www.fine-tek.com

EST Grain Silo Temperature & Level Monitoring System

FineTek

Innovation · Quality · Sharing

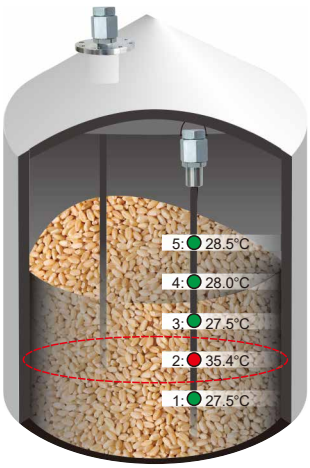
System Introduction

Temperature is a key factor for maintaining grain quality in a grain storage system. When the grain has suffered from deterioration, corrosion or pest and disease damage, the temperature is increased inevitably. If precise temperature information of the grain can be mastered, an air conditioning system can be more efficiently controlled to achieve high efficient energy management. For silo management, an EST system can measure grain temperature in silo and measure stored grain level synchronously, thereby not only instantly tracking and recording grain conditions, recording historical records, but also providing optimal grain storage quality monitoring.

The EST can be matched with the FineLink hub series, and employs an RS485 communication interface to transmit information to a central control room or a human-machine interface via wire or wirelessly. The EST is matched with MMS-TLA silo information and integrated with monitoring software, so that a user can easily monitor dual information, both the temperature and grain level in the silo, through a remote computer, thereby performing grain storage management with the utmost convenience and efficiency.

Content

EST20000-A
multi-point temperature sensor



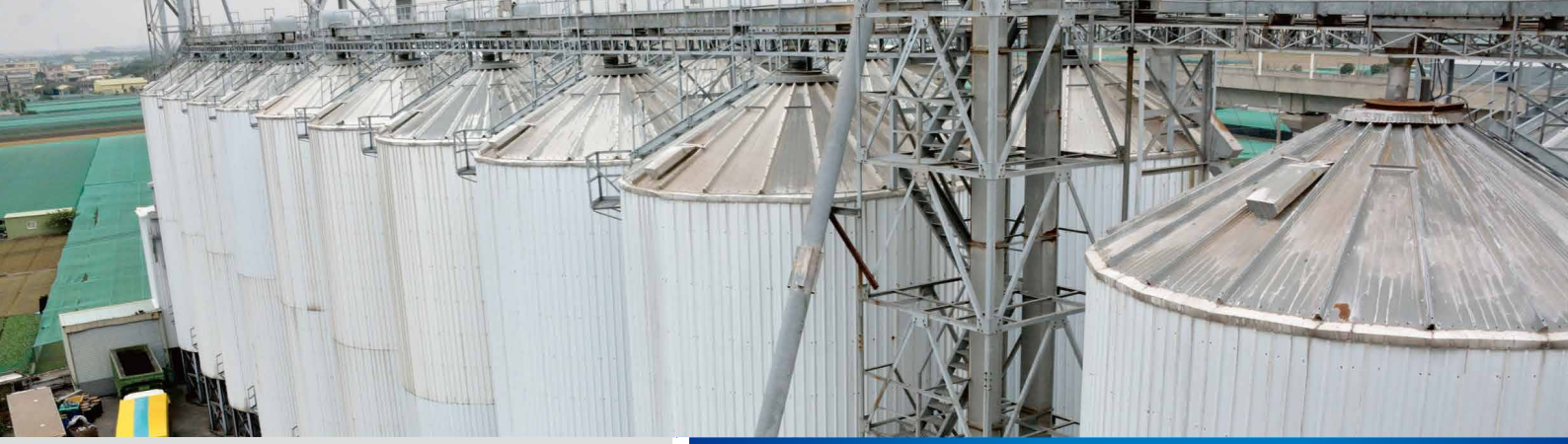
CE

System Introduction

EST20000-A multi-point temperature sensor wire can measure temperature of grain in different positions of the silo in real time, to record condition of the grain and provide you the optimal monitoring of grain storage quality. Relative to the traditional silo, manual temperature measurement is time-consuming and arduous. The temperature measured by EST20000-A is digital signal, which can output RS485 communication mode through matching with FineLink 1-wire to transmit information to the central control room or human-machine interface. The user can easily know the grain temperature in the silo only from the remote end and conduct the most efficient grain storage management.

Features

- Reinforced steel cable design can effectively resist the impact of grain and prolong service life of the product.
- Provide multi-point temperature measurement to help managers cope with food more swiftly.
- Detect whether there is fungus produced or activities of insects, to maintain food quality.
- Provide real-time monitoring of silo temperature for practitioners in food, fodder and grain, to help long-term storage.
- Prevent qualitative change of grain in the silo and fire disaster due to smolder.
- Temperature measurement position can be customized according to customer's requirements, which can be hung outside or built in the silo.

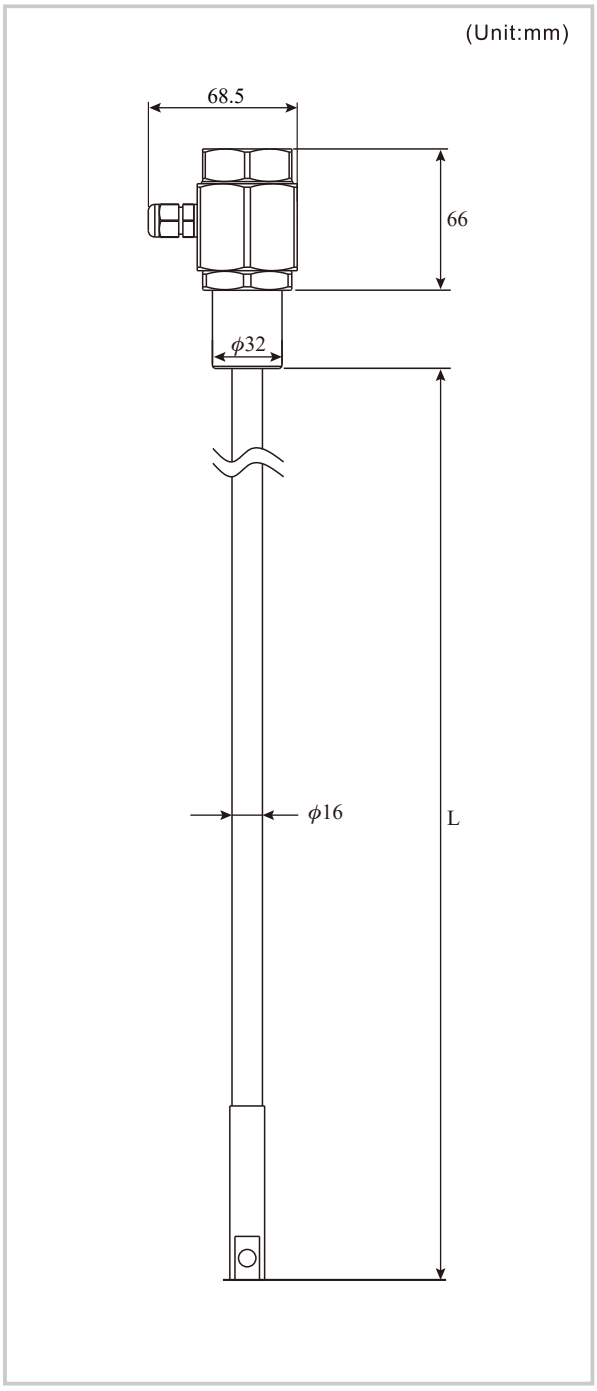


Specifications

Measurement range	-10~85°C
Resolution	0.1°C
Accuracy	±0.5°C
Length Max.	Max. 30 m
Quantity of sensors	Max. 30 PCS
Position of sensors	One sensor is built in every meter
Cable material	Coated with XLPE, inner ring is copper wire (Standard)
Tensile load	4500 Kgf
IP rating	IP67
Housing material	SS41 Low-carbon steel
Outgoing cable diameter	ϕ4~7mm
Ambient temp.(Ta)	T80°C:-40 ≤ Ta ≤ 70°C T95°C:-40 ≤ Ta ≤ 80°C

※FineLink 1-wire is requirement (combination)

Dimension



EST20000-B 2 in 1 grain temperature & level monitoring transmitter

Introduction

For silo management, users must install temperature sensing wire and grain level sensor separately in the past to get the information of temperature and grain level. EST20000-B two-in-one silo temperature and grain level meter can synchronously measure grain temperature and level in the silo, to track and record grain condition, so as to provide you the optimal grain storage quality monitoring. EST20000-B adopts the RS485 communication interface, to transmit information to the central control room or human-machine interface. Users can monitor dual information of grain temperature and level in the silo from the far end, to conduct the most convenient and efficient grain storage management.

