EST120 2 IN 1
GRAIN TEMPERATURE AND LEVEL MONITORING TRANSMITTER

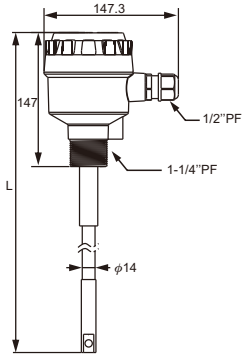
Thank for buying FineTek's products.
Please read the user manual first before using it. It is important to be familiar with product's performance and function. Please keep the user manual for operation refereuce.

08-EST120-B11-EM, 03/23/2022

PROCEDURES OF CALIBRATION FOR THE FIRST INSTALLATION

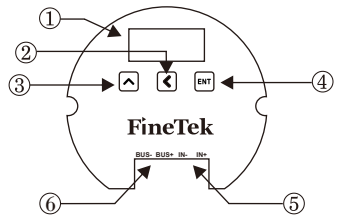
For installation of EST120, it requests to do the calibration in any two level points for getting a correct measuring result of material level height.
Strongly recommend to record the capacitance value for empty in silo after mounting EST120, and then record and set when the silo is full with materials, so that enable to have a correct result of measurement.

DIMENSION OF PRODUCT



(unit:mm)

DESCRIPTION OF PANEL

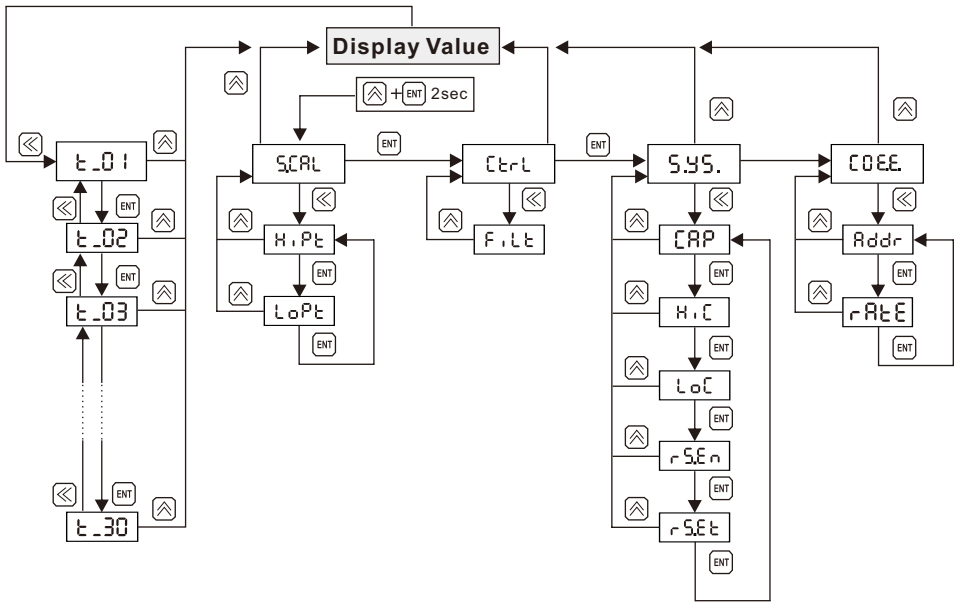


① LCD monitor
② Shift
③ UP
④ Enter
⑤ Power supply terminal
⑥ RS-485 terminal

CODE

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

PROGRAM SETTING FLOW CHART



SETTINGS

Item	Sub-Item	Range	Default	Description
SCAL	HiPt	-1999~9999	100.0	High Point Value (Note1)
	LoPt	-1999~9999	0.0	Low Point Value
Ctrl	FiLt	LO,MID,HI	LO	Software filter
SYS.	CAP	0~9999		Current Level
	HiC	0~9999	4000	High Calibration Point
	LoC	0~9999	0.0	Low Calibration Point
	rSEn			Refresh temperature calibration (Note2)
	rSEt			Reset to Factory Default
COEE	Addr	1~255	1	Device Address
	rAtE	9.6,19.2,38.4 57.6,115.2	9.6	Communication Rate
t_01		-99.9~999.9	(Note2)	Temp. of 01th point
t_02		-99.9~999.9		Temp. of 02th point
t_03		-99.9~999.9		Temp. of 03th point
t_04		-99.9~999.9		Temp. of 04th point
t_05		-99.9~999.9		Temp. of 05th point
t_06		-99.9~999.9		Temp. of 06th point
t_07		-99.9~999.9		Temp. of 07th point
t_08		-99.9~999.9		Temp. of 08th point
t_09		-99.9~999.9		Temp. of 09th point
t_10		-99.9~999.9		Temp. of 10th point
t_11		-99.9~999.9		Temp. of 11th point
t_12		-99.9~999.9		Temp. of 12th point
