# Vibrating Probe Level Switch

www.fine-tek.com

FineTek

# PRODUCT INTRODUCTION

## WORKING PRINCIPLE

The Finetek vibrating probe switch is highly versatile and can be used for most almost any bulk solid application. This includes level detection of almost any granular, sandy, chip like, foodstuff, grain or powdery materials.
The operating principle is based on the changes of vibration frequency of the tuning fork when it comes into contact with a liquid or solid material..
The Vibrating probe contains piezoelectric crystals built into the vibration tube that produce vibrations/resonations at specific frequencies. One element acts as a transmitter of the signal and the other receives the signal and converts it to electrical output.
When the Vibrating probe comes in contact with material the vibration is weakened/dampened and results in a frequency change which triggers the switch. It's ideal for applications where: the dielectric constant is low (where capacitance level switches can't be used) ; when material moisture content changes easily; low viscosity liquids; there is a combination of differing materials in the container/tank.
The Vibrating probe provides a reliable & maintenance-free means of process control for bulk solids. Easy mounting at almost any angle and basic calibration procedures will provide reliable functioning and less required monitoring. This device can withstand tough lateral loads and static electricity.
Furthermore, it eliminates the application issues associated with jamming and clogging between tines on a 'tuning fork' device Also; it is equipped with a Fail-safe that prevents malfunctioning caused by power cuts

## FEATURES

- Voltage supply range 20~250, 50~60Hz Vac/ Vdc.
- SPDT Relay output, SSR MOSFET output.
- Sensitivity adjustment is available for different density mediums.
- Low wear and tear, maintenance free and self cleaning.
- Fine powders can be detected.
- Euro and UL certified Models available.

## APPLICATION

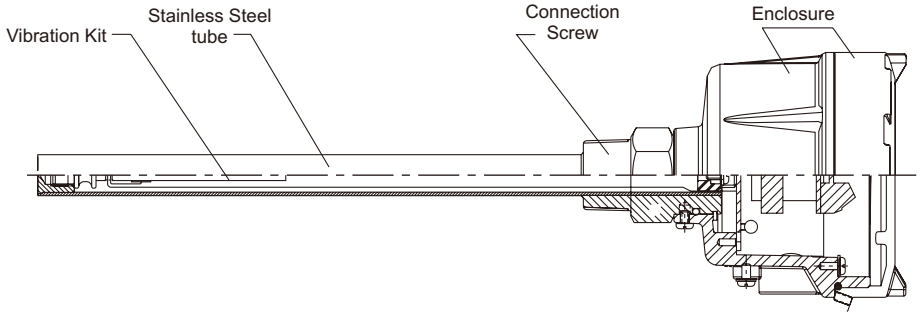
Solid Level Detection
Powders:
Powdered milk, flour, spices, coffee beans, coffee powder, tea, salt, sugar, grains, chocolate
Tobacco, powdered cellulose, powdered clay, polystyrene powder, dry soot, soda ash, coal ash

**Granular & plastics:**
Gravel, glass fine power, granular plastics, foundry sand, cements, plastic pellets
**Chip or pellet like:**
Frozen potato chips, beans, peanuts, sweets and candy, animal / pet food
Wood shavings, chalk, steering chips, styrofoams, charcoals

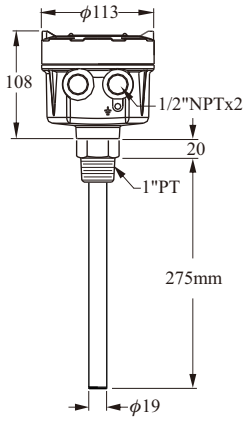
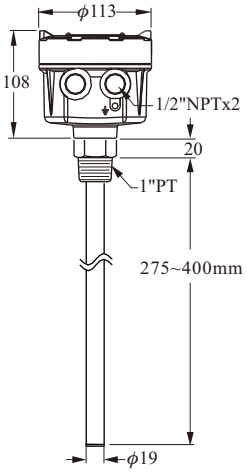
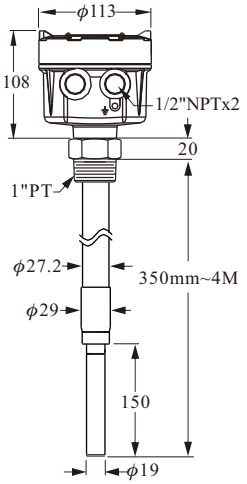
## BENEFITS

- No calibration required, easy use, sturdy and durable
- Rounded design prevents medium build up on probe
- Operates well under high temperature, humid and moist conditions
- High vibration force
  (also helps shake off build up)
- Fine powers can be detected.

