



Vibrerande Gaffelnivåvakt serie SC

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PRODUCT INTRODUCTION

WORKING PRINCIPLE

The FineTek tuning fork level switch is suitable level control switch for liquids, sludges, petroleums as well solid level detection of almost any granular, sandy, chip like, powdery, low bulk density materials.

The working 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 Tuning fork contains piezoelectric crystals built into the vibration tube that produces 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 fork comes in contact with material the vibration is weakened/dampened and results in 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 tuning fork level switch provides a reliable & maintenance-free means of process control for bulk solids. Easy mounting at almost any angle and calibration procedures will provide reliable functioning and less required monitoring. This device can withstand tough lateral loads and static electricity. Also, it is equipped with a Fail-safe that prevents malfunctioning caused by power shortage.

FEATURE

- Glass window, to review power supply and output directly without having to take off enclosure cover (SC 3 series).
- Dual insulation can reduce damage on PCB board caused by temperature, humidity, and condensation effects.
- Wide voltage supply range 20~250, 50~60Hz Vac/ Vdc
- SPDT Relay output, SSR MOSFET output.
- No calibration required, easy use, sturdy and durable design.
- High / Low failure safe modes.
- Sensitivity adjustment is abailable for different density of media. Fine power can be detected.
- Suitable for liquid, power, solid applications.

APPLICATION

- Most materials in powder can be measurable, includes the grounded coffee, milk power, chocolate, coal ash, bulk, sugar, salt, wheat, grains, glass debris, plastic pellet, cement
- Sludge level detection in waste water

The SC series detects the min. and max of level in bins, silos and hoppers, filled with powdered materials. The following list shows its applications.

SOLID LEVEL DETECTION

- * Powdered milk
- * Frozen potato chips
- * Beans
- * Sugar
- * Sweets
- * Coffee beans
- * Coffee Powder
- * Tea
- * Salt
- * Flour (in a flour mill)
- * Foundry sand
- * Spices
- * Animal food
- * Pellets

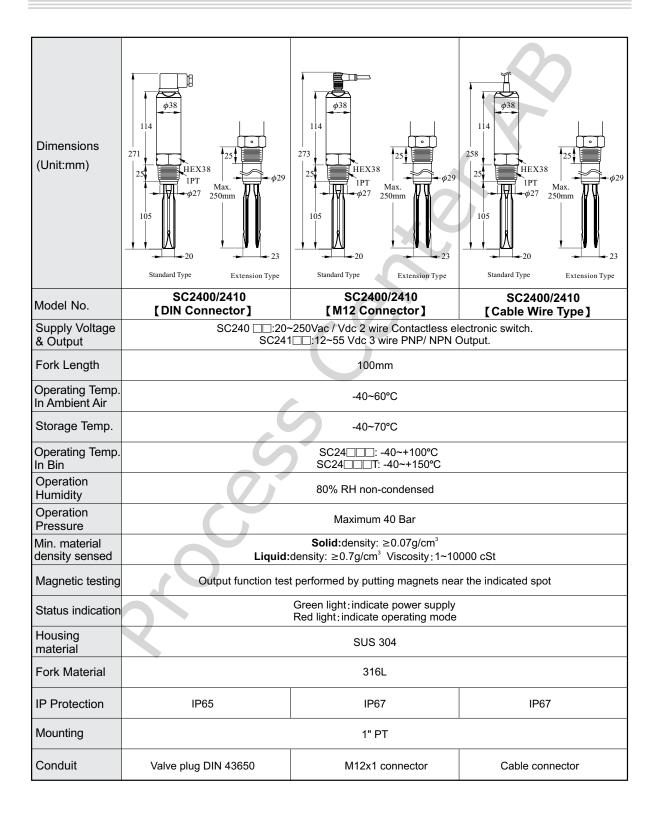
- * Peanuts
- * Tobacco
- Wood shavings
- * Chalk
- * Stearin chips
- * Powdered cellulose
- * Glass fine power
- * Granular plastics
- * Gravel
- * Powdered clay
- * Polystyrene powder
- * Styrofoam
- * Soda
- * Soot dry

FOR LIQUID

- * Water & Solutions
- * General Purpose Solvent
- * Petroleum
- * Oil
- * Heavy oil
- * Ink
- * Corrosive liquid
- * Cream
- * Drink & Beverage

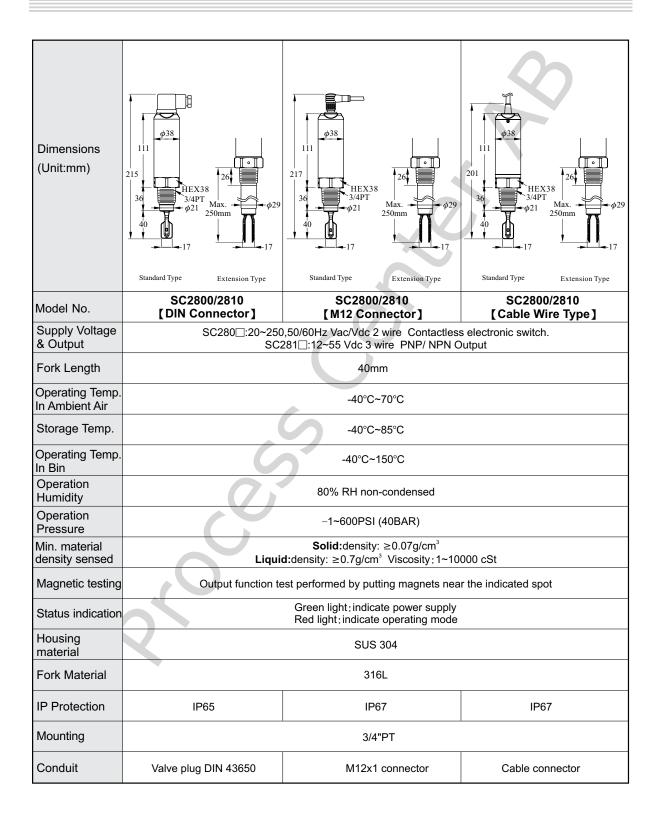
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SPECIFICATION



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MINI TUNING FORK LEVEL SWITH



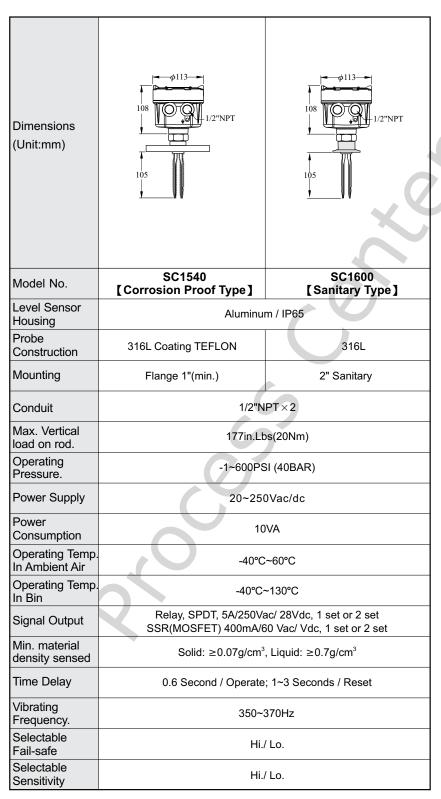
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SPECIFICATION

Dimensions (Unit:mm)	108 1/2"NPT 20 1/2"NPT 20 1/2"NPT 4/27 1/2"NPT 105	φ27.2 250mm~3M φ27.2 105	φ113 108
Model No.	SC1400 [Standard Type]	SC1410 【Tuning Fork Ultra Extension Type】	SC1420 [Tuning Fork Extension Type]
Level Sensor Housing	Aluminum / IP65		
Probe Construction	316L		
Mounting	1"PT		
Conduit	1/2"NPT×2		
Max. Vertical load on rod.	177in.Lbs(20Nm)		
Operating Pressure.	-1~600PSI (40BAR)		
Power Supply	20~250,50/60Hz Vac/Vdc		
Power Consumption	10VA		
Operating Temp. In Ambient Air	-40°C~60°C		
Operating Temp. In Bin	-40°C~130°C		
Signal Output	Relay, SPDT, 5A/250Vac/ 28Vdc, 1 set or 2 set SSR(MOSFET) 400mA/60 Vac/ Vdc, 1 set or 2 set		
Min. material density sensed	Solid:≥0.07g/cm³, Liquid: ≥0.7g/cm³		
Time Delay	0.6 Second / Operate; 1~3 Seconds / Reset		
Vibrating Frequency.	350~370Hz		
Selectable Fail-safe	Hi./ Lo.		
Selectable Sensitivity	Hi./ Lo.		

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SPECIFICATION





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SPECIFICATION

PTB PROOF No. 09 ATEX 1058 © II 2G Ex d IIB T4 Gb © II 2D Ex tb IIIC T80°C ~ T130°C Db IP65

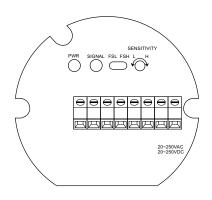
Dimensions (Unit:mm)	108 108 105 105	φ27.2 — 250mm~3M φ27- 105 Ex	
Model No.	SC1740 【Standard Type】	SC1741 【Tuning Fork Ultra Extension Type】	
Level Sensor Housing	Aluminum / NEPSI Ex d IIC T3~T6 / 🐼 II 2G Ex d IIB T4		
Probe Construction	316L		
Mounting	1"PT	1-1/4"PT	
Conduit	1/2"NPT×2		
Max. Vertical load on rod.	177in.Lbs(20Nm)		
Operating Pressure.	-1~600PSI (40BAR)		
Power Supply	20~250,50/60Hz Vac/Vdc		
Power Consumption	10	VA	
Operating Temp. In Ambient Air	-40°C~60°C		
Operating Temp. In Bin	-40°C~130°C		
Signal Output	Relay, SPDT, 3A/250Vac/ 28Vdc, 1 set or 2 set SSR(MOSFET) 400mA/60 Vac/ Vdc, 1 set or 2 set		
Min. material density sensed	Solid: ≥0.07g/cm³, Liquid: ≥0.7g/cm³		
Time Delay	0.6 Second / Operate; 1~3 Seconds / Reset		
Vibrating Frequency.	350~370Hz		
Selectable Fail-safe	Hi./ Lo.		
Selectable Sensitivity	Hi./ Lo.		
-		Process Center AB	



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TERMINAL / SENSITIVITY ADJUSTMENT (SPDT TYPE)

SC1400X, SC1410X, SC1420X, SC1540X, SC1600X, SC1740X, SC1741X



TERMINALI FUNCTION

• L+, N-: Power Supply

· NC, COM, No: Relay Output

RT1, RT2: Remote-Test

• ੈਵਾਂ: SSR(MOSFET) Output

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 tuning fork switch does not sense the material and the relay is conductive.

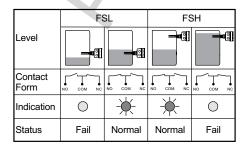
Failure: When the power shuts down, the signal lamp is off. It means that the tuning fork switch is voided and the relay is not conductive.

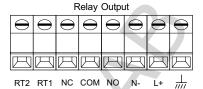
FSL (Fail-Safe Low) Protection:

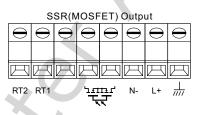
Switch to FSL mode.

Normal Status: The signal lamp is on. The tuning fork switch senses the material and the relay is conductive.

Failure: When the power shuts down, the signal lamp is off. The tuning fork switch is voided and the relay is not conductive.







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 tuning fork switch 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 tuning fork switch senses the material, the signal lamp is on and relay is conductive.
- SENSITIVITY L: Low Sensitivity
- · SENSITIVITY H: High Sensitivity

SENSITIVITY ADJUSTMENT

The SENSITIVITY is located on the right side of the panel. The user is able to do the minor adjustment by the screw driver. If it turns to H position clockwise, the sensitivity increases; if it turns to L position anti-clockwise, the sensitivity decreases. The sensitivity is originally set at max. value. The switching point is at 15mm from tip of tuning fork switch.

The switching point position will be changed by the sensitivity value. If the sensitivity adjusts to lower value, the switching point position is moving backward; if the sensitivity adjusts to high value, the switching point position is moving forward. The changing range of switching point is about 60mm.

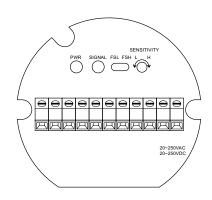
For example, if the switching point needs to be moved backward by 30mm, the user needs to adjust SENSITIVITY anti-clockwise by 10 turns. In general case, it is no need for sensitivity adjustment.



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TERMINAL / SENSITIVITY ADJUSTMENT (DPDT TYPE)

SC1400X, SC1410X, SC1420X, SC1540X, SC1600X, SC1740X, SC1741X



TERMINAL FUNCTION

. L+, N-: Power Supply

• NC1, COM1, NO1: Relay Output

• NC2, COM2, NO2: Relay Output

• RT1, RT2: Remote-Test

• 🛨 : Ground Connection

י 'בְּדְיּבְי : 1st SSR(MOSFET) Output
'בְּדְיּבְי : 2st SSR(MOSFET) Output

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 tuning fork switch does not sense the material and the relay is conductive.

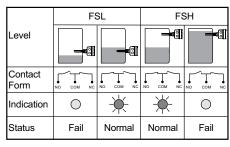
Failure: When the power shuts down, the signal lamp is off. It means that the tuning fork switch is voided and the relay is not conductive.

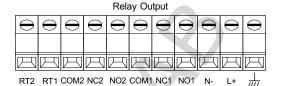
FSL (Fail-Safe Low) Protection:

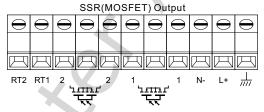
Switch to FSL mode.

Normal Status: The signal lamp is on. The tuning fork switch senses the material and the relay is conductive.

Failure: When the power shuts down, the signal lamp is off. The tuning fork switch is voided and the relay is not conductive.







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 tuning fork switch senses the material, the signal lamp is off and relay is not conductive.
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The switching point position will be changed by the sensitivity value. If the sensitivity adjusts to lower value, the switching point position is moving backward; if the sensitivity adjusts to high value, the switching point position is moving forward. The changing range of switching point is about 60mm.

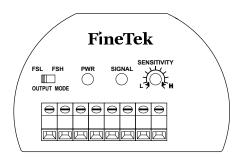
For example, if the switching point needs to be moved backward by 30mm, the user needs to adjust SENSITIVITY anti-clockwise by 10 turns. In general case, it is no need for sensitivity adjustment.



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TERMINAL / SENSITIVITY ADJUSTMENT (MULTI-FUNCTION TYPE)

SC3400X, SC3410X, SC3420X, SC3450X



TERMINAL FUNCTION

· L+, N-: Power Supply

NC, COM, No: Relay Output

• RT1, RT2: Remote-Test

• ಇವ್ : SSR(MOSFET) Output

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 tuning fork switch does not sense the material and the relay is conductive.

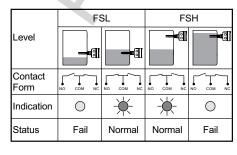
Failure: When the power shuts down, the signal lamp is off. It means that the tuning fork switch is voided and the relay is not conductive.

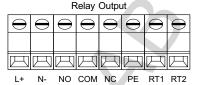
FSL (Fail-Safe Low) Protection:

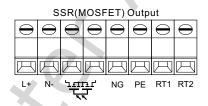
Switch to FSL mode.

Normal Status: The signal lamp is on. The tuning fork switch senses the material and the relay is conductive.

Failure: When the power shuts down, the signal lamp is off. The tuning fork switch is voided and the relay is not conductive.







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 tuning fork switch senses the material, the signal lamp is off and relay is not conductive.
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The switching point position will be changed by the sensitivity value. If the sensitivity adjusts to lower value, the switching point position is moving backward; if the sensitivity adjusts to high value, the switching point position is moving forward. The changing range of switching point is about 60mm.

For example, if the switching point needs to be moved backward by 30mm, the user needs to adjust SENSITIVITY anti-clockwise by 10 turns. In general case, it is no need for sensitivity adjustment.



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WIRING DIAGRAM DETAILS

SC240X (Two wires) WIRING

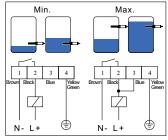
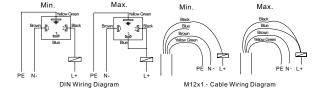


Figure 1 Two wires wiring



Wiring

Power can be AC/DC switching. Two wires are connected with terminals (L+/N-) as in Figure 1.

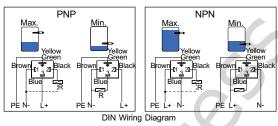
Low (Min.) Mode:

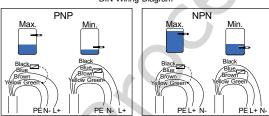
Pin 1 (Brown) is connected to N-. Pin 2 (Black) is connected to L+ with relay. Pin 4 (Yellow Green) connects to tank ground.

High (Max.) mode:

Pin 1 (Brown) is connected to N-. Pin 3 is connected to pin 2 (Black) to L+ with Relay . Pin 4 (Yellow Green) connects to tank ground.

SC240X (Two wires) WIRING





M12x1 - Cable Wiring Diagram Figure 2 PNP / NPN Output Wiring Diagram

Power supply is for DC only. Output is PNP / NPN. Please see Figure 2.

PNP wiring : High(Max.) Mode:

Pin 1(Brown) connects to N-. Pin 3 (Blue) connects to L+. To output, it is pin 2. (Black) connects to N- with relay. Pin 4 (Yellow Green) connects to tank ground.

Low(Min.)Mode:

Pin 1 (Brown) connects to N-. Pin 2 (Black) connects to L+. To output, Pin 3 (Blue) connects to N- with relay. Pin 4 (Yellow Green) should contact to tank ground.

NPN wiring:

High(Max.) Mode:

Pin 1 (Brown) connects to L+. Pin 3 (Blue) connects to N-. To output, Pin 2 (Black) connects to L+ with relay. Pin 4(Yellow Green) should contact to tank ground.

Low(Min.)Mode:

Pin1 (Brown) connects to L+. Pin 2 (Black) connects to N-. To output Pin 3 (Blue) connects to L+ with relay. Pin 4 (Yellow Green) should contact to tank ground.



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TUNING AND INDICATION DETAILS

FORK TRIGGER POINT

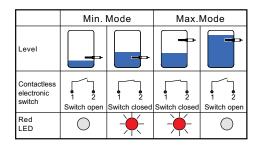
SC2409 fork trigger point is shown as Figure 3 below. The testing medium is water(S.G.=1 g/cm³), and its trigger point is about 23mm from the fork tip. If testing medium with S.G (specific gravity) lower than 1g/cm³ (water), the trigger point would increase. Similarly, the trigger point will downward while the S.G is large than water.

S.G.<1g/cm³ Trigger Point moves upward Trigger Point moves downward S.G.>1g/cm³ Trigger Point moves downward S.G.<1g/cm³ Trigger Point moves upward Sensing spot 10mm S.G.>1g/cm³ Trigger Point moves downward

Output Status for Relay

Low (Min.) Mode: Tuning fork switch will be active after 3 seconds while power on. Relay is on NO status and red LED indication is off. When tuning fork is covered by testing medium, the vibration will stop and relay becomes NC status. Red LED indication then is on.

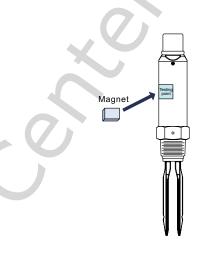
High(Max.) Mode: Tuning fork switch will be active after 3 seconds while the power on. Relay is on NC status and red LED indication is on. When tuning fork covered by testing medium, the vibration stops and relay becomes NO status. Red LED indication is on.



MAGNETIC TEST

After the switch has installed and power tested, magnetic switch can be performed accordingly. Output status will switch from status of NO. to NC. or NC to NO. and red LED would indicate the vibration status by on / off.

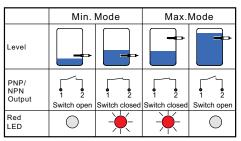
When magnet is pulled away from the housing, red LED would return as default while fork continues to vibrate. By this verification, user can confirm the wiring and function are correct or not.



Output Status for PNP / NPN Transistor

Low(Min.) Mode: Tuning fork switch will be active after 3 seconds while power on. Output transistor is on NO status and red LED indication is off. When tuning fork covered by testing medium, vibration will stop and output transistor becomes NC status. Red LED indication is on.

High(Max.) Mode: Tuning fork switch will be active after 3 seconds while power on. Output transistor is on NC status and red LED indication is on. When tuning fork covered by testing medium, vibration will stop and output transistor becomes NO status. Red LED indication is off.



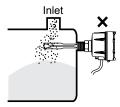


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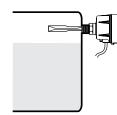
INSTALLATION FOR TUNING FORK

Horizontal Installation:

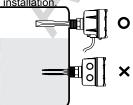
 Can be applied for high viscosity fluid and power Do not install near around material inlet.



2. Wiring port faces downward recommended.



 Consistence of the wiring port direction and always in downward direction for multi-tuning fork installation.

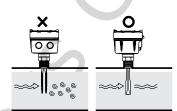


Vertical Installation:

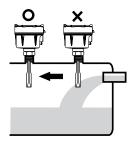
 Depends on the sensitivity tuning, user should note the switching point is triggered around 15mm from the tip of fork.



3. Consistence of the wiring port direction for multituning fork installation



3. Do not install near material inlet.





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ORDER INFORMATION

1400: Tuning Fork Standard Type	
1410: Tuning Fork Extension Type	
1420: Tuning Fork Ultra Extension Type	
1540: Tuning Fork Corrosion Proof Type	
1600: Tuning Fork Sanitary Type	
1740: Explosion Proof Tuning Fork Standard Type	
1741: Explosion Proof Tuning Fork Ultra Extension Type	
3400: Multi-Function Tuning Fork Standard Type 3410: Multi-Function Tuning Fork Extension Type	
3420: Multi-Function Tuning Fork Extension Type	
3440: Multi-Function Tuning Fork Corrosion Proof Type	
3450: Multi-Function Tuning Fork Sanitary Type	
3800: Multi-Function Mini Type	
POWER & OUTPUT MODULE	
20~250Vac/ Vdc, 50/60Hz R: Relay O/P-EuroType	
N: SSR(MOSFET) EuroType	
Q: Relay O/P x 2 -EuroType	
M: SSR(MOSFET) x 2 -EuroType	
MATERIAL (Wetted Part)	
0: SUS304 6: SUS316 L: SUS316L	

CONNECTION -

Dimension	Specification
D1"(25A) 31-1/4"(32A) E1-1/2"(40A) F2"(50A) G2-1/2"(65A) H3"(80A) I4"(100A) J5"(125A) K6"(150A) Sothers	M5kg/cm ² YPN 25 N10kg/cm ² ZPN 40 O150 Lbs Sothers P300 Lbs 9Sanitary QPT RPF(G) TBSP UNPT WPN 10 XPN 16

LENGTH (L) (UNIT: mm)

0500: below 500mm **1000:** 501~1000mm

1500: 1001~1500mm

1500: 1001~1500mm

- W Use English letter as first code for probe length over 10m. A150 represents 15m, A200 represents 20m.
- * The Probe Length of SC3800 is Fixed.

BEFORE YOU ORDER

- 1. Please affirm the voltage.
- 2. Please affirm the mounting positions.
- 3. Please affirm the material specific gravity (S.G.) value.
- 4. Please affirm whether any bridge block or vibrating motor are attached onto the silo wall.

Tolerance of the total product length is±5mm

Characteristics, specifications and dimensions are subject to change without notice.

Please contact your nearest distributing office for further information.



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ORDER INFORMATION

SC	
ORDER NO.	
24: 100mm 28: 40mm	
POWER & OUTPUT MODULE 0: 20~250Vac / Vdc 2 wire Contactless electronic switch. 1: 12~55 Vdc 3 wire PNP/ NPN Output.	
MATERIAL (Wetted Part) 0: SUS304 6: SUS316 L: SUS316L	
MODEL —	
0: Standard 1: Extended	
(High temp. 150°C)	
ELECTRICAL CONNECTION ———	
A: M12x1(180°) B: M12x1(90°) C: CABLE D: Valve plug DIN43650 (M12x1/ CABLE Wire length are 2M,PVC 24A	wg)

CONNECTION -

Dimension	Specification
C3/4"(20A)SC28 only D1"(25A) E1-1/2"(40A) F2"(50A) G2-1/2"(65A) H3"(80A) I4"(100A) J5"(125A) K6"(150A) SSpecial	M5kg/cm ² XPN16 N10kg/cm ² YPN25 O150 Lbs ZPN40 P300 Lbs SSpecial QPT RPF(G) TBSP UNPT WPN10

PROBE LENGTH (UNIT: mm) -

Max Length:250mm :250mm EX 0205

BEFORE YOU ORDER

- 1. Please affirm the voltage.
- 2. Please affirm the mounting positions.
- Please affirm the material specific gravity (S.G.) value.
 Please affirm whether any bridge block or vibrating motor are attached onto the silo wall.

Tolerance of the total product length is±5mm

Characteristics, specifications and dimensions are subject to change without notice.

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