

FC SERIES LIQUID LEVEL TRANSMITTER (FLANGE TYPE)

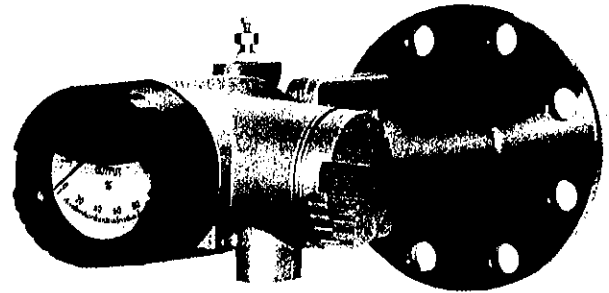
DATA SHEET

FPA

FC SERIES capacitance type liquid level transmitters provide precise level measurement, flange mounted on a tank wall. Process pressure acts on the flat diaphragm through metal seal diaphragm and changes capacitance by deflection of the flat diaphragm or a moving electrode. This change is measured and converted to a signal current in the electronics circuit for transmission to receiving instruments.

It is best suited for level or specific gravity measurement of slurry, viscous or corrosive liquid.

Explosionproof, field indicator, corrosion resistant materials, built-in arrester and other specifications are fully filled up.



FEATURES

1. **High accuracy**
The simple measuring principle to detect the capacitance change by a very small deflection of the flat diaphragm and the unique Floating Cell system assures high accuracy of 0.25%. The influence of static pressure, overload and temperature is smaller than any other transmitters on the market.
2. **High reliability and long-term stability**
All welded, simple mechanism with few parts causes little failure and drift.
3. **Excellent environmental adaptability**
Minimal influence of vibration, weather and radio frequency interference enables this transmitter to locate in almost all circumstances.
4. **Easy maintenance and handling**
Compact and lightweight design ensures speedy installation. Zero, span and damping are easily and independently adjusted on the front panel. The detecting unit and the electronics unit are interchangeable and easily replaceable because of the three block structure.
5. **Full range specifications**
To meet any process requirements, a wide choice of explosionproof, large indicator, arrester, corrosion resistant materials, various treatments etc. are available.
6. **Wide rangeability**
Each transmitter is available with 10 to 1 turndown for application flexibility. FC SERIES transmitters are offered in three ranges; 0~130mmH₂O to 0~32000mmH₂O with the same structure and size.

SPECIFICATIONS

Measuring range: FPA□3 0 to 130 . . . 1,300mmH₂O
 FPA□4 0 to 640 . . . 6,400mmH₂O
 FPA□5 0 to 3,200 . . . 32,000mmH₂O

Working pressure:
 FPA1 -1 to 10 kg/cm²
 * FPA3 -1 to 20 kg/cm²
 (vacuum service: below 60°C)

Material:

Detecting unit;

Material code	Flange material (high pressure side)		Low pressure side material	
	Seal diaphragm	Other wetted parts	Seal diaphragm and other wetted parts	Process cover
W	SUS316L	SUS316	SUS316L	SUS316
H	Hastelloy C	Hastelloy C	Hastelloy C	SUS316
M	Monel	Monel	Monel	SUS316
T	Tantalum	Tantalum	Tantalum	SUS316
B	Hastelloy C	Hastelloy C	Hastelloy C	Hastelloy C lining
L	Monel	Monel	Monel	Monel lining
R	Tantalum	Tantalum	Tantalum	Hastelloy C lining

O-Ring; Viton
 Fill; Silicone oil or Daiffoil (fluorinated fluid for oxygen measurement)

Electronics casing;
 Aluminium alloy
 Epoxy-polyurethane double coating, silver
 Field indicator; Black N3

Zero shift: Adjustable from -100% to +100% of the maximum span
 (The sum of zero shift and calibrated span should not exceed the upper range limit.)

