



www.fine-tek.com

EST Grain Silo Temperature & Level Monitoring System



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.

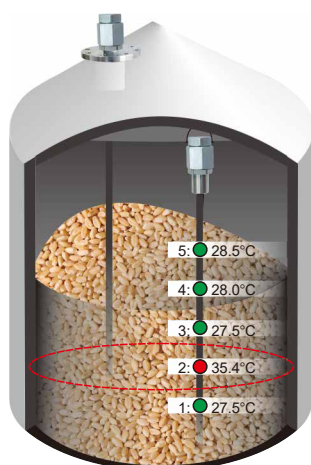
The EST can be matched with the FineLink hub series, and employs an RS485 communication interface to transmit information to a central control room or a human-machine interface via wire or wirelessly. The EST is matched with MMS-TLA silo information and integrated with monitoring software, so that a 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

EST10000-A multi-point temperature sensor	3
EST10000-B 2 in 1 grain temperature & level monitoring transmitter	5
Installation Qty Guide	7
Order Information	9
FineLink System Hub(1 to 8)	11
RCU2 Remote Control Unit	13
MMS-TL Materials Management System	15
IPC Industrial Computer	17
FineLink 1-wire / FineLink RS485	19
System Architecture	21
Wireless System Architecture	23
Application Example	27

EST10000-A

multi-point temperature sensor



System Introduction

EST10000-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 EST10000-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.



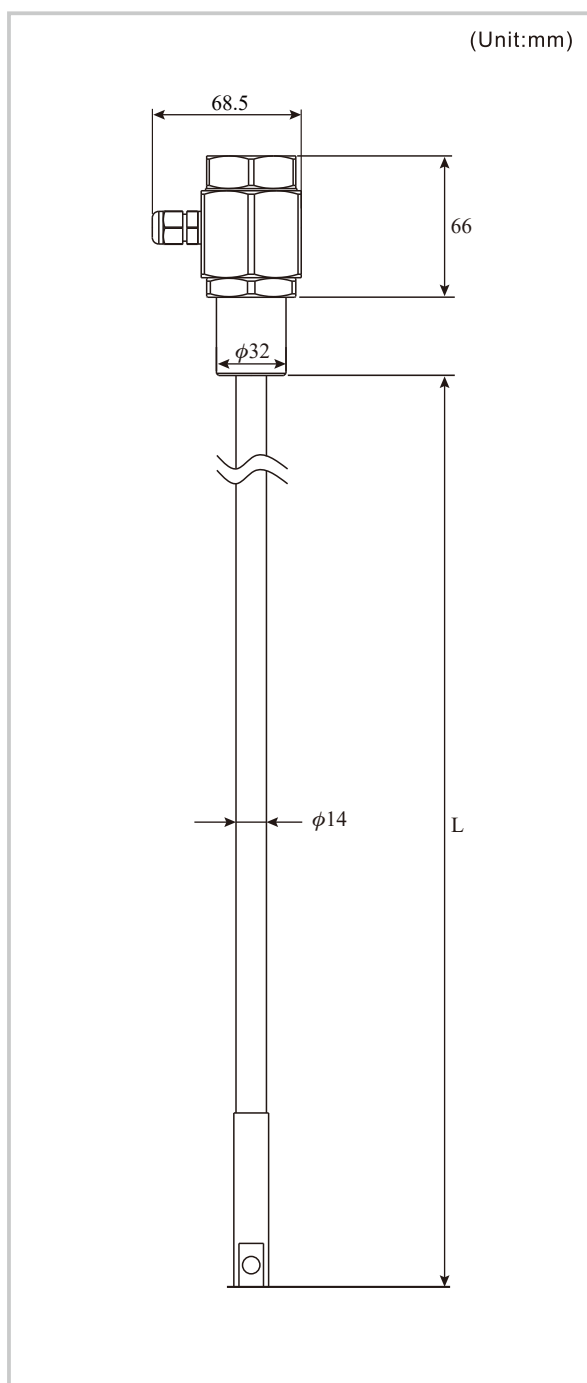
Specifications

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	2500 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)

※Requires JMW6 for intrinsic safety.

Dimension



EST10000-B 2 in 1 grain temperature & level monitoring transmitter



CE



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. EST10000-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. EST10000-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

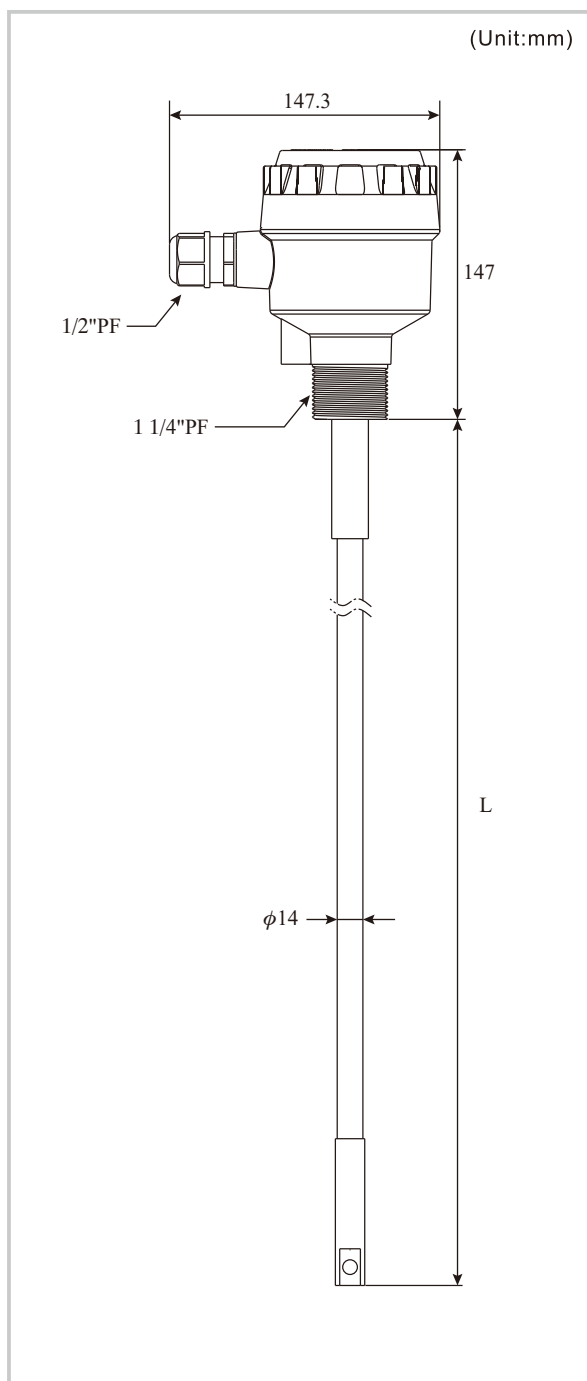
- Unique in the industry, EST10000-B transmitter integrated with simultaneous monitoring of grain level and temperature.
- Steel cable design can effectively resist the impact of grain and prolong service life of the product.
- Provide real-time multipoint temperature measurement to help managers cope 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 EST10000-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.



