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EST Grain Silo Temperature
& Level Monitoring System

Distributor:

www.fine-tek.com
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 HubLink 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.
EST110
multi-point temperature sensor

System Introduction

EST110 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 EST110 is digital signal, which can output RS485 communication mode through matching with HubLink 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 PVC, inner ring is copper wire (Standard)
- **Tensile load**: 5000 Kgf
- **IP rating**: IP67

Dimensions

(Unit:mm)

---

<table>
<thead>
<tr>
<th>Measurement range</th>
<th>-10~85°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>0.1 °C</td>
</tr>
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<tr>
<td>Position of sensors</td>
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</tr>
<tr>
<td>Cable material</td>
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</tr>
<tr>
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<td>IP rating</td>
<td>IP67</td>
</tr>
</tbody>
</table>
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. EST120 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. EST120 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.

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. EST120 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. EST120 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, EST120 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 EST120 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 | φ5.5~11.2 mm |
| Cable material | Coated with PVC, inner ring is copper wire |
| Tensile load | 5000 Kgf |
| IP rating | IP 67 |

Dimension

(Unit:mm)
Introduction

MMS-TLA intelligent grain silo temperature and level management system is a set of PC software, which can replace measurement and record manually and operating method is through configuration of electricity meter and switch. It can be widely applied to industries such as rice milling, flour, fodder, food, low temperature unhulled rice and grain crop as well as grain level environment that needs measurement of multi-point temperature. It is applicable to temperature and grain level detection in tank and barrel of general power, particle and block. MMS-TLA can monitor temperature change of the silo all the time, to prevent abnormal temperature, so as to avoid damage to the grain. It can also effectively manage entry, stock and sales of grain, to reduce operating cost, so as to increase profit and improve customers' competitiveness.

Software (MMS-TLA)

- Central processing unit (CPU) P4
- Memory RAM 512MB above
- Operating system Microsoft Windows 2000 above
- At least 1GB idle hardware space for database
- RS232 or USB

Features

- Set Item: Tank number, tank name, device number, device model, HubLink 1-Wire general setting, grain high level alarm, grain low level alarm, high temperature alarm, low temperature alarm, series port setting, connection timeout setting, selection of multiple tank types and related parameters corresponding to sizes, alarm sending mode, alarm information receiving mode and SMTP email server setting, etc.
- Display Item: Tank name, grain percentage, grain weight, minimum temperature, maximum temperature, current temperature of each measuring point of a sensing device, temperature change of a certain sensing device’s certain measuring point on that day and history information review, etc.
- Alarm Item: Grain high/low level alarm, high/low temperature alarm and connection timeout, etc.
- Report Output: History information is transformed to text or Excel format.
- Alarm Mode: Display it on the screen on the spot and utilize e-mail to transmit alarm information to preset receivers through regional Intranet or Internet.
- Account Setting: Set the account for rights of Supervisor or Operator.

Specifications

- Model Name TANK-600-D2550
- Dimensions (WxDxH): 193.4 x 200 x 57 mm
- Chassis: Aluminum alloy
- System Fan: Fanless
- CPU: Intel® D2550 1.86 GHz dual-core processor
- Chipset: Intel® NM10
- System Memory: On-board DDR3 4GB
- Storage: 1 x 2.5" SATA HDD Bay
- USB: 6
- Ethernet: 2 x RJ-45 Realtek 8111E GbE LAN
- RS-422/485: 2 x RS-232/422/485 by DB-9
- Display: 1 x VGA
- Audio: 1 x Line-out, 1 x Mic-in
- PCIe Mini: 1 x Full Size (Support eSATA)
- Mini PCIe: 1 x Half Size
- Power Input: DC Jack: 9~36V DC
- Power Consumption: 12V/2A (Intel® Atom™ D2500 with 4GB DDR3 memory)
- Reliability: Half-sine wave shock 5G, 3 shocks per axis
- Operating Temperature: -20°C ~ 70°C with air flow (SSD), 5% ~ 95%, non-condensing

IPC (Industrial PC)

- Central processing unit (CPU) P4
- Memory RAM 512MB above
- Operating system Microsoft Windows 2000 above
- At least 1GB idle hardware space for database
- RS232 or USB

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
HubLink 1-wire / HubLink RS485

Introduction
It extends and connects to the sensor through wired way, which can connect 4 sets of EST110 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-TLA silo temperature and grain level management system or PLC read and use.

Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>1-wire</th>
<th>RS485</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>10~30Vdc</td>
<td>10~30Vdc</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-40~80°C</td>
<td>-40~80°C</td>
</tr>
<tr>
<td>Connection port</td>
<td>Max.4</td>
<td>Four sets</td>
</tr>
<tr>
<td>Housing</td>
<td>Aluminum alloy (ADC-12)</td>
<td>is independent and isolated</td>
</tr>
<tr>
<td>Communication interface</td>
<td>RS-485</td>
<td>RS-485</td>
</tr>
<tr>
<td>Sensor</td>
<td>1-Wire digital temperature sensor</td>
<td>Four sets of RS-485 (each set is independent and isolated)</td>
</tr>
<tr>
<td>RS-485 baud rate</td>
<td>9600~115200</td>
<td>1200~57600</td>
</tr>
<tr>
<td>IP rating</td>
<td>IP67</td>
<td>IP67</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Specification</th>
<th>1-wire</th>
<th>RS485</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power input</td>
<td>10~30Vdc</td>
<td>10~30Vdc</td>
</tr>
<tr>
<td>Current input</td>
<td>2A</td>
<td>400 mA / CH (under power input and current of 2A)</td>
</tr>
<tr>
<td>Power output</td>
<td>10~30Vdc</td>
<td>10~30Vdc</td>
</tr>
<tr>
<td>Current output</td>
<td>400 mA / CH (under power input and current of 2A)</td>
<td>400 mA / CH (under power input and current of 2A)</td>
</tr>
<tr>
<td>Output</td>
<td>RS-485</td>
<td>RS-485</td>
</tr>
<tr>
<td>Input</td>
<td>Four sets of RS-485 (each set is independent and isolated)</td>
<td>Four sets of RS-485 (each set is independent and isolated)</td>
</tr>
<tr>
<td>Baud rate</td>
<td>1200~57600</td>
<td>1200~57600</td>
</tr>
<tr>
<td>Working temperature</td>
<td>-40~80°C</td>
<td>-40~80°C</td>
</tr>
<tr>
<td>Electrostatic protection</td>
<td>IEC61000-4-2 ESD 8kV Air, 4kV contact</td>
<td>IEC61000-4-2 ESD 8kV Air, 4kV contact</td>
</tr>
<tr>
<td>IP rating</td>
<td>IP67</td>
<td>IP67</td>
</tr>
</tbody>
</table>
Application Example

Case 1: EST110

Grain silo*28pcs
Each tank is installed with an EST110

Case 2: EST120

Grain silo*8pcs
Each tank is installed with an EST120
Application Example

Case 3: EST110+EST120

Grain silo*2pcs
Height 30m
Each tank is installed with
1pcs EST120 + 3pcs EST110

Successful stories

EST120
HubLink RS485
HubLink 1-wire

EST110

EST120

EST110

EST110

EST110

EST120
## EST110  multi-point temperature sensor

**Connection**

<table>
<thead>
<tr>
<th>Flange</th>
<th>Size</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>1-1/2&quot;</td>
<td>M: 5kg/cm²</td>
</tr>
<tr>
<td>F</td>
<td>2&quot;</td>
<td>N: 10kg/cm²</td>
</tr>
<tr>
<td>G</td>
<td>2-1/2&quot;</td>
<td>O: 150Lbs</td>
</tr>
<tr>
<td>H</td>
<td>3&quot;</td>
<td>P: 300Lbs</td>
</tr>
</tbody>
</table>

SS: Special connection  
00: No flange  
88: Hanging hook (ETB-0030)  
99: Adjustable rotation angle mechanism (ETB-0040)

**Length (Unit:m)**

- 01: 1m(min.)  
- 02: 2m  
- 30: 30m(max.)

**Sensor interval**

- 05: One sensor every 0.5m  
- 10: One sensor every 1m (std.)  
- 15: One sensor every 1.5m  
- 20: One sensor every 2.0m  
- 95: One sensor every 9.5m (max.)

**Sensor amount**

- 01: 1PCS  
- 02: 2PCS  
- 30: 30PCS(max.)

## EST120 2 in 1 grain temperature & level monitoring transmitter

**Connection**

<table>
<thead>
<tr>
<th>Flange</th>
<th>Size</th>
<th>Specification</th>
</tr>
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<tbody>
<tr>
<td>E</td>
<td>1-1/2&quot;</td>
<td>M: 5kg/cm²</td>
</tr>
<tr>
<td>F</td>
<td>2&quot;</td>
<td>N: 10kg/cm²</td>
</tr>
<tr>
<td>G</td>
<td>2-1/2&quot;</td>
<td>O: 150Lbs</td>
</tr>
<tr>
<td>H</td>
<td>3&quot;</td>
<td>P: 300Lbs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R: PF(G)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>U: NPT</td>
</tr>
</tbody>
</table>

SS: Special connection  
00: No flange  
88: Hanging hook (ETB-0031)  
99: Adjustable rotation angle mechanism (ETB-0041)

**Length (Unit:m)**

- 01: 1m(min.)  
- 02: 2m  
- 30: 30m(max.)

**Sensor interval**

- 05: One sensor every 0.5m  
- 10: One sensor every 1m (std.)  
- 15: One sensor every 1.5m  
- 20: One sensor every 2.0m  
- 95: One sensor every 9.5m (max.)

**Sensor amount**

- 01: 1PCS  
- 02: 2PCS  
- 30: 30PCS(max.)
Order Information

IPC contains MMS-TLA

ETB-0001  IPC (traditional Chinese WINXP)
  + MMS-TLA
  + RS485-USB converter (YTXPUSB485-T)

ETB-0003  IPC (English WINXP)
  + MMS-TLA
  + RS485-USB converter (YTXPUSB485-T)

ETB-0005  IPC (simplified Chinese WINXP)
  + MMS-TLA
  + RS485-USB converter (YTXPUSB485-T)

HubLink

JMH104-M  HubLink 1-wire
JMH101-M  HubLink RS485

Accessories

EST120 Hanging hook  ETB-0030
EST120 Adjustable rotation angle mechanism  ETB-0041
EST110 Adjustable rotation angle mechanism  ETB-0040

Electrical Insulator  EBA-1400