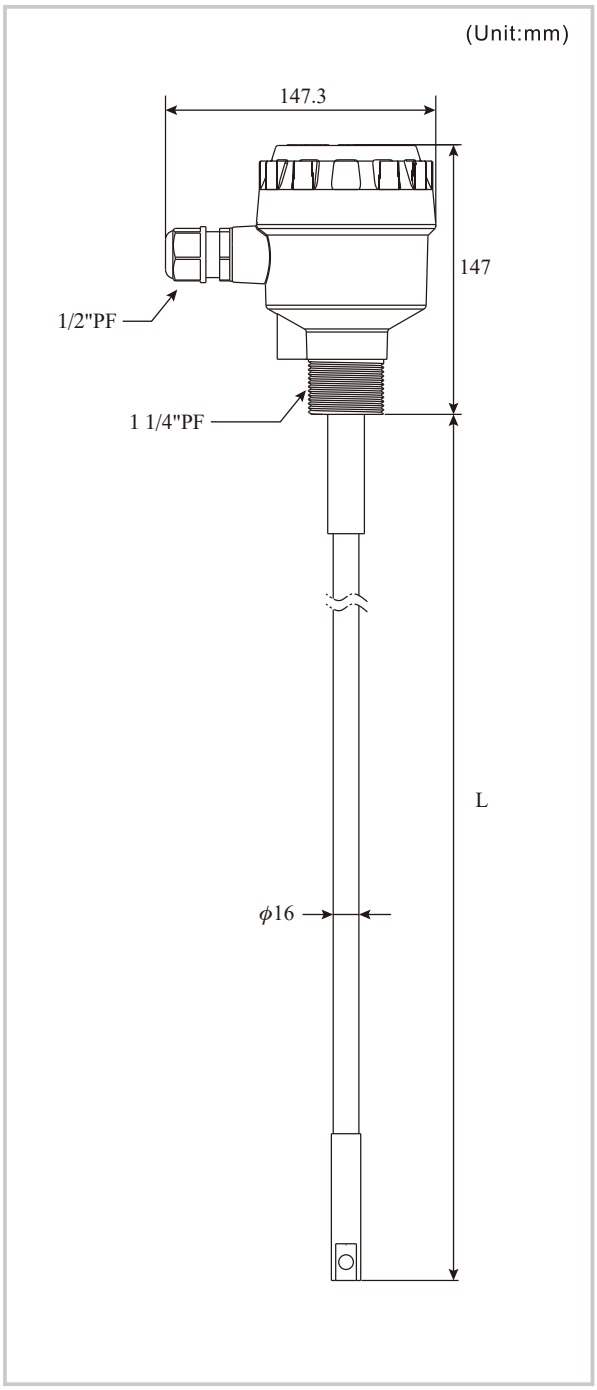
Features

- Unique in the industry, EST20000-B transmitter integrated with simultaneous monitoring of grain level and temperature.
- Steel cable design can effectively resist the impact of grain and prolong service life of the product.
- Provide real-time multipoint temperature measurement to help managers cope with food more swiftly.
- Detect whether there is fungus produced or there are activities of insects, to maintain food quality and facilitate long-term storage.
- Prevent qualitative change of grain in the silo and fire disaster due to smolder.
- Temperature measurement can be customized according to customer's requirements.
- Any two points of EST20000-B are in simple calibration mode of grain level.
- The product uses open main current communication interface RS485. The system user can install the device on any system having the communication interface.

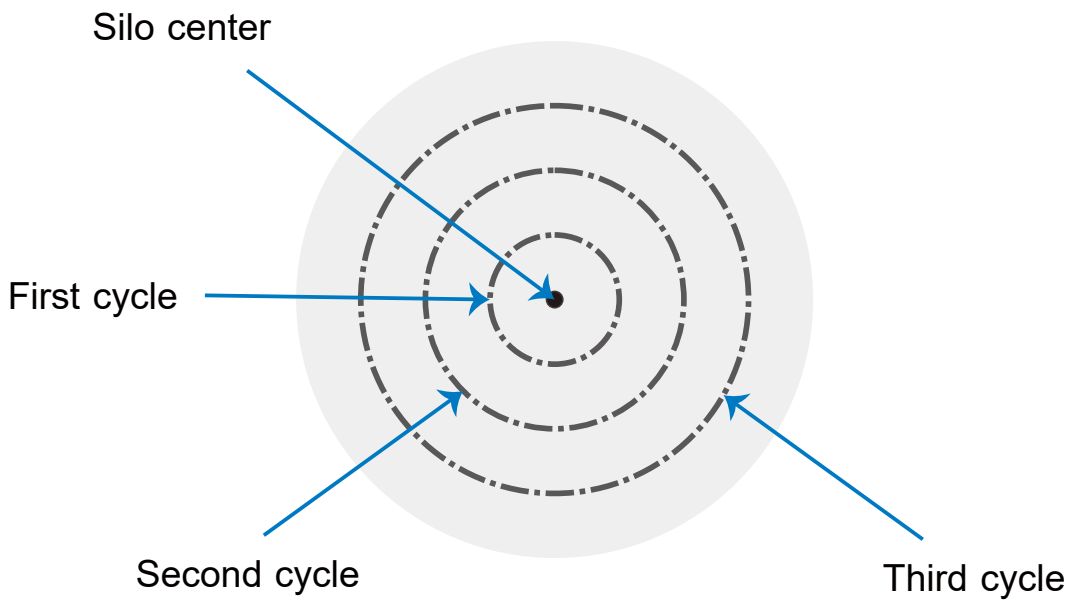
Specifications

Power input	9 ~ 30 Vdc
Measurement range	-10~85°C
Resolution	0.1°C
Accuracy	±0.5°C
Length	Max.30 m
Quantity of sensors	Max.30 PCS
Position of sensor	One sensor is built in every meter
Sampling speed	Grain level measurement: ≤1sec Temperature measurement: ≤1sec/node
Non-linearity of grain level	±1 % FS
Output interface	RS485; Baud Rate:9600~57600 bps
Material of junction box	Aluminum alloy (ADC-12)
Outgoing cable diameter	ϕ4~7 mm
Cable material	Coated with XLPE, inner ring is copper wire
	4500 Kgf
IP rating	IP67
Ambient temp.(Ta)	T80°C: -40 ≤ Ta ≤ 70°C T95°C: -40 ≤ Ta ≤ 80°C

Dimension



Installation Qty Guide



If the silo is bigger than 8 meters in diameter, we suggest the customer follows our guide of sensor number and sensor installation position to guarantee system can totally monitor temperature change of material inside the silo.

