# WEIR FLOW TRANSMITTER

DATA SHEET FJC

This is a weir flow transmitter utilizing an induction potentiometer.

A weir or parshall flume is installed along an open channel and the head of the water flowing through it is detected by a float and conveyed as a rotating angle to the induction potentiometer which transmits a signal current of 4 to 20mA DC proportionate to the flow rate.

## FEATURES

1. High reliability
   Use of a contactless induction potentiometer assures a long life and high reliability of the instrument.
2. A variety of specifications available
   The transmitter can be provided with intrinsically safe explosionproofing, various materials for the components, an arrester plus other items.
3. The operating principle and structure of the transmitter are simplified for easy operation, maintenance and inspection.

## SPECIFICATIONS

**Measuring range:** Any water head of 0 to 90…1800 mm (see the attached characteristic curves for the relation between water head and flow rate)

**Indicator:** Analog type (0 to 100% scale)

**Allowance:** ±1.0% (less than 10% of full scale is not guaranteed; this accuracy does not include the instrumental error of weir and flume)

**Output signal:** 4 to 20mA DC

**Ripple content:** 1.5% p-p (at approx. 25 kHz)

**Allowable load resistance:**
0 to 550Ω (at 24V DC)

**Power supply:** 13 to 33V DC
(less than 26V DC with intrinsically safe explosion-proofing)
(less than 27V DC with arrester)
100/24V AC ±10%, 50/60 Hz
(see example of configuration on final page)

**Wiring method:** 2-wire system

**Ambient temperature:**
–30 to +80°C
(but not usable in freezing condition)
50°C max. with intrinsically safe explosionproofing
60°C max. with arrester

**Ambient humidity:**
Less than 95% RH

**Principal materials:**
Wire rope; SUS304 (stainless steel)
Float; Hard PVC or SUS304
Counterweight; Coated with zinc metallikon or SUS304
Instrument body; Aluminum alloy

**Conduit connection:**
G3/4 internal thread

**Enclosure:** Splash-proof (JIS C 0920)

**Arrester:** Built in when requested

**Explosionproof structure:**
Intrinsically safe explosionproofing i3nG5

**Mass:** Approx. 10.5 kg (excluding float and counterweight)

**External dimensions (HxWxD):**
320 x 304 x 218 mm

**Finish color:** Silver (melamine paint);
may be provided with acid and alkaliproof treatment

**Range of delivery:**
Transmitter, Float, Counterweight, Wire rope (Weir excluded)

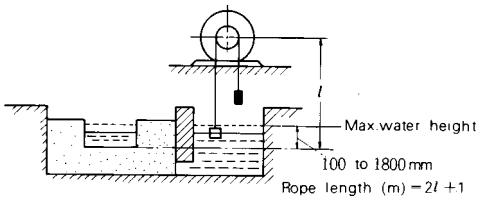
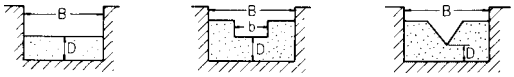



Fig. 1 Measuring Principle Diagram




Full-width weir | Rectangular weir | Triangular weir

Fig. 2 Weir Structural Diagram

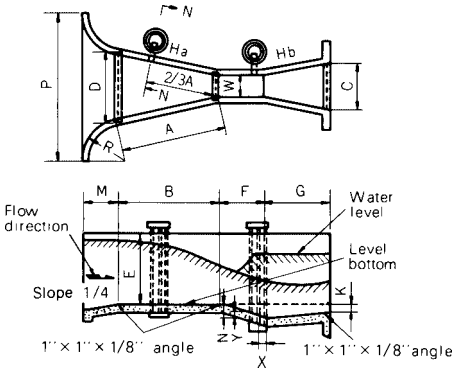



Fig. 3 Parshall Flume Structural Diagram

## Applicable

| Full – Width weir | Rectangular weir | Triangular weir |
|---|---|---|
| B ≧ 0.5m<br>D = 0.3–2.5m<br><br>h = 0.03 – 0.8m and less than $\frac{B}{4}$ | B = 0.5 – 6.3m<br>b = 0.15 – 5m<br>D = 0.15 – 3.5m<br>h = 0.03 – $\sqrt{b}$ m<br>$\frac{bD}{B^2} \geqq 0.06$ | B = 0.5 – 1.2m<br>D = 0.1 – 0.75m<br><br>h = 0.07 – 0.26m and less than $\frac{B}{3}$ |

