

# FineTek EB5 Series

## RF Admittance Level Transmitter

### Operation Manual



Thank for buying FineTek's products. Please read the user manual first before using it. It is important to be familiar with product's performance and function. Please keep the user manual for operation reference.

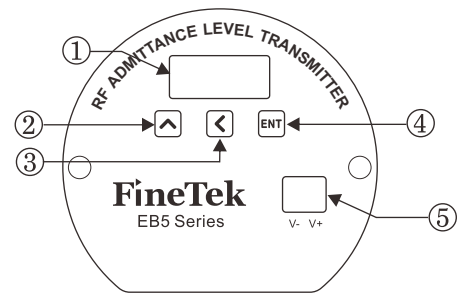


08-EB5XXX-B2-EM, 09/23/2022

#### SPECIFICATION

Power supply		18~30Vdc
Measuring range		20~2000pF
Output	Output current	4~20mA (2 wire)
	Upper limit	20mA
	Lower limit	4mA
	HART	Option
Linearity		± 1%F.S. or ± 0.5pF
Load resistance		<(Vs-22) × 50Ω Vs: Power Voltage (volt)
Environment temperature	-40°C~85°C	
	LCD monitor: -20°C~85°C	
Operation temperature		According to the specification of probe
Environment humidity		0~85% RH, non-condensing
Temperature coefficient		< ± 0.2% F.S. per °C or 0.1pF per °C
LCD Display range		-1999~9999
Protection degree		IP 65

#### DESCRIPTION OF PANEL

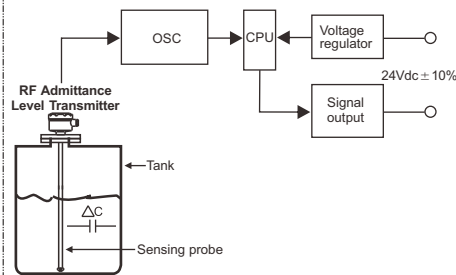


- ① LCD display
- ② "UP" button
- ③ "Shift" button
- ④ "Enter" button
- ⑤ Power supply

#### WORKING PRINCIPLE

When the probe is surrounding by the air, little capacitance ( $C_A$ ) is measured by the equivalent capacitor, the capacitance increase gradually as computing media, the max. capacitance ( $C_B$ ) will be measured while the tank is full, the difference ( $\Delta C$ ) between  $C_A$  and  $C_B$  is proportional to the level.

(Recommend range  $\Delta C = 25 \sim 2000 \text{ pF}$ )



#### DESCRIPTION OF PANEL

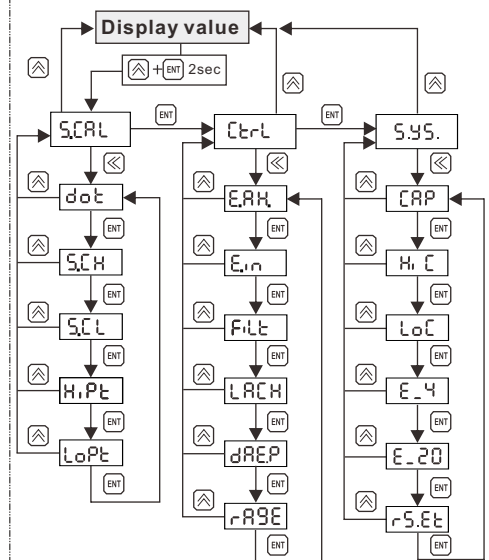
1. Button Protection, requiring to press ENT+UP buttons for 2 seconds in order to get into main menu.
2. Three input buttons; user-friendly.
3. Any two points for calibration
4. Retention for maximum and minimum values.

