

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: $\pm 1.0\%$ (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 550 Ω (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 $\pm 10\%$, 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)

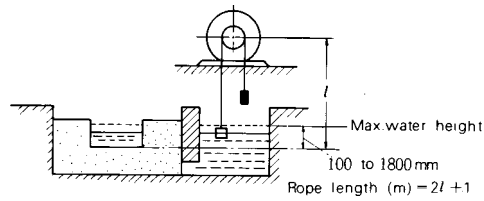


Fig. 1 Measuring Principle Diagram

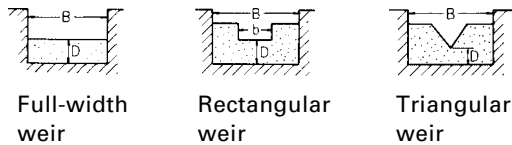


Fig. 2 Weir Structural Diagram

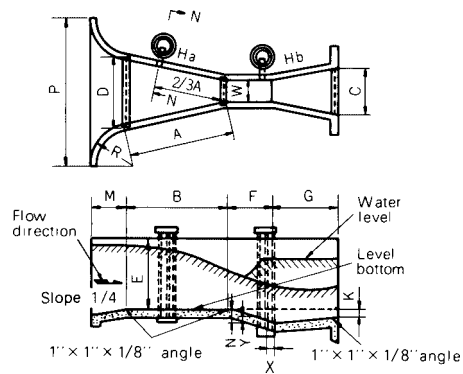


Fig. 3 Parshall Flume Structural Diagram

