



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



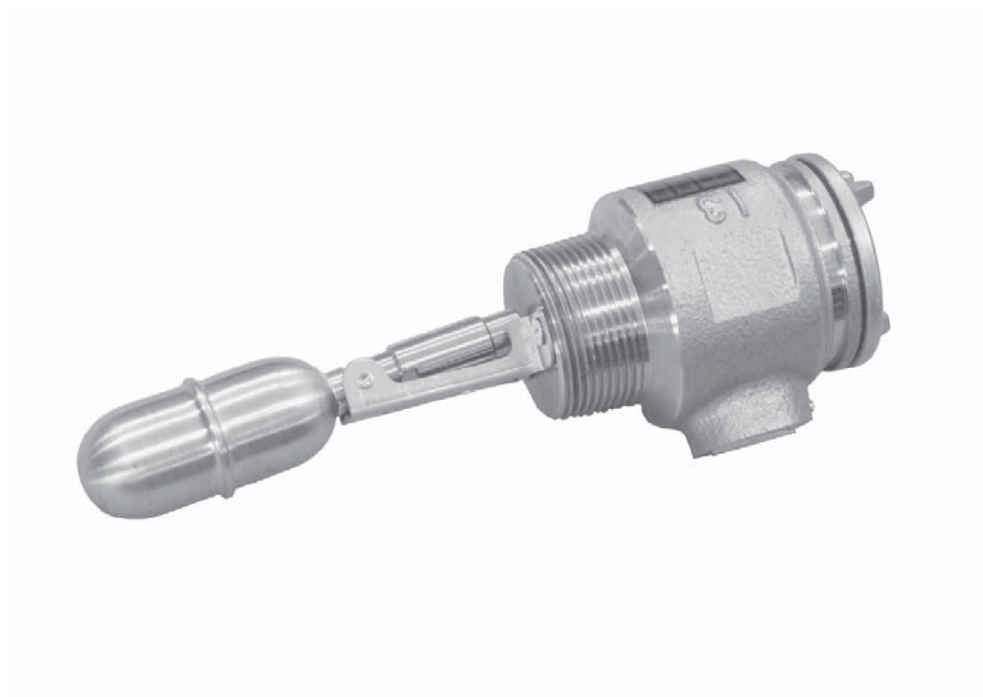
Solutions

Technical Information

Float Level Switch

CS1103/CS1203/CS1603

Upper/Lower Limit Alarms



Application

Float Level Switch CS1103/CS1203/CS1603 is a compact level switch, which utilizes a stainless steel float. It is horizontally mounted on tanks to activate an alarm using a reed switch when a change in liquid level is detected. This system is ideal for upper and lower limit alarms on fuel oil storage tanks.

Features and Benefits

- Simple Function
- Extremely Compact Design
- Safety Operation
- Reliable Mechanical Contact
- Easy Mounting
- High Corrosion Resistance (Stainless Steel)
- Automatic Pump and Valve Control with Nivotester "FTW 325"

Table of Contents

| | | | |
|---|----------|--|-----------|
| Function and System Design | 3 | Operation Condition: Installation | 7 |
| Operating Principle | 3 | Thread Type Installation | 7 |
| Standard Specification | 4 | Flange Type Installation | 7 |
| Contact Operation for Upper Limit Alarm | 4 | Application | 8 |
| Contact Operation for Lower Limit Alarm | 4 | Alarm | 8 |
| Ambient Temperature | 4 | Control of Pump and Valve | 8 |
| Measured Liquid Temperature | 4 | Certificates and Approvals | 9 |
| Maximum Allowable Working Pressure | 4 | Ex Approval | 9 |
| Measured Liquid Specific Density | 4 | Protection Class | 9 |
| Level Accuracy (50mm Displacer) | 4 | Order Information | 10 |
| Approval | 4 | CS1103 | 10 |
| Protection Class | 4 | CS1203 | 11 |
| Installation | 4 | CS1603 | 12 |
| Material | 4 | Documentation | 13 |
| Cable Entry | 4 | Technical Information | 13 |
| Weight | 4 | Operating Instructions | 13 |
| Paint Color | 4 | | |
| Dimensions | 5 | | |
| CS1103 (Thread Type) | 5 | | |
| CS1203 (Flange Type, Low Pressure) | 5 | | |
| CS1603 (Flange Type, High Pressure) | 6 | | |

Function and System Design

Operating Principle

The float detects liquid level inside the tank, while the reed switch is turned on or off by a magnet, installed on the rear of the float. The reed switch is turned off when magnet centers with it, and conversely turned on when magnet moves off center.