t_13		-99.9~999.9		Temp. of 13th point
t_14		-99.9~999.9		Temp. of 14th point
t_15		-99.9~999.9		Temp. of 15th point
t_16		-99.9~999.9		Temp. of 16th point
t_17		-99.9~999.9		Temp. of 17th point
t_18		-99.9~999.9		Temp. of 18th point
t_19		-99.9~999.9		Temp. of 19th point
t_20		-99.9~999.9		Temp. of 20th point
t_21		-99.9~999.9		Temp. of 21th point
t_22		-99.9~999.9		Temp. of 22th point
t_23		-99.9~999.9		Temp. of 23th point
t_24		-99.9~999.9		Temp. of 24th point
t_25		-99.9~999.9		Temp. of 25th point
t_26		-99.9~999.9		Temp. of 26th point
t_27		-99.9~999.9		Temp. of 27th point
t_28		-99.9~999.9		Temp. of 28th point
t_29		-99.9~999.9		Temp. of 29th point
t_30		-99.9~999.9		Temp. of 30th point

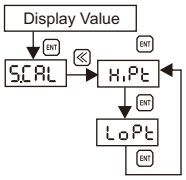
Note 1: Please refer to calibration process when setting Hi point and Lo point
Note 2: When the display of temperature is abnormal, please refresh the temperature calibration.

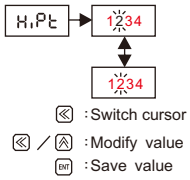
BUTTON INSTRUCTION

There are three input button, UP, SHIFT, and ENTER, on control panel. First, select item, and then set the value. Functions of these three buttons are described as below.

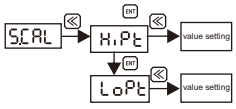
	At Menu	At Setting
Up	Exit	Adding
SHIFT	Enter	Shift
ENTER	Shift	Confirm

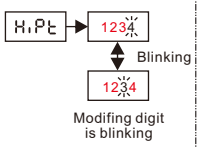
ENT ENTER
- Switching between menu and menu
- Confirm to save





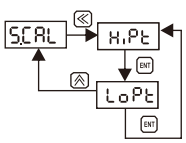
SHIFT
- Enter from main menu to sub-menu
- Digit shift at setting mode

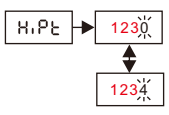




Modifing digit is blinking

Up
- Exit from sub-menu to main menu
- Progressively increase value

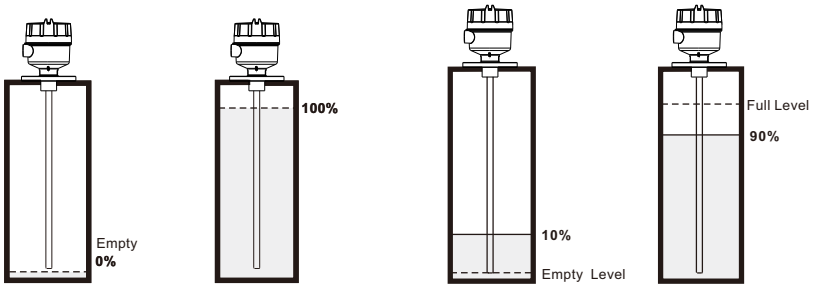




CALIBRATION WORKING FLOW

Note :
1. Read instruction before calibration
2. Let material level slightly contact sen-sor cable when calibrating low point
3. During calibration, sensor cable must be inside the vessel.
4. Separate HIPT, LOPT as far as possible (Minimum 50%). It would be the best to calibrate from empty to full.