Silo diameter	EST sensor number	Silo center	First cycle			Second cycle			Third cycle		
			Radius (m)	Quantity	Interval angle	Radius (m)	Quantity	Interval angle	Radius (m)	Quantity	Interval angle
4	1	1									
6	1	1									
8	3	0	2.3	3	120						
10	3	0	2.5	3	120						
12	4	1	3.3	3	120						
14	6	1	4.7	5	72						
16	7	1	5.6	6	60						
18	8	1	6	7	51						
20	11	0	2.5	3	120	7.5	8	45			
22	12	0	2.8	3	120	8.2	9	40			
24	13	0	3	3	120	9	10	36			
26	17	1	5.3	6	60	10.6	10	36			
28	19	1	6.6	6	60	10.6	12	30			
30	22	0	2.6	3	120	7.5	7	51	12.8	12	30
36	29	0	2.5	3	120	8.5	10	36	14.5	16	22.5
40	34	1	5.6	5	72	11.3	10	36	17	18	20

Order Information

⑦⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳ ㉑ ㉒ ㉓ ㉔ ㉕

EST2 0 0 □□-□□□□□□□□□□□□□□□□□□□□□

⑦⑧ Certification

00: None

⑨ Type

A：Multi-point temperature sensor
B：2 in 1 grain temperature & level monitoring transmitter

(Next page)

Connection

⑩⑪	⑫⑬	⑭⑮
00: None	00: None	00: None
Flange item	A9: 1-1/4"	03: PF male
AK: JIS-FF	B1: 1-1/2"	07: NPT male
AN: ANSI-RF	B2: 2"	40: 5kg/cm²
AS: DIN-FF	B4: 2-1/2"	42: 10kg/cm²
	B5: 3"	48: 150Lbs
Thread item	B7: 4"	49: 300Lbs
AC: ANSI	B8: 5"	57: PN10
AA: JIS	B9: 6"	58: PN16
	D9: DN32	
	E1: DN40	
	E2: DN50	
	E3: DN65	
	E4: DN80	
	E5: DN100	

※ The standard connect of EST20000-A is 000000
The standard connect of EST20000-B is AAA903

⑯⑰ Connection material

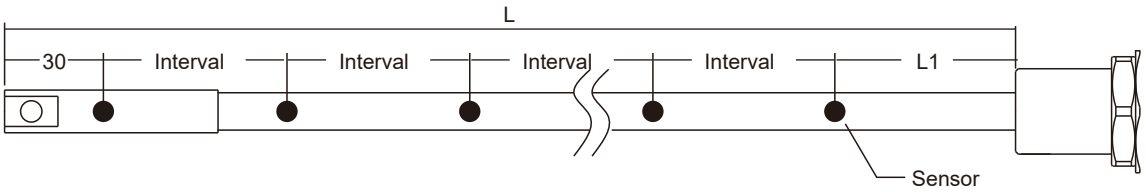
MA：SUS304
MD：Low carbon steel
MH：Aluminum alloy

EST2 0 0 0 0 - ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳ ㉑ ㉒ ㉓ ㉔ ㉕

⑱⑲ Sensor interval

05: One sensor evey 0.5m
08: One sensor evey 0.8m
10: One sensor evey 1.0m
15: One sensor evey 1.5m
20: One sensor evey 2.0m
28: One sensor evey 2.8m
⋮
95: One sensor evey 9.5m

※Temp. sensor interval=cable length ÷ numbers of temp. sensor .
Lowest interval = lowest temp. sensor to end of cable is fixed to be 30mm .
Highest interval (L1) = sensor interval -30mm .



⑳㉑ Sensor amout

01：1 Pcs
02：2 Pcs
⋮
30：30 Pcs(Max)

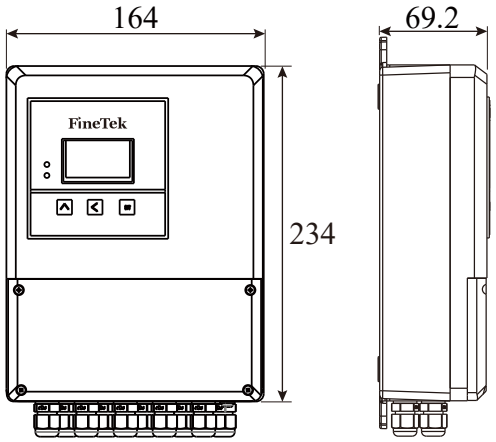
㉒㉓㉔㉕ Length

Code	Probe Length
0500~9999	500~9999mm
A100~A300	10000~30000mm "A" means multiplied by 100 times

FineLink System Hub(1 to 8)

FineLink system Hub(1 to 8)

(Unit:mm)



Introduction

The multiple measuring data in one sensor will be interpreted by FineLink through RS-485 signal and send out to PC or other human machine interface. So the immediate temperature status can be monitored. In order to prevent infestation of pest in the storage when there is temperature changes.

Specifications

Input power supply	12~28Vdc
Ambient temp.	-40~80°C
EST110	8
Housing material	Aluminum alloy (ADC-12)
RS-485 baud rate	RS-485
Cable diameter	1200~57600
Cable Isolated thickness	ϕ4~7
Communication interface	>0,5mm
IP rating	IP67

Order Information

JMW 6 ⑤⑥⑦⑧-⑨⑩

⑤⑥ Construction

01：Wired

⑦⑧ Certification

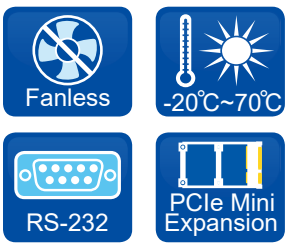
00：None

⑨⑩ Function

A4：1-wire

IPC Industrial Computer

IPC (Industrial PC)



Features

- Fanless system with Intel® Celeron® J6412 processor
- Multiple COM ports: six RS-232 and two RS-232/422/485
- 2 x HDMI dual independent display
- M.2 and one 2.5" SATA storage device
- CE/FCC compliant

Specifications

Form factor

SBC Form Factor:
» Supported CPU: Intel® Celeron® J6412 2.0 GHz
(up to 2.6 GHz, quad-core, TDP 10W)
» Chipset: SoC
» System Memory:
2 x SO-DIMM DDR4 3200 (8GB pre-installed) (up to 32GB)
» Power:
DC Jack: 12 ~ 28V DC
Terminal Block: 12 ~ 28V DC
Consumption: 12V@3.36
(Intel® Celeron® J6412 with 8GB DDR4 Memory)

I/O Interface

I/O Ports:
» USB: 2 x USB3.2 Gen2, 4 x USB 2.0
» Ethernet: 3 x 2.5 GbE by Intel® I225-V/I226-V controller
» Display: 2 x HDMI™ (up to 4K@30Hz)
» COM Port: 2 x RS-232/422/485 (DB-9)
6 x RS-232 (DB-9)
» Digital I/O: 12-bit Digital I/O (DB15)
» Audio: 1 x Line-out, 1 x Mic-in
» Wireless: 1 x 802.11a/b/g/n/ac (optional)
» TPM: 1 x TPM (2 x10 pin) Intel PTT
» Watchdog Timer: Programmable 1 ~ 255 sec/min

Expansion Slots

Expansion Slots

» M.2: 1 x 2230 A-key (PCIe Gen3 x1/USB 2.0)
1 x 2042/52/80 B-key (SATA/USB 2.0)
1 x 2280 M-key (PCIe Gen3 x2)

System

» Cooling method / System Fan: Fanless
» Drive Bays : 1 x 2.5" SATA 6Gb/s HDD/SSD bay

Indicator & Buttons

» Buttons 1 x Power Button: 1 x Reset Button
1 x AT/ATX Switch
» Indicators: 1 x LED for Power
1 x LED for HDD

Physical Characteristics

» Construction: Extruded aluminum alloy

Color

» Color: Black

Dimensions

» Dimensions: 184 x 200.6 x 53 (mm)

Weight

» Weight: 2.04 /2.29 kg

Environment

» Operating Temperature: -10°C ~ 50°C with 0.7M/S air flow (M.2)
» Humidity: 10% ~ 95% non-condensing
» Operating Vibration: MIL-STD-810G 514.6C-1 (SSD)
» Operating Shock: Half-sine wave shock 5G, 11ms, 100 shocks per axis (SSD)
» Safety & EMC : CE, FCC, UKCA

OS Compatible

» OS Compatible: Microsoft® Windows® 10/11, Linux

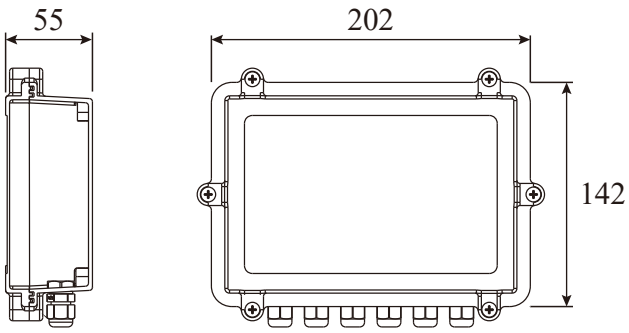
FineLink 1-wire / FineLink RS485

FineLink 1-wire / FineLink 1-wire wireless

(Unit:mm)

Wired JMW10100-A4□□

Wireless JMW10200-A4□□



(Combine with EST2000-A
multi-point temperature sensor)

Introduction

It extends and connects to the sensor through wired way, which can connect 4 sets of EST20000-A 1-Wire communication modes. Each sensor has an independent connection, which can prevent the whole system from crashing due to a particular equipment failure, so as to make users capable of maintaining multiple equipment more easily. 1-wire digital signal can be transformed to RS485 to make MMS-TL silo temperature and grain level management system or PLC read and use.