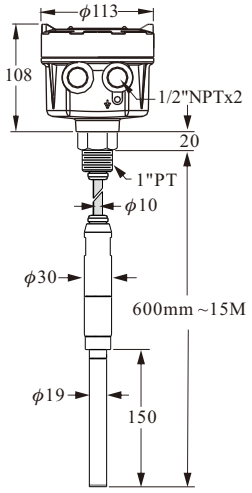
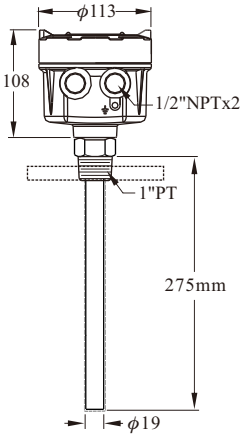
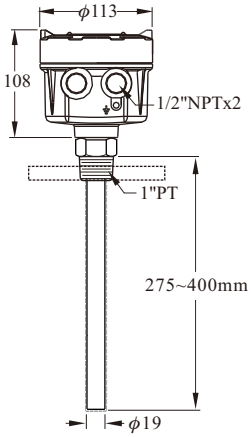
## Structure & Dimension



# SPECIFICATIONS

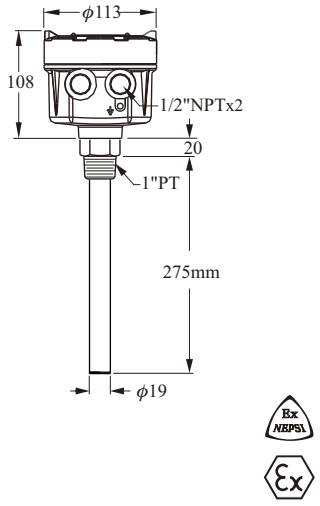
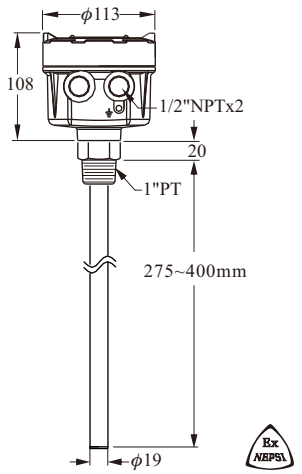
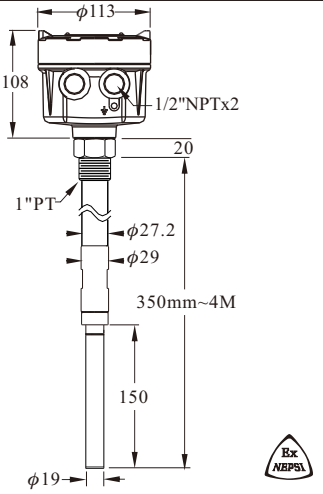
| | | | |
|---|---|---|---|
| **Dimensions (Unit:mm)** |  |  |  |
| **Order No.** | **SC2100 【Standard Model】** | **SC2110 【Probe Extension Model】** | **SC2120 【Ultra Extension Model】** |
| **Level sensor housing** | Aluminum / IP65 | | |
| **Probe construction** | SUS 304 / 316 | | |
| **Mounting** | 1"PT | | |
| **Conduit** | 1/2"NPT × 2 | | |
| **Max. vertical load on rod.** | 177in.Lbs(20Nm) | | |
| **Operating pressure.** | -1~150PSI (10BAR) | | |
| **Power supply** | 20~250, 50/60Hz Vac/ Vdc | | |
| **Power consumption** | 15VA (Max.) | | |
| **Operating temp. in ambient air** | -40°C~60°C | | |
| **Operating temp. in bin** | -40°C~80°C | | |
| **Signal output** | Relay, SPDT, 5A/250Vac, PNP/NPN(MOSFET)400mA/60 Vac/ Vdc | | |
| **Min. material density sensed** | Solid: ≥0.32g/cm$^3$ | | |
| **Time delay** | 0.6~1 Second / Operate; 2~5 Seconds / Reset | | |
| **Remote-test** | Yes | | |
| **Vibrating frequency.** | 395~405HZ | | |
| **Selectable Fail-safe** | Hi./ Lo. | | |
| **Selectable sensitivity** | Hi./ Lo. | | |