Standard Calibration Procedure:
1. Vessel Full: Set and save HIPT
2. Vessel Empty: Set and save LOPT



Example 1
Display 0 at empty, 100 at full. Calibrate with empty and full vessel
Procedure
When vessel is empty, key in 0.0 in LOPT. And then press “ENT” to save the value.(Note 1)
When vessel is full, key in 100.0 in HIPT. And then press “ENT” to save the value.(Note 1)

Example 2
When vessel is 10% full, key in 10.0 in LOPT. And then press “ENT” to save the value.
When vessel is 90% full, key in 90.0 in HIPT. And then press “ENT” to save the value.

Note 1: At HIPT and LOPT setting, after press “ENT” button, it will show a switching screen
n y ↔ SAVE press “ENT” again to save the value or press “UP” to cancel the setting.

Note2: HiC、LoC instructions and the use timing
HiC、LoC Instructions:
When HIPT or LOPT is calibrated, the system automatically writes the current corresponding measurement values (CAP) into HiC or LoC.

Example 1: when the lowest point indicates 0% while the corresponding CAP value shows 100pF; the highest point indicates 100% while the corresponding shows 1500pF, when HIPT and LOPT calibration finished, the lowest point measurement value 100pF is written to LoC and the highest point measurement value 1500pF is written to HiC.

Example 2: when the lowest point indicates 10% while the corresponding CAP value shows 200pF; the highest point indicates 90% while the corresponding shows 1400pF, when HIPT and LOPT calibration finished, the system will write the lowest point display value 200pF is written to LoC and the highest point display value 1400pF is written to HiC, When HIPT or LOPT is calibrated, the system will automatically write the corresponding CAP values to HiC and Loc while modifying HiC and LoC will not affect HIPT/LOPT calibration values. For example, after the calibration completion of the example 1, the LoC is modified to 50pF, the corresponding LOPT is still 0%; the HiC is modified to 1600pF and the corresponding HIPT is still 100%.

HiC、LoC use timing:
Timing 1: When the usage environment (test medium, tank structure, probe length, installation position etc.) are the same,
The four parameters of HIPT, LOPT, HiC, and LoC can be copied and set to another device sequentially to save calibration steps.
Timing 2: The transmitter maintenance or replacement by new circuit board can follow the original parameter settings.

※Because the change of HiC and LoC will affect the original calibration values of HiC and LoC, the measurement results will be changed. If not necessary, please do NOT change the HiC and LoC values Arbitrarily.