Output signal: DC 4 to 20mA or DC 10 to 50mA

Power supply and allowable load resistance:
 DC 4 to 20mA output
 DC 12 to 45V
 (Less than DC 27V; with arrester)
 0 to 600Ω (at DC 24V power supply)
 DC 10 to 50mA output
 DC 25 to 70V
 0 to 450Ω (at DC 48V power supply)

Wiring system: 2-wire system

Ambient temperature:
 -30 to 80°C
 (-30 to 60°C; with arrester or vacuum service)
 (-10 to 60°C; Oxygen measurement)

Weather resistance:
 DIN 40040 HQC

Liquid temperature:
 -30 to 180°C
 (Non-freezing condition)
 (-10 to 60°C; Oxygen measurement)
 (-30 to 60°C; Vacuum service)

Response time: Faster than 0.3 sec.
 (time constant of the detecting unit at room temperature)

Adjustable damping:
 Four steps selectable; no damping, and time constants of 0.2, 1 and 3 sec.

Waterproof: IEC IP65 or NEMA4

Explosionproof:

	Certifying authority	Area classification	Temperature classification
Flameproof (Explosionproof)	FM	Class I, Division 1 Group B, C, D	T6
	CSA	Class I, Division 1 Group C, D	T6
Intrinsically safe	FM	Class I, Division 1 Group A, B, C, D	T6
	CSA	Class I, Division 1 Group A, B, C, D	T6
	SAA	Exia II C	T6
	PTB	Exib II C	T5, T6

FM : Factory Mutual Research (USA)
 CSA : Canadian Standards Association
 SAA : Standards Association of Australia
 PTB : Physikalisch-Technische Bundesanstalt

External dimensions (HxWxD) and weight:
 Approx. 210x210x356 (386)* mm (flush type)
 *; with field indicator
 13 to 16 kg

Mounting method:
 Flange mounting
 Flush type
 FPA1 ANSI 150LB 3" flange
 FPA3 ANSI 300LB 3" flange
 (Extension type; 4" flange, 150LB or 300LB)

Diaphragm extension length:
 100 mm
 (Distance between flange surface and diaphragm. 50mm, 150mm or 200mm are also available.)
 ANSI 4" flange

Process connection (low pressure side):
 1/4-18NPT internal thread
 (1/2-14NPT; with oval flange)

Conduit connection:
 1/2-14NPT internal thread

OPTIONAL SPECIFICATIONS

Field indicator: Built in the electronics casing, class 1.5
 0 to 100% linear scale.

Arrester: Built-in the electronics casing
 (DC 4 to 20mA output only)

Oxygen measurement:
 Daifloil (fluorinated fluid) filled and special cleaning

Acid and alkali-proof treatment:
 Detecting unit bolts; SUS 304

Oval flange: Available for process piping flange.
 For details, refer to the oval flange data sheet EDS6-10.

CHARACTERISTICS

(indicated by % of span with stainless steel diaphragm and silicone fill)

Accuracy: Better than ±0.25%
 (under reference operating conditions, includes linearity, hysteresis and repeatability)

Repeatability: Better than ±0.1%

Sensitivity: Better than 0.05%

Temperature effect: 1), 2)
 At maximum span and between -30 to 80°C:
 Total effect (zero and span) ±1%/55°C

Static pressure effect:
 At maximum span
 Zero shift 0.2%/rated pressure 1), 2)

Allowable differential overpressure:
 Up to the max. working pressure

Effect of differential overpressure:
 At maximum span
 Zero shift 0.3%/rated pressure

Power fluctuation:
 Zero shift 0.005%/V

Effect of position:
 Zero shift (Flush type);
 30mmH₂O/10° 2)

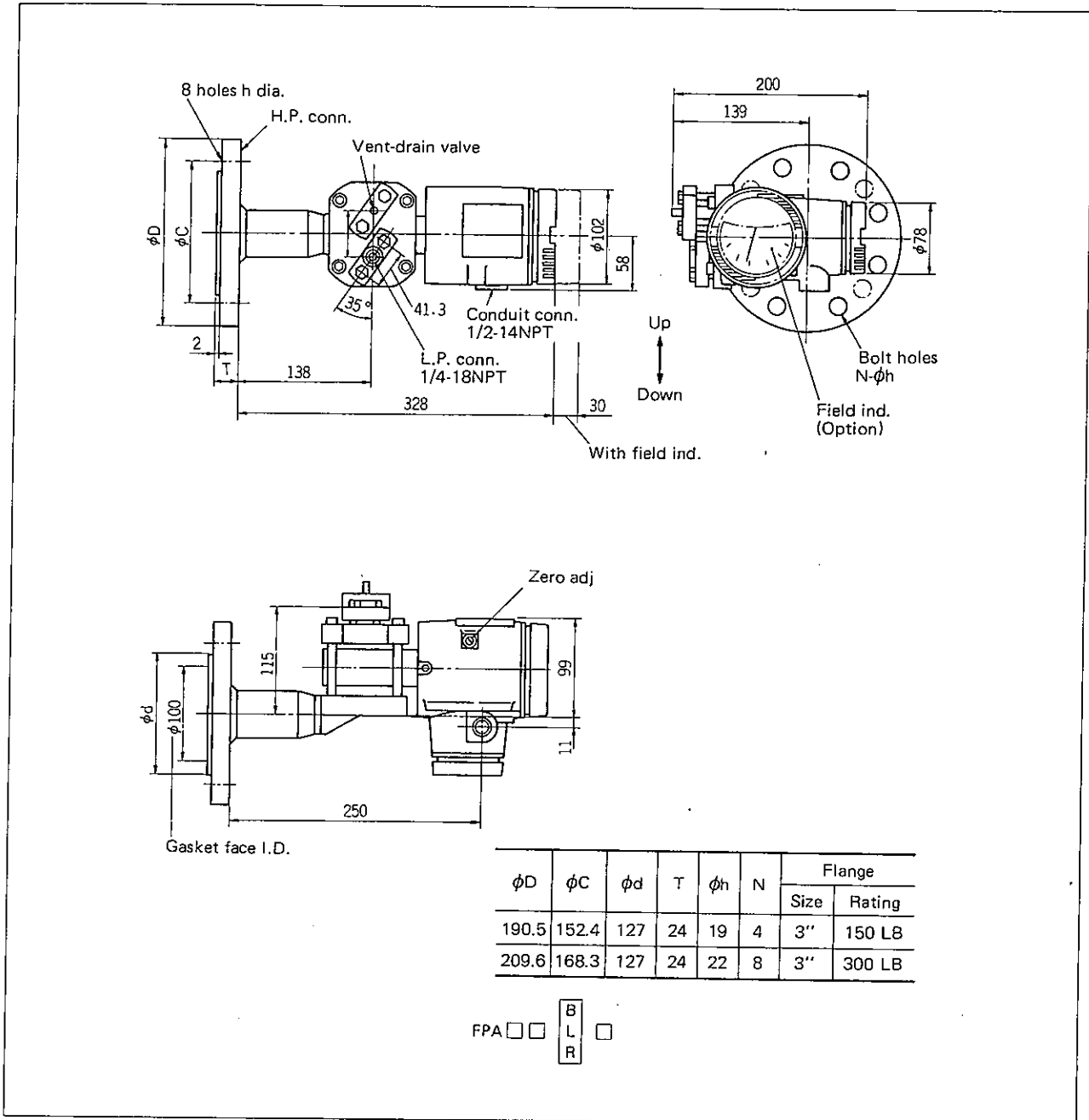
Note 1) This is doubled for corrosion resistant materials (Code; H, M, T, B, L and U) or measurements.
 2) This is doubled for oxygen measurement.

CODE SYMBOLS

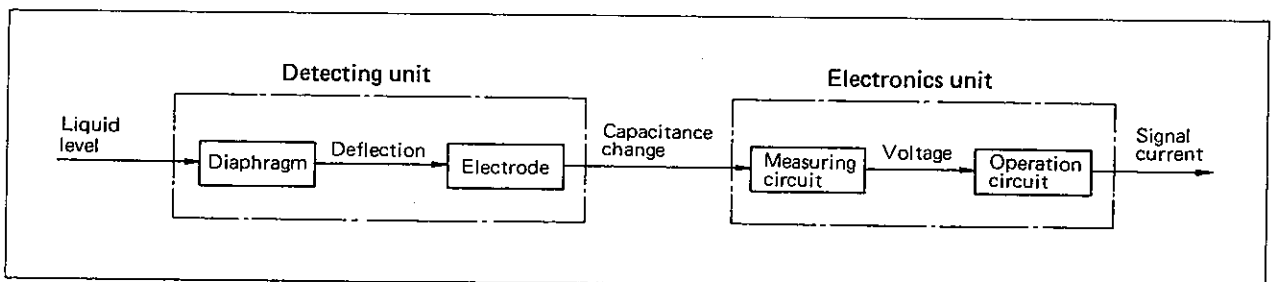
F P A		2		Description				
1				Pressure rating (kg/cm ²)				
* 3				10 (ANSI 150LB 3" flange) } 4" for extension				
* Z				20 (ANSI 300LB 3" flange) }				
				Other (contact Fujii)				
3				Measuring range (mmH ₂ O)				
4				0 to 130 1,300				
5				0 to 640 6,400				
				0 to 3,200 32,000				
				Materials of detecting unit				
				Flange material (high pressure side)		Low pressure side material		
				Seal diaphragm	Other wetted parts	Seal diaphragm and other wetted parts	Process cover	
W				JIS SUS316L	JIS SUS316	JIS SUS316L	JIS SUS316	
H				Hastelloy C	Hastelloy C	Hastelloy C	JIS SUS316	
M				Monel	Monel	Monel	JIS SUS316	
T				Tantalum	Tantalum	Tantalum	JIS SUS316	
B				Hastelloy C	Hastelloy C	Hastelloy C	Hastelloy C lining	
L				Monel	Monel	Monel	Monel lining	
R				Tantalum	Tantalum	Tantalum	Hastelloy C lining	
				Electronics unit, field indicator and arrester				
				Field indicator		Arrester	Output signal	Note
				Yes/No	Scale			
A				-	-	-		
B				○	0~100% linear	-		
G				-	-	○	DC	
H				○	0~100% linear	○	4 to 20mA	
P				-	-	-	DC	} Not available for intrinsic safety
Q				○	0~100% linear	-	10 to 50mA	
				Hazardous location				
9				Non-explosionproof				
5				FM approved explosionproof				
6				CSA " "				
A				FM approved intrinsically safe with STAHL barrier				
B				FM " " " " TAYLOR barrier				
C				FM " " " " WESTING HOUSE barrier				
D				FM " " " " M.T.L barrier				
F				FM " " " " FOXBORO barrier				
G				FM " " " " HONEY WELL barrier				
K				SAA " " " " M.T.L barrier				
L				PTB " " " "				
P				CSA " " " " STAHL barrier				
Q				CSA " " " " TAYLOR barrier				
S				CSA " " " " M.T.L barrier				
U				CSA " " " " FOXBORO barrier				
V				CSA " " " " HONEY WELL barrier				
				Input/output				
0				Normal operation				
1				Reverse operation				
				Special specifications				
0				Standard				
2				Low temperature service (-40 to +60 °C)				
				Diaphragm extension length				
0				0 (3" flange)				
* 1				50 } (4" flange)				
* 2				100 } Available only when				
* 3				150 } the 6th digit code is "W".				
* 4				200 }				
				Treatment				
Y				Standard				
A				Oxygen measurement (O ₂ no oil treatment)				
B				Acid and alkali-proof treatment				
C				A + B				

