EE Series

Alarm ZigBee Slave Master Measure

ESC   ENT

Remote Control Unit

WWW.FLUTECH.CO.TH

LINE ADD FRIEND
@flutech.co.th

Authorized Distributor

Electromechanical Level Measuring System

บริษัท ฟลูเทค จำกัด
Flu-tech co.,ltd
Fluid Control Specialists

FineTek
Innovation · Quality · Sharing

PRODUCT INTRODUCTION

WORKING PRINCIPLE

FineTek's Electro-Mechanical Level Measuring System consists of plumb, cable wire, measuring pulley, position sensor, and control board to measure the material level. It senses the weight status and count the cable wire length from the device to the level of material. The EE series equips with robust position sensor to calculate the numbers of rotating circles of pulley, which can be operated in harsh environment. Moreover, it can connect with FineTek's material measurement system (MMS) to build an monitoring control system, save the production cost.

Measuring Pulley
AL Housing
Receiving Pulley
1/4"NPT
AL Base
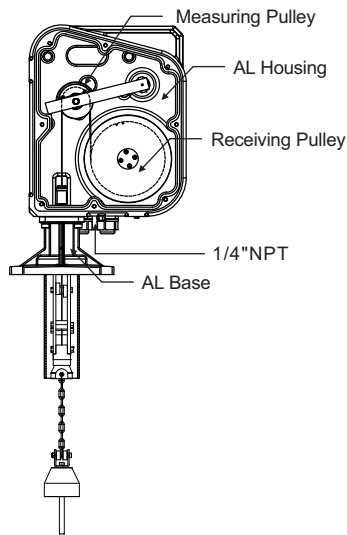
Rear View: Wiring Mechanism

APPLICATION

- The result of measurement is not affected by environmental factors as sound waves, dust, static electricity, humidity and dielectric etc. Can be widely applied for applications in mining, cement, petrochemical, feeding and power plants.
- Suitable for different variety of materials as powder, pellet, liquid, and also good for open tanks or sealed tank with no inner pressure inside.
- Working perfectly with software of material management system (MMS), accurately monitoring and managing the level of materials inside the tank.
- It features multifunction in on,needn't extra controlling box, connecting to panel for a immediate usage is available.

FEATURES

- Measurement immunes from the interference of environment such as sound waves, dust, capacitance, or temperature change.
- User-friendly in touch buttons with microprocessor-based calculation design.
- Relay output (5A/240Vac)×4: HI, LO alarm or Pulse, Reset, fault alarm, operation indication or Lock alarm output can be.
- EE is equipped with LCM Graphic 128x64 Dots.,
- Analog output: 4-20mA dc.
- Pulse output:
  Transistor output NPN/PNP(10mm/pulse)
  Relay output (100mm/pulse)
- Cable Break Alarm: System will detect cable broken during measuring.
- Plumb Buried Protection: System can sense and stop the measurement as the plumb hit by materials and retrieve the wire to prevent the plumb being buried.
- Plumb Buried Alarm: System will detect plumb buried by the medium.
- Four Start Modes: auto start, manual start, intelligent start, and external triggered start.
- Intelligent Start: Measuring interval is inverse proportional to medium level.
- Auto Return Setup: Prevent sensing weight from buried or sliding into the tank pivot and avoid damage facility equipment while tank is empty.
- Material Fill-Up Protection: Reduce the possibility of plumb being buried.
- Measuring range of 30m (Standard), Max.45m is available.
- RS485 MODBUS communication protocol.
- Various selections of weights for different requirements.
- Freeze Prevention Capability: being able to work normally in cold temperature.
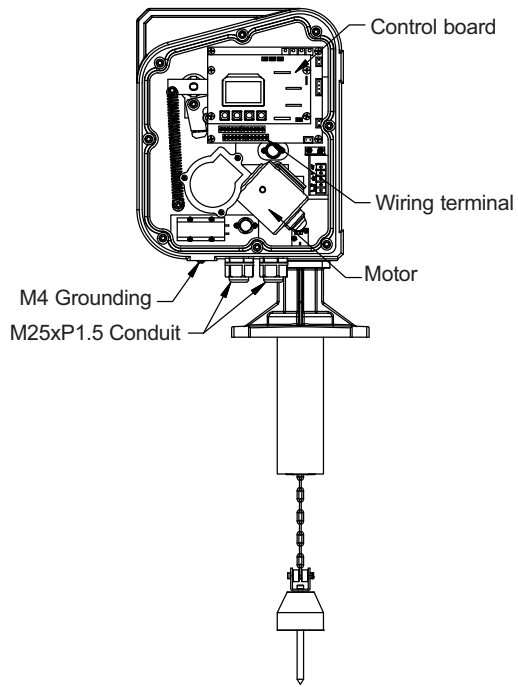
Product Testing Standards

