REMOTE SEAL TYPE PRESSURE & ABSOLUTE PRESSURE TRANSMITTER

DATA SHEET **FKP，FKH…5**

The FCX -AIII remote seal type pressure & absolute pressure transmitter accurately measures pressure & absolute pressure and converts it into an output signal of 4~20mA DC.
The transmitter utilizes a unique micromachined capacitance silicon sensor with state-of-the-art microprocessor technology to provide exceptional performance and functionality.FCX-AIII series transmitters with safety funtion have obtained the certificate of SIL certification by TÜV.

Features

1. High accuracy
   The base accuracy of all pressure transmitters is ±0.1%, the accuracy of all absolute pressure transmitters is ± 0.2%. Aftet zero elevation and suppression, fuji's micromachined capacitance silicon sensor can still maintain this accuracy without additional adjustments.
2. Minimum inventory
   All electronic parts, field indicators and cases of FCX-AIII series transmitters are universal, they can be replaced with each other, so the spare parts are little.
3. FUJI/HART dual language communication protocol, F.F is compatible with Profibus™
   FCX-AIII transmitter has dual language communication function, it complies wirh FUJI's proprietary communication protocol, also complies wirh HART communication protocol. FCX-AIII transmitter can communicate with any device that supports HART communication protocol. Besides, F.F and Profibus™ communication can be achieved by replacing and upgrading electronic parts.
4. Strong adaptability in using situation
   FCX-AIII can be used in almost any process situation, because it has the folliowing features:
   - The analog indicator can be mounted on the electronic part side, and also can be mounted on the terminal side.
   - All range meet the requirements of explosion-proof
   - Built-in RFI filter and lightning arrester
   - 5-digit digital indiactor with engineering unit
   - Stainless steel AMP case
   - Various materlais can be used
   - Uesd for high temperature and high vacuum
5. Design
   The remote seal type absolute pressure transmitter is designed by "all welding", and the flanged is welded on the measuring side of the transmitter to ensure vacuum and absolute tight connection.
6. Programmable linearization function output
   In addition to the linear and square root output, in can also output programmable linearization function.
7. Output current can be set when fault (below zero scale: 3.2mA to 4.0mA，above full scale: 20.8mA to 22.5mA)
   The output current when fault can be set by the FXW type hand held communicator(HHC), comply with NAMUR NE43 standard.

Specifications

Functional specifications

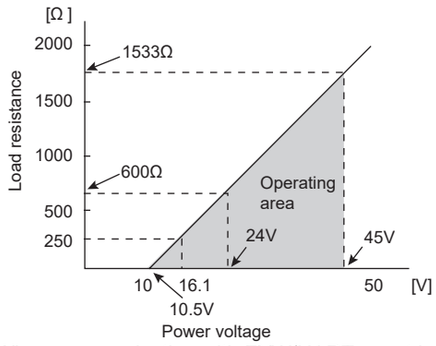
- Model: absolute pressure and pressure transmitter with external seal diaphragm:
  FKH & FKP：smart，4～20mA DC＋Fuji/Hart digit signal.
- Measured medium: Liquid, gas, or bapor
- Span, measuring range, and overrange limit:

Model	Span(kPa)		Range (kPa)	overrange limit (MPa)
	Min.	Max.		
	FKP			
F□P□01	8.125	130	-100～+130	1
F□P□02	31.25	500	-100～+500	1.5
F□P□03	187.5	3000	-100～+3000	9
F□P□04	625	10000	-100～+10000	15
Model	FKH (kPa abs)		(kPa abs)	(MPa abs)
F□H□02	8.125	130	0～+130	0.5
F□H□03	31.25	500	0～+500	1.5
F□H□04	187.5	3000	0～+3000	9

Note: To reduce the effect of operating conditions, the span of transmitter should be greater than 1/10 of max.span.

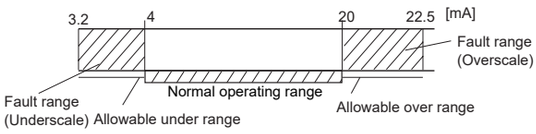
8. Dry calibration without standard pressure
   Due to using the unique machanical structure (sensor unit) and high performance electronic circuit (electronic unit), the instrument can be calibrated without standard pressure, dry calibration is as reliable as wet calibration.

- Output signal: 4 ~ 20mA DC superposed digital signal
- Power voltage: 10.5V ~ 45V DC(terminal)
  10.5V ~ 32V DC(selecting bulit-in arrester)
- Load characteristics:



Note: When communicating with FXW/HART, an at least 250Ω resistor should be connected into the circuit.