# SPECIFICATIONS

| | | | |
|---|---|---|---|
| **Dimensions (Unit:mm)** |  |  |  |
| **Order No.** | **SC2300 【Cable Extension Model】** | **SC2500 【Corrosion-Proof】** | **SC2510【Corrosion-Proof & Extension Typ】** |
| **Level sensor housing** | Aluminum / IP65 | | |
| **Probe construction** | SUS 304 / 316 | SUS 304/316 Coating TEFLON | SUS 304/316 Coating TEFLON |
| **Mounting** | 1"PT | Flange 1"(min.) | Flange 1"(min.) |
| **Conduit** | 1/2"NPT × 2 | | |
| **Max. vertical load on rod.** | 177in.Lbs(20Nm) | | |
| **Operating pressure.** | -1~150PSI (10BAR) | -1~150PSI (10BAR) | -1~150PSI (10BAR) |
| **Power supply** | 20~250, 50/60Hz Vac/ Vdc | | |
| **Power consumption** | 15VA (Max.) | | |
| **Operating temp. in ambient air** | -40°C~60°C | | |
| **Operating temp. in bin** | -40°C~80°C | | |
| **Signal output** | Relay, SPDT, 5A/250Vac, PNP/NPN(MOSFET)400mA/60 Vac/ Vdc | | |
| **Min. material density sensed** | Solid: ≥0.32g/cm$^3$ | | |
| **Time delay** | 0.6~1 Second / Operate; 2~5 Seconds / Reset | | |
| **Remote-test** | Yes | | |
| **Vibrating frequency.** | 395~405HZ | | |
| **Selectable Fail-safe** | Hi./ Lo. | | |
| **Selectable sensitivity** | Hi./ Lo. | | |

NEPSI PROOF NO. GYJ111212 Ex d IIC T3~T6
PTB PROOF NO. 05 ATEX 1026 Ⓔx II 2G Ex d IIB T6 Gb
Ⓔx II 2D Ex tb IIIC T85°C Db IP65

# SPECIFICATIONS

| | | | |
|---|---|---|---|
| Dimensions (Unit:mm) |  |  |  |
| **Order No.** | **SC1700 【Standard Type】** | **SC1701 【Probe Extension Type】** | **SC1710 【Ultra Extension Type】** |
| **Level sensor housing** | Aluminum | | |
| **Probe construction** | SUS 304 / 316 | | |
| **Mounting** | Screw: 1"PT or PF, Flange: 1"~6"JIS / DIN / ANSI | | |
| **Conduit** | 1/2"NPT × 2 | | |
| **Max. vertical load on rod.** | 177in.Lbs(20Nm) | | |
| **Operating pressure.** | -1~150PSI (10BAR) | | |
| **Power supply** | 20~250Vac/dc | | |
| **Power consumption** | 15W | | |
| **Operating temp. in ambient air** | -20°C~70°C | | |
| **Operating temp. in bin** | -40°C~80°C | | |
| **Signal output** | Relay, SPDT , 3A/250Vac Max. | | |
| **Min. material density sensed** | Solid: ≥0.32g/cm$^3$ | | |
| **Time delay** | 0.6 Second / Operate; 2~5 Seconds / Reset | | |
| **Vibrating frequency.** | 395~405HZ | | |
| **Selectable Fail-safe** | Hi./ Lo. | | |
| **Selectable sensitivity** | Hi./ Lo. | | |

# INSTALLATION

### Vertical Installation (Figure 1):

1. Install the vibrating probe away from the inlet to avoid material impact or false readings.
2. Note the material flow pattern and place the vibrating probe in the appropriate position to avoid overflow.