MODBUS ADDRESS TABLE

Parameter	ADDRESS		TYPE	UNITS	PROPERTY	DESCRIPTION
	HEX	DEC				
PFC_CAP_VALUE	0x1022	4130	FLOAT32	PF	R	Current level value
PFC_DISPLAY_PERCENTAGE	0x1024	4132	FLOAT32	%	R	Capicitance
PFC_BOARD_TEMPERATURE	0x1026	4134	FLOAT32	°C	R	Temp. of PCB
PFC_TEMPERATURE_VALUE-1	0x1028	4136	FLOAT32	°C	R	1st point’s temperature
PFC_TEMPERATURE_VALUE-2	0x102a	4138	FLOAT32	°C	R	2nd point’s temperature
PFC_TEMPERATURE_VALUE-3	0x102c	4140	FLOAT32	°C	R	3rd point’s temperature
PFC_TEMPERATURE_VALUE-4	0x102e	4142	FLOAT32	°C	R	4th point’s temperature
PFC_TEMPERATURE_VALUE-5	0x1030	4144	FLOAT32	°C	R	5th point’s temperature
PFC_TEMPERATURE_VALUE-6	0x1032	4146	FLOAT32	°C	R	6th point’s temperature
PFC_TEMPERATURE_VALUE-7	0x1034	4148	FLOAT32	°C	R	7th point’s temperature
PFC_TEMPERATURE_VALUE-8	0x1036	4150	FLOAT32	°C	R	8th point’s temperature
PFC_TEMPERATURE_VALUE-9	0x1038	4152	FLOAT32	°C	R	9th point’s temperature
PFC_TEMPERATURE_VALUE-10	0x103A	4154	FLOAT32	°C	R	10st point’s temperature
PFC_TEMPERATURE_VALUE-11	0x103C	4156	FLOAT32	°C	R	11st point’s temperature
PFC_TEMPERATURE_VALUE-12	0x103E	4158	FLOAT32	°C	R	12nd point’s temperature
PFC_TEMPERATURE_VALUE-13	0x1040	4160	FLOAT32	°C	R	13rd point’s temperature
PFC_TEMPERATURE_VALUE-14	0x1042	4162	FLOAT32	°C	R	14th point’s temperature
PFC_TEMPERATURE_VALUE-15	0x1044	4164	FLOAT32	°C	R	15th point’s temperature
PFC_TEMPERATURE_VALUE-16	0x1046	4166	FLOAT32	°C	R	16th point’s temperature
PFC_TEMPERATURE_VALUE-17	0x1048	4168	FLOAT32	°C	R	17th point’s temperature
PFC_TEMPERATURE_VALUE-18	0x104A	4170	FLOAT32	°C	R	18th point’s temperature
PFC_TEMPERATURE_VALUE-19	0x104C	4172	FLOAT32	°C	R	19th point’s temperature
PFC_TEMPERATURE_VALUE-20	0x104E	4174	FLOAT32	°C	R	20th point’s temperature
PFC_TEMPERATURE_VALUE-21	0x1050	4176	FLOAT32	°C	R	21th point’s temperature
PFC_TEMPERATURE_VALUE-22	0x1052	4178	FLOAT32	°C	R	22nd point’s temperature
PFC_TEMPERATURE_VALUE-23	0x1054	4180	FLOAT32	°C	R	23rd point’s temperature
PFC_TEMPERATURE_VALUE-24	0x1056	4182	FLOAT32	°C	R	24th point’s temperature
PFC_TEMPERATURE_VALUE-25	0x1058	4184	FLOAT32	°C	R	25th point’s temperature
PFC_TEMPERATURE_VALUE-26	0x105A	4186	FLOAT32	°C	R	26th point’s temperature
PFC_TEMPERATURE_VALUE-27	0x105C	4188	FLOAT32	°C	R	27th point’s temperature
PFC_TEMPERATURE_VALUE-28	0x105E	4190	FLOAT32	°C	R	28th point’s temperature
PFC_TEMPERATURE_VALUE-29	0x1060	4192	FLOAT32	°C	R	29th point’s temperature
PFC_TEMPERATURE_VALUE-30	0x1062	4194	FLOAT32	°C	R	30th point’s temperature
PFC_Hi_Point	0x106D	4205	FLOAT32	%	R/W	Hi_Point
PFC_Lo_Point	0x106F	4207	FLOAT32	%	R/W	Lo_Point
PFC_Hi_C	0x1073	4211	FLOAT32	PF	R/W	Hi_C
PFC_Lo_C	0x1075	4213	FLOAT32	PF	R/W	Lo_C
PFC_Reset	0x108A	4234	FLOAT32		R/W	(Standard type)Reset
PFC_Save(Singned)	0x108E	4238	FLOAT32		R/W	(Standard type)Save(Singned)
PFC_Rescan	0x10A0	4256	NUIT16		**R/W**	(Explosion-proof type)Rescan
PFC_Reset	0x10A1	4257	NUIT16		R/W	(Explosion-proof ype)Reset
PFC_Save(Singned)	0x10A4	4260	NUIT16		R/W	(Explosion-proof type)Save(Singned)