- Protection IP Rating: IP66(IEC60947-2)
- IEC Standards for Withstand Voltage: IEC60947-2
- IEC Standards for Insulation resistance: IEC60092-504
- IEC Standards for changes in power supply: IEC60092-504
- IEC Standards for power supply failure: IEC60092-504
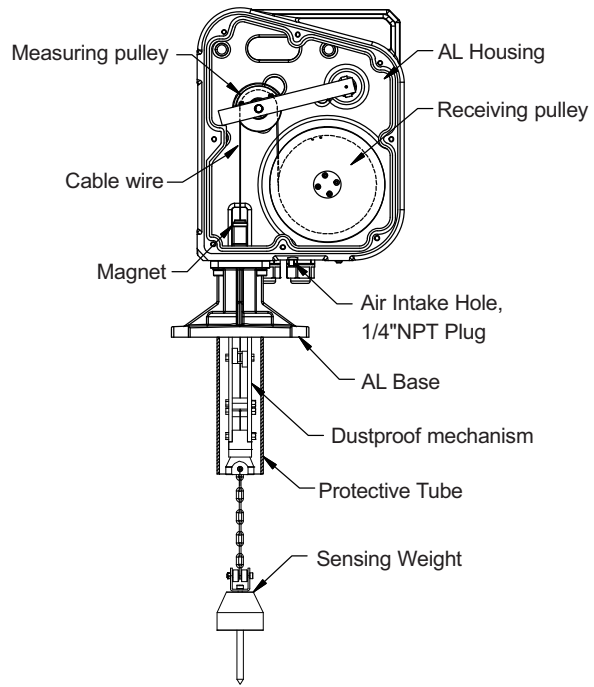
SPECIFICATION(EE310)EEX2

No .	Category	Specification		
1	Power supply	100~240Vac ±10%,50/60 Hz (Standard) 24Vdc ±10% (By order)		
2	Measuring resolution	Transistor output NPN / PNP ±5pulse(10mm/pulse) Relay output ±1pulse(100mm/pulse)		
3	Measuring speed	Avg. 0.23m/s		
4	Analog output	0/4-20mA ±1%		
5	Pulse output	1. NPN、PNP output : max. 60Vdc, max. 400mA ※ When the counter is connected, the pulse extraction rate needs to be ＞50Hz. 2. Relay output (dry contact) ※ When the counter is connected, the pulse extraction rate needs to be ＞30Hz.		
6	Relay output	SPDT 5A/240Vac,2A/48Vdc x4 1. Pulse / HI Alarm (Can be set up)　　3. Failure 2. Reset / LO Alarm (Can be set up)　　4. Run Signal / Lock (Can be set up)		
7	Status LED	Indication for power & run signal & abnormal		
8	Display	LCM Graphic 128x64 Dots		
9	Ambient temp.	-40°C - 60°C		
10	Operating temp.	-40°C - 80°C		
11	Measuring range	30m Max.		
12	Protection level	IP66		
13	Body material	Aluminium		
14	Anti-Dew heater (Optional)	Start heating <16°C (prevent frostbite, prevent dew)		
15	Cable break detection	Yes		
16	Sensing weight buried detection	Yes		
17	Manual/Auto measuring mode	Yes		
18	Motor protection	Yes		
19	Malfunction diagnosis display	Yes		
20	Material Fill-Up protection	Yes		
21	External trigger start	Yes		
22	Communication protocol (RS485)	Yes	Baudra	9600,19200,38400,57600
23	Intelligent start	Yes(Measuring interval is inverse proportional to medium level.)		
24	Reset output	Yes		
25	Cable wire	ϕ1.2mm		

EEX2 SKETCH & DRAWING/ DIMENSION

Sketch & Drawing

Control board

Wiring terminal

Motor

M4 Grounding

M25xP1.5 Conduit

Measuring pulley

AL Housing

Receiving pulley

Cable wire

Magnet

Air Intake Hole,
1/4"NPT Plug

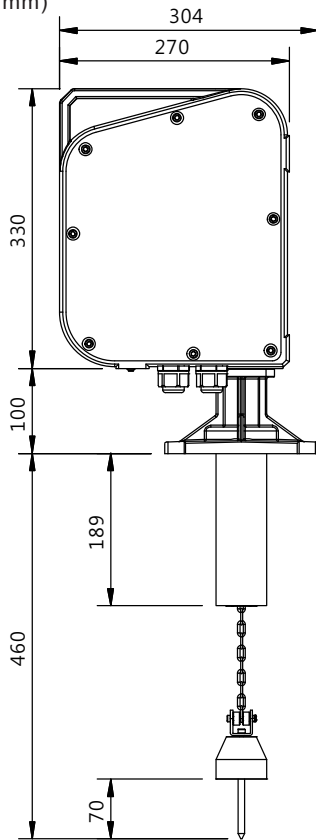AL Base

Dustproof mechanism

Protective Tube

Sensing Weight

Front View: Electric Board & Motor

Rear View: Wiring Mechanism

Dimension

(Unit: mm)

304
270
330
100
189
460
70

238
190

180
90°
45°
180
P.C.D.φ160
4-φ19
18.8°

Top View
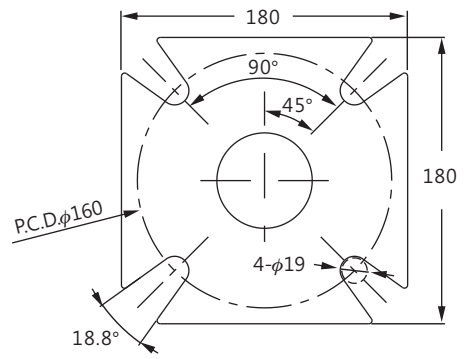
Front View
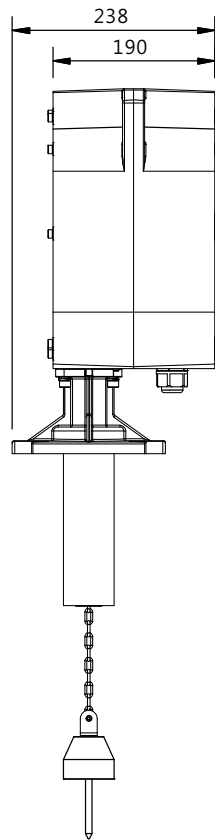
Side View