### Horizontal Installation (Figure 2)

1. Install the vibrating probe away from the inlet to avoid material impact. If this is unavoidable make use of a shield or barrier for protection.
2. Installing the vibrating probe at a 20 degree incline will optimize the results and increase sensitivity.
3. Keep the conduit facing downward to avoid moisture getting inside the housing.

### Notice:

1. Users are advised to tighten the connection by using a spanner.
2. Do not bend the probe, put force on it or attempt to modify the probe length.
3. The maximum vertical pressure of the vibrating probe is 177in.Lbs (20Nm)

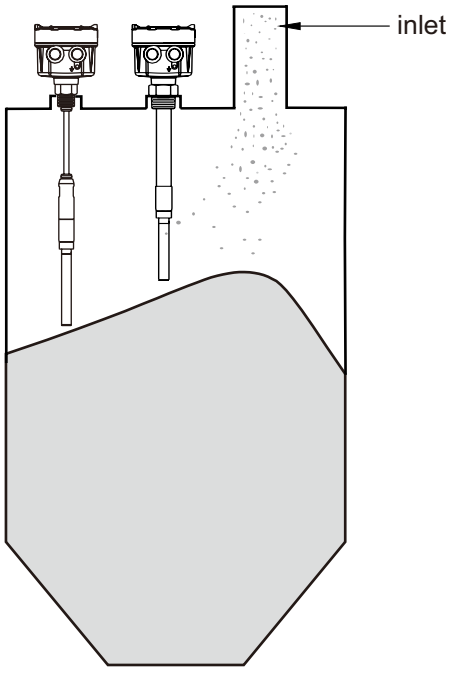



Figure 1

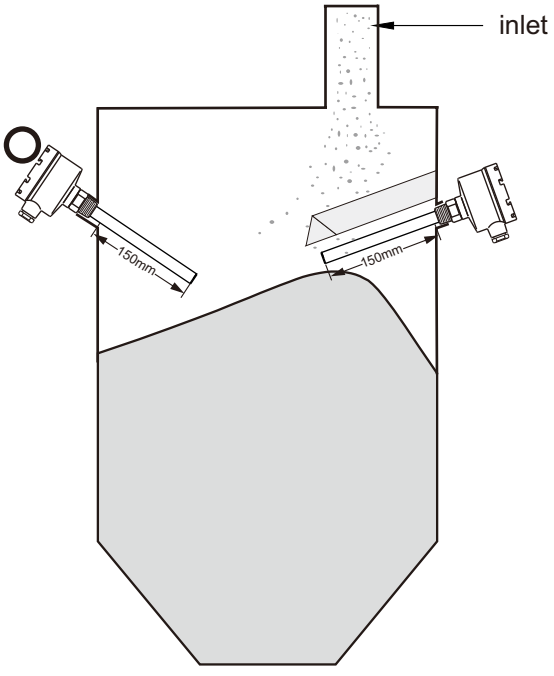



Figure 2

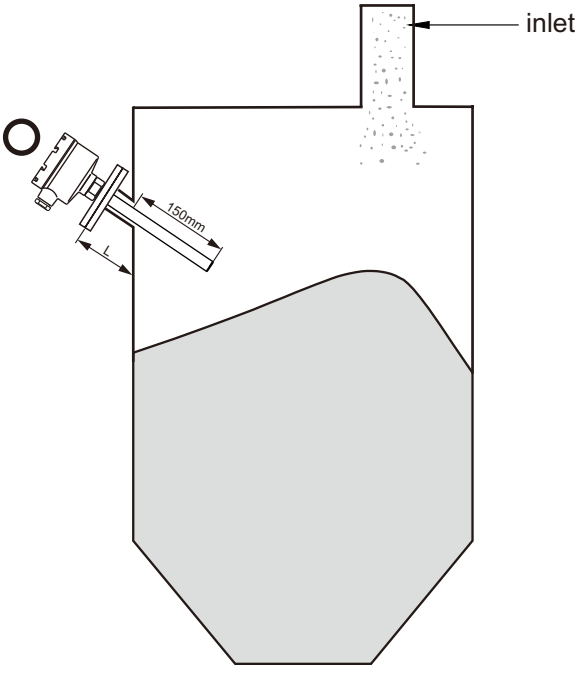
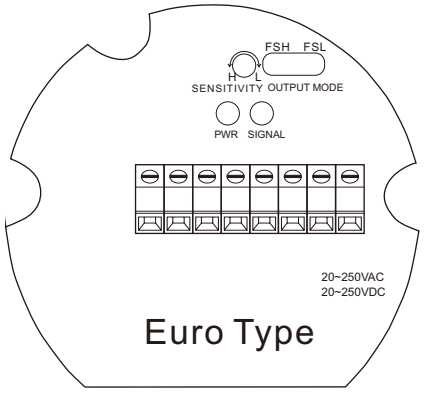
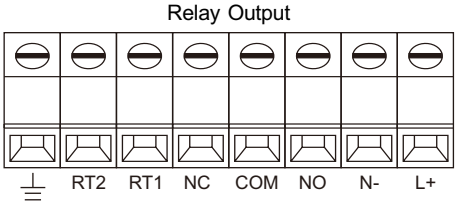