Applicable

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

Applicable

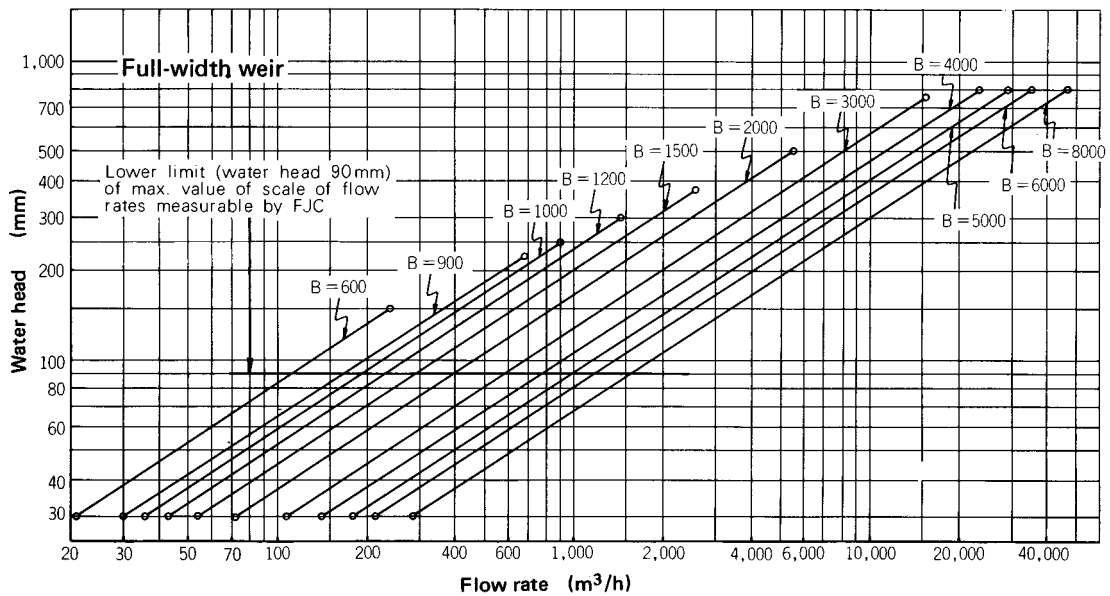
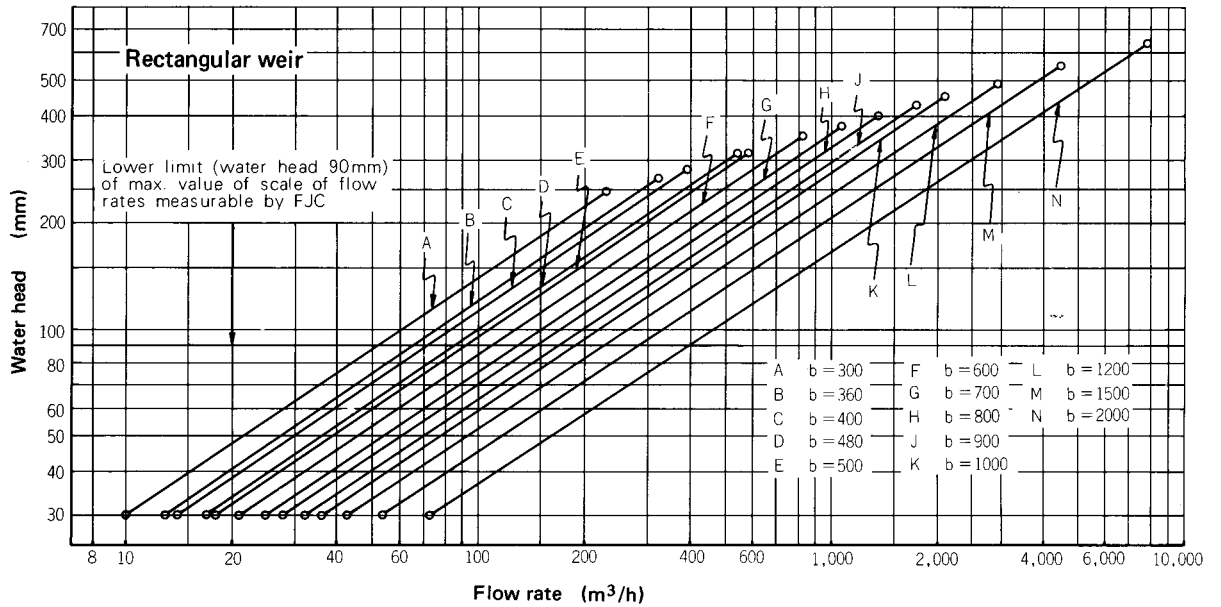
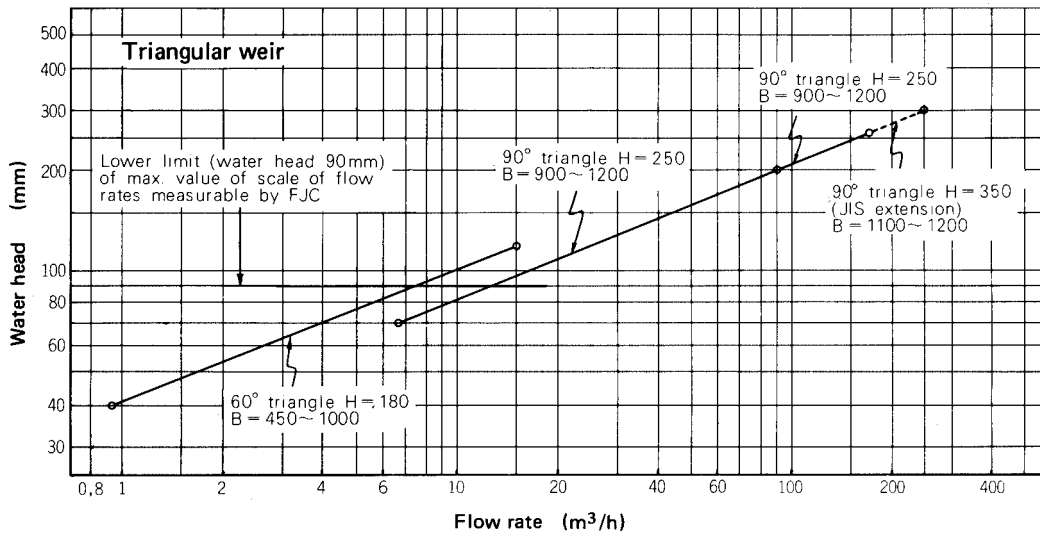
Calls	W (mm)	Flow rate (m ³ /h)	
		Min.	Max.
3 in	76.2	3	193
6 in	152.4	5	398
9 in	228.6	9	907
1 ft	304.8	11	1641
1.5 ft	457.2	15	2508
2 ft	609.6	43	3374
3 ft	914.4	62	5138
4 ft	1219.2	133	6922
5 ft	1524.0	163	8726
6 ft	1828.8	265	10551
7 ft	2133.6	306	12376
8 ft	2438.4	357	14221