- Explosion proof certification: meeting the requirements of explosin-proof，please see the 10th digit of model code for details.
- Zero/Span adjustment: zero/span of instrument can be adjusted by HHC, also can use the external adjustment screw of AMP case to carry out zero adjustment.
- Damping adjustment: The damping of output signal can be adjusted by HHC, time constant is between 0.06s to 32s. it also can be local adjusted by LCD digital display unit.(refer to the option of field indicator.)
- Zero elevation/suppression: it can be adjust by HHC or external screw of AMP case.
- Normal/reverse action: selectable by HHC
- Field indicator: Plug-in analog indicator can be mounted on the electronic part side, also can be mounted on the terminal side.The 5 digit local LCD display unit is mounted on the electronic part side.
- Brunout direction: if the fault of instrument is detected when self-diagnosis, the analog output can be set by HHC in advance, any one of the following is selectabel：(1) Hold, (2) Overscale, (3)Underscale.
  - "Output hold"
    Output value is hold just before fault happens.
  - "Otuput overscale"
    Adjustable between 20.0mA to 22.5mA with HHC.
  - "Otuput underscale"
    Adjustable between 3.2mA to 4.0mA with HHC.



- Loop check output: It can be set between 3.2mA to 22 .5mA with HHC.
- Temperature range: ambient temperature: -40°C ~ +85°C
  -30°C ~ +80°C(for LCD digit display unit)
  -40°C ~ +60°C(for built-in arrester)
  -20°C ~ +80°C(for transmitter filled with fluorinated oil)
  For the explosion-proof instrument (flameproof orIntrinsic safety type), ambient temperature must be within the scope of the explosion proof standard.
- Storage temperature: -40°C ~ +90°C
- Relative humidity: 0 ~ 100%RH
- Communication function: note: The version of HHC must be higher than 7.0 (or FXW□□□□1-□4)

Table 1 Adjustment function

No.	Items		HART protocol		FUJI protocol	
			Display	Set	Display	Set
1	Tag No.		○	○	○	○
2	Type		—	—	○	○
3	Serial No. & Software Version		○	—	○	—
4	Engineering unit		○	○	○	○
5	Range Limit		○	—	○	—
6	Measuring range		○	○	○	○
7	Damping		○	○	○	○
8	Output mode	Linear	○	—	○	—
		Square root	—	○	○	—
9	Burnout direction		○	○	○	○
A	Zero/span calibration		○	○	—	○
B	Calibration of output circuit		—	○	—	○
C	Measured data		○	—	○	—
D	Self-diagnosis		○	—	○	—
E	Printer function		—	—	—	—
F	Lock of adj. function		○	○	○	○
G	Indication of digital indicator		○	○	○	○
H	Linzearize		—	—	○	○
I	Rerange		○	○	○	○

Performance specifications

(Under the reference conditions)

- Accuracy: (including linearity, hysteresis, and repeatability)

  For spans greater than 1/10 of URL:

  Accuracy of FKP is ± 0.1%/span

  Accuracy of FKH is ± 0.2%/span

  For spans below 1/10 of URL:

  Accuracy of FKP

  $$\pm \left(0.05 + 0.05 \frac{0.1\times \text{URL}}{\text{span}} \right) \%$$

  Accuracy of FKH

  $$\pm \left(0.1 + 0.1 \frac{0.1\times \text{URL}}{\text{span}} \right) \%$$

- Stability: changed ± 0.2% of URL for 10 years
- Temperature effect: the effect of changing per 28°C in the range of -40°C ~ +85°C.

  FKP：Zero shift:
  ± 0.25%/28° C(span is 1 ~ 2/5 of URL)± (0.25× 0.4× URL / span)/28° C
  (span is less than 2/5 of URL)
  Total shift:
  ± 0.25%/28° C(span is 1 ~ 2/5 of URL)± (0.25+0.25× 0.4× URL / span)%/28° C
  (span is less than 2/5 of URL)

  FKH：Zero shift:
  ± (0.25× URL / span)%/28° C
  Total shift: ± (0.25+0.25× URL / span)%/28° C
- Overrange effect: When the overrange pressure is not exceeded the range limit, zero shift is ± 0.3%/URL.
- Power voltage effect: per change 10V, less than 0.05% of the calibration range.
- Radio frequency interference (RFI) effect: frequency 20 ~ 1000MHz, electric field intensity 10V/m, the case is screwed on, less than 0.2% of URL(class: 2-abc: according to SAMA PMC 33.1 it's 0.2% of span.)
- Response time: time constant: 0.2s

  Dead time: about 0.3s

  Respone time= time constant +dead time
- Effect of mounting location: When tilting 10° in any direction, zero shift is less than 0.1KPa, this error can be eliminated by zero adjustment, it's no effect to span. The effect of the transmitter filled with fluorinated oil is doubled.
- Insulation strength: 500VAC 50/60Hz, between circuit and earth, 1 min
- Insulation resistance: more than 100MΩ (500V DC)
- Start-up time: 4s
- Internal resistance of field indicator:≤12Ω

Physical characteristics

- Conduit connection: 1/2-14NPT, Pg13.5 or M20× 1.5
- Materials of non-wetted part:

  Electronic part case:

  Standard: Low Cu-Al alloy, coating two layers of expoy polyurethane paint on the surface

  Fill fluid: standard: silicone oil

  optinoal: fluorinated oil
- Case structure: IEC IP67 NEMA6/6P
- Weight: transmitter body: about1.9kg

  Options: mounting bracket 0.5kg

  field indicator 0.8kg

Seal diaphragm assembly (S1): selecting the complete model according to the specification of seal diaphragm assembly (S1)

Optional specifications

- Field indicator: analog, moving-coil indicator or 5 digit LCD digital indicator.
- Arrester: The arrester can prevent the instrument damaged from lightning.
- NACE specification: All the metal materials of under pressure parts comply with NACE MR-01-75 specification.
- User tag plate: Stainless steel tag plate is used to print the tag number of instrument, it's tied to the transmitter.

Options

- HHC: Model FXW
- Vacuum application:

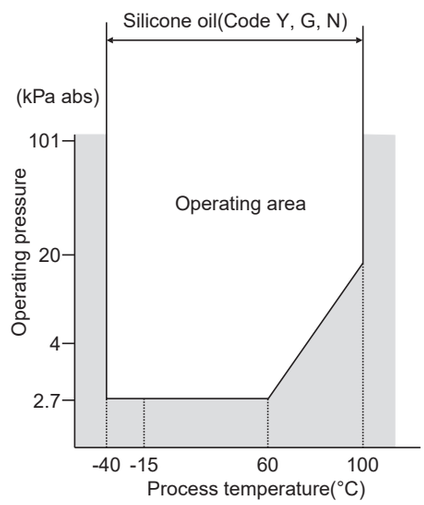


Figure 1 Relation between process temperature and operating pressure

The product conforms to the requoirments of European EMC directive "Electromagnetic Compatibility Directive2004/108/EC". The detail content is recorded in the techiacal construction file nmber TN5A0704. The applicable standards are as follows:

Emission list:
EN 61326-1 : 2006 Class A (Industrial location)

Frequency range	Limits	Reference standard
30 ~ 230MHz	40dB(μV/m) quasi peak, measured at 10m distance	EN55011:1998 +A1:1999 +A2:2002 (Group1 Class A)
230 ~ 1000MHz	47dB(μV/m) quasi peak, measured at 10m distance	

Immunity requirements:
EN 61326-1 : 2006 Table2 (Industrial location)

Phenomenon	Test value	Basic standard	P.C.
Electrostatic discharge	2/4kV (Contact) 2/4/8kV (Air)	IEC 61000-4-2:1995 +A1:1998+A2:2001	B
Electromagnetic field	10V/m(80 ~ 1000MHz) 3V/m(1.4 ~ 2.0GHz) 1V/m(2.0 ~ 2.7GHz) 80%AM(1kHz)	IEC 61000-4-3:2002 +A1:2002	A
Rated power frequency magnetic field	30 A/m 50/60 Hz	IEC 61000-4-8:1993 +A1:2001	A
Burst	2kV	IEC 61000-4-4:2004	B
Surge	1.2/50μs(Voltage) 8.0/20μs(Current) 0.5/1kV line to line 0.5/1/2kV line to ground	IEC 61000-4-5:1995 +A1:2001	B
Conducted RF	0.15 ~ 80MHz 3V 80%AM(1kHz)	IEC 61000-4-6:1996 +A1:2001	A

Definition of performance criteria:
A: During testing, normal performance within the specification limits.
B: During testing, temporary degradation, or less of function or performance which is self-recovering.

