

# SCS 163 Series Mini Tuning Fork Vibrating Switch Operation Manual

## Description

SCS163 tuning fork switch uses three wires power supply with 12~55 Vdc, PNP / NPN. It can be utilized to detect medium in applications with S.G. > 0.07 g/cm<sup>3</sup> and viscosity between 1~10000 cSt. It also has compact size, which is suitable for applications with limited space. SCS163 offers 3 options of plug connections: DIN 43650 · Cable Connector · M12x1 Connector. Furthermore, the fork can be polished (Ra) to meet the requirements for particular industries like pharmaceutical and food processing. SCS163 is equipped with magnetic test function. It can examine the functioning of the switch after the switch is installed.

## Features

- Compact size, suitable for limited space.
- Wide range of power supply is 12~55 Vdc with PNP / NPN output mode.
- 3 options of plug connections.
- Fork polished to users' standard for industries like pharmaceutical and food processing.
- Magnetic test to examine proper functioning of the switch.

## 1. Specification

Housing	Housing material	SUS 304
	Protection	IP 65 / IP 67
	Torque on the hexagon	80 Nm
	Plug connection	DIN 43650 Cable Connector M12x1 Connector
Process connection	Connection	Clamp
	Material	SUS 316L
Tuning fork	Material	316L
	Length	Min. 40 mm
	Surface quality	Option
Weight	Total weight	Approx. 0.4 kg
Electronics	Power supply	12~55 Vdc
	Output	PNP / NPN
	Internal current requirement	Approx. 10 mA
	Load current	Max. 350 mA
	Vibrating frequency	Approx. 1KHz ± 10%
	Time delay	1~3 s since the measured material contacted 1~3 s react to the measured material fall off
	Fail-safe	Min./Max. detecting mode by connection
	Status	Green LED-Power indicants Red LED-Switching status indicants
	Switching point	Vertical orientation: 12 ± 3mm from top of fork Horizontal orientation: 8 ± 1mm from fork centre
	Magnetic testing	Place magnet nearby the testing spot to perform
Overvoltage category	III	
Ambient conditions	Ambient temperature on the housing	-40~+80°C
	Storage and transport temperature	-40~+85°C
	Operating temperature	-40~+150°C
	Ambient damp	20%~80% RH non-condensed
	Operating pressure	Max. 40 Bar
Product	Viscosity	1~10000 cSt
	Density	Solid: ≥ 0.07g/cm <sup>3</sup> Liquid: ≥ 0.7g/cm <sup>3</sup>

## 2. Appearance

Types of SCS163 series as shown below:

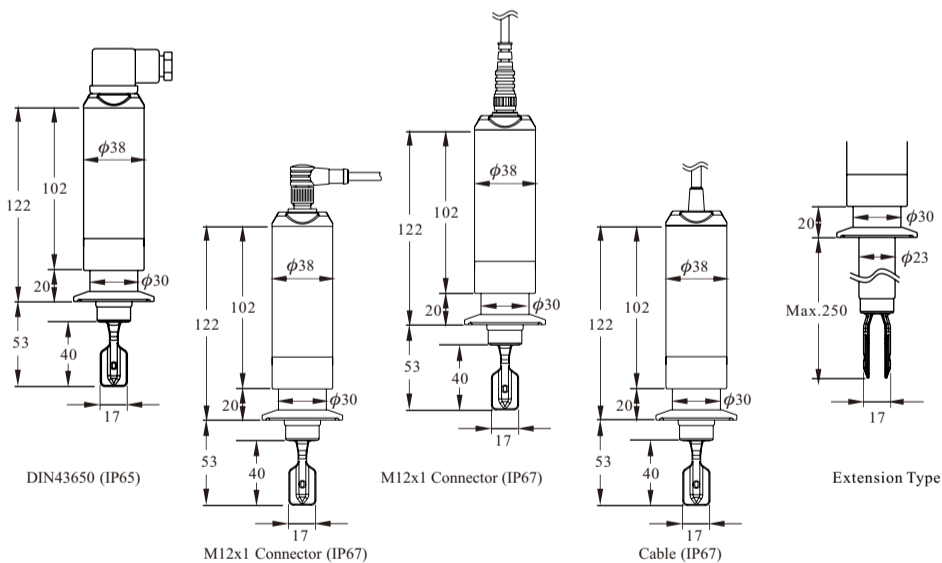


Figure 1 sizes and plug connections

## 3. Wiring

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

### PNP wiring :

- High(Max.) Mode:** No. 1 pin(Brown) is connected to L-. No.3 pin(Blue) is connected to L+. Output is connected to No. 2 pin(Black), then connected to L-. No. 4 pin(Yellow Green) goes to ground.
- Low(Min.) Mode:** number 1 pin(Brown) is connected to L-. No.2 pin(Black) is connected to L+. Output is connected to No. 3 pin(Blue), then connected to L-. No. 4 pin(Yellow Green) goes to ground.

### NPN wiring :

- High(Max.) Mode:** No. 1 pin(Brown) is connected to L+. No.3 pin(Blue) is connected to L-. Output is connected to No. 2 pin(Black), then connected to L+. No. 4 pin(Yellow Green) goes to ground.
- Low(Min.) Mode:** No. 1 pin(Brown) is connected to L+. No.2 pin(Black) is connected to L-. Output is connected to No. 3 pin(Blue), then connected to L+. No. 4 pin(Yellow Green) goes to ground.