TERMINAL WIRING DIAGRAM

Terminal Wiring Diagram

AC type

Counting pulse
0V   IN PNP
IN NPN   0V

Max:36Vac
Max:30mA

Analog output
0/4~20mA
−   +

RESET or
Low alarm

Lock or
operation
indication

Power switch

| 1 | 2 | 3 | 4 | 5 | 6 |

GND   +24V

ON

OFF

| 7 | 8 | 9 | 10 | 11 | 12 |

| N | L |

| 13 | 14 | 15 | 16 | 17 | 18 |

| 19 | 20 | 21 | 22 | 23 | 24 |

TR+ TR-
RS485

Start
contact

in_Lock

Pulse or
hight alarm

Malfunction
alarm buried
break

Power supper
100~240Vac

DC type

Counting pulse
0V   IN PNP
IN NPN   0V

Max:36Vac
Max:30mA

Analog output
0/4~20mA
−   +

RESET or
Low alarm

Lock or
operation
indication

Power switch

| 1 | 2 | 3 | 4 | 5 | 6 |

GND   +24V

OFF   ON

| 7 | 8 | 9 | 10 | 11 | 12 |

| − | + |

| 13 | 14 | 15 | 16 | 17 | 18 |

| 19 | 20 | 21 | 22 | 23 | 24 |

TR+ TR-
RS485

Start
contact

in_Lock

Pulse or
hight alarm
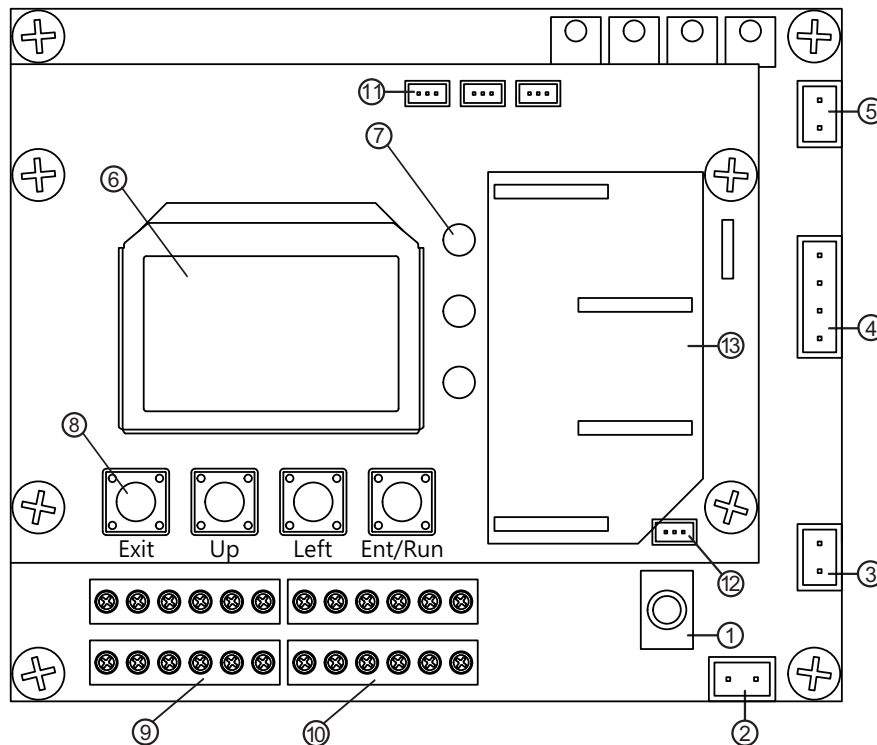
Malfunction
alarm buried
break