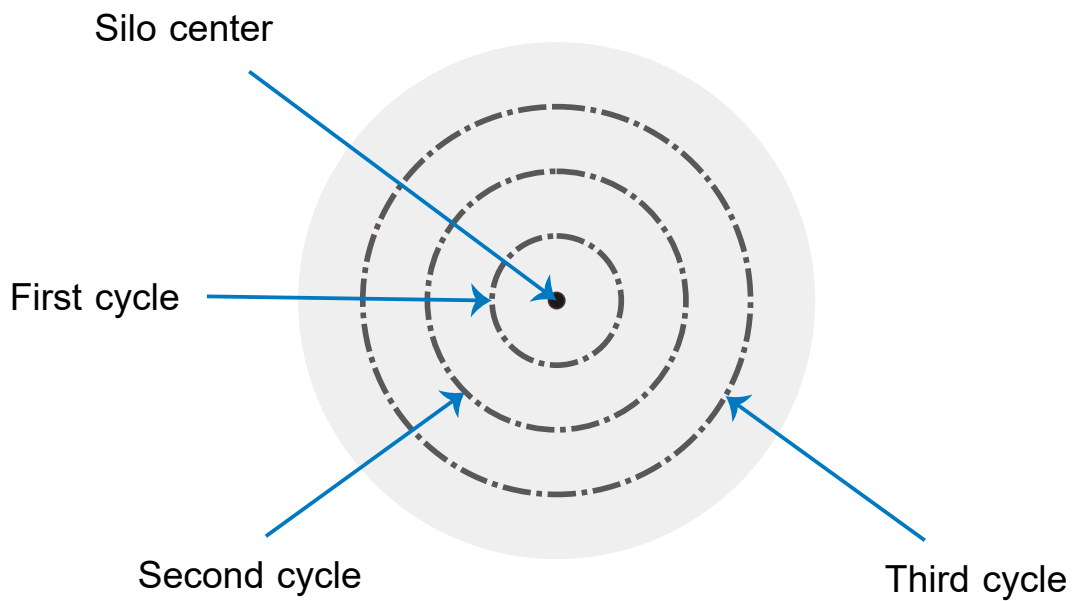
Specifications

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
	2500 Kgf
IP rating	IP67
Ambient temp.(Ta)	T80°C: -40 ≤ Ta ≤ 70°C T95°C: -40 ≤ Ta ≤ 80°C
ATEX	ATEX II 1D Ex ia IIIC T80°C, T95°C Da IECEX Ex ia IIIC T80°C, T95°C Da (Needs a matching Ex ia barrier.)

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

EST1 0 0

07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

07 08 Certification

00: None
1B: ATEX-Exia
2B: IECEx-Exia

09 Type

A: Multi-point temperature sensor (Requires JMW6 for intrinsic safety.)
B: 2 in 1 grain temperature & level monitoring transmitter

Connection

10 11

00: None
Flange item
AK: JIS-FF
AN: ANSI-RF
AS: DIN-FF

Thread item
AC: ANSI
AA: JIS

12 13

00: None
A9: 1-1/4"
B1: 1-1/2"
B2: 2"
B4: 2-1/2"
B5: 3"
B7: 4"
B8: 5"
B9: 6"
D9: DN32
E1: DN40
E2: DN50
E3: DN65
E4: DN80
E5: DN100

14 15

00: None
03: PF male
07: NPT male
40: 5kg/cm²
42: 10kg/cm²
48: 150Lbs
49: 300Lbs
57: PN10
58: PN16

(Next page)

※ The standard connect of EST10000-A is 000000
The standard connect of EST10000-B is AAA903

16 17 Connection material

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



EST1 0 0 0 0 -

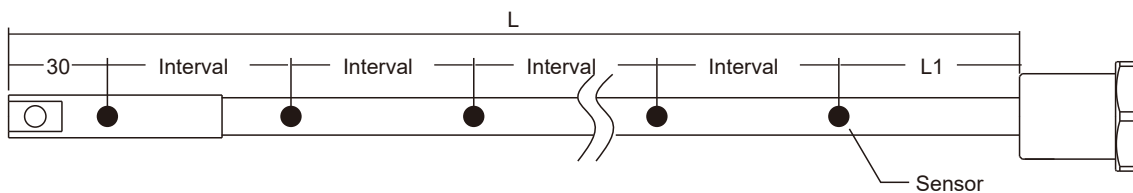
⑱⑲ Sensor interval

- 05: One sensor every 0.5m
- 08: One sensor every 0.8m
- 10: One sensor every 1.0m
- 15: One sensor every 1.5m
- 20: One sensor every 2.0m
- 28: One sensor every 2.8m

⋮

- 95: One sensor every 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 amount

- 01: 1 Pcs
- 02: 2 Pcs
- ⋮
- 30: 30 Pcs(Max)

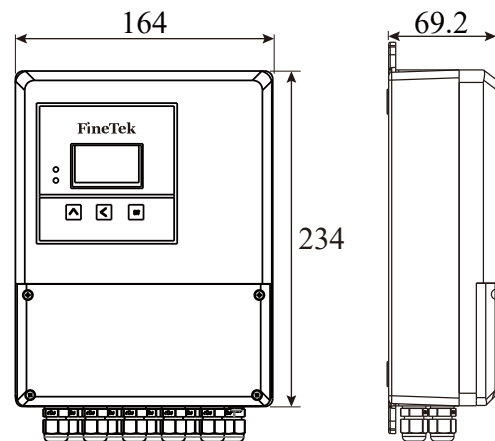
㉒㉓㉔㉕ Length

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
ATEX	ATEX II 1D Ex ia IIIC T80°C, T95°C Da IECEx Ex ia IIIC T80°C, T95°C Da ※ Need to match the barrier with same Exia explosion proof ※ Requires EST110 for intrinsic safety.