## Applicable

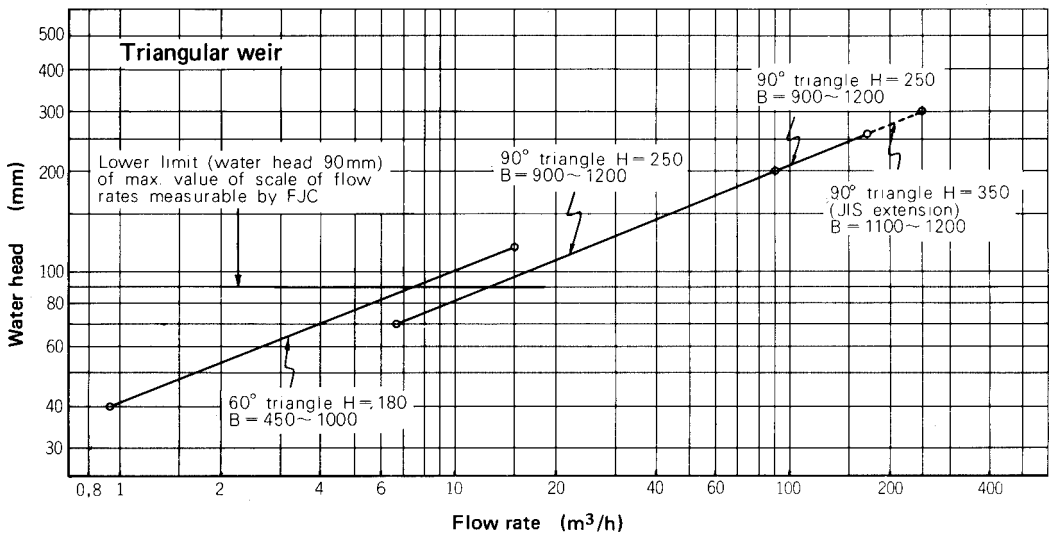
| Calls | W (mm) | Flow rate (m³/h) | |
|---|---|---|---|
| | | Min. | Max. |
| 3 in | 76.2 | 3 | 193 |
| 6 in | 152.4 | 5 | 398 |
| 9 in | 228.6 | 9 | 907 |
| 1 ft | 304.8 | 11 | 1641 |
| 1.5 ft | 457.2 | 15 | 2508 |
| 2 ft | 609.6 | 43 | 3374 |
| 3 ft | 914.4 | 62 | 5138 |
| 4 ft | 1219.2 | 133 | 6922 |
| 5 ft | 1524.0 | 163 | 8726 |
| 6 ft | 1828.8 | 265 | 10551 |
| 7 ft | 2133.6 | 306 | 12376 |
| 8 ft | 2438.4 | 357 | 14221 |