Power supper
24Vdc

DESCRIPTION OF PANEL

Panel Diagram

①   Power switch: On-site operation, maintenance, and power off when needed.
②   Power terminal: power input 100~240Vac, 50/60Hz or 24Vdc (please confirm the order specification)
③   Heater terminal: connected to the internal antifreeze heater.
④   Power system terminal: connect with DC power supply.
⑤   Motor Power terminal: connect to the motor DC24V
⑥   Display: status display, height indication, fault indication, parameter setting
⑦   Indicator light:
     (Green) → Power indicator: Lights up when power is on, and the light is turned off when the power is disconnected.
     (Yellow)→ Operation indicator: Lights up during the measurement (up and down), and lights off when measurement ends.
     (Red)→ Fault indication: Lights up on wire breakage, buried, knot, over-heat occurs, and lights off when troubleshooting is finished.
⑧   Button:
     Ent/Run: Measured value display mode = start the measuring.
             Menu mode = enter into the next menu / confirm to save.
     Left: Measured value display mode = enter into the menu.
        Menu mode = scroll down the menu.
        Number mode = cursor moves to left.
     Up: The number on the cursor increases.
     Exit: Return to the previous menu.
⑨   Input/output terminal: Transistor pulse output/external trigger/fill-in protection.
⑩   Relay output terminal: Relay 1~4.
⑪   Connector socket: wiring with Sensor connector
⑫   Connector socket: wiring with Sensor connector
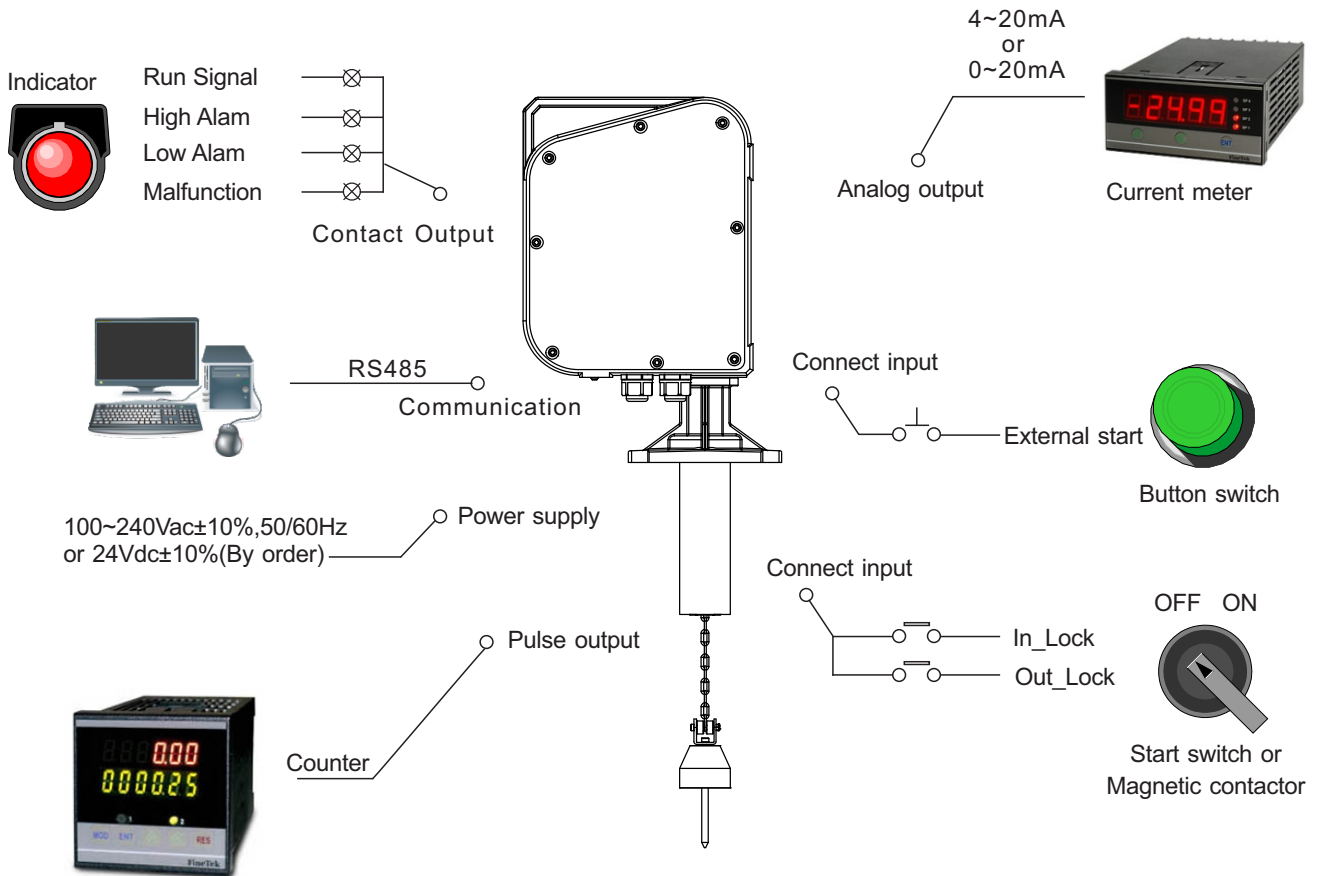⑬   Connector socket: wiring with the wireless module (if any) connector

- Please use 0.75mm2 multi-core cable(soft cable), prevent using signal core or 7 cores cable to damage the PCB. Power supply cable should be separated from signal cable, should use isolated cable for signal output.
- Un-shielded length of wire is not too long to prevent any short circuit. The un-shielded part must be with soldering or isolated terminal to prevent any potential danger.
- The wiring connection must be correct. Any mistakes on wiring may cause a critical damage to system.
- Power Switch: If necessary, the power can be switched to be off as in maintenance and repair.

System Diagram

※Below image is only an example, order will be included sensor only.

Indicator
Run Signal
High Alam
Low Alam
Malfunction
Contact Output

4~20mA or 0~20mA
Analog output
Current meter

RS485
Communication

Connect input
External start
Button switch

100~240Vac±10%,50/60Hz or 24Vdc±10%(By order)
Power supply

Connect input
In_Lock
Out_Lock

OFF ON
Start switch or Magnetic contactor

Pulse output
Counter

Warning: In order to avoid the sensing weight to be buried or impacted by the material and cause the damage on the equipment, please install material fill-up protection. It is recommended to connect with the conveyor control switch or the "NO" contact input of the contactor. If there is a concern that the sensing weight will be caught by the conveyor and cause damage to the equipment, It is recommended to install the material outlet protection and connect it in parallel with the fill-up protection.