Order Information

JMW 6 ⁰⁵☐ ⁰⁶☐ ⁰⁷☐ ⁰⁸☐ - ⁰⁹☐ ¹⁰☐

⁰⁵ ⁰⁶ **Construction**

01: Wired

⁰⁷ ⁰⁸ **Certification**

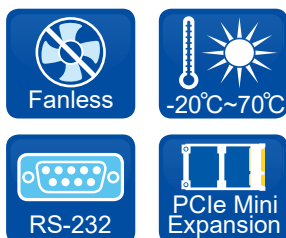
- 00: None
- 1B: ATEX-Exia
- 2B: IECEX-Exia

⁰⁹ ¹⁰ **Function**

A4: 1-wire

IPC Industrial Computer

IPC (Industrial PC)



Features

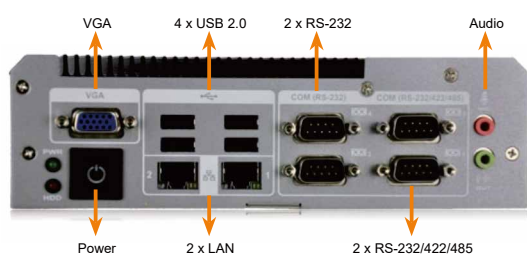
- Intel® Dual Core D2550 1.86 GHz processor
- 8 COM model: 6 x RS-232, 2 x RS-232/422/485
- 6 x USB 2.0
- Dual PCIe GbE LAN for high-speed network applications

Specifications

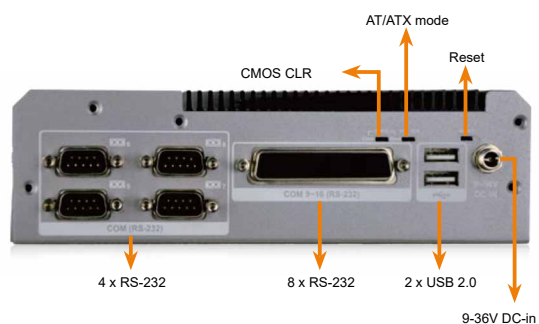
Model Name		TANK-600-D2550
Chassis	Color	Black C + Silver
	Dimensions (WxDxH)	193.4 x 200 x 57 mm
	System Fan	Fanless
	Chassis Construction	Aluminum alloy
Motherboard	CPU	Intel® D2550 1.86 GHz dual-core processor
	Chipset	Intel® NM10
	System Memory	On-board DDR3 4GB
Storage	Hard Drive	1 x 2.5" SATA HDD Bay
I/O interfaces	USB 2.0	6
	Ethernet	2 x RJ-45 Realtek 8111E GbE LAN
	RS-232	6 COM: 6 x DB-9 16 COM: 14 x RS-232 by DB-78
	RS-422/485	2 x RS-232/422/485 by DB-9
	Display	1 x VGA
	Resolution	VGA: Up to 2048 x 1536 @ 75Hz
	Audio	1 x Line-out, 1 x Mic-in
Expansions	PCIe Mini	1 x Full Size (Support mSATA) 1 x Half size
Power	Power Input	DC Jack : 9~36V DC
	Power Consumption	12V@2.2A (Intel® Atom™ D2550 with 4GB DDR3 memory)
Reliability	Mounting	VESA 100, DIN-Rail
	Operating Temperature	-20°C ~70°C with air flow (SSD), 5% ~ 95%, non-condensing
	Operating Shock	Half-sine wave shock 5G, 11ms, 3 shocks per axis
	Operating Vibration	MIL-STD-810F 514.5C-2 (with SSD)
	Weight (Net/ Gross)	2.2 Kg / 3 Kg
	Safety / EMC	CE/FCC
OS	Supported OS	Microsoft® Windows®7



Front View

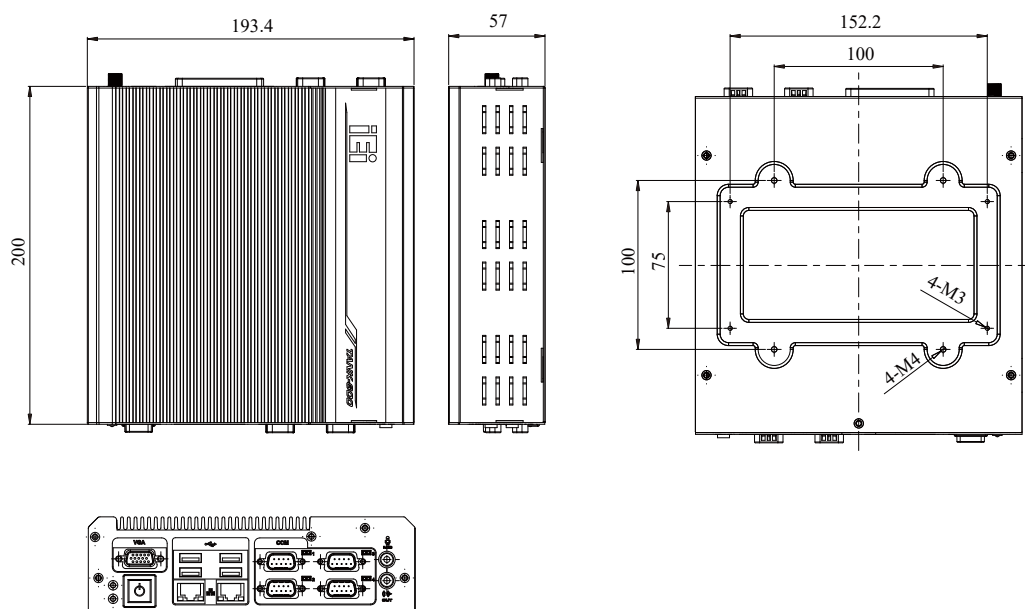


Rear View



Dimension

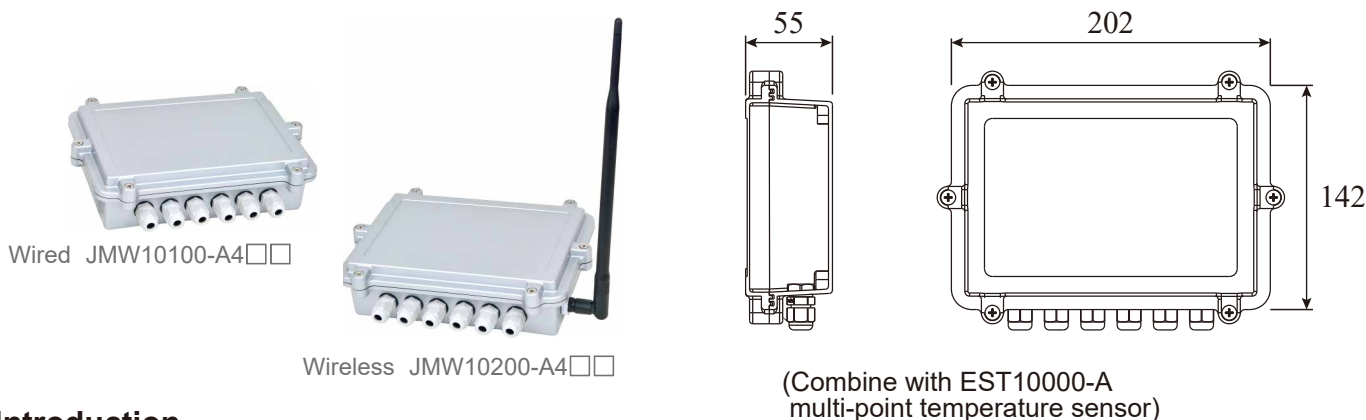
(Unit:mm)



FineLink 1-wire / FineLink RS485

FineLink 1-wire / FineLink 1-wire wireless

(Unit:mm)



Introduction

It extends and connects to the sensor through wired way, which can connect 4 sets of EST10000-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.