Specifications

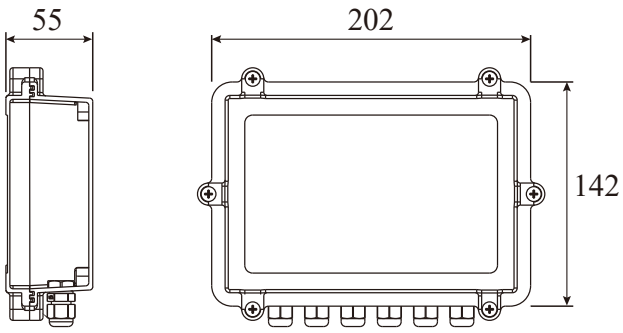
Supply voltage	10~30Vdc
Ambient temperature	-40~80°C
Connection port	Max.4
Housing	Aluminum alloy (ADC-12)
Communication interface	RS-485
RS-485 baud rate	9600~115200
IP rating	IP67

FineLink RS485 / FineLink RS485 wireless

(Unit:mm)

Wired JMW10100-A1☐☐

Wireless JMW10200-A1☐☐



(Combine with EST20000-B 2 in 1 grain temperature & level monitoring transmitter)

Introduction

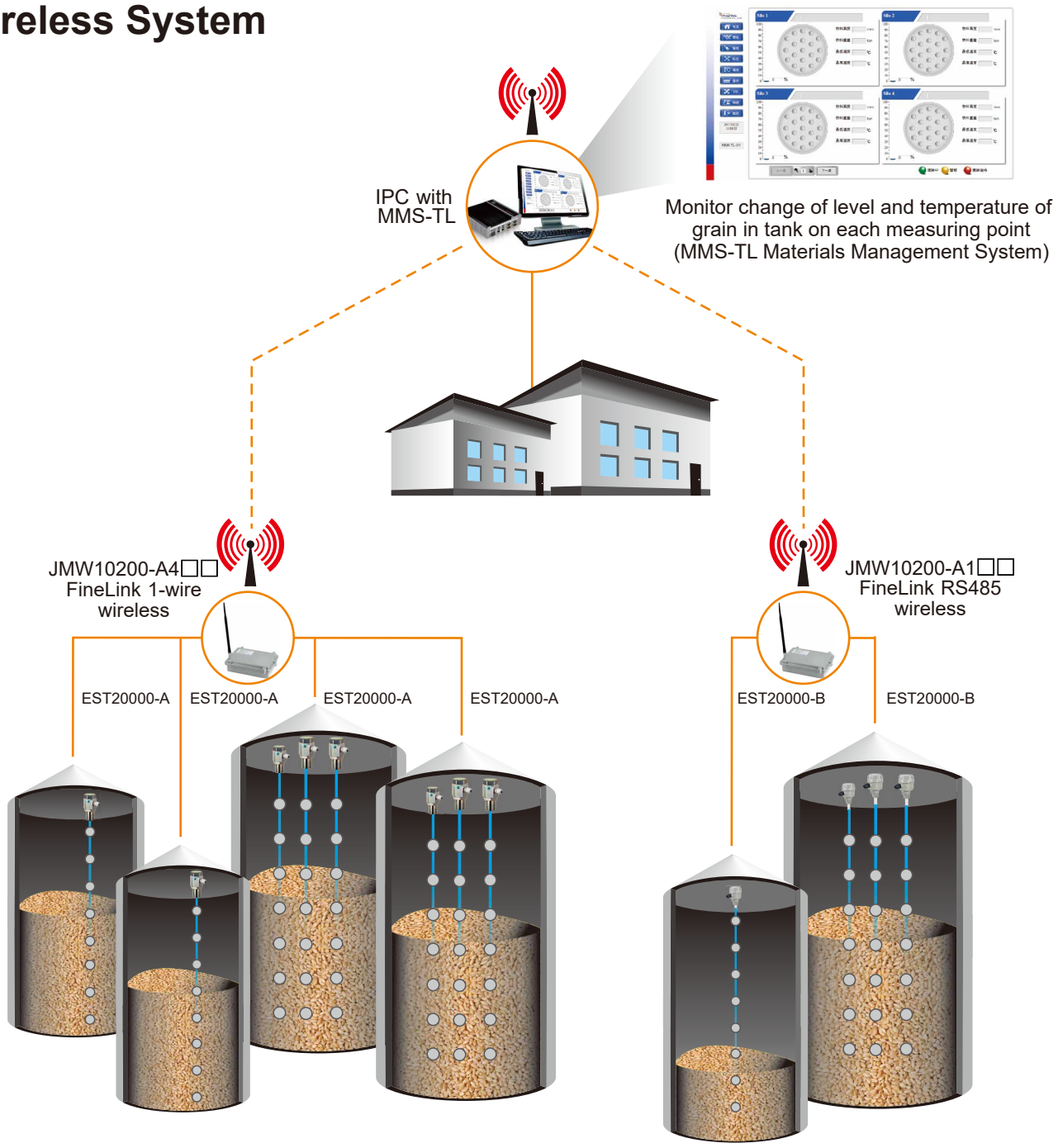
It integrates 4 sets of signals with RS485 communication mode to make wiring more convenient and clear. Each port is independent, which can prevent the whole system from crashing due to a particular equipment failure, to make users capable of maintaining multiple equipments more easily. 4 sets of 4-wire type connection ports also supply 24VDC power for external device.

Specifications

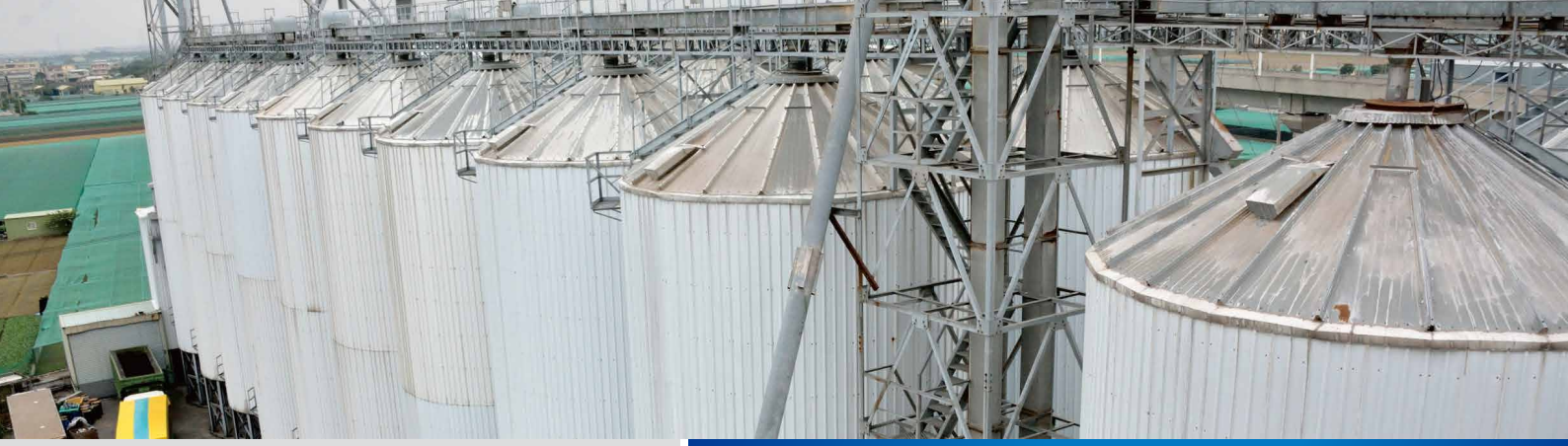
Power input	10~30Vdc
Current input	2A
Power output	10~30Vdc
Current output	400 mA / CH (under power input and current of 2A)
Output	RS-485
Input	Four sets of RS-485 (each set is independent and isolated)
Baud rate	1200~57600
Working temperature	-40~80°C
Electrostatic protection	IEC61000-4-2 ESD 8kV Air,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