OPTIONAL ACCESSORIES – FINELINK RS-485

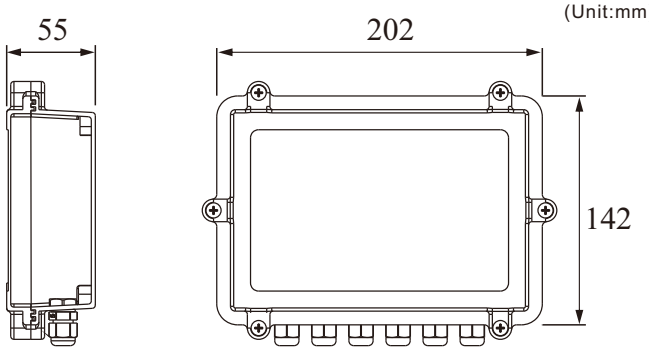
Wired
JMW10100-A1

Wireless
JMW10200-A1

Finelink-RS485 collects data from 4 sensors, then transmit to receiver via cable or wireless solution. Each sensor has independent terminal block for wiring to prevent the failure of whole system, easy maintenance. Finelink-RS485 also provides the 24Vdc external power for 4 sensors.

DIMENSION

(Unit:mm)



WARNINGS AND CAUTIONS

1. Intrinsic safe explosion system must request to use explosion proof model together with safety barriers that complied with Ex ia. So that it can be used in hazardous area.
2. Casing material is Aluminum. Installation should make precaution to prevent burn by shock or rub.
3. Please make precaution to avoid static and burn caused by non-metal material.
4. EST connect with equipment in non-hazardous area, should follow the user's manual and wire correctly.
5. Shielded cable should be used when connect with external equipment. Shields should be well grounded.
6. Intrinsically safe electric parameter:

Terminal code (Power)	Max. Voltage input Ui(V)	Max. Current input Ii(mA)	Max. Power input Pi(mW)	Max. Internal equivalent parameter	
				Ci(F)	Li(H)
IN-,IN+	28	100	700	0	0

Terminal Code (RS485)	Max. Voltage Ui (V)	Max. Current Ii (mA)	Max. Power Pi (mW)	Max. Internal equivalent parameter	
				Ci(μF)	Li(mH)
BUS-,BUS+	8.5	90	192	0	0
	Max. Voltage Output Uo (V)	Max. Current Output Io (mA)	Max. Power Output Po (mW)	Max. External Parameter	
				Co(F)	Lo(mH)
	5.88	19.8	29.11	20	10

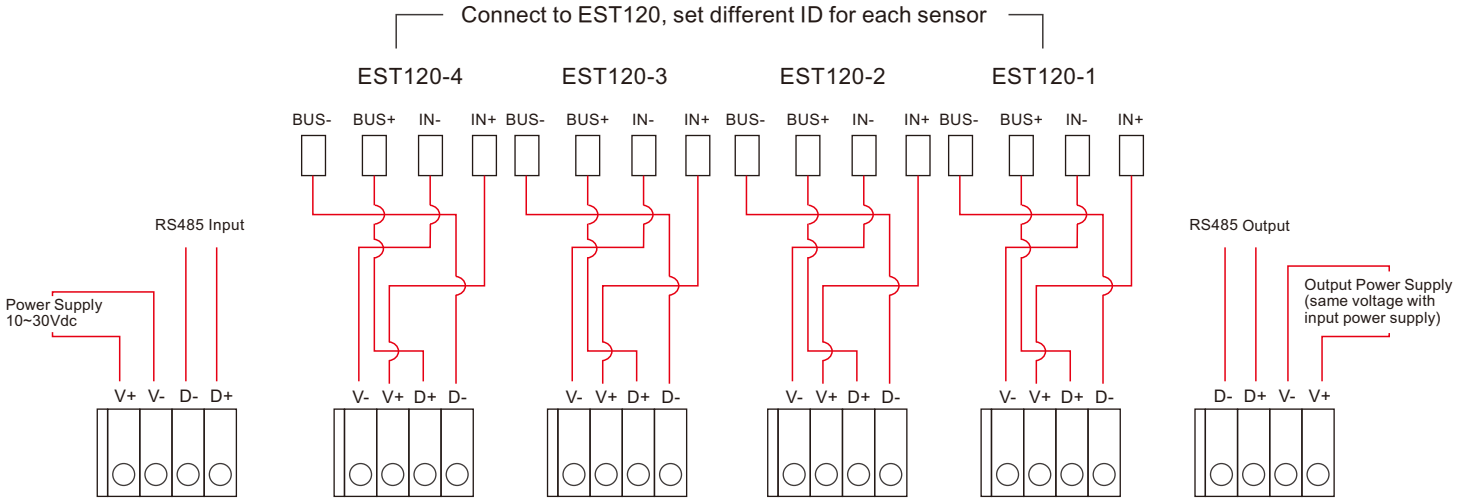
Actual temperature resistance refers to the latest catalogue and comply with the explosive proof certificate and standards.

7. Customer is not allowed to replace components by themselves. It's requested to contact manufacturer and solve problem together to avoid damage happened.
8. The relationship between ambient temperature and process temperature is as below:

Temperature catagories	Ambient temperature	Medium(Process) temperature
T6 / T80°C	-40°C ≤ Ta ≤ +70°C	-40~80°C
T5 / T95°C	-40°C ≤ Ta ≤ +80°C	-40~95°C

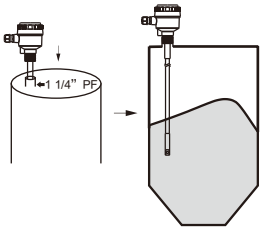
9. The product installation, use and maintenance shall follow the user's manual and the following standards:
IEC 60079-14 Explosive atmospheres - Part 14: Electrical installations design, selection and erection.
IEC 60079-17 Explosive atmospheres - Part 17: Electrical installations inspection and maintenance.
IEC 60079-19 Explosive atmospheres - Part 19: Equipment repair, overhaul and reclamation.
IEC 60079-25 Explosive atmospheres - Part 25: Intrinsically safe systems.

WIRING DIAGRAM



INSTALLATION

With thread connection, please drill a 1-1/4"PF thread, and then tighten the device firmly.



CAUTION

(1) The sensor cable or stem should be in parallel with wall of vessel or silo. Because Of accumulation of material on the cable would degrade accuracy, please don't let cable or stem be too close to the wall.
(2) After installation, firm the thread and flange. And check if enclosure and vessel/silo are well grounded. If it's not, sensor might not work functionally.
(3) When operating with big vessel/silo and material is grainy or powder type, the Terminal of cable should be anchored at bottom of vessel. Meanwhile, use isolator to mount the cable.
(4) Make sure the cover and cable is tightly closed to avoid any moist from outside. Otherwise, the level measurement will not be accurate.
(5) EST120 measures both level and temperature of material. Sensor can be mounted Directly on the top of the silo by thread connection.
(6) To avoid the cable damage, please fix the cable to the bottom of tank. The tensile force does not exceed 30 kgf.
(7) Using FineLink RS485 to avoid malfunction of whole system that is caused by single sensor.
(8) We suggest to use Category 5 cable (CAT5E) or Category 6 cable CAT6 UTP to ensure quality of signal transmission. Insulated ICD connector is recommended for wiring.
(9) The total length of sensor cable and wiring cable is not longer than 100 meters.
(10) For the best and stable performance on signal connection, strongly recommend
EST Temperature cable "must" be equipped with IPC (Industrial computer) which has MMS software installed already. It will generate cost and charge to the customers who WITHOUT FineTek's IPC, but requesting after service for commissioning and troubleshooting for signal connection.
(11) For each time the power turned off, it will take 15 seconds to warm up to facilitate the device to rescan and save the data.

SPECIFICATIONS-FINELINK RS-485

Power input	10~30Vdc
Current input	2A
Power output	10~30Vdc
Current output	400 mA / CH (Under power input and current of 2A)
Output	RS-485
Input	Four sets of RS-485 (Each set is independent and isolated)
Baud rate	1200~57600
Working temp	-40~80°C
Electrostatic protection	IEC61000-4-2 ESD 8kV Air, 4kV contact
IP rating	IP67
Power consumption	200mA at 24VDC

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