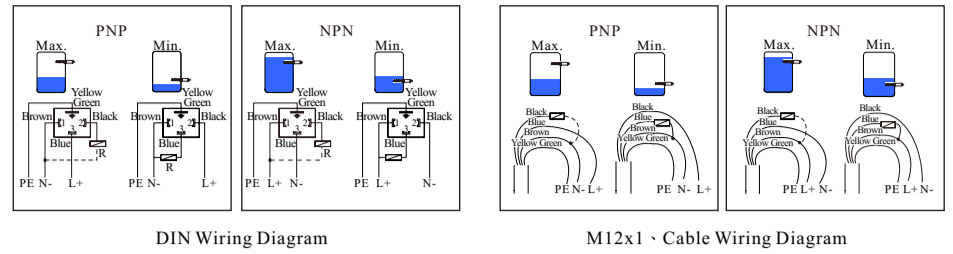


Figure 2 PNP / NPN Output Wiring Diagram

## 4. Fork Sensing Spot

SCS163 fork sensing spot is shown as Figure 3 below. Considering testing medium is water (S.G.=1 g/cm<sup>3</sup>), sensing spot is at the fillister about 11mm from the tip. If testing medium has S.G. lower than 1 g/cm<sup>3</sup>, sensing spot would be above the fillister. In contrast, sensing spot will be below the fillister.

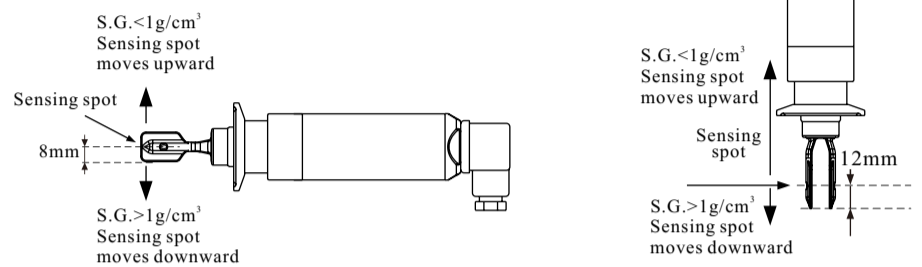


Figure 3 Fork Sensing Spot

## 5. Output Status

SCS163 is equipped with DC power. There are two output options of PNP / NPN, which offers Min./Max. modes according to different pin numbers. When powered with 12~55 Vdc, top of housing would light up with green LED.

- Low(Min.) Mode:** Tuning fork switch will be actuated 3 seconds after the power is on. Output transistor is NO and red LED indication is off. When tuning fork is covered by testing medium, vibration stops and output transistor becomes NC. Red LED indication is on.
- High(Max.) Mode:** Tuning fork switch will be actuated 3 seconds after the power is on. Output transistor is NC and red LED indication is on. When tuning fork is covered by testing medium, vibration stops and output transistor becomes NO. Red LED indication is off.

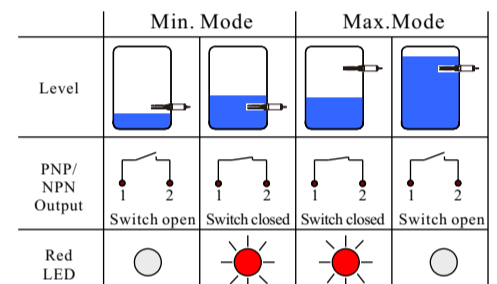


Figure 4 Min./Max. Mode

## 6. Magnetic Test

After the switch is installed and powered, magnetic switch can be performed accordingly. Output status will switch from NO. to NC. or NC to NO. and red LED would switch on or off while fork continues to vibrate. When magnet is pulled away from the housing, red LED would return as default while fork continues to vibrate. The purpose of testing is to confirm the wiring and functioning are correct.

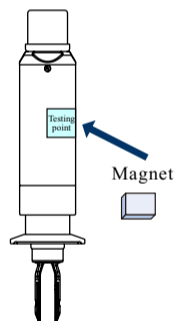
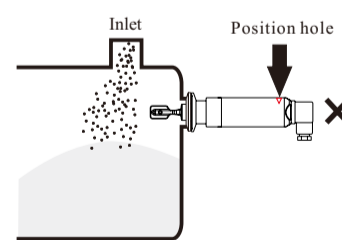


Figure 5 Magnetic Test Diagram

## 7. Installation

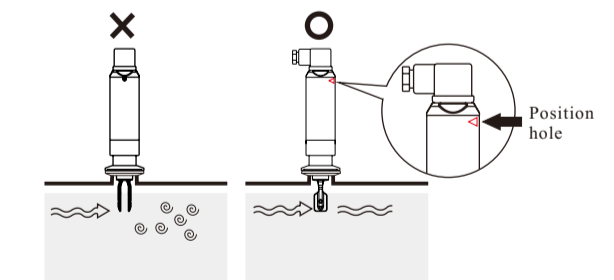
### Horizontal Installation:

- Can be applied in viscosity, powder, and liquid. Do not install near substance inlet.



### Vertical Installation:

- Opening of the two fork blades is to be as the flow direction.



- When installing the product, The position hole must be upward direction. If not, incorrect installation could be damage the product.