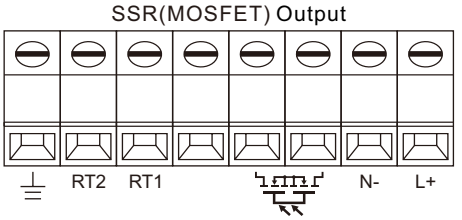

Figure 3

# OPERATING INSTRUCTIONS (EURO MODEL)

SC2100X, SC2110X, SC2200X, SC2210X,SC2300X, SC2500X, SC1700X, SC1701X,SC1710X




## Terminal Function

- L+, N-: Power Supply
- NC, COM, No: Relay Output
- RT1, RT2: Remote-Test
- ⏚ : Ground Connection
- : SSR(MOSFET) Output

## Panel Function

- PWR: Power Supply (Green Light)
- SIGNAL: Output Indication (Red Light)
- FSH: Power On. The signal lamp is on and the relay is conductive. While the vibrating probe senses the material, the signal lamp is off and relay is not conductive.
- FSL: Power On. The signal lamp is off and the relay is not conductive. While the probe senses the material, the signal lamp is on and relay is conductive.
- SENSITIVITY L: Low Sensitivity
- SENSITIVITY H: High Sensitivity

## Sensitivity Adjustment

1. SENSITIVITY: Located upside of PCB. When switching to H position, it has the highest sensitivity. When switching to L position, it has the lowest sensitivity. The original setting is at L position and users are able to adjust the sensitivity depends on the specific gravity of material.

## Fail-Safe High / Low Protection

**FSH (Fail-Safe High) Protection:**
Switch to FSH mode.
Normal Status: The signal lamp is on. It means that the vibrating probe does not sense the material and the relay is conductive.
Failure: When the power shuts down, the signal lamp is off. It means that the vibrating probe is voided and the relay is not conductive.

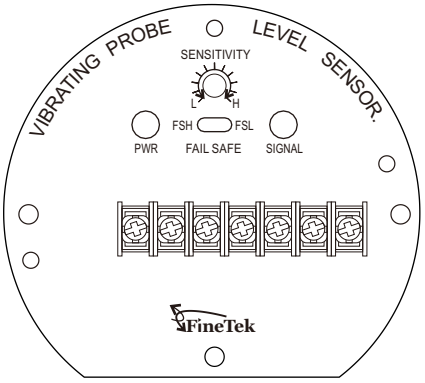
**FSL (Fail-Safe Low) Protection:**
Switch to FSL mode.
Normal Status: The signal lamp is on. The vibrating probe senses the material and the relay is conductive.
Failure: When the power shuts down, the signal lamp is off. The vibrating probe is voided and the relay is not conductive.