Barriers and Gas groups

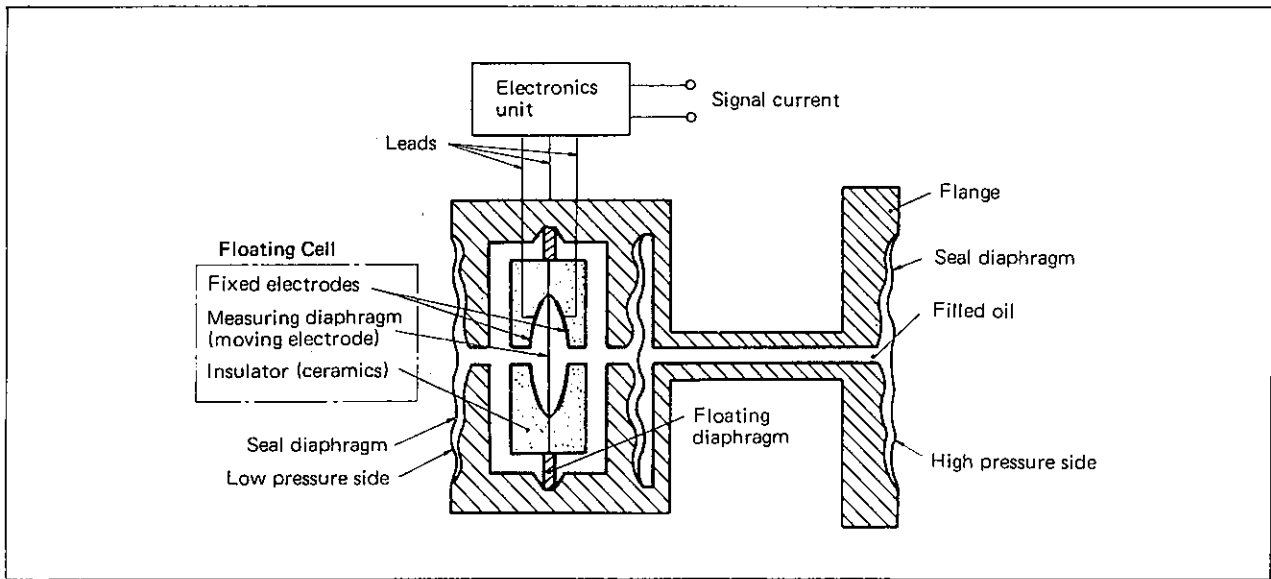
Codes	Certified by	Barrier	Installation drawing	Applicable gas groups
A	FM	STAHL, 8901, 8903	TC 408292	A, B, C, D
B	FM	Taylor, 1130, 1135	TC 408293	C, D
C	FM	Westinghouse, 75SB02	TC 408294	A, B, C, D
D	FM	MTL, 128, 188, 322	TC 408650	A, B, C, D
F	FM	Foxboro,	TC 409102	B, C, D
G	FM	Honeywell, 38545	TC 408625	A, B, C, D
K	SAA	MTL, 128, 188, 322	TD 407370	II C
L	PTB	Ik ≤ 100mA, U ≤ 30V		II C
P	CSA	STAHL, 8901, 8903	TC 408628	A, B, C, D
Q	CSA	Taylor, 1130, 1135	TC 408629	C, D
S	CSA	MTL, 128, 188, 322	TC 408661	A, B, C, D
U	CSA	Foxboro,	TC 409101	B, C, D
V	CSA	Honeywell, 38545	TC 408630	A, B, C, D



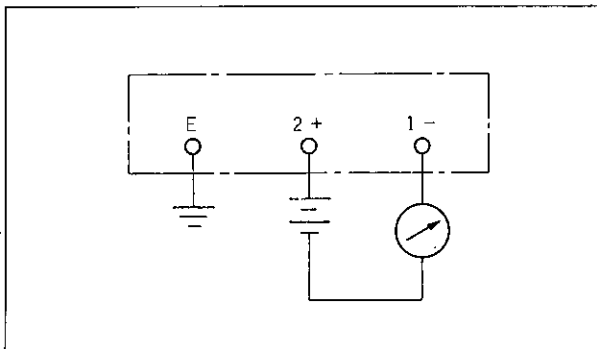
FUNDAMENTAL DIAGRAM



STRUCTURAL PRINCIPLE



CONNECTION DIAGRAM



ORDERING INFORMATION

1. Measuring object or application
2. Product name
3. Code symbols
4. Operating pressure and measuring range
5. Material of detecting unit
6. Explosionproof or special specifications
7. Other requirements

RELATED INSTRUMENTS

- Oval flange
- Opener
- Distributor