CODE SYMBOLS

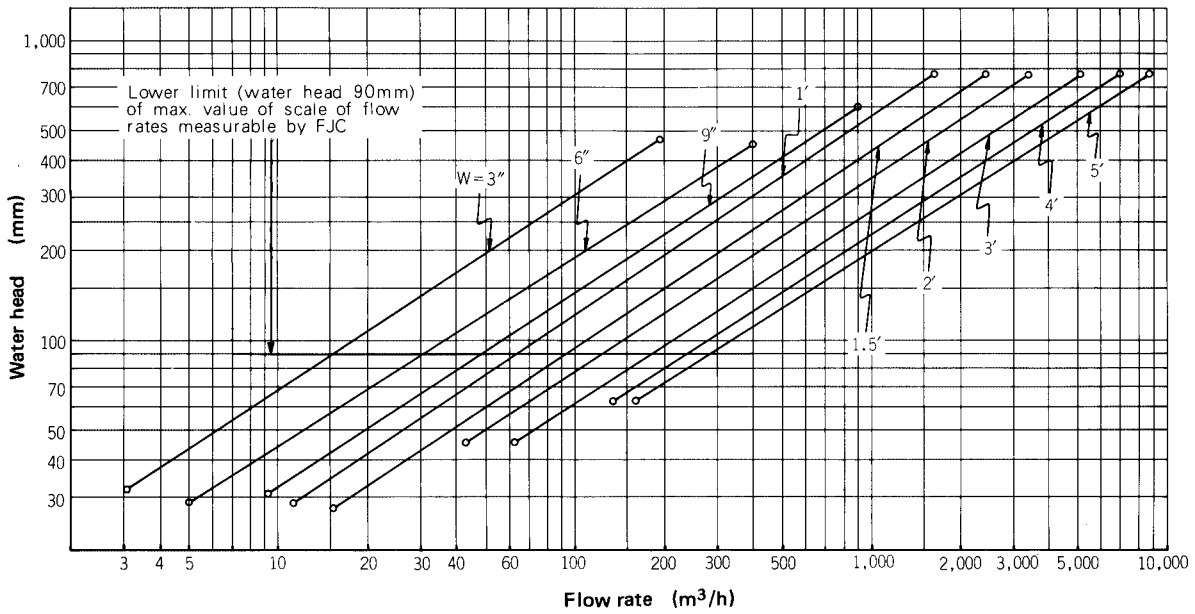
1	2	3	4	5	6	7	8	9	10	Description
F	J	C					4	-	0	Length of wire rope
	A									5 m
	B									10 m
	C									15 m
	D									20 m
	E									25 m
	F									30 m
		V								Material of float
		S								Poly vinyl chloride
			S							SUS304 (stainless steel)
				E						Material of counterweight
			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

• Asterisked (*) items: Nonstandard.