System Architecture

Wireless System



(Wireless system, please refer P15 for more details)

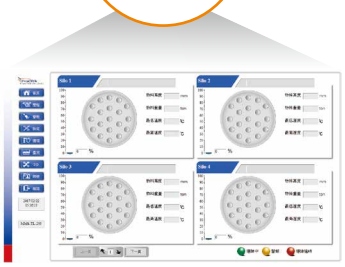


Wired System

IPC with
MMS-TL

RS485

RS485



Monitor change of level and temperature of grain in tank on each measuring point (MMS-TL Materials Management System)

JMW10100-A4□□
FineLink 1-wire

JMW10100-A1□□
FineLink RS485

EST20000-A

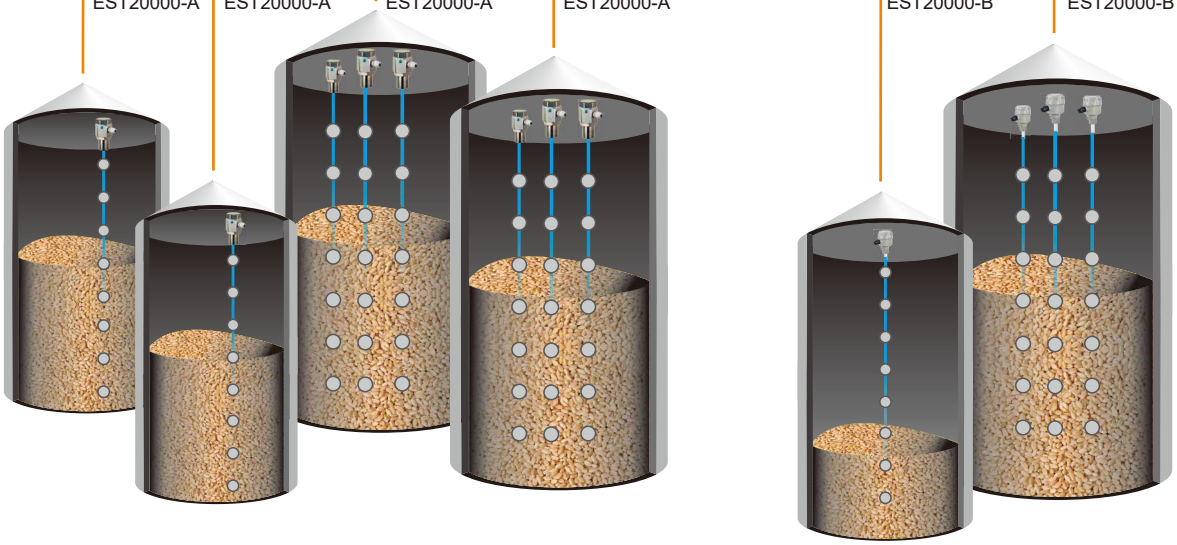
EST20000-A

EST20000-A

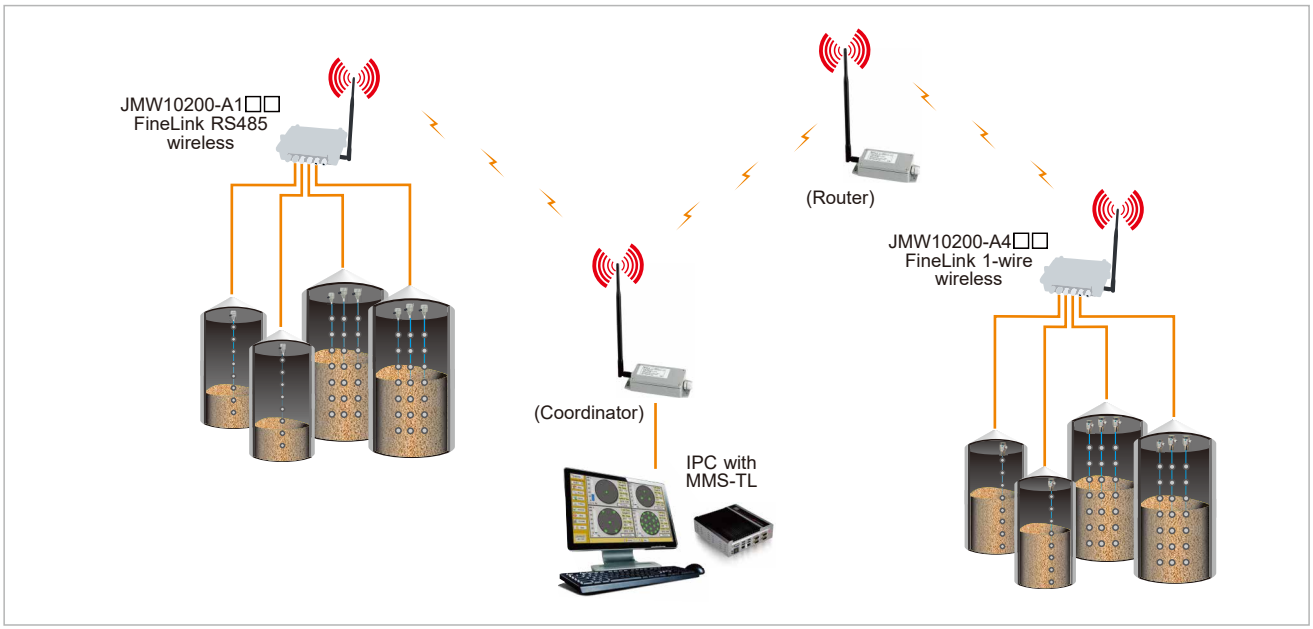
EST20000-A

EST20000-B

EST20000-B



Wireless System Architecture



FineLink Wireless uses wireless to transmit RS485 signal, help customer reduce cable and maintenance costs.

Specification

Output communication	RS485
Input communication	FineLink RS485: RS485 FineLink 1-wire: 1-wire signal
RS-485 baud rate	9600/19200/38400 57600/115200
Storage temp.	-40~80˚C
Operating temp.	-40~80˚C
Static electricity protection	IEC61000-4-2 ESD 8kV Air 4kV contact
Power Input	10V~30V
IP rating	IP67

Wireless Communication

Operating frequency Range	2405 MHz ~ 2480 MHz
Number of channels	16 CH
Channel spacing	5 MHz
Date transmission rate	250 kbps
Sensitivity	-100 dBm (PER≦ 1%)
Transmission range	Max. 2Km

Coordinator / Router

Coordinator

P/N: JMW20200-0C

Coordinator receives signal from FineLink or Router, then sends to PC or PLC via RS485 interface, MMS software reads and displays the measured data

Router

P/N: JMW20200-0R

Router increases transmission distance when the wireless signal strength from Finelink to Coordinator is not strong enough due to long distance. Router receives data from FineLink, then enhance and forward signal to Coordinator. then enhance and forward signal to Coordinator.

Specification

RS-485 baud rate	9600/19200/38400 57600/115200
Storage temp.	-40~80˚C
Operating temp.	-40~80˚C
Static electricity protection	IEC61000-4-2 ESD 8kV Air 4kV contact
Dimension	146 X 66 X 30 mm
Power Input	10V~30V
IP rating	IP67

Wireless Communication

Operating frequency Range	2405 MHz ~ 2480 MHz
Number of channels	16 CH
Channel spacing	5 MHz
Date transmission rate	250 kbps
Sensitivity	-100 dBm (PER≦ 1%)
Transmission range	Max. 2Km
Antenna specification	3.5mm SMA Female

Order Information

IPC contains MMS-TL

MMS/M300 IPC (traditional Chinese WIN7)
+ MMS-TL
+ RS485-USB converter (YTXPUSB485-T)

MMS/M200 IPC(English WIN7)
+ MMS-TL
+ RS485-USB converter (YTXPUSB485-T)

MMS/M400 IPC(simplified Chinese WIN7
+ MMS-TL
+ RS485-USB converter (YTXPUSB485-T)