SETTING PROCEDURE

Caution

1. Don't start the measurement when the silo is empty and height of silo is unknown. It will possibly lead to the plumb falling into the silo outlet and getting stuck and damaged.
2. Be sure the measuring level must be higher than bottom of silo and avoid any possibility of being stuck by conveyer, ladders, and any mechanisms, suggesting the measuring level is at least 0.5 meter higher than silo outlet/ conveyer.
3. Materials filling conveyer must connect with filling up protection switch so that it will prevent the damage occured by plumb got hit or buried.
4. It's necessary to consider 0.6 meter as blind area for measuring range in case the plumb got stuck and can't be retrieved.

Setting Procedure

K Tank Height:
distance between connecting flange to tank outlet

S Blind Distance:
distance from connecting flange to the tip of the weight

Z Safety Distance:
To avoid obstacle and prevent weight sliding into the outlet.

H Measuring Height:
Full measuring range from drop and return with full pulse signal record.
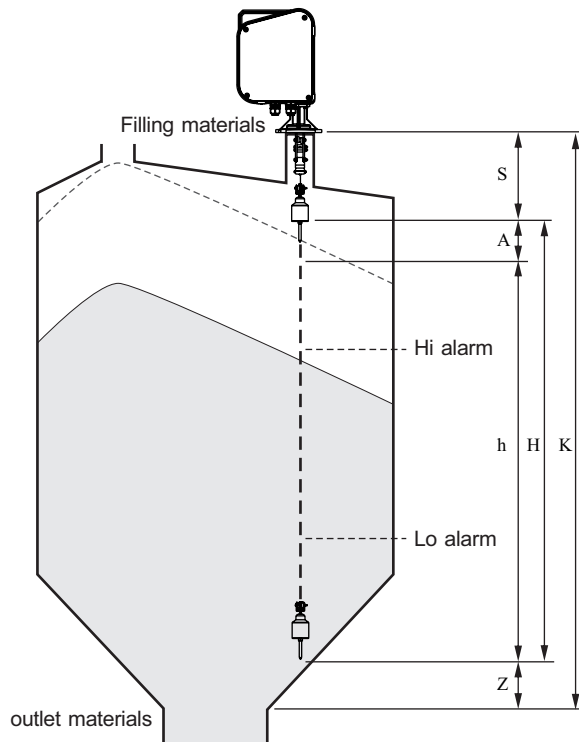
A Air Zone(deadband):
Variation of tank capacity and real medium level. Default setting is 0.

H Effective measuring distance:
distance will change according to A value and corresponds to 0/4~20mA output signal.

Hi Alarm: High level alarm setup.

Lo Alarm: Low level alarm setup.

Example

Tank height K=25.00 m,Blind distance S=0.4,Safety distance Z=0.6,Air Zone(deadband) A=1m,

Hi alarm 80%,Low alarm 20%,

In Smart Mode, please try to calculate and get the values for H(measuring range), A(starting position of effective measuring distance), Hi alarm position, Low alarm position.

1. $H = K-(S+Z) \rightarrow 25-(0.4+0.6)=24$, FULL measuring distance will be 24.0m
2. A=1m $\rightarrow$ Effective measuring distance h=23m
3. Hi Alarm = hx80% $\rightarrow$ 23x0.8=18.4, hi alarm position: 18.4m
4. Lo Alarm = hx20% $\rightarrow$ 23x0.2=4.6, low alarm position: 4.6m

INSTALLATION

Installation Position

- Installation position should be away from the inlet or outlet of silo at lease 1.2 m, and prevent the damage occured by plumb got hit or buried.
- Reservoir or tank equipped with observation window is suggested; it will be beneficial for maintenance in future. The installation location should be away from the ladder, frame or any protrusion. The minimum distance between the EE center and tank wall should be 1m or more.
- Must be located away from the inlets flow direction to avoid the cable and hammer being damaged by material or disconnected or buried.
- The optimal position is at the average depth of measured material, it will generally locate in the middle of the peak and bottom (the angle of repose after filling process), indicates below.

Installation Instruction

- Please ensure that the flange is horizontal positioned and the installation is vertical. The movement of sensing weigh must be vertical and aligning with central of flange so that it can prevent incorrect movement and wear on wire.
- Welding a steel tube on silo roof is necessary if the silo roof is not in horizontal shape. In order to install horizontally, the diameter of welded steel tube must be more than 4" and the length is as short as better. It is suggested to put a gasket between two flanges.
- Please make sure the housing is air tight. The aluminum cover for housing must be screwed tight.

Caution

- The position and method of inlet condition installation:
  1. Direct filling: Please install at either side of inlet.
  2. Vortex filling: Please install at left side of inlet as in clockwise direction or at right side of inlet as in counter-clockwise direction.
  3. Sprinkle filling: Please install farthest at the opposite to inlet to avoid impact by filling.
- During installation, user should carefully check the cable wire is wound up well in pulley set and not folded, broken or squeezed.
- The cable wire should put on the hole of weight head connect and be secured indeed by screwdriver.
- Firmly secure the screws to fix the front cover and body, otherwise the dust or powder will permeate into the electric board.
- The installation hole must be larger than diameter 104 mm.
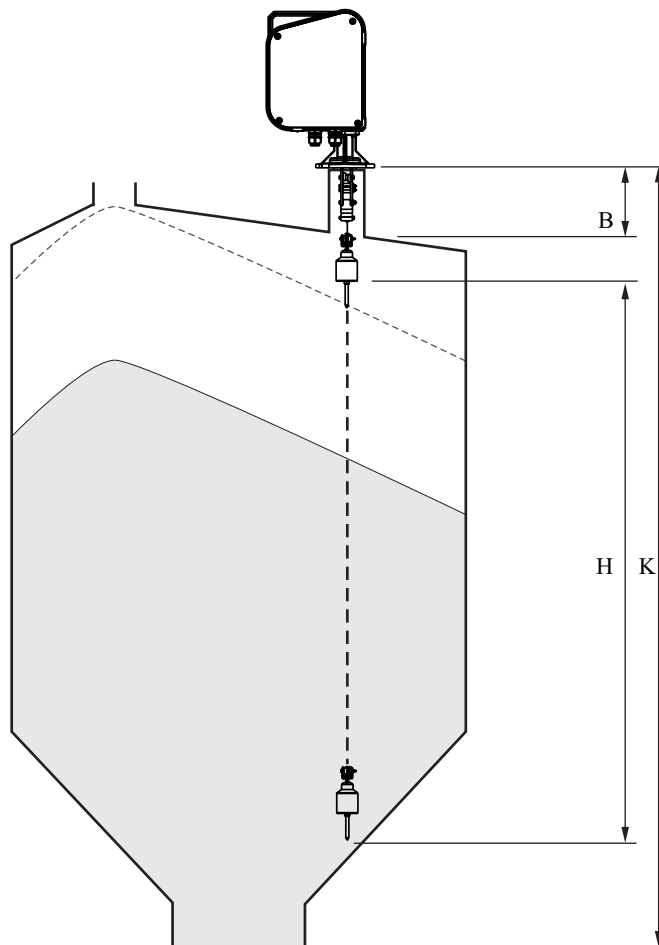
Wiring Instruction

- FineTek suggests 0.75mm^2 non-twist multiple-cores isolated electric wire to connect with the terminal block.
- The power line should be separated from the signal lines. It should leave a flexible length of electric wire to avoid pull and drag the electric board.
- The length of wire stripping should be proper to prerent circuit short,and should be well welded and connected by terminal block well.
- Wiring should be clearly identified and in correct connect.
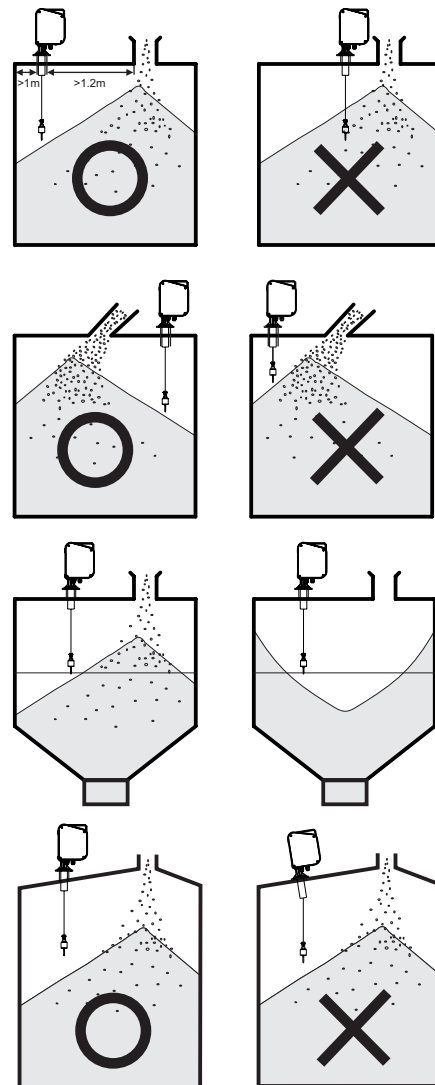
ORDER INFORMATION

Please provide the following parameters and equipment needs when inquiring

1. The name of the material to be measured: _____
2. Material morphology: ☐powder ☐granular ☐massive ☐fluid
3. Granularity: _____
4. Specific gravity: _____
5. Pressure: ☐normal pressure
   ☐Transient Pressure: _____ kg / cm 2
   ☐sustained pressure: _____kg / cm 2
6. Tank -temperature: _____ ℃
7. Humidity: _____%
8. Supply Voltage: ☐AC: _____ V ☐DC: _____V
9. Installation size: ☐Screw thread specifications ☐flange specifications
10. RCU controller: ☐required ☐not required
11. Control box ☐not required
    ☐required，need functional description: _____
12. Other instrumentation needs: ☐not required
    ☐required，specifications description: _____
13. Tank height (K): _____ m
14. Extension tube height (B): _____m
15. Measuring span (H): _____ m

ORDER INFORMATION

EEX 2 0 0 0 0 - ⑨⑩ ⑪ 272850 ⑱⑲⑳㉑㉒㉓ 0 ㉕㉖㉗㉘㉙

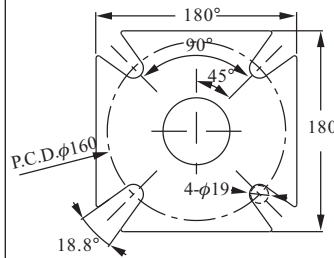*(Positions labeled: ⑨⑩⑪ after the dash; ⑱⑲⑳㉑㉒㉓ then 0; then ㉕; then ㉖㉗㉘㉙)*

⑨⑩ Anti-freeze Heater

00 : N/A
01 : With Heater

⑪ Power Supply
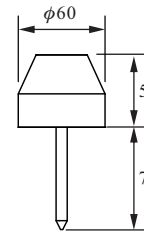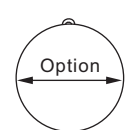
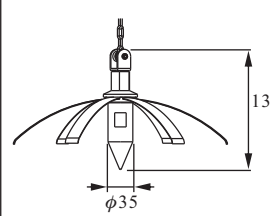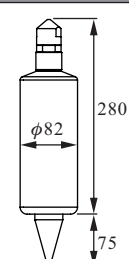C : 100~240Vac, 50/60Hz
D : 20~28Vdc

⑱⑲⑳㉑㉒㉓ Connection

Code	000000
Name	**Standard**
Type	

※Flanges For Standard Model :
4"x5kg/cm² 、 4"x10kg/cm² 、 4"x16kg/cm² 、
4"x20kg/cm² 、 4"x150Lbs
DN100 PN6 、 DN100 PN10 、 DN100 PN16 、
DN100 PN25 、 DN100 PN40

㉕ Sensing weight type

Code	A	B	C	D
Name	**Standard type Stainless steel**	**Float type Stainless steel**	**Umbrella Stainless steel**	**Auto-Fall-Off Plastic**
Type	φ60 / 50 / 70	Option	138 / φ35	280 / φ82 / 75

※Custom made is available for sensing weight

㉖㉗㉘㉙ Length

Code	Probe Length
3000	3000mm(3m)(Minimum)
A300	30000mm (30m) Maximum "A" means multiplied by 100 times

RCU1 Remote Control Unit

WORKING PRINCIPLE

The Remote Control Unit (hereinafter RCU) is to read and control instruments/ sensors connected through RS-485 or Zigbee. All data received from instruments/ sensors can be displayed on the RCU. The RCU, as a Middle Master, can transfer the data to the PC. Smart and easy-to-use, the RCU allows the user to efficiently revise parameters of instruments/ sensors and then monitor. With ModBus Potocol and FineTek's unique Auto ID, the RCU is designed to connect our instruments/ sensors.

FEATURES

- Utilizing ModBus Potocol and FineTek unique Auto ID
- Driven by a microprocessor, user-friendly
- Power Input: 20~250Vdc/ Vac
- Communication interface: RS-485 or ZigBee wireless
- Relay output: SPDT 3A/250Vac x 1 (alarm outputted)
- LCM (Graphic 128x64 Dots)
- LED indicator: measuring/ connection/ Alarm
- Effective range of ZigBee: 200 meters
- Two units of RS-485; one unit of ZigBee
- User setting adjustability