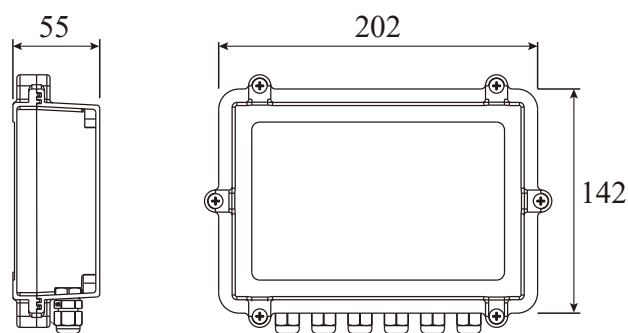
Specifications

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)



(Combine with EST10000-B 2 in 1 grain temperature & level monitoring transmitter)

Introduction

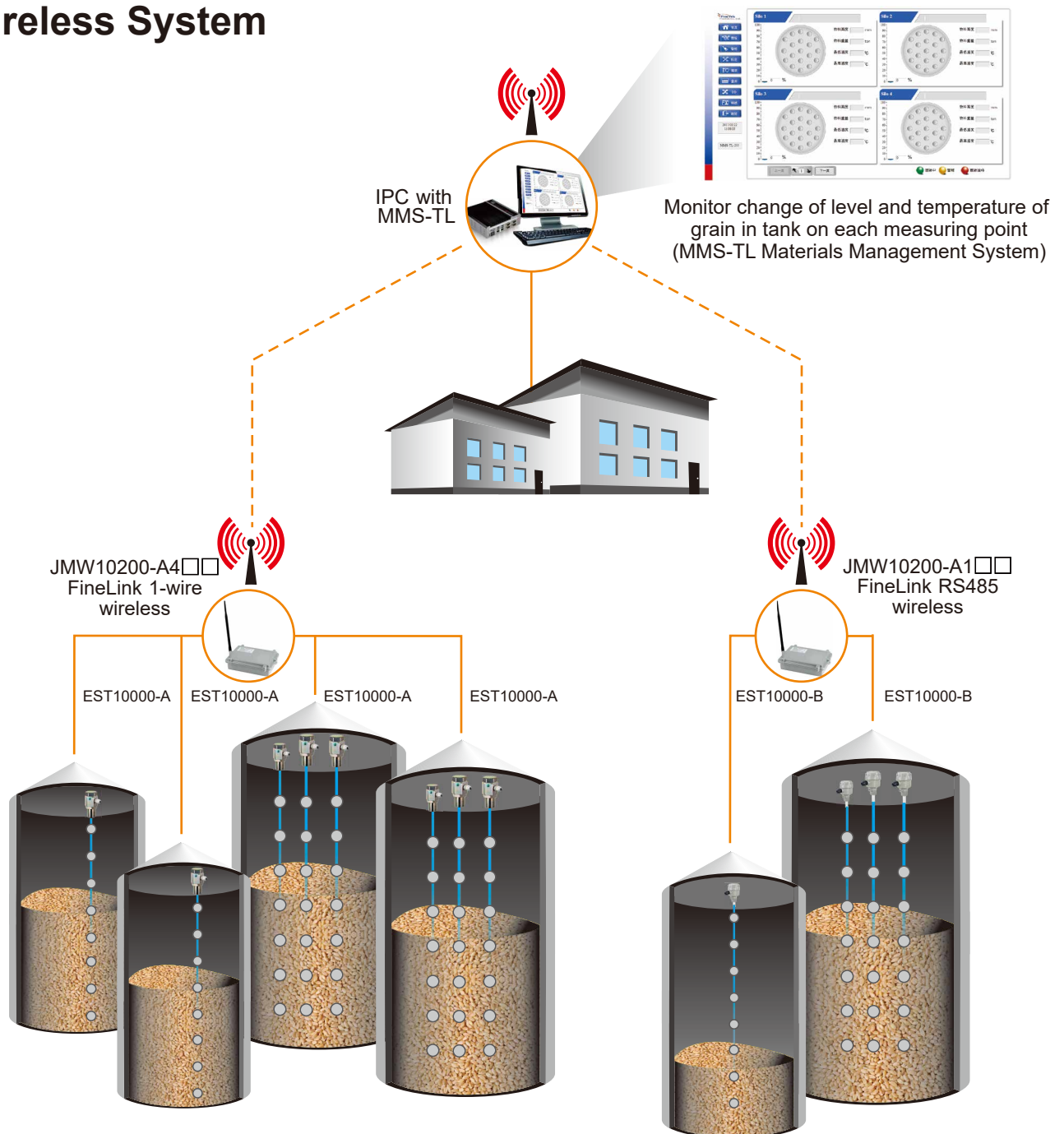
It integrates 4 sets of signals with RS485 communication mode to make wiring more convenient and clear. Each port is independent, which can prevent the whole system from crashing due to a particular equipment failure, to make users capable of maintaining multiple equipments more easily. 4 sets of 4-wire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