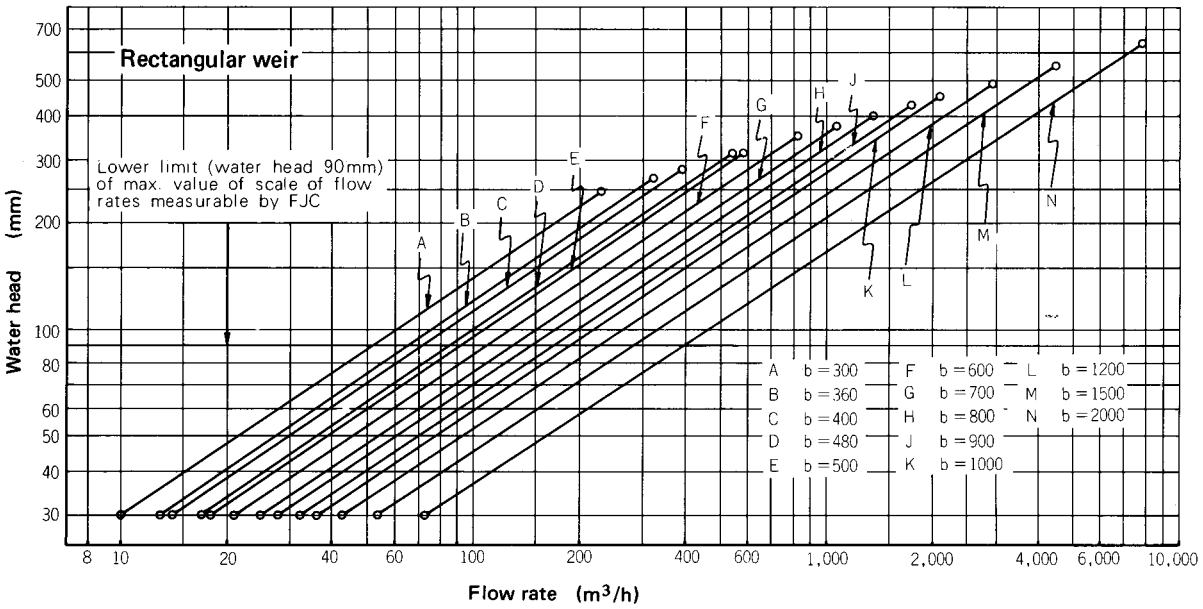
# CODE SYMBOLS

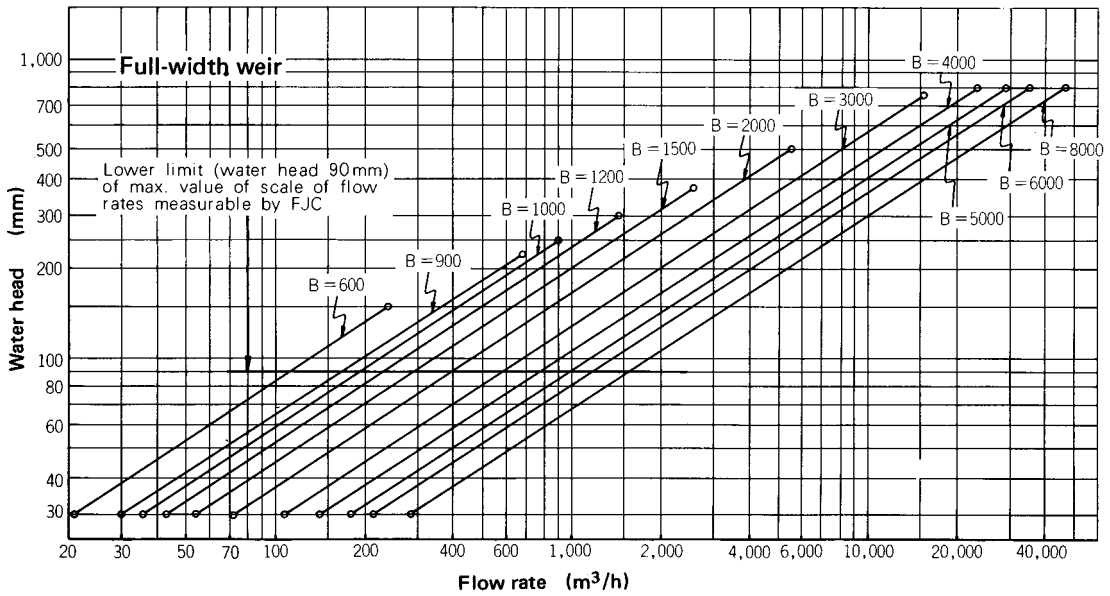
| 1 2 3 4 5 6 7 8 | 9 10 | Description |
|---|---|---|
| F J C 4 - 0 | | |
| A | | **Length of wire rope**<br>5 m |
| B | | 10 m |
| C | | 15 m |
| D | | 20 m |
| E | | 25 m |
| F | | 30 m |
| V | | **Material of float**<br>Poly vinyl chloride |
| S | | SUS304 (stainless steel) |
| E | | **Material of counterweight**<br>Iron |
| S | | SUS304 (stainless steel) |
| A | | **Transmitter, Arrester**<br>4 to 20mA DC |
| B | | 4 to 20mA DC intrinsically safe explosionproof structure for instrumentation system |
| K | | 4 to 20mA DC, with arrester |
| | Y | **Treatment**<br>For general use |
| | * B | Acid and alkaliproof treatment |
| | * D | Chlorine-proof treatment |

• Asterisked (*) items: Nonstandard.

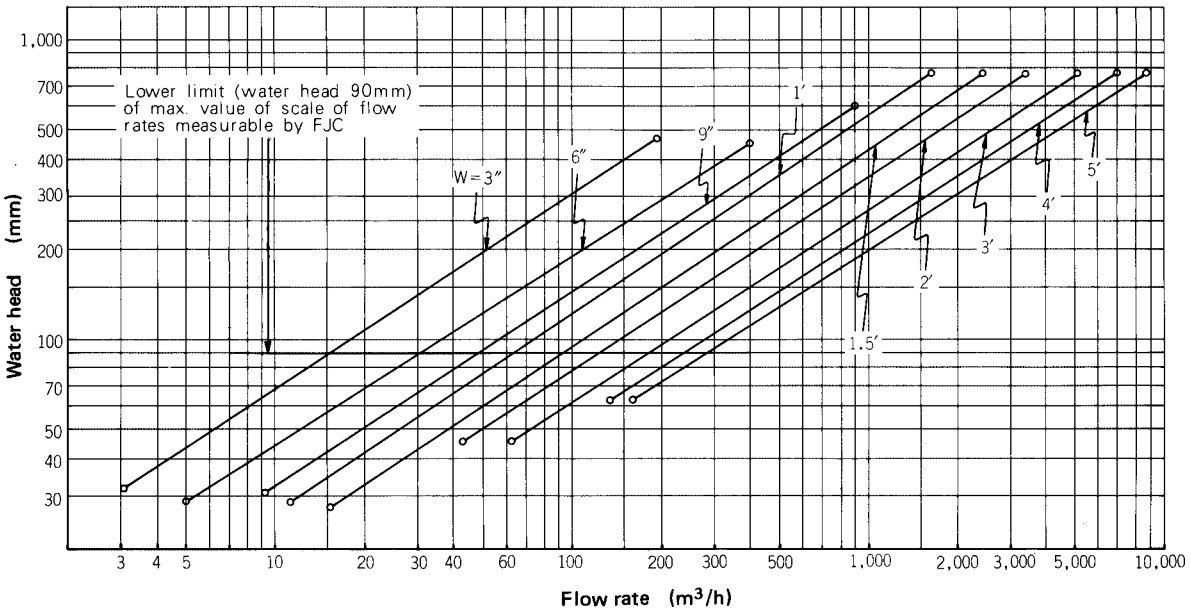
## Weir flow rate vs. water head curves



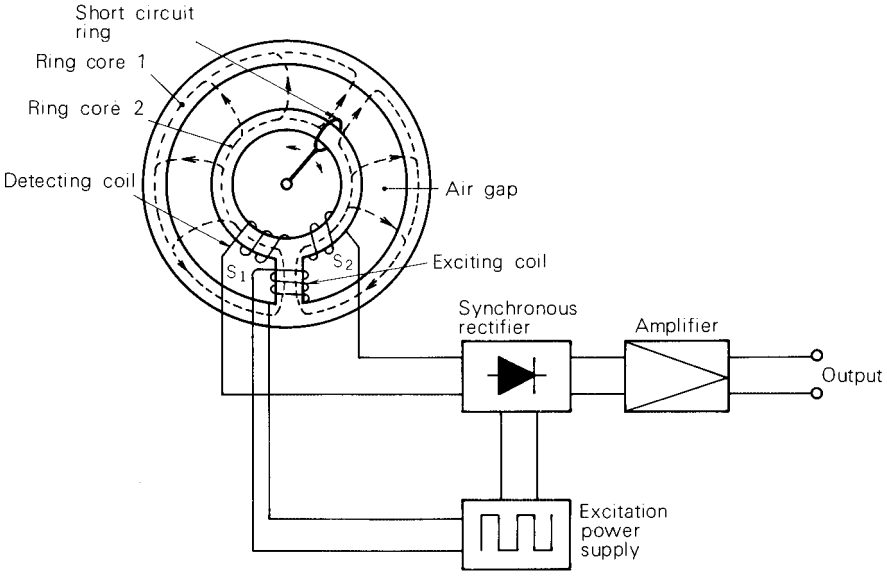



Parshall flume flow rate vs. water head curves (w:3 in to 5ft)



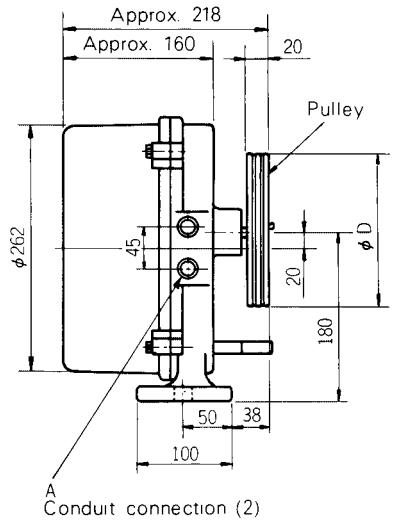

## PRINCIPLE OF INDUCTION POTENTIOMETER

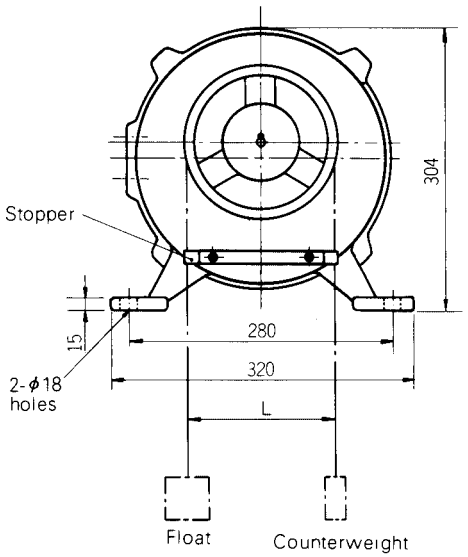



When the short circuit ring is positioned at the center, the magnetic flux at left and right sides is equal and the voltages produced at detecting coils $S_1$ and $S_2$ are equal. But if the ring rotates to the right side for example, then the flux at $S_1$ will increase and that at $S_2$ will decrease. Upon detecting this difference, an output voltage is produced which is proportional to the ring displacement (input rotating angle).

# OUTLINE DIAGRAM (Unit:mm)

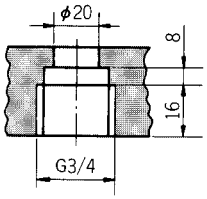
## Transmitter



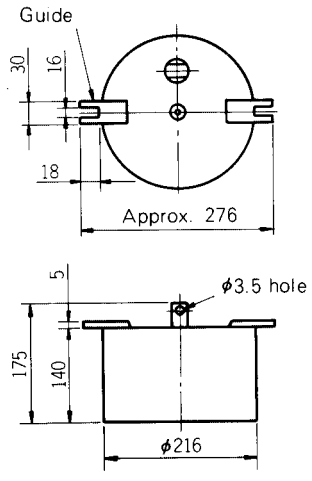

| Measuring range h | D | L |
|---|---|---|
| 0.41m > h | φ166 | 159 |
| 0.41m ≦ h ≦ 1.8m | φ325 | 318 |

### Details of A

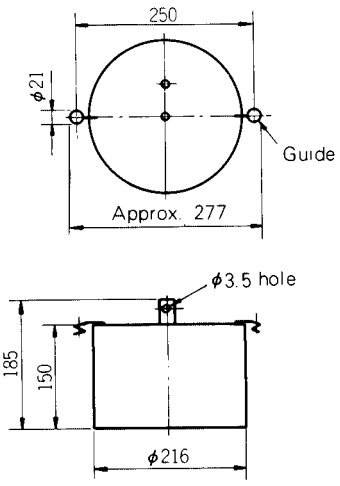



## Float

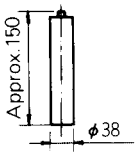
### Hard PVC (V)



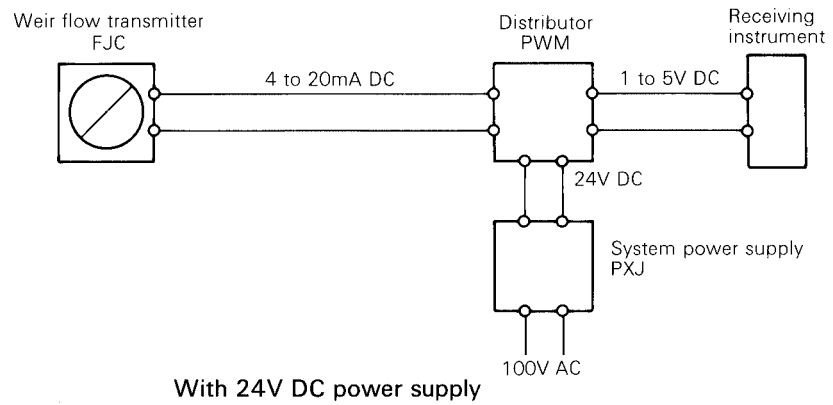

### SUS304(S)



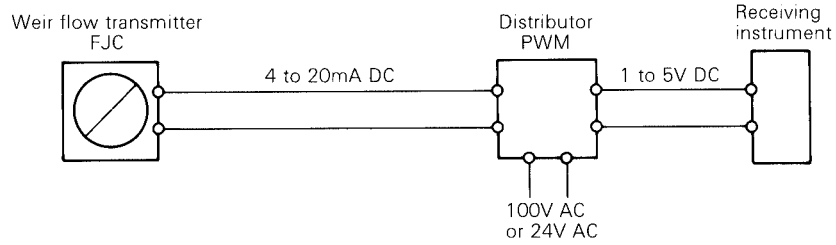

## Counter weight



## EXAMPLE OF CONFIGURATION ACCORDING TO POWER SUPPLY

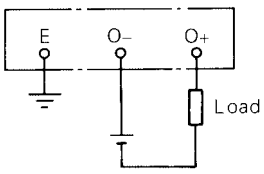



With 24V DC power supply




With 100V/24V AC power supply

## CONNECTION DIAGRAMS




## ORDERING INFORMATION

1. Object to be measured or application
2. Product name
3. Code symbols
4. Measuring range
5. Weir specs (kind of weir and dimensions of each part, B. b. D)
6. Parshall flume size (W)
7. Float and counterweight material
8. Whether arrester and explosionproofing required

## RELATED INSTRUMENT

Distributor

⚠ Caution on Safety

*Before using this product, be sure to read its instruction manual in advance.

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