TEST & PROTECTION
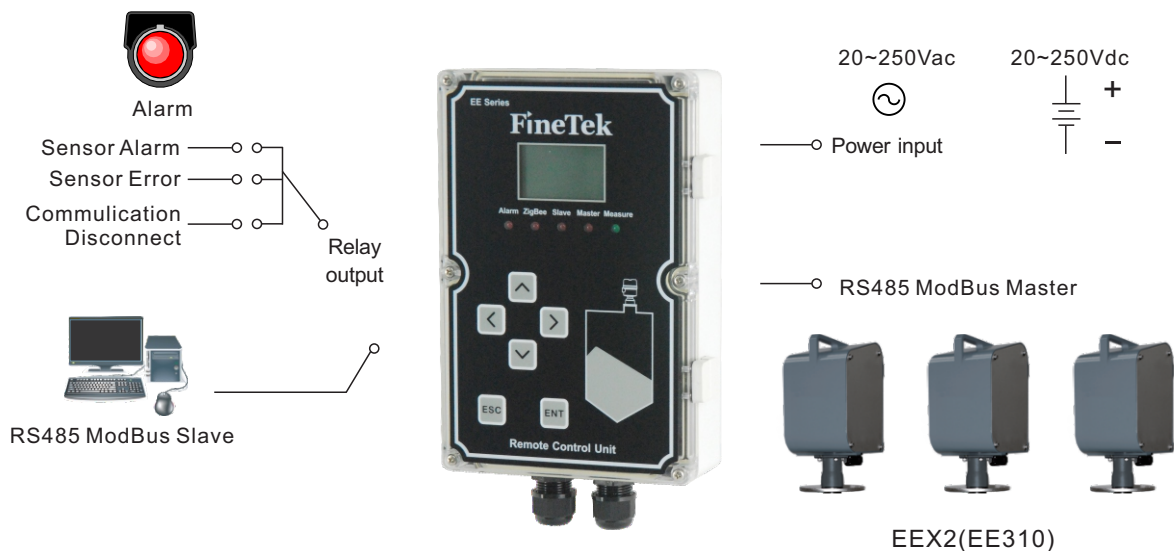
Protection: IP65 (IEC60529)
Pressure test: IEC60947-2
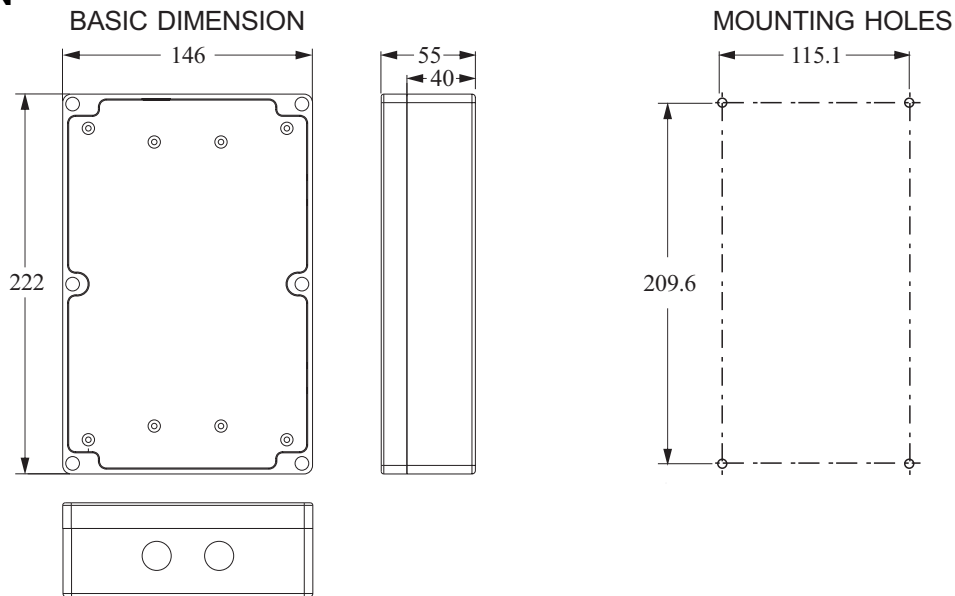Insulation resistance Test: IEC60092-504
Power supply test: IEC60092-504
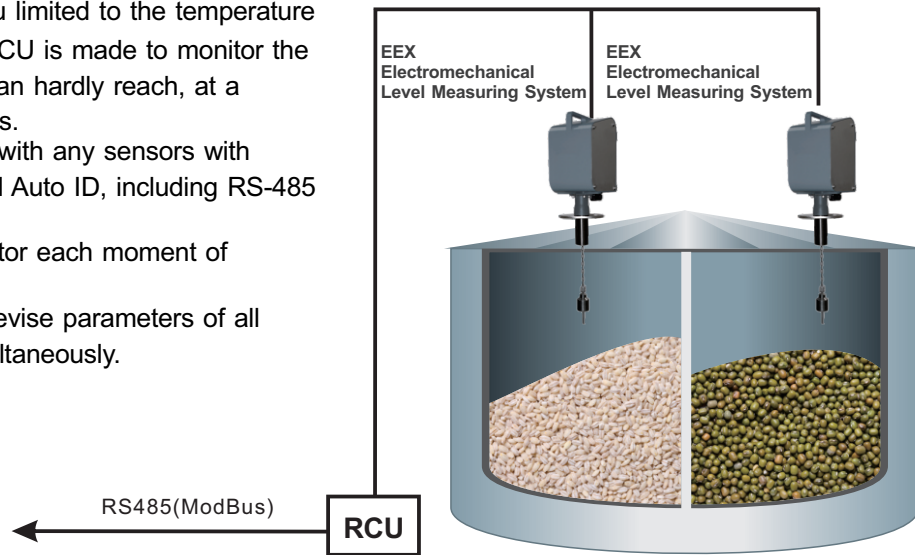Power supply failure Test: IEC60092-504

SYSTEM DIAGRAM

EEX2(EE310)

DIMENSION

BASIC DIMENSION

MOUNTING HOLES

SPECIFICATION

NO	ITEM	DESCRIPTION
1	POWER SUPPLY	DC/AC 20V~250V
2	MAXIMUM CURRENT	200mA~250mA (While connecting 128 sensors)
3	OPERATING TEMPERATURE	0~50°C(32~122°F)
4	PROTECTION STANDARD	IP65
5	BODY MATERIAL	PP
6	DISPLAY	LCM 128*64 dots Graphic Display
7	RELAY OUTPUT	SPDT 3A/250V X 1 (Sensor_alarm*1 (Sending an alarm signal)
8	COMMUNICATION INTERFACE	1、RS-485(Master)max up to 128 sensor 2、RS-485(Slave)
9	LED INDICATORS	1、RS-485(Master)*1 LED 2、RS-485(Slave)*1 LED 3、Measure*1 LED 4、Sensor_alarm*1 LED
10	EFFECTIVE RANG	Up to 200m
11	OTHER	1、 User Settings 2、Unit Under Control 3、 Overall Control (Parameter Copy)

APPLICATION

Available in indoor facilities, not limited to control centers, and outdoor lieu limited to the temperature from -40°C~85°C, the RCU is made to monitor the sensors where people can hardly reach, at a maximum of 128 sensors.

The RCU is compatible with any sensors with FineTek Modbus Potocol Auto ID, including RS-485 and Zigbee

Enable the user to monitor each moment of sensors connected.

The user is allowed to revise parameters of all sensors connected simultaneously.

EEX
Electromechanical
Level Measuring System

EEX
Electromechanical
Level Measuring System

RS485(ModBus)

RCU

MMS

ORDER INFORMATION

⑨ ⑩ ⑪ ⑫

RCU 1 0 0 0 0 - A 3 ☐ ☐

⑨⑩ **NPUT**

A3: EEX Electromechanical Level Measuring System

⑪ **COMMUNICATION**

A: RS-485

⑪ **OPERATING TEMPERATURE**

A: Standard Type(0~50°C/32~122°F)