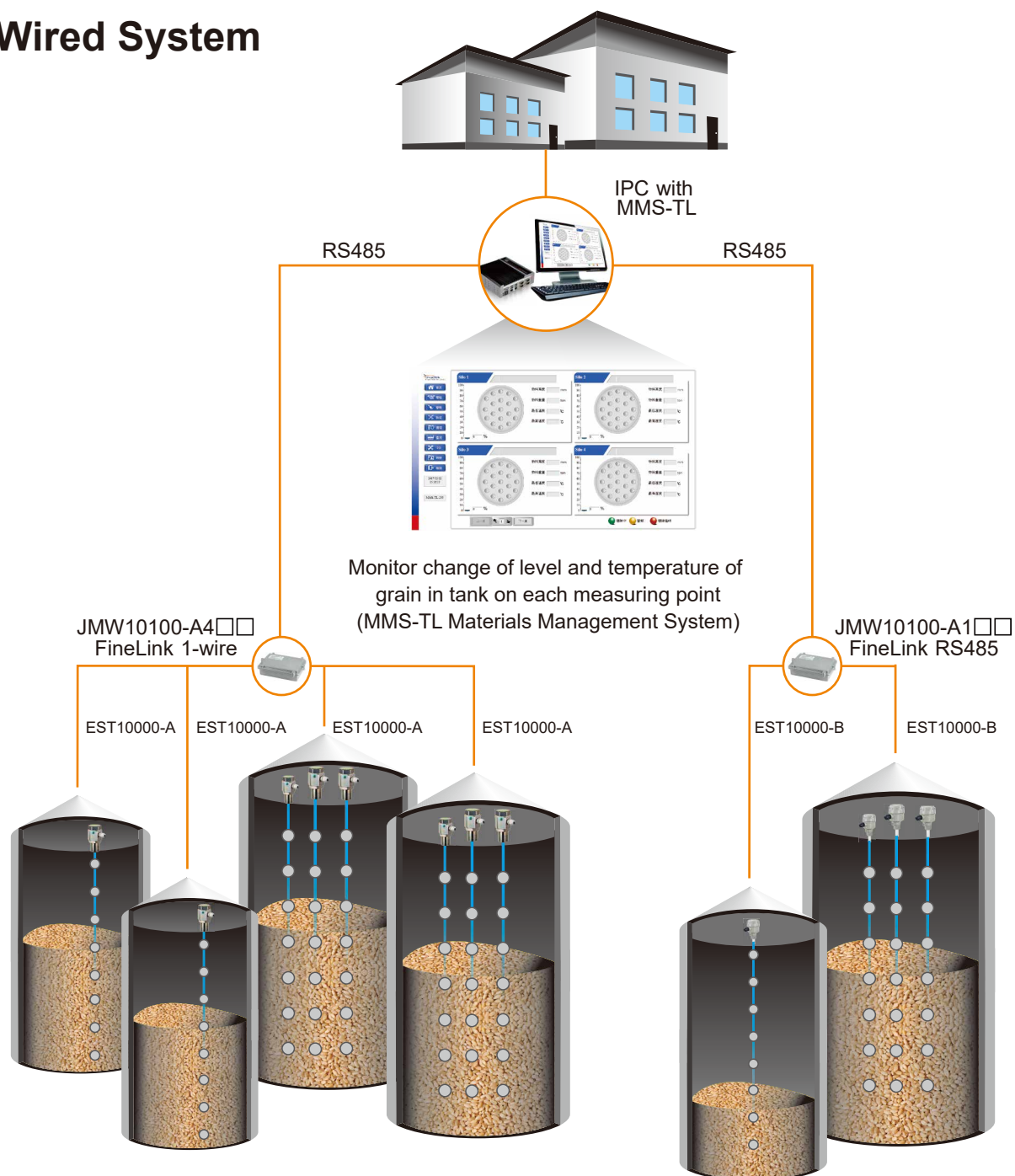
Wireless System



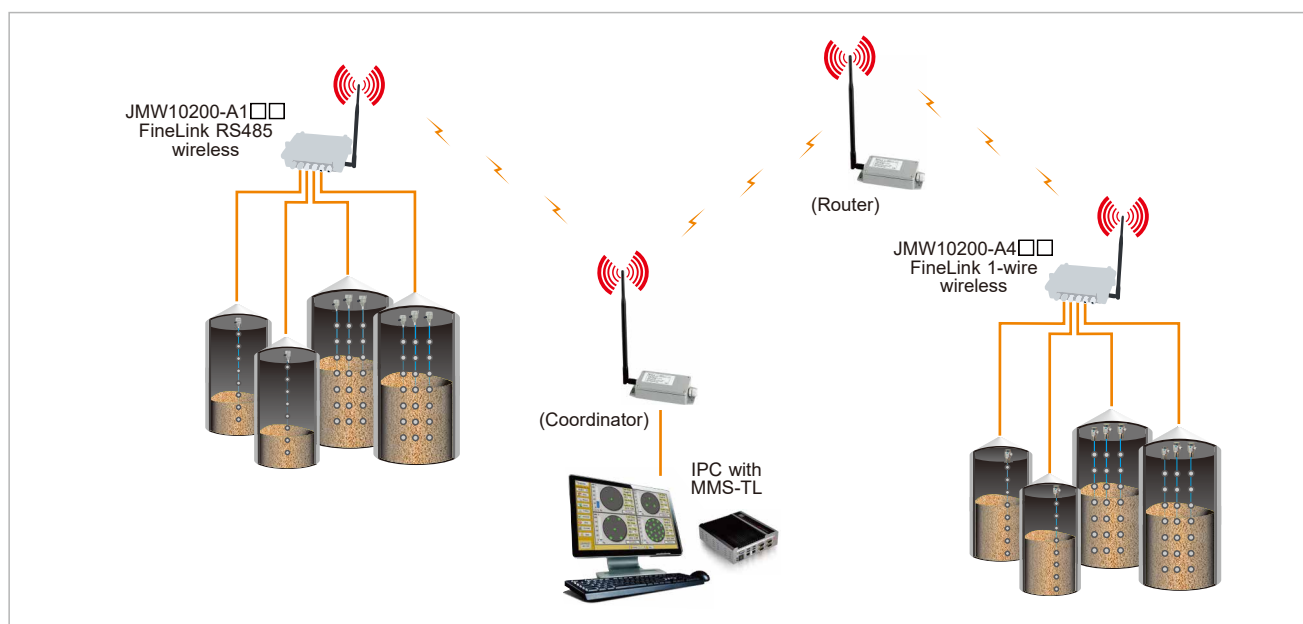
(Wireless system, please refer P15 for more details)



Wired System



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

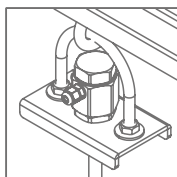
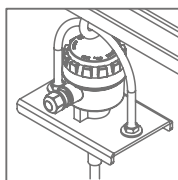
Communication	Model	Order Code	Communication interface
FineLink Wired	EST10000-B	JMW10100-A150	Input: RS-485, Output: RS-485
	EST10000-A	JMW10100-A450	Input: 1-wire, Output: RS-485
FineLink Wireless	EST10000-B	JMW10200-A157	Input: RS-485, Output: ZigBee
		JMW10200-A158	Input: RS-485, Output: LoRa
		JMW10200-A159	Input: RS-485, Output: GSM-(GPRS/3G/4G)
		JMW10200-A162	Input: RS-485, Output: NBIOT
	EST10000-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



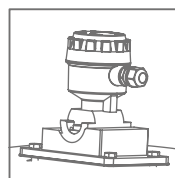
Accessories

EST110 Hanging hook
ETB-0030
(ESTAM1D-MDA0000003)