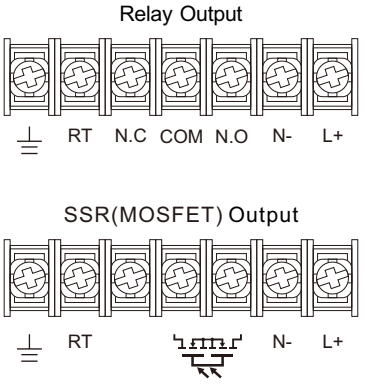
| | FSL | | FSH | |
|---|---|---|---|---|
| Level | | | | |
| Contact Form | NO COM NC | NO COM NC | NO COM NC | NO COM NC |
| Indication | ○ | ☼ | ☼ | ○ |
| Status | Fail | Normal | Normal | Fail |

☐H: High Sensitivity (Suitable for detecting low specific gravity material)
☐L : Low Sensitivity (Suitable for detecting low specific gravity material)

# OPERATING INSTRUCTIONS (UL MODEL)

SC2100X, SC2110X, SC2200X, SC2210X,SC2300X, SC2500X, SC1700X, SC1701X,SC1710X




## Terminal Function

- L+, N-: Power Supply
- NC, COM, No: Relay Output
- RT: Remote-Test
- ⏚ : Ground Connection
- ⊓⊓ : SSR(MOSFET) Output

## Panel Function

- PWR: Power Supply (Green Light)
- SIGNAL: Output Indication (Red Light)
- FSH: Power On. The signal lamp is on and the relay is conductive. While the vibrating probe senses the material, the signal lamp is off and relay is not conductive.
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- SENSITIVITY L: Low Sensitivity
- SENSITIVITY H: High Sensitivity

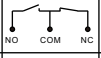
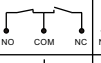
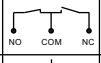
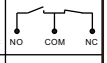
## Sensitivity Adjustment

1. SENSITIVITY: Located upside of PCB. When switching to H position, it has the highest sensitivity. When switching to L position, it has the lowest sensitivity. The original setting is at L position and users are able to adjust the sensitivity depends on the specific gravity of material.

## Fail-Safe High / Low Protection

**FSH (Fail-Safe High) Protection:**
Switch to FSH mode.
Normal Status: The signal lamp is on. It means that the vibrating probe does not sense the material and the relay is conductive.
Failure: When the power shuts down, the signal lamp is off. It means that the vibrating probe is voided and the relay is not conductive.

**FSL (Fail-Safe Low) Protection:**
Switch to FSL mode.
Normal Status: The signal lamp is on. The vibrating probe senses the material and the relay is conductive.
Failure: When the power shuts down, the signal lamp is off. The vibrating probe is voided and the relay is not conductive.

| | FSL | | FSH | |
|---|---|---|---|---|
| Level |  |  |  |  |
| Contact Form |  |  |  |  |
| Indication | ○ | ☼ | ☼ | ○ |
| Status | Fail | Normal | Normal | Fail |

☐H: High Sensitivity (Suitable for detecting low specific gravity material)
☐L : Low Sensitivity (Suitable for detecting low specific gravity material)

# HOW TO ORDER

**SC□□□□ □ (□ □□) (□□□□)**

## ORDER NO.

2100: Standard Model
2110: Extension Model
2120: Vibrating Probe Ultra Extension Model
2300: Cable Extension Model
2500: Corrosion Proof Model
Explosion Proof models
1700: Standard
1701: Extension
1710: Ultra Extension

## POWER & OUTPUT MODULE

20~250Vac/ Vdc, 50/60Hz
A: Relay O/P (Barrier terminal block-limited to the 17's and 21's series)
B: Transistor PNP/NPN (Barrier terminal block-limited to the 17's and 21's series)
R: Relay O/P (Green terminal)-EuroType
N: Transistor PNP/NPN-EuroType

## MATERIAL

0: SUS304
6: SUS316
A: Stainless steel+PFA
E: Stainless steel+ECTFE(black)

## CONNECTION

| Dimension | Specification |
|---|---|
| D---1"(25A)<br>3---1-1/4"(32A)<br>E---1-1/2"(40A)<br>F---2"(50A)<br>G---2-1/2"(65A)<br>H---3"(80A)<br>I---4"(100A)<br>J---5"(125A)<br>K---6"(150A)<br>S---others | M---5kg/cm$^2$<br>N---10kg/cm$^2$<br>O---150 Lbs<br>P---300 Lbs<br>Q---PT<br>R---PF(G)<br>T---BSP<br>U---NPT<br>W---PN 10<br>X---PN 16<br>Y---PN 25<br>Z---PN 40<br>S---others<br>9---Sanitary |

## LENGTH (L) (UNIT: cm)

**0500:** below 500mm
**1000:** 501~1000mm
**1500:** 1001~1500mm
•
•
•

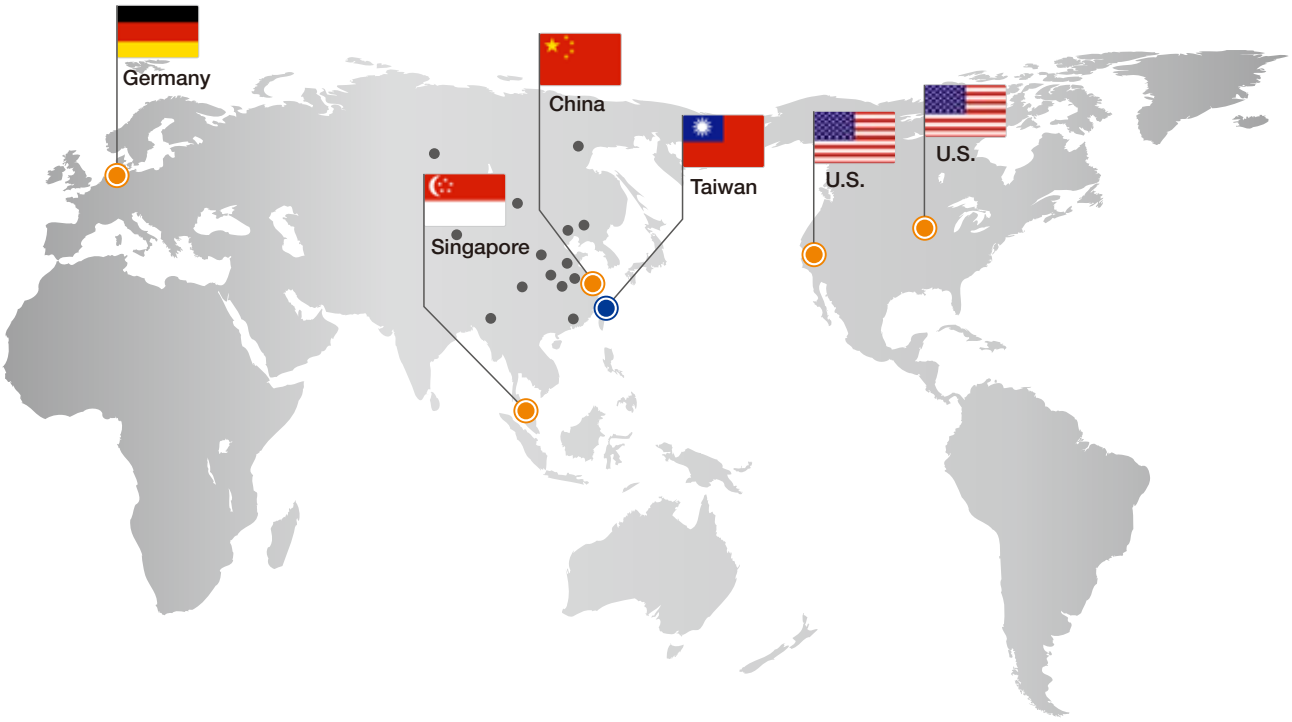
※ 500mm per Unit
※ The letter A depicts lengths longer than 10m: A150 =15m, A200 = 20m

## CHECK – before placing order

1. Check the voltage.
2. Check the mounting positions.
3. Check the material specific gravity (S.G.) value.
4. Check whether any bridge block or vibrating motors are attached to the silo wall.

Length tolerance/margin of error : ±5mm
Characteristics, specifications and dimensions are subject to change
Please contact your nearest distributor for further information.
※ Material Coode A and E, limited to SC1710, SC2120 these products.

# Global Network

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FAX: 886-3-9909659

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FAX: 886-4-2337-0836

FINETEK CO., LTD. - Kaohsiung Branch
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FineTek

**Distributor:**

08-SC01-B0-EP, 12/30/2015