#### DESCRIPTION OF PARAMETERS

Main Menu	Sub-Menu	Range	Default	Description
SCRL	dot	0~3	DOT1	Decimal point setting
	SCH	-1999~9999	100.0	20mA corresponding display value
	SCl	-1999~9999	0	4mA corresponding display value
	H, Pt	-1999~9999	100.0	Corresponding calibration value for high point (HiPt). See remark 1
	LoPt	-1999~9999	0.0	Corresponding Calibration Value for low point (LoPt). See remark 1
Ctrl	EAH	SAVE, RSET BACK	SAVE	Memory for max & mini value during operation. SAVE: Save value into Eeprom
	E.n	SAVE, RSET BACK	SAVE	REST: Clear present value and memoryBACK: Go back to sub-menu
	Filt	Lo, MID, HI	LO	Software Filter
	LACH	ON, OFF	OFF	Output latch enable or disable. See remark 2.
	dREP	1~60sec	1	Output updated time
	rRGE	LO, MID, HI	HI	Measuring range remark 3.
SYS.	CAP	0~9999		Display current capacitance value
	H.C	0~9999	400	High point Capacity Value
	LoC	0~9999	200	Low point Capacity Value
	E_4	-1999~9999	0	4mA micro setting value
	E_20	-1999~9999	0	20mA micro setting value
	rS.Et			Default

Remark 1: Please refer to calibration procedure for HIPT & LOPT setting.  
 Remark 2: The output is latched when display is up to 110% or -10%  
 Remark 3: Re-calibration is essential when the measuring range is revised.  
 Remark 4: When calibrating 4~20mA, 0.24uA per step will be changed when press up bottom once.

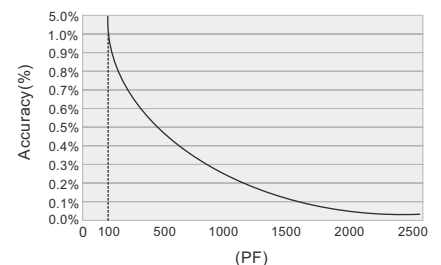
#### PROGRAM SETTING FLOW CHART



#### DESCRIPTION OF ALARM MODES

Error Message	Correction
No Display	Make sure the power supply 24V $\pm$ 10%
Display "1"	Recalibrate HIPT
Display "-1"	Recalibrate LOPT
Display "Over"	The capacitance is too much, please select plastic coating version, or caused to short between probe and wall.
"SPAN" "WARN" Glisten	The output range is smaller than 20Pf, Adjust range to low level and recalibrate it
"LACH" ↔ "1234"	The output is latched, enter CTRL → LACH to turn off this function
Display "NULL"	There is shortcut between probe and tank wall, please recheck the installation
The output change rapidly when level disturbance	Increase "DAMP" value
The output change rapidly when level is stable (<3%)	Set "FILT" to HI, increase the frequency of filter
The output change rapidly when level is stable (>3%)	1. Enter manu "CAP" to check if the value change 2. When level remains, but the value change <1pF, please recalibrate HIPT & LOPT 3. When level remains, but the value change >1pF, please recheck the wiring.
The output is not proportional to the level	Try to calibrate at 0% & 100%, the accuracy is higher when the setting is closer to 0% & 100%
The LCD Display low point but the display on the Panel at control is not equal low point	Enter the manu to E_4, If the display at the control room > low point, decrease E_4 value; if the display at the control room < low point, increase E_4 value
The LCD Display high point but the display on the Panel at control is not equal high point	Enter the manu to E_20, If the display at the control room > high point, decrease E_20 value; if the display at the control room < high point, increase E_20 value

#### PF & ACCURACY CHART



#### CODE

A:R	B:b	C:C	D:d	E:E	F:F
G:9	H:H	I:i	J:j	K:k	L:L
M:E	N:n	O:o	P:P	Q:q	R:r
S:S	T:t	U:U	V:U	W:3	X:H
Y:y	Z:2				

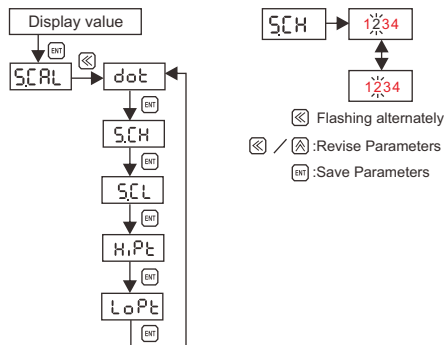
## SETTING FLOWCHART FOR EACH FUNCTION

Compact Capacitance Level Transmitter is to press the three buttons (UP, SHIFT, ENTER) on display panel. Firstly, selecting the setting menu then input value by using three buttons showing below:

	Selection	Setting
Up button	Escape button	Increment button
SHIFT button	Enter button	Position shift button
ENTER button	Swap button	Confirmation button

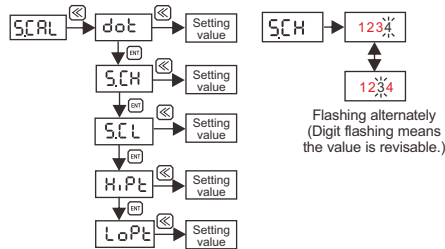
### ENT Enter Button

- **Swap Button** is for swapping to different menus, such as from main menu to main menu or from sub menu to sub menu.
- **Confirmation button**. After revising the SCH value, press enter button to save the revised value.



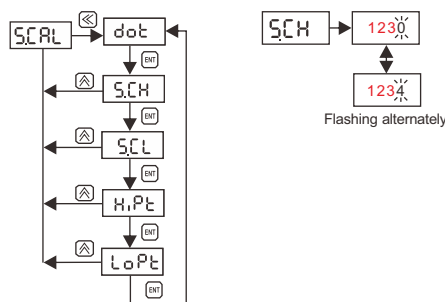
### SHIFT Button

- **Shift Button** is for entering a sub menu from main menu or doing a position shifting after entering sub menu.
- **Position Shift Button**. After entering revision mode, press this button to shift into revisable position.



### UP Button

- **Up button** is enable to escape from revision mode or to escape from sub menu to main menu.
- **Increment button**. After entering revise mode, press this button to increase the revisable value. For example, changing SCH value from "1230" to "1234" is to press this button fourth.



## CALIBRATION PROCEDURES

1. Read installation notice before calibration.
2. It is recommended to have the media touched probe bottom when users calibrate lowest value for empty tank.
3. During calibration, probe should be put into the tank. Don't calibrate the product outside the tank.
4. Please keep at least 50% distance between HIPT and LOPT to ensure accuracy. It is recommended to calibrate with empty and highest level in the tank.

Standard procedures:

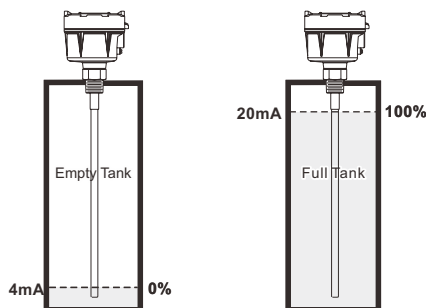
1. SCH : Set the max display value corresponding to 20mA at SCH.
  2. SCH : Set the min display value corresponding to 4mA at SCH.
  3. HIPT : Input and save the corresponding value at HIPT, while the medium is in high level.
  4. LOPT : Input and save the corresponding value at LOPT, while the medium is in low level.
- Completed Calibration

Example 1:

The lowest value sets at 0 and the output sets at 4mA. The highest value sets at 100.0 and the output sets at 20mA. Calibration is done in empty and full tank.

### Procedures of calibration for example 1

1. Input  
Dot=1, SCH=0.0  
SCH=100.0  
(It can be adjusted anytime; Nothing is related with the status of tank.)
2. When the tank is empty, go to the LOPT setting and input 0.0, then press "ENT" → "SAVE" (remark 1).
3. When the tank is full, go to the HIPT setting and input 100.0, then press "ENT" → "SAVE" (remark 1).

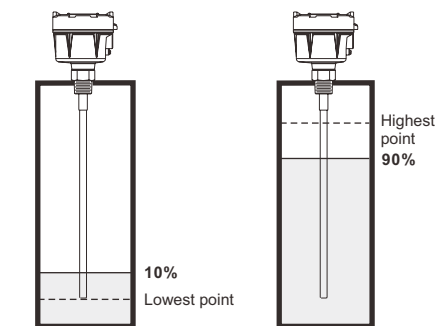


Example 2:

The lowest value sets at 100.0 and the output sets at 4mA. The highest value sets at 200.0 and the output sets at 20mA. It is calibrated at 10% of tank high and 90% of tank high. The 0% of the total height of the tank is corresponded to 4mA, while the 100% of the total height of the tank is corresponded to 20mA.

### Procedures of calibration for example 2

1. Input  
Dot=1, SCH=100.0  
SCH=200.0  
(It can be adjusted anytime; Nothing is related with the status of tank.)
2. To fill the medium till reaching to the 10% height of the tank, go to the LOPT setting and input the value of 110.0 and then press "ENT" → "SAVE" (Remark 2).
3. To fill the medium till reaching to the 90% height of the tank, go to the HIPT setting and input the value of 190.0 and then press "ENT" → "SAVE" (Remark 3).



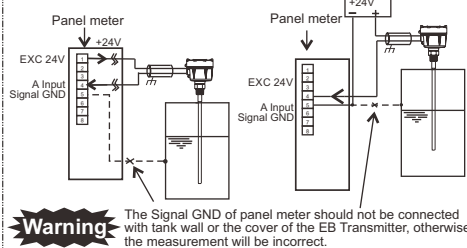
Remark 1: Under the setting for Hipt & Lopt, press "ENT" to show (screen flashing)  
Press "ENT" button to save the value and then press "UP" button to escape the setting.  
Remark 2: When Hipt or Lopt setting is over range, the LCD show "Err", Please reset the value.

## WIRING AND CAUTION

- After installation of the Compact Capacitance Level Transmitter on the top of tank, please make sure the cover of the transmitter is contacted with tank perfectly. Please avoid the grounding of panel meter to touch the tank wall.
- While the panel meter is not supplied with a power supply, please prepare a 24V power supply for use. The wiring for panel meter is showing in diagram 1.
- The max cable length is depends on the max resistance. Maximum resistance is not to exceed (Vs-15) x 50W to ensure the accuracy of measurement.
- Make sure to separate the signal cable with other big power cables (such as pump, conveyer and solenoid valve) while wiring. Before turning on power, make sure all wirings are correct.
- Connect isolation cable with GND of power.
- Connect tank with heater or cover of electric device to decrease EMI.

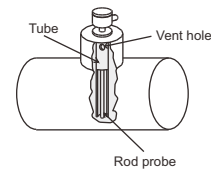
[ Description of wiring ]

(Diagram 1) Power supply

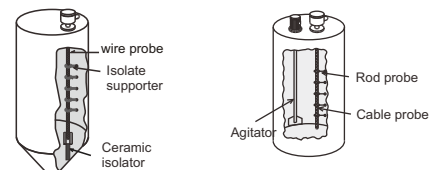


## INSTALLATION

1. Please install a concentric circles metal pipe shield with vent hole at the top outside the probe (Fig. 1)
2. The rod or wire probe should be parallel to the tank wall. To prevent material from sticking between the probe and tank wall, the probe shouldn't be too close to the tank wall.
3. If the container is irregular-shaped, such as a cylindrical, and the medium is liquid with low viscosity, the rod should be placed inside a concentric circles metal pipe shield with vent hole at the top. (Fig. 1)
4. Coating Probe type is necessary for conductive media (eg. Water...), as the bare electrode can't operation normally in conductive media.
5. During the installation, the process connection should be grounded. An installation without proper grounding will not guarantee normal operation of the device later on.
6. For non-conductive medium of powder or granules in big tank, the wire probe should be fixed to the bottom of tank
7. When all electrical connections inside of Admittance Level Transmitter housing are finished, the housing cover and the conduit opening should be sealed and tightened to prevent moisture from soaking in.
8. If an agitator is in place (see fig. 3), a pipe shield outside the probe is recommended.



(Fig. 1)



(Fig. 2)

(Fig. 3)

## DIELECTRIC CONSTANTS CHART

Material	Dielectric Constant.	Material	Dielectric Constant.
Air	1	Cement	4~6
Gasoline	1.9	Butanol	11
Diesel	2.1	Ethanol	16~31
Edible Oil	2~4	Ammonia	21
Heavy Oil	2.6~3.0	Acetone	20~30
Grain	2.5~4.5	Carbide Powder	5.8~7.0
Corn	2.3~2.6	Sulfuric Acid	84
Rice	3~8	Water	81

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