FineLink

Communication	Model	Order Code	Communication interface
FineLink Wired	EST20000-B	JMW10100-A150	Input: RS-485, Output：RS-485
	EST20000-A	JMW10100-A450	Input: 1-wire, Output：RS-485
FineLink Wireless	EST20000-B	JMW10200-A157	Input: RS-485, Output：ZigBee
		JMW10200-A158	Input: RS-485,Output：LoRa
		JMW10200-A159	Input: RS-485, Output：GSM-(GPRS/3G/4G)
		JMW10200-A162	Input: RS-485, Output：NBIOT
	EST20000-A	JMW10200-A457	Input: 1-wire, Output：ZigBee
		JMW10200-A458	Input: 1-wire, Output：LoRa
		JMW10200-A459	Input: 1-wire, Output：GSM-(GPRS/3G/4G)
		JMW10200-A462	Input: 1-wire, Output：NBIOT
— —	— —	JMW20200-0C	Coordinator
— —	— —	JMW20200-0R	Router

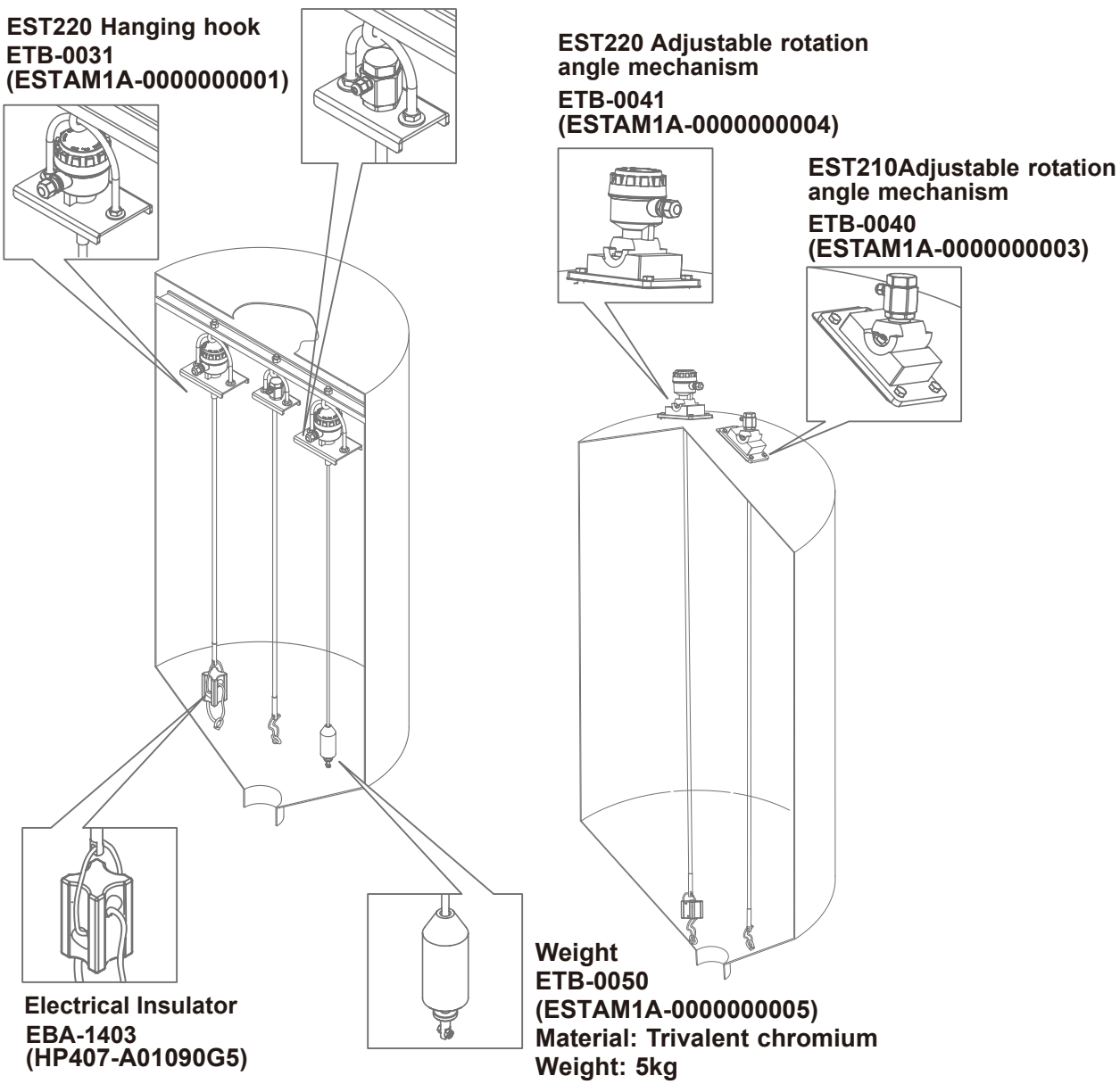
Accessories

EST210 Hanging hook
ETB-0030
(ESTAM1D-MDA0000003)

EST220 Hanging hook
ETB-0031
(ESTAM1A-0000000001)

EST220 Adjustable rotation angle mechanism
ETB-0041
(ESTAM1A-0000000004)

EST210Adjustable rotation angle mechanism
ETB-0040
(ESTAM1A-0000000003)

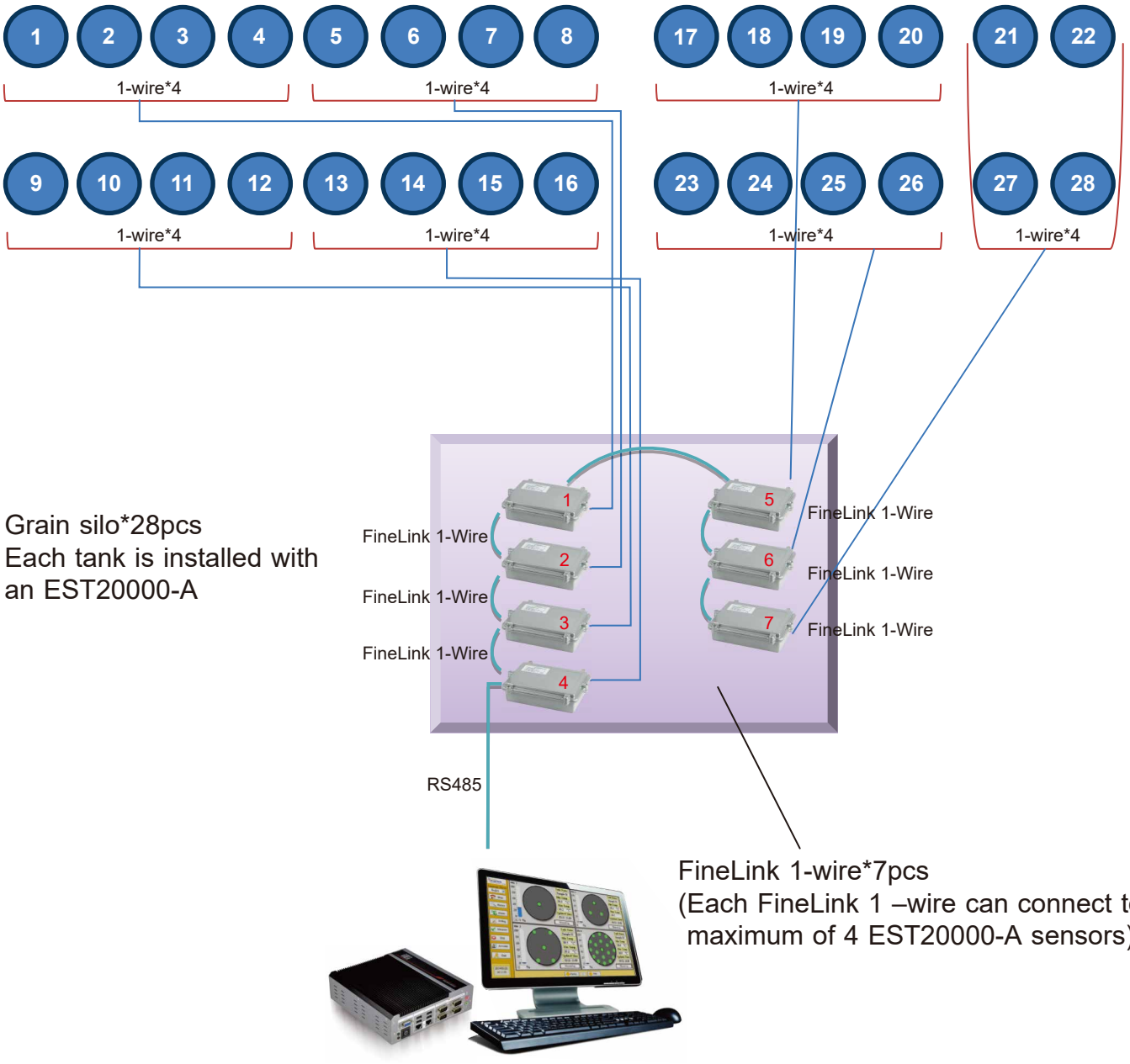


Electrical Insulator
EBA-1403
(HP407-A01090G5)