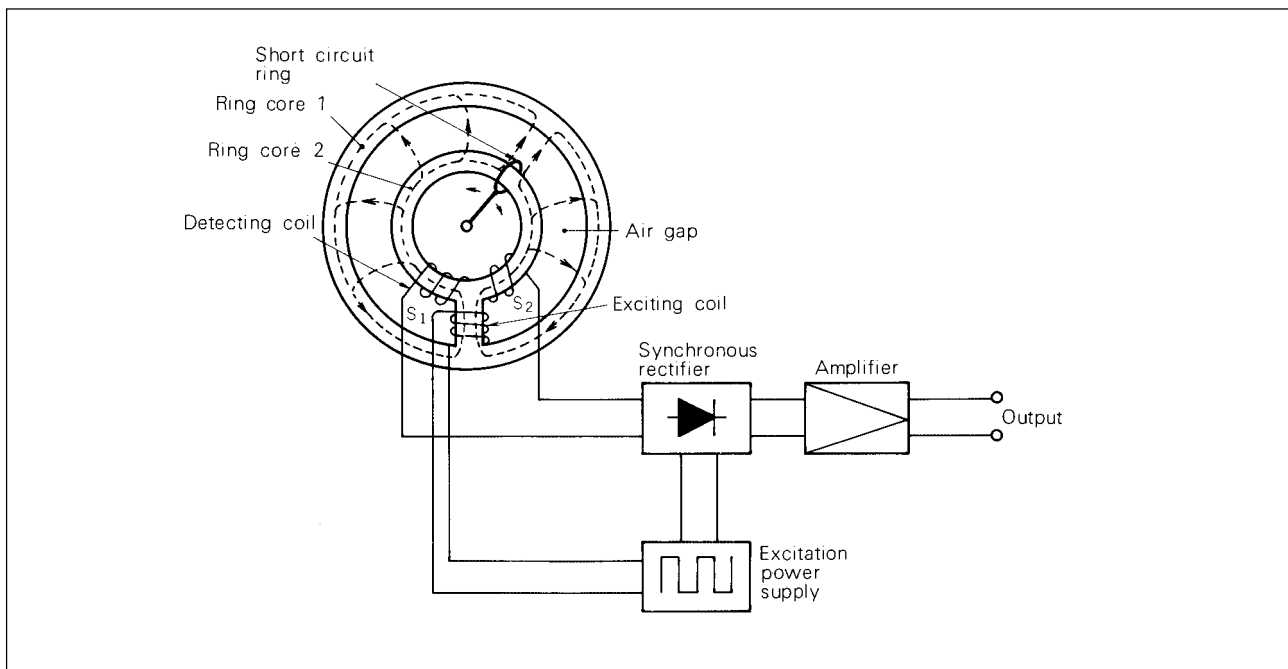
Weir flow rate vs. water head curves



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



PRINCIPLE OF INDUCTION POTENTIOMETER

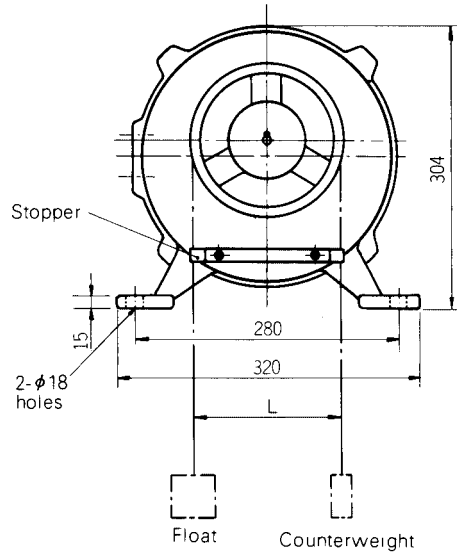
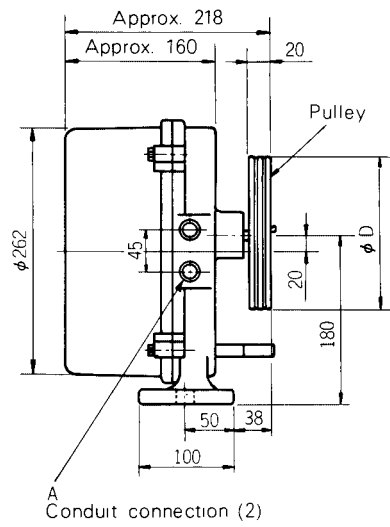


When the short circuit ring is positioned at the center, the magnetic flux at left and right sides is equal and the voltages produced at detecting coils S_1 and S_2 are equal. But if the ring rotates to the right side for example, then

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).

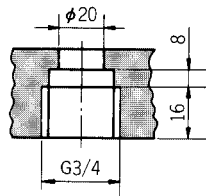
OUTLINE DIAGRAM (Unit:mm)

Transmitter



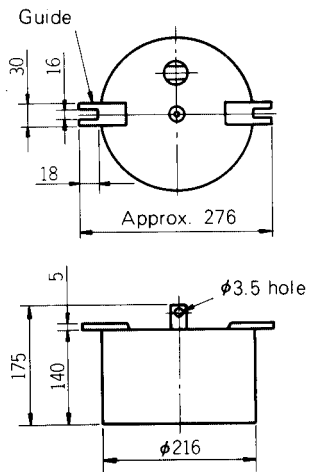
Measuring range h	D	L
$0.41\text{ m} > h$	$\phi 166$	159
$0.41\text{ m} \leq h \leq 1.8\text{ m}$	$\phi 325$	318

Details of A

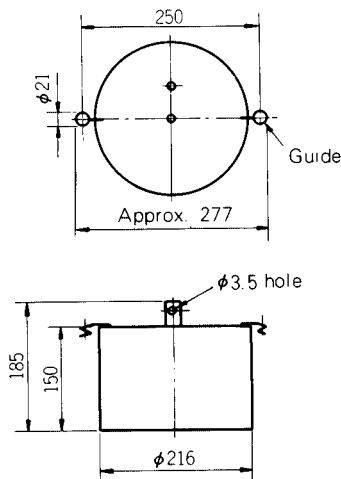


Float

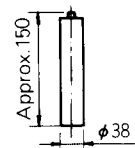
Hard PVC (V)