Model code—**FKP**

Digit	Discription	1	2	3	4	5	6	7	8	-	9	10	11	12	13 ←Digit No.
								V	5						Y
	Type Smart pressure transmitter, 4~20mA DC+Fuji/Hart digital signal	F	K	P											
4	<Conduit connection> 1/2-14NPT Pg13.5 M20 × 1.5				T V W										
5	<Pressure rating of seal diaphragm assembly (MPa)> PN2.5 PN2.0(150LB) PN5.0(300LB) PN4.0 PN1.6 PN10.0(600LB)					2 4 6 8 9 L									
6	<Span (kPa)> 8.125…130 31.25…500 187.5…3000 625…10000〉						1 2 3 4								
9	<Field indicator and arrester> <Initial setting> / <Field indicator> / <Arrest> Smart, 4 ~ 20mA DC +Fuji/Hart digital signal / None / None										A				
	Analog, 0~100% linear scale / None										B				
	Smart, 4 ~ 20mA DC +Fuji/Hart digital signal / None / Yes										E				
	Analog, 0~100% linear scale / Yes										F				
	Smart, 4 ~ 20mA DC +Fuji/Hart digital signal / Digital, 0~100% / None										1				
	Digital, customer scale / None										2				
	Digital, 0~100% / Yes										4				
	Digital, customer scale / Yes										5				
10	<Explosion-proof structure> General, Non explosion proof											A			
	ATEX, Flameproof ⟨Ex⟩II2 GD EEx d IICT5/T6											X			
	ATEX, Intrinsic safety ⟨Ex⟩II1 GD EEx ia IICT4/T5											K			
	ATEX, n type ⟨Ex⟩II3 GD EEx nL IICT4/T5											M			
	FM, Flameproof											D			
	FM, Intrinsic safety											H			
	FM, Combine(Flameproof and intrinsic safety)											V			
11	<Mounting type> / <Ambient temperature correction> Capillary / Transmitter only												G		
	Direct mounting / Transmitter only												S		
12	<Stainless steel tag plate> None													Y	
	Yes													B	

Model code—**FKH**

Digit	Discription	1	2	3	4	5	6	7	8	-	9	10	11	12	13
	Type Smart absolute pressure transmitter, 4~20mA DC+Fuji/Hart digital signal	F	K	H				V	5						Y
4	<Conduit connection> 1/2-14NPT Pg13.5 M20 × 1.5				T V W										
5	<Pressure rating of seal diaphragm assembly (MPa)> PN 2.5 PN 2.0(150LB) PN 5.0(300LB) PN 4.0 PN 1.6 PN 10.0(600LB)					2 4 6 8 9 L									
6	<Span (kPa abs)> 8.125　130 31.25···500 187.5···3000						2 3 4								
9	<Field indicator and arrester>														
	<Initial setting> Smart 4 ~ 20mA DC +Fuji/Hart digital signal — <Field indicator> None — <Arrest> None										A B				
	<Initial setting> Smart 4 ~ 20mA DC +Fuji/Hart digital signal — <Field indicator> None — <Arrest> Yes										E				
	<Initial setting> Smart 4 ~ 20mA DC +Fuji/Hart digital signal — <Field indicator> Analog, 0~100% linear scale — <Arrest> Yes										F				
	<Initial setting> Smart 4 ~ 20mA DC +Fuji/Hart digital signal — <Field indicator> Digital, 0~100% — <Arrest> None										1				
	<Initial setting> Smart 4 ~ 20mA DC +Fuji/Hart digital signal — <Field indicator> Digital, customer scale — <Arrest> None										2				
	<Initial setting> Smart 4 ~ 20mA DC +Fuji/Hart digital signal — <Field indicator> Digital, 0~100% — <Arrest> Yes										4				
	<Initial setting> Smart 4 ~ 20mA DC +Fuji/Hart digital signal — <Field indicator> Digital, customer scale — <Arrest> Yes										5				
10	<Explosion-proof structure> General, Non explosion proof ATEX, Flameproof ⟨Ex⟩II2 GD EEx d IICT5/T6 ATEX, Intrinsic safety ⟨Ex⟩II1 GD EEx ia IICT4/T5 ATEX, n type ⟨Ex⟩II3 GD EEx nL IICT4/T5											A X K M			
	FM, Flameproof FM, Intrinsic safety FM, Combine(Flameproof and intrinsic safety)											D H V			
11	<Mounting type> Capillary Direct mounting												G S		
12	<Stainless steel tag plate> None Yes													Y B	

Digit No.

⚠ Caution on Safety

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