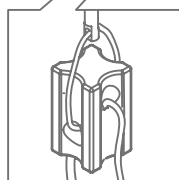
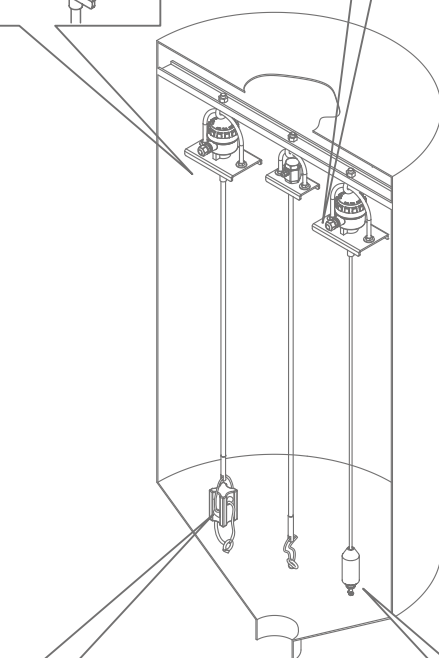
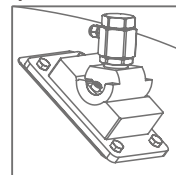
EST120 Hanging hook
ETB-0031
(ESTAM1A-0000000001)



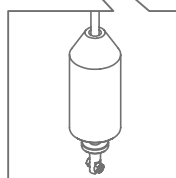
EST120 Adjustable rotation angle mechanism
ETB-0041
(ESTAM1A-0000000004)



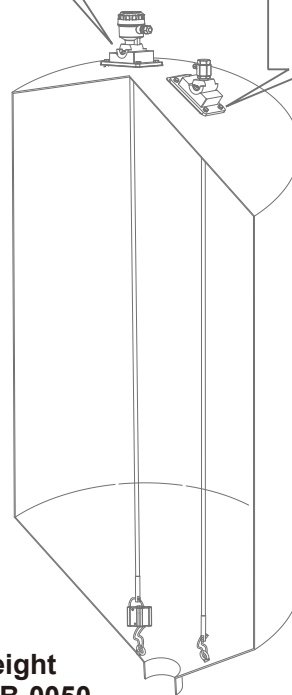
EST110 Adjustable rotation angle mechanism
ETB-0040
(ESTAM1A-0000000003)



Electrical Insulator
EBA-1403
(HP407-A01090G5)