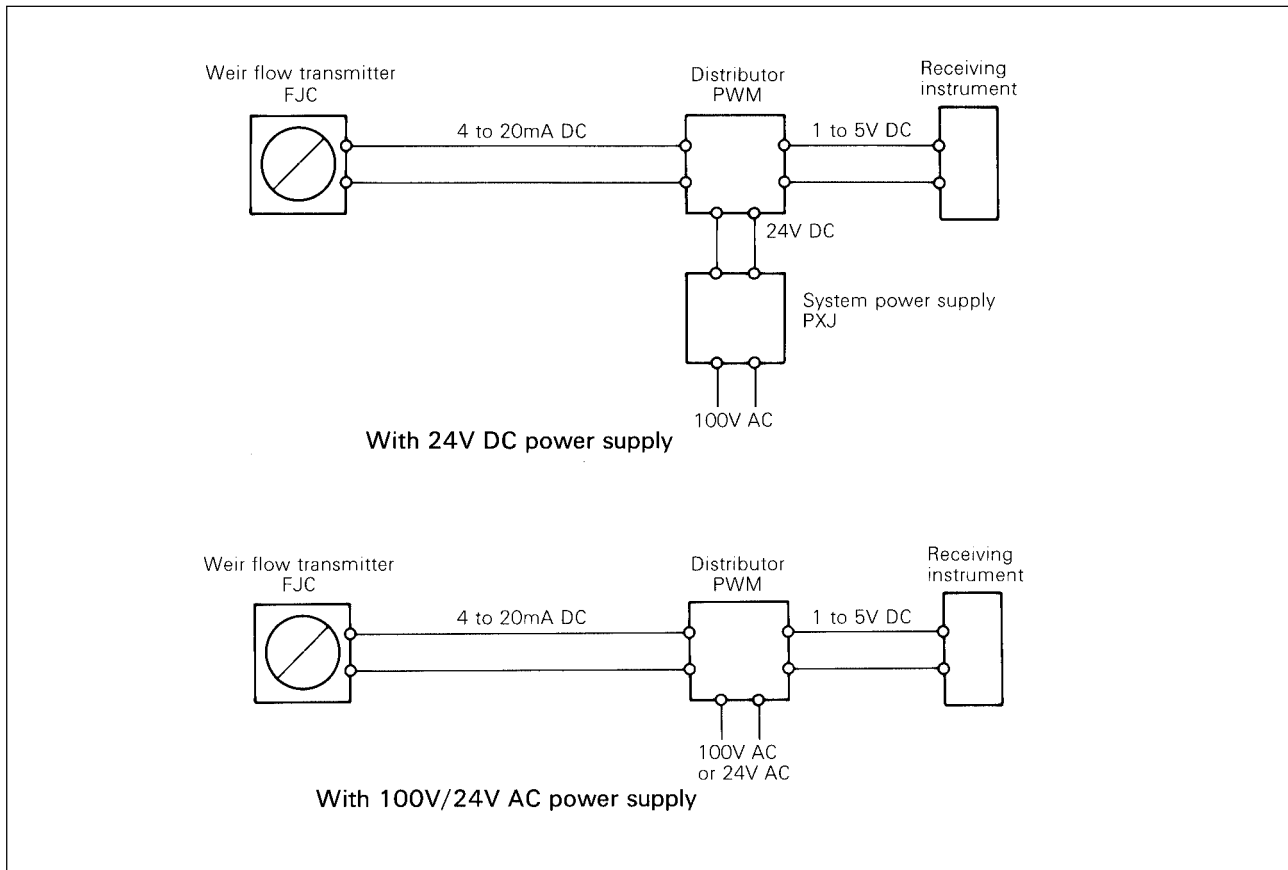
SUS304(S)



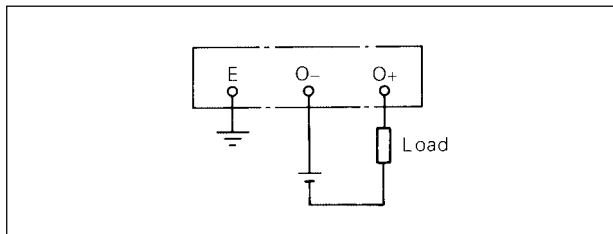
Counter weight



EXAMPLE OF CONFIGURATION ACCORDING TO 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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Information in this catalog is subject to change without notice.

Printed in Japan