Weight
ETB-0050
(ESTAM1A-0000000005)
Material: Trivalent chromium
Weight: 5kg

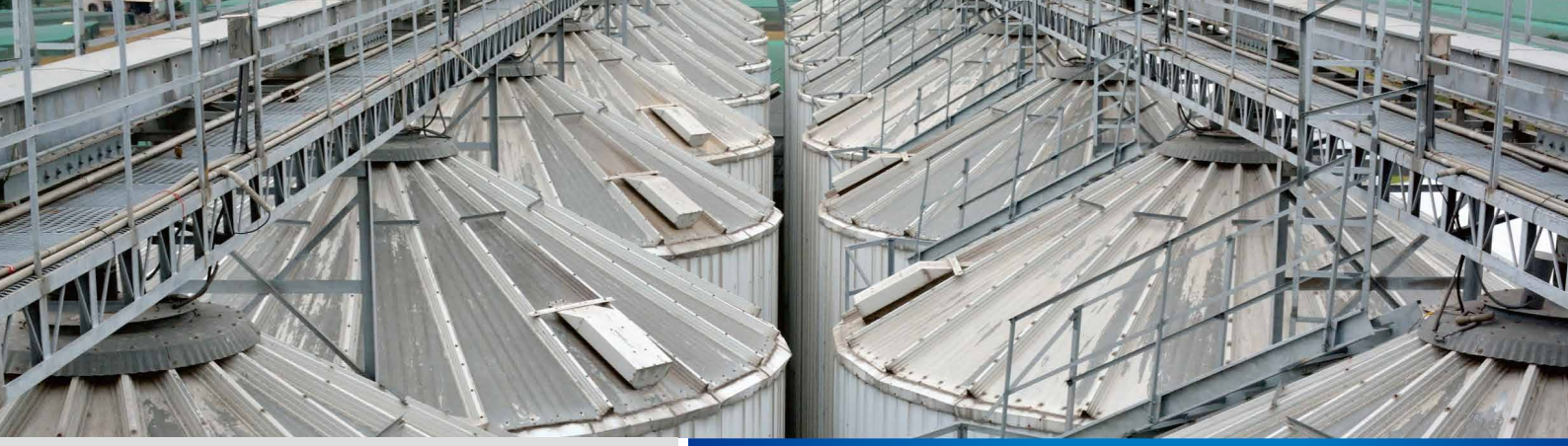
Application Example

Case 1： EST20000-A

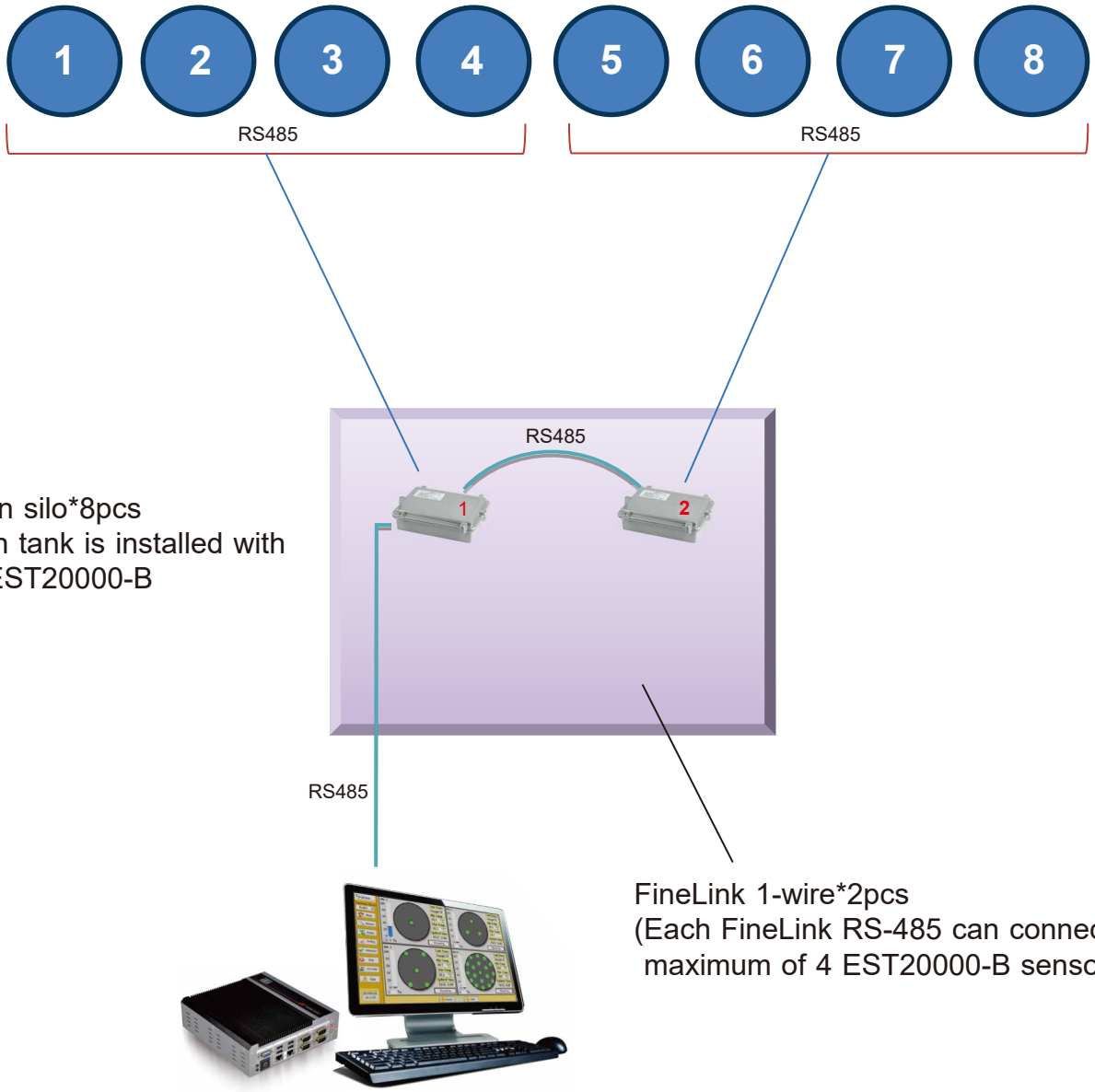


Grain silo*28pcs
Each tank is installed with an EST20000-A

FineLink 1-wire*7pcs
(Each FineLink 1 –wire can connect to maximum of 4 EST20000-A sensors)



Case 2： EST2 0000-B

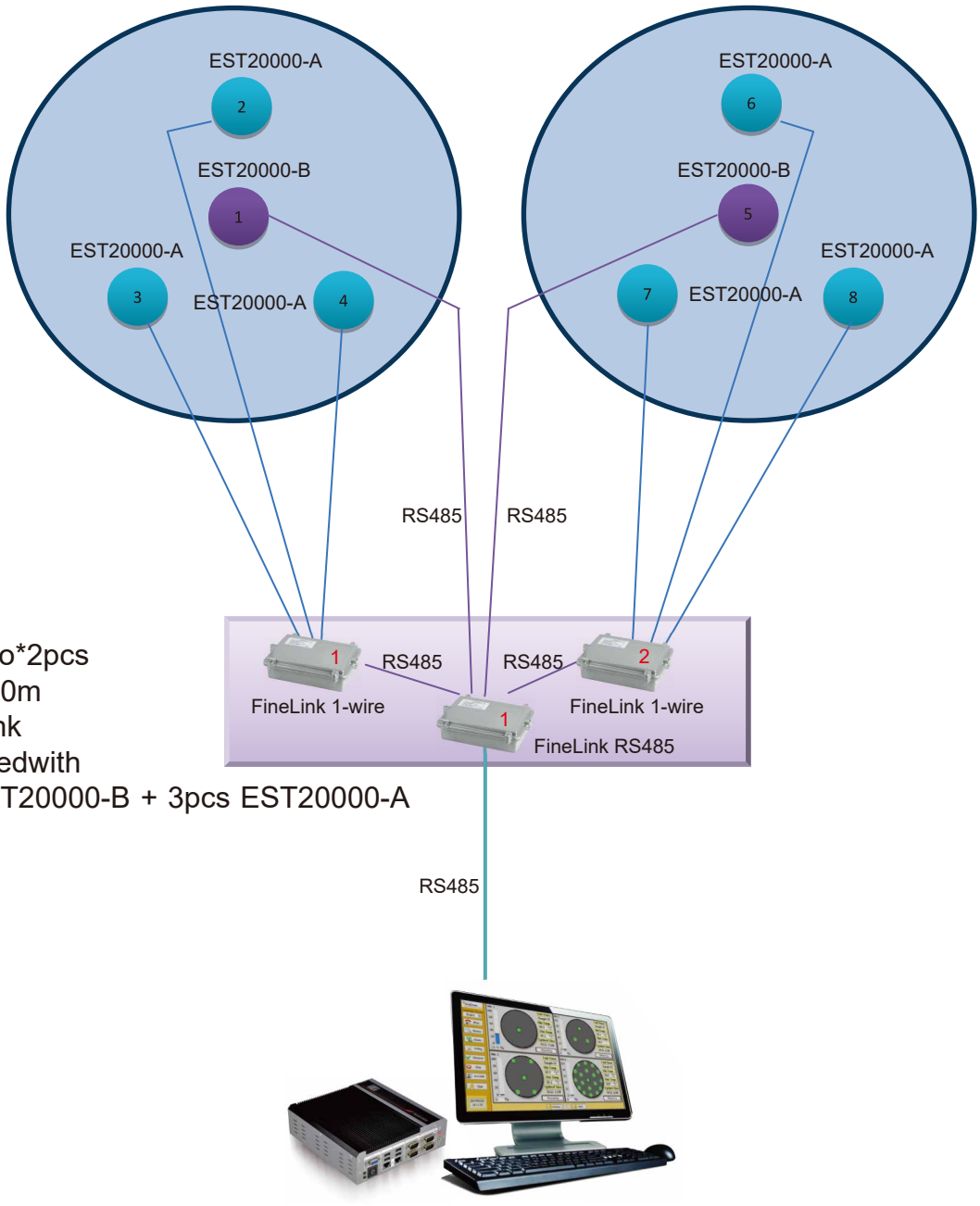


Grain silo*8pcs
Each tank is installed with an EST20000-B

FineLink 1-wire*2pcs
(Each FineLink RS-485 can connect to maximum of 4 EST20000-B sensors)

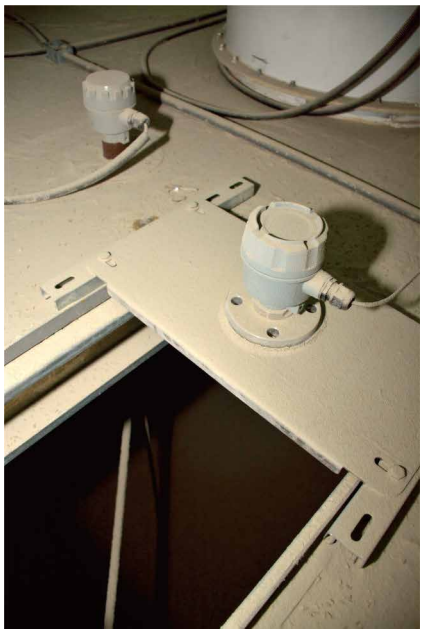
Application Example

Case 3: EST20000-A+EST20000-B

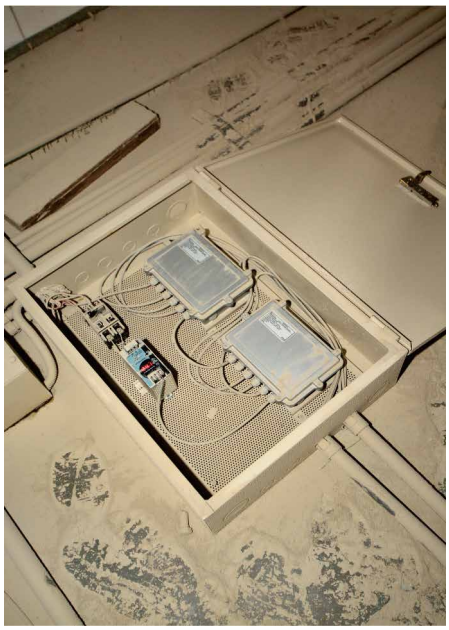


Grain silo*2pcs
Height 30m
Each tank
is installedwith
1pcs EST20000-B + 3pcs EST20000-A

Successful stories



▲ EST20000-B



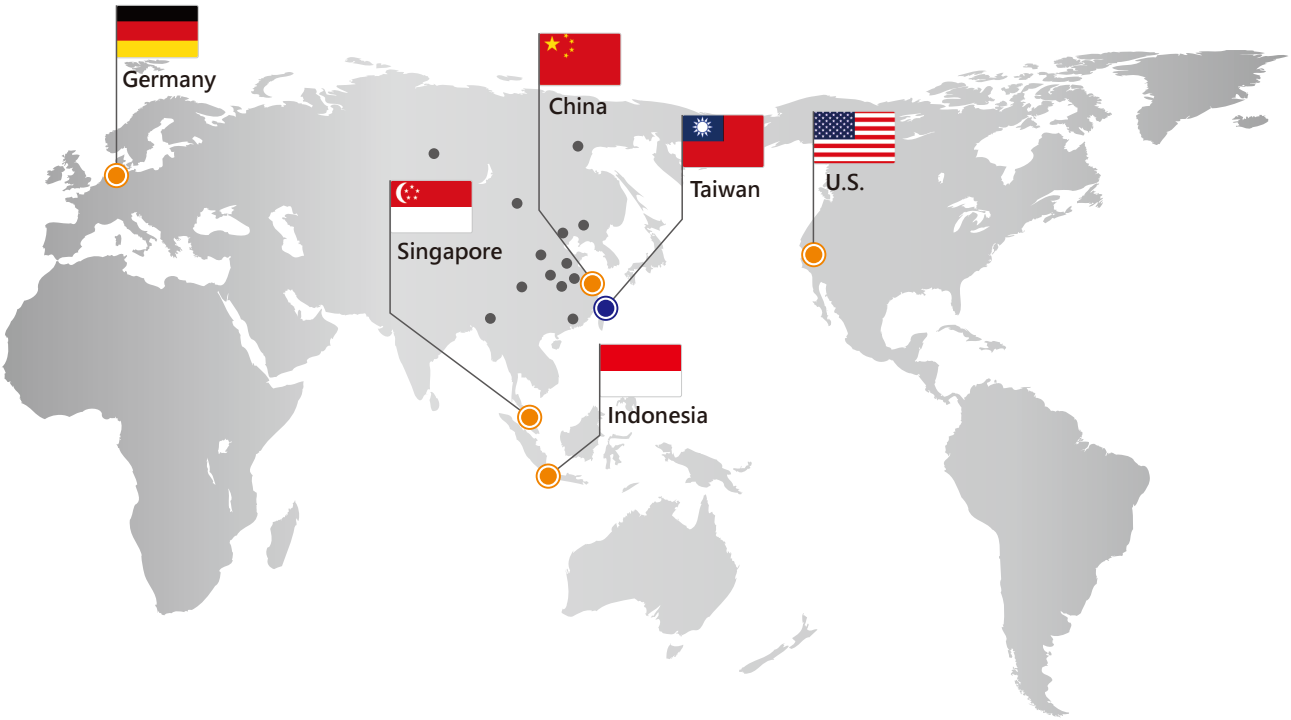
▲ FineLink RS485

▲ FineLink 1-wire

▲ EST20000-B

▲ EST20000-A

GlobalNetwork



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