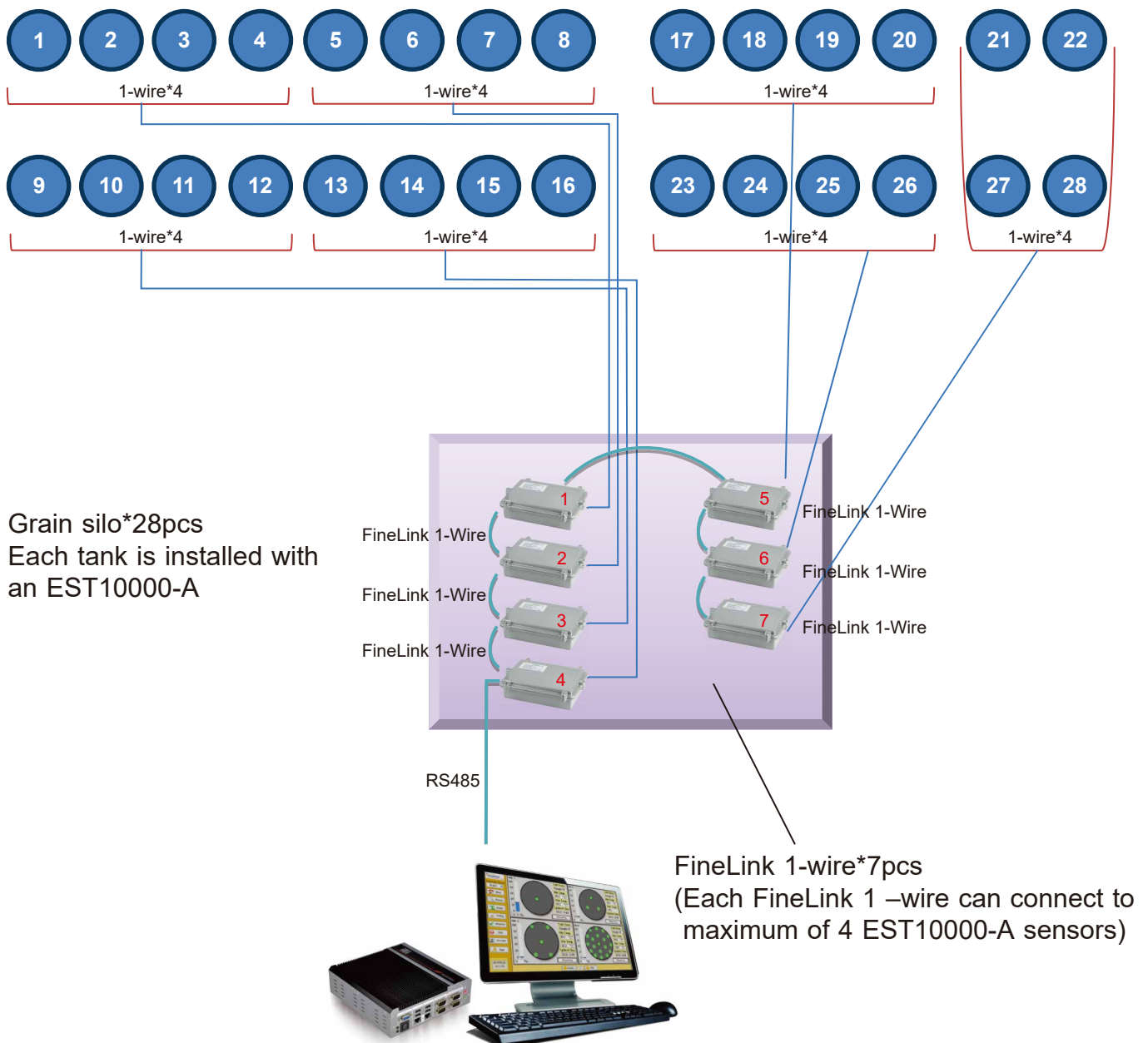


Weight
ETB-0050
(ESTAM1A-0000000005)
Material: Trivalent chromium
Weight: 5kg



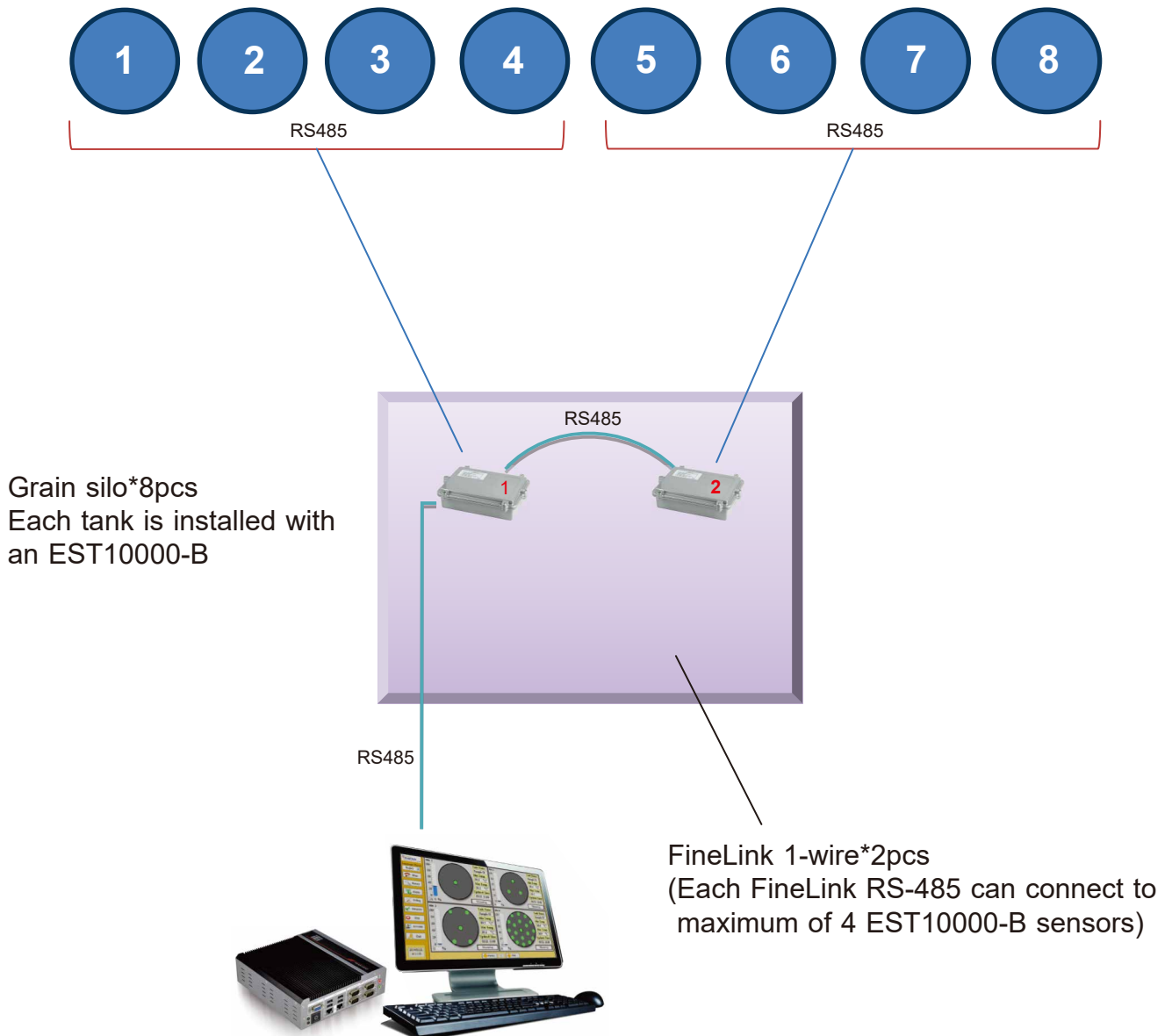
Application Example

Case 1: EST10000-A



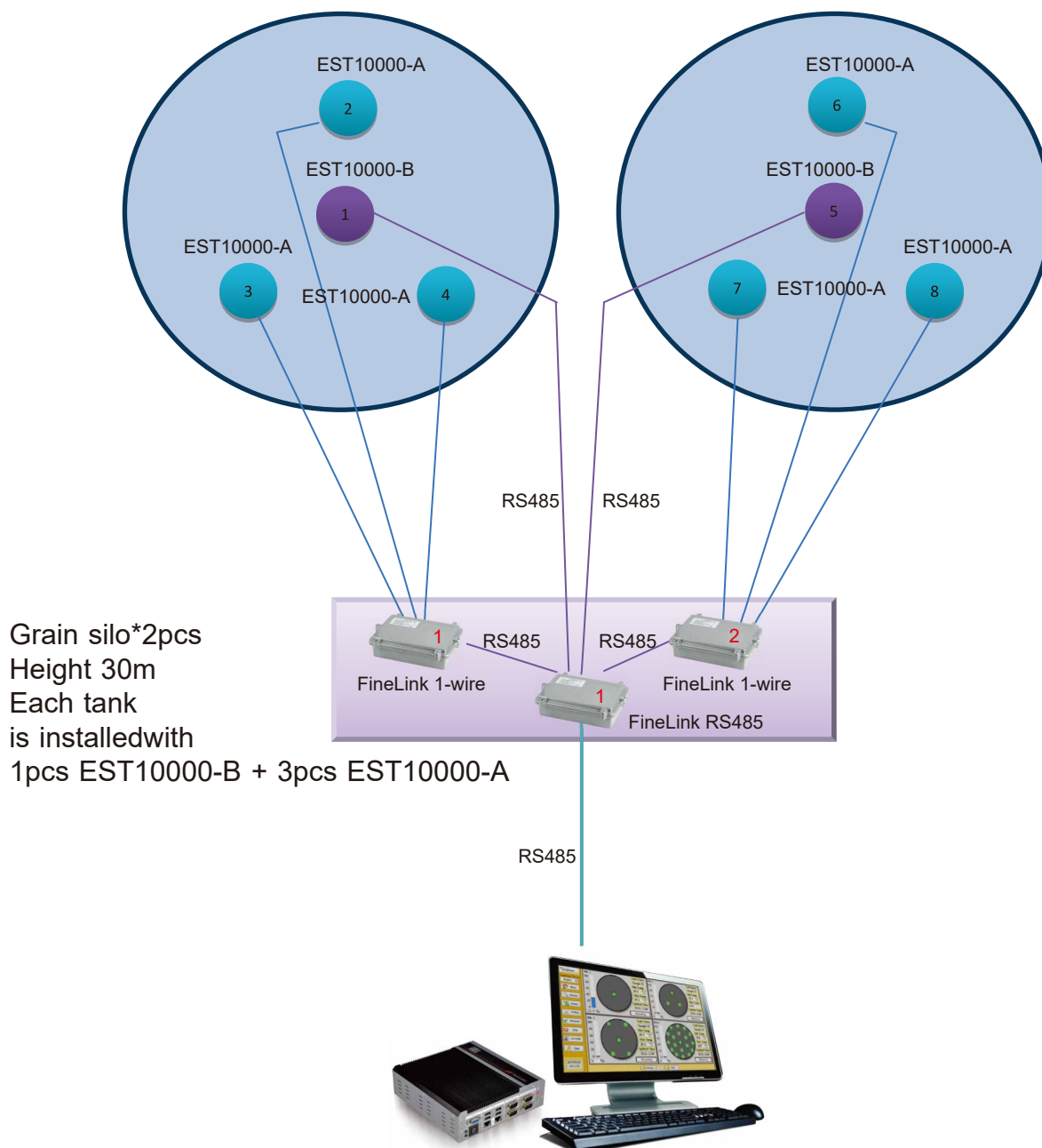


Case 2: EST10000-B



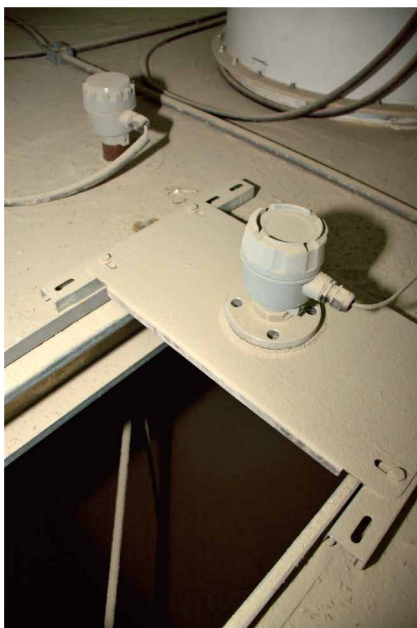
Application Example

Case 3: EST10000-A+EST10000-B

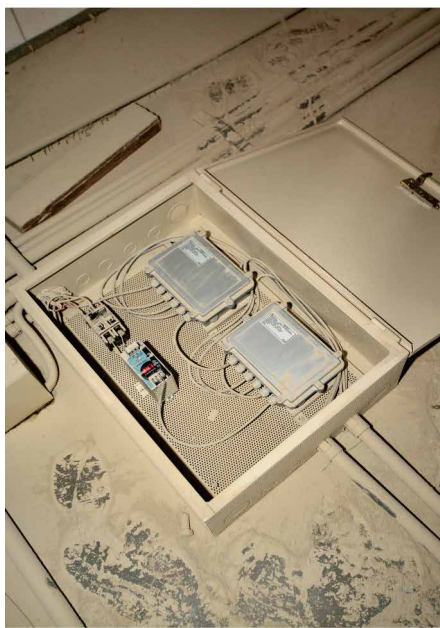




Successful stories



▲ EST10000-B



▲ FineLink RS485



▲ FineLink 1-wire

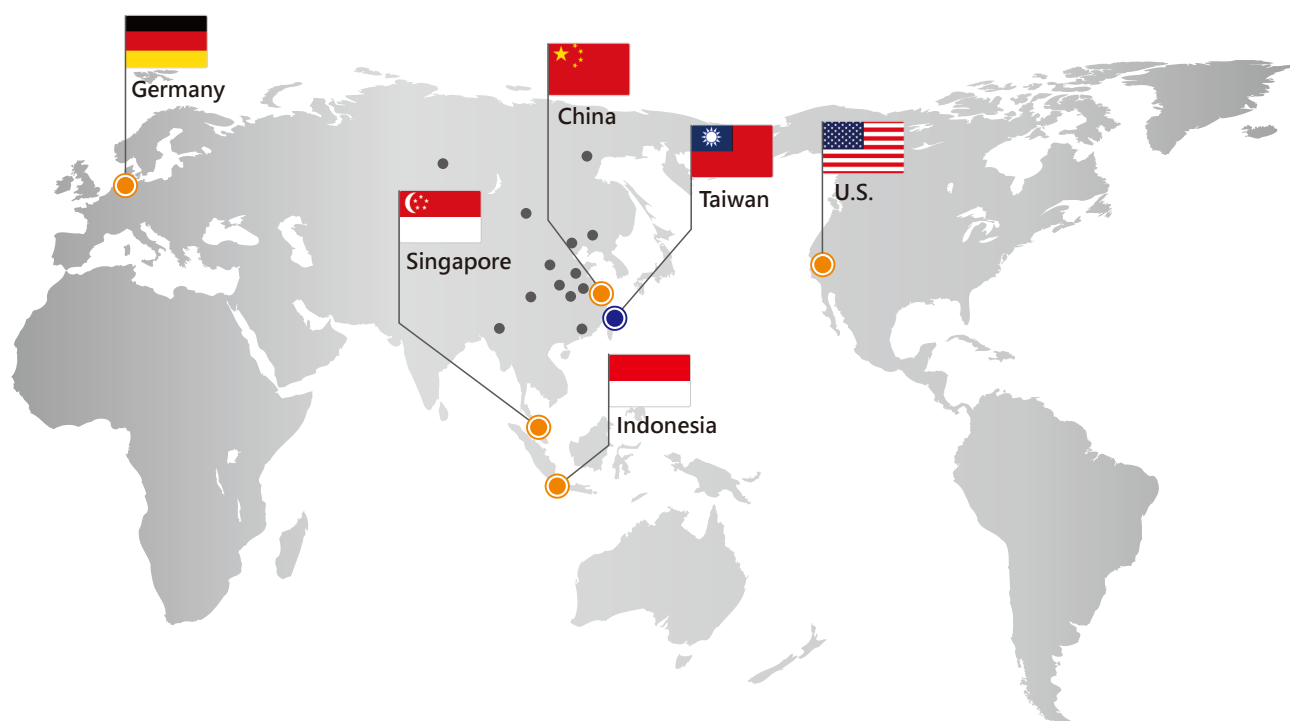


▲ EST10000-B



▲ EST10000-A

GlobalNetwork



■ HeadQuarter

- Taiwan
FineTek Co., Ltd. - Taipei Head Quarter 
No.16, Tzuchiang St., Tucheng Industrial Park
New Taipei City 236, Taiwan
TEL: 886-2-2269-6789
FAX: 886-2-2268-6682
EMAIL: info@fine-tek.com

■ NorthAmerica

- California, U.S.
Aplus Finetek Sensor Inc. - US Office
355 S. Lemon Ave, Suite D
Walnut, CA 91789
TEL: 1 909 598 2488
FAX: 1 909 598 3188
EMAIL: info@aplusfine.com

■ Europe

- Germany
FineTek GmbH - Germany Office
Bei den Kämpen 26
21220 Seevetal-Ramelsloh, Germany
TEL: +49-(0)4185-8083-12
FAX: +49-(0)4185-8083-80
EMAIL: info@fine-tek.de

■ Asia

- China
Fine automation Co., Ltd. - Shanghai Factory 
No.451 DuHui Rd, MinHang District, Shanghai,
China 201109
TEL: 86-21-6490-7260
EMAIL: info.sh@fine-tek.com
- Singapore
FineTek Pte Ltd. - Singapore Office
37 Kaki Bukit Place, Level 4 Singapore 416215
TEL: 65-6452-6340
EMAIL: info.sg@fine-tek.com
- Indonesia
PT. FineTek Automation Indonesia - Indonesia Office 
PERGUDANGAN TUNAS BITUNG
JL. Raya Serang KM. 13,8, Blok C3 No. 12&15,
Bitung Cikupa, Tangerang 15710
TEL: 62 (021)-2958-1688
EMAIL: info.id@fine-tek.com



Distributor: