SC35 Tuning Fork Level Switch (3 wires NPN/PNP Transistor output) Operation Manual

INTRODUCTION

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.
When the fork comes in contact with material the vibration is dampened and results in frequency change which triggers the switch. It's ideal for applications where: the dielectric constant is low; when material moisture content changes easily; low viscosity liquids; there is a combination of differing materials in the container/tank.

FEATURE

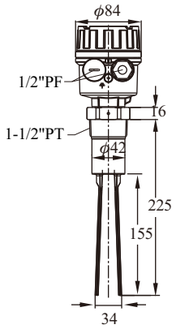
- Inner box type housing , small dimension, space saving.
- Housing could be 270 degree rotate, easy adjustment of incoming wires direction.
- The measurable lowest s.g. is 0.01 g/cm^3.
- Extra protection mechanism where the second output could be setting as alarm alert.
- Self-diagnostic system which detects the fork abrasion or build up.
- Output switch delay function.
- Underwater sediments detection.

SPECIFICATION

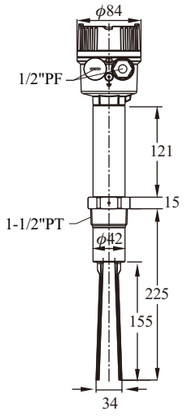
Supply voltage	10~55Vdc
Power consumption	Max. 40mA @ 10V, Max. 0.6 W
Separation voltage	3.7 kV
Overvoltage protection	Overvoltage category II
Storage temp.	-40~85^{0}C
Ambient temp.	-40~85^{0}C (Cable type: -40~75^{0}C)
Process temp.	Standard/Extension: -40~150^{0}C Hi-temp./Extension: -40~280^{0}C Cable wire: -40~80^{0}C

Bulk density	≥0.01 g/cm^3 or ≥0.05 g/cm^3
Measuring frequency	140Hz±5Hz
Material size	Max.10 mm
Connecting cable	ϕ6~10mm
Operating pressure	SC350/SC351: 25 Bar SC352: 2 Bar
Output signal	3 wires NPN/PNP
Contact rating	350mA , 55Vdc
IP rating	IP 66/IP 67

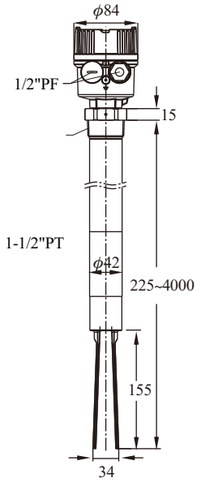
DIMENSIONS
(Unit:mm)



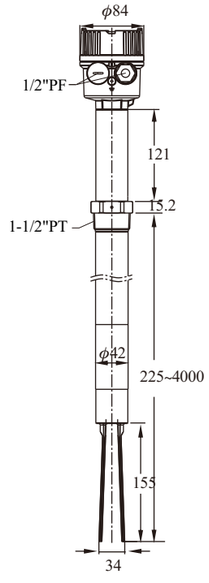
SC350
Standard



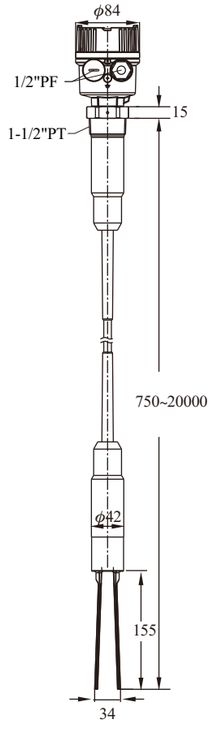
SC350
Hi-temperature



SC351
Extension

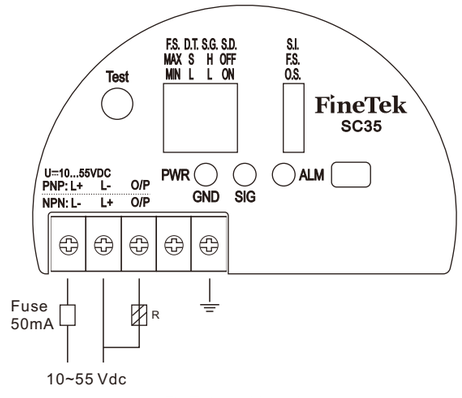


SC351
Extension high temperature



SC352
Cable type

Wiring and Function



R=External Load
U ⎓ max. 55Vdc@I ⎓ max. 350mA

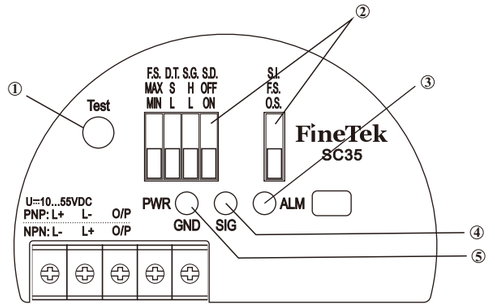
SC35 provides Max./Min. operation modes, and has the corresponding indicators and output status according to the functional settings and whether it is covered by the material. The working status is detailed in the figure below.

Fail-safe mode	Level	Output signal	LED Indicator Power green	LED Indicator Status yellow	LED Indicator Alarm red
MAX		I_L	☼	O.S. ☼ / F.S. ○	○
		<100μA	☼	O.S. ○ / F.S. ☼	○
MIN		I_L	☼	O.S. ☼ / F.S. ○	○
		<100μA	☼	O.S. ○ / F.S. ☼	○
Fork build-up		Maintain the previous state	☼	O.S. ○ / F.S. ☼	⊘
Fork brasion		<100μA	☼	○	☼
Output1 > 350mA		<100μA	☼	⊘	☼

IL : Load current

☼ : ON ⊘ : Flash ○ : OFF

PANEL DESCRIPTION

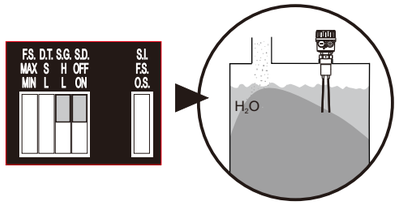


①:Test button
②:Function switch
③:Alarm indicator
④:Signal indicator
⑤:Power indicator

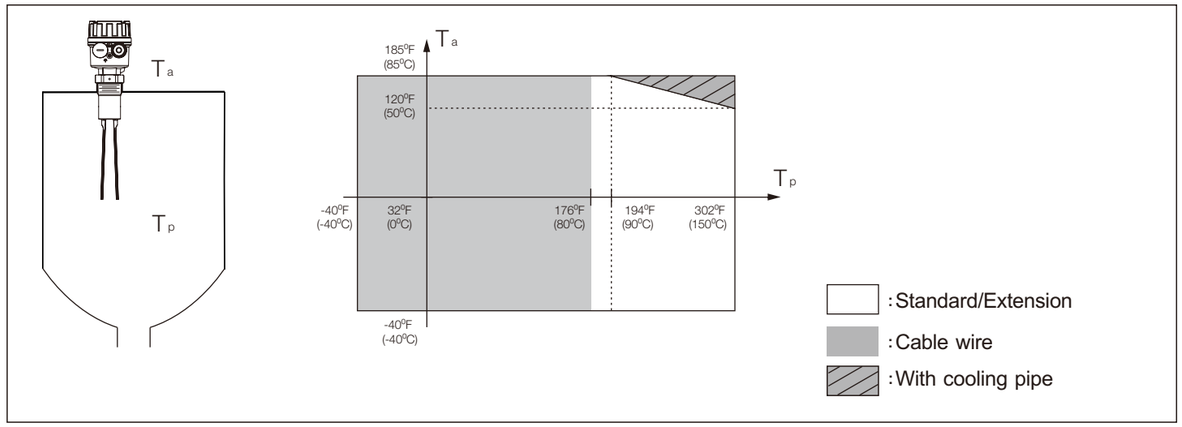
Abb.	Functions	Description	Remarks
Test	Test Bottom	Reverse output signal	Reverse output signal can be used to provide a method for testing control equipment which is connected to sensor output
F.S.	Fail Safe	MAX: High MIN: Low	Includes high low fail-safe mode
D.T.	Delay Time	S: General settings L: Delay of 5 seconds	Material covered: 0.5 Material not covered: 150^{0}C:≤1.5s 230^{0}C/280^{0}C:≤2s L sets delay of 5s for covered/ uncovered
S.G.	Specific Gravity	H: 0.05 g/cm^3 L: 0.01 g/cm^3	High Density >0.05 g/cm^3 Low Density >0.01 g/cm^3
S.D.	Self Diagnosis	OFF ON	ON setting allows the sensor to detect fork abrasion or material build-up; SIG LED will flash if trouble exists
S.I.	Signal Indicator	F.S.: failsafe mode O.S.: output status mode	F.S. (fail safe) selected = Normal / Alarm status; O.S. (relay output status) selected = Relay energized (on) or de-energized (off)

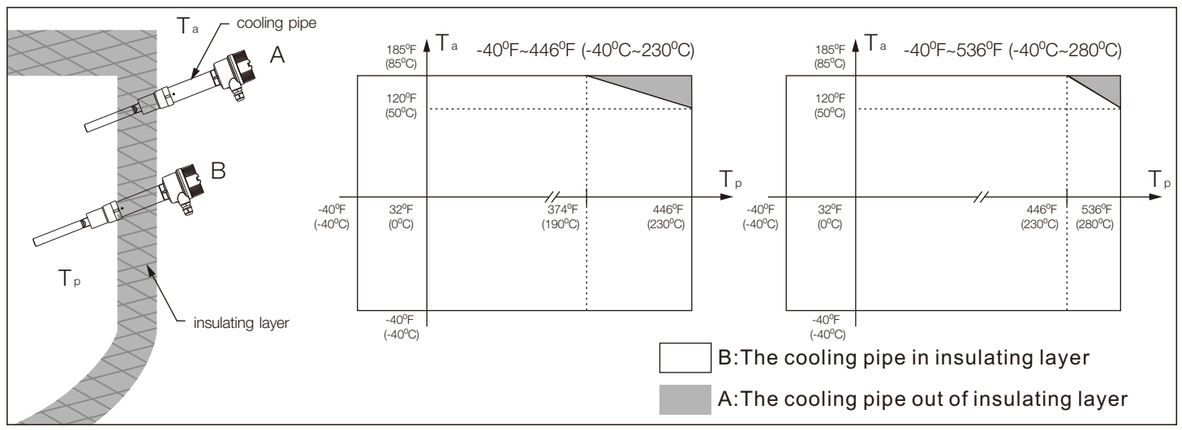
SEDIMENT DETECTION

1. Only sediment is detected.
   Water-like liquids or entrained substances are not detected.
2. S.G. (Specific Gravity) to set to H position.
3. S.D. (Self Diagnostics) to be turn off.
4. SC352 cable wird type is not suitable for Immersion.



AMBIENT TEMPERATURE / PROCESS TEMPERATURE





※ ETFE coating : T_P max. =150°C。
※ PTFE coating : T_P max. =230°C。

INSTALLATION INSTRUCTIONS

I. Top mounts (Figure 1)

※Keep away from the mouth when installing in order to not cause damage when the sensor bar is hit by the material.

※Take account of the angle problems when installing, to avoid the material splitting untouched with the sensor bar.

II. Slide Mount (Figure 2)

※The best installation angle is leaning 15-20 degrees, as it can reduce the strike and the pile up.

※The gate of the terminal box should be installed lower in order not to let the water get into and damage the circuit.

III General Requirements

※The lead-in of the wire terminal should correctly comply with and the nut should be tightly locked, to ensure the validity of the IP grade.

※The wire should be installed downwards and again round it and get into the gate in order not let the rain into the box.

※The total length of the wire should be >the length of the extended pipe + fork length 165mm.(Figure 3)

※The maximum vertical stress that can be received by the Sensor bar is 177in.Lbs(20Nm)

※Avoid twisting the box directly during installation and dismounting. Try to spanner tighten the nut.

※Please avoid cutting the sensor bar or altering the size or specifications of the products on your own.

※When carrying, avoid sizing tuning fork in order not to cause any damages.

※When operating in the tub, avoid taking the tuning fork as the climbing ladder.

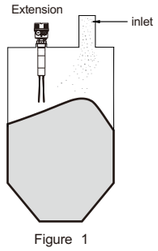


Figure 1

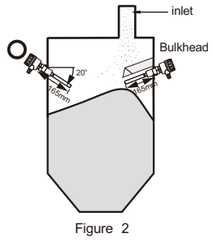


Figure 2

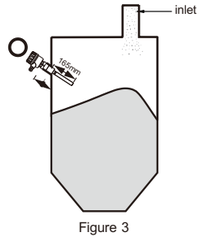


Figure 3

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