 173 | 167 | 166 | 10 | 185 | 150 | 8  | 19 | 75          |
|                              |              | JIS20K          | -   | 448 | 448 |     |     |     |     |    | 200 | 160 | 8  | 23 | 77          |
| 100A0                        | 100          | JIS10K          | 440 | 440 | 440 | 453 | 173 | 171 | 173 | 10 | 210 | 175 | 8  | 19 | 77          |
|                              |              | JIS20K          | -   | 448 | 452 |     |     |     |     |    | 225 | 185 | 8  | 23 | 79          |
| 100B0                        | 100          | JIS10K          | 600 | 600 | 600 | 517 | 234 | 192 | 180 | 0  | 210 | 175 | 8  | 19 | 116         |
|                              |              | JIS20K          | -   | 608 | -   |     |     |     |     |    | 225 | 185 | 8  | 23 | 118         |
| 150A0                        | 150          | JIS10K          | 600 | 600 | 600 | 517 | 234 | 192 | 180 | 0  | 280 | 240 | 8  | 23 | 128         |
|                              |              | JIS20K          | -   | 612 | -   |     |     |     |     |    | 305 | 260 | 12 | 25 | 133         |

- Note) 1. In case of single stage radiating fin, size is A+100mm, and weight is +2kg.  
 2. Shown weight is for material code FF (JIS 10K) and DD (JIS 20K). Add 2kg for signal output type, and add 5kg for explosion proof type.

## 10. Products code



●: Standard; ○: Manufacturable; ×: Non-manufacturable

| Type                             | Specification code   |       | Specifications   | 080B0 | 100A0 | 100B0 | 150A0 |
|----------------------------------|--|-------|--|-------|-------|-------|-------|
| SS                               |  |       | Slide vane flow meter  | ●     | ●     | ●     | ●     |
| Counter symbol                   | A0   |       | Pointer and direct-reading type  | ●     | ●     | ●     | ●     |
|                                  | Z8   |       | Digital zero-reset and direct-reading type   | ●     | ●     | ●     | ●     |
|                                  | I0   |       | With direct-reading instantaneous flow indicator   | ○     | ○     | ○     | ○     |
|                                  | CN   |       | Pneumatic batch counter type (80B-100A only)   | ○     | ○     | ×     | ×     |
| Nominal size symbol              | 080  |       | 80mm   | ●     |       |       |       |
|                                  | 100  |       | 100mm  |       | ●     | ●     |       |
|                                  | 150  |       | 150mm  |       |       |       | ●     |
| Volume symbol                    | A0   |       | Volume small   | ×     | ●     | ×     | ●     |
|                                  | B0   |       | Volume large   | ●     | ×     | ●     | ×     |
| Material symbol                  | FF   |       | Main body: FC200, Measuring chamber: FC200, Rotor: AC3A, Rotor shaft: SK4, Vane: Special Carbon, Operating pressure: 1.0 MPa             | ●     | ●     | ●     | ●     |
|                                  | S7   |       | Main body: SCS13, Measuring chamber: SCS13, Rotor: SCS13, Rotor shaft: SCS13, Vane: Special Carbon, Operating pressure: 1.0 MPa, 2.0 MPa | ●     | ●     | ●     | ●     |
|                                  | FC: Cast iron, SCS13: Stainless steel casting; AC3A: Corrosion-resistant aluminum, SK4: Tool steel |       |  |       |       |       |       |
| Type of generator and pulse unit | 12   |       | Without pulse output   | ●     | ●     | ●     | ●     |
|                                  | R4   |       | Reed switch (contact) pulse 1L/p   | (○)   | (○)   | ×     | ×     |
|                                  | R5   |       | Reed switch (contact) pulse 10L/p  | ○     | ○     | ○     | ○     |
|                                  | R6   |       | Reed switch (contact) pulse 100L/p   | ○     | ○     | ○     | ○     |
|                                  | R7   |       | Reed switch (contact) pulse 1m3/p  | ○     | ○     | ○     | ○     |
|                                  | M3   |       | High frequency (no-contact) pulse 0.1L/p   | (○)   | (○)   | ×     | ×     |
|                                  | M4   |       | High frequency (no-contact) pulse 1L/p   | ○     | ○     | ○     | ○     |
|                                  | M5   |       | High frequency (no-contact) pulse 10L/p  | ○     | ○     | ○     | ○     |
|                                  | MD   |       | High frequency (no-contact) pulse DA conversion pulse  | ○     | ○     | ○     | ○     |
| XX                               |  | Other | ○  | ○     | ○     | ○     |       |
| Supplementary specifications     | 345  |       | Non-explosion proof & without radiating fins   | ●     | ●     | ●     | ●     |
|                                  | X00  |       | Flameproof enclosure type  | ○     | ○     | ○     | ○     |
| Flange standard                  | 010  |       | JIS 10K  | ●     | ●     | ●     | ●     |
|                                  | 020  |       | JIS 20K  | ○     | ○     | ○     | ○     |
|                                  | AS1  |       | ANSI class 150   | ○     | ○     | ○     | ○     |
| Flange shape                     | R  |       | RF flange  | ●     | ●     | ●     | ●     |
|                                  | F  |       | FF flange  | ○     | ○     | ○     | ○     |

## 11. Strainer

To avoid a flow meter trouble caused by foreign matter in a liquid coming into the flow meter, it is necessary to install a strainer shortly before or as near as before the upstream side of the flow meter.

◆◆◆ 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.

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