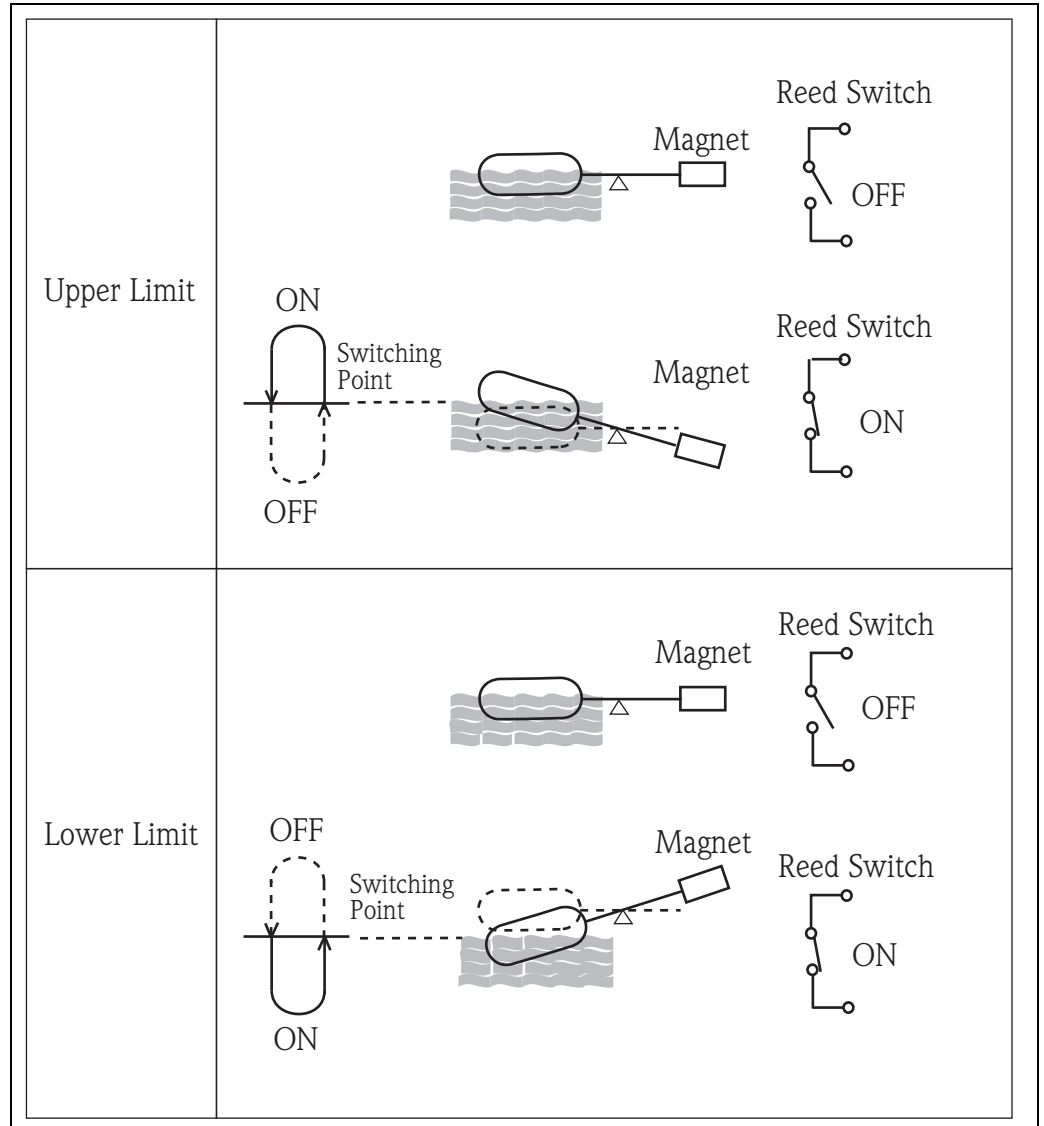


Figure 1: Operation of Reed Switch

Standard Specification

| | |
|--|--|
| Contact Operation for Upper Limit Alarm | ON when liquid level exceeds the set position |
| Contact Operation for Lower Limit Alarm | ON when liquid level becomes lower than the set position |
| Ambient Temperature | -10 to +40 °C (14 ° F to 104° F) (operation not possible in freezing temperature) |
| Measured Liquid Temperature | -20 to +80 °C (-4 ° F to 176° F) (operation not possible in freezing temperature) |
| Maximum Allowable Working Pressure | 1.96MPa (20kg /cm ²) |
| Measured Liquid Specific Density | 0.7 to 2.0g/cm ³ |
| Level Accuracy (50mm Displacer) | within ±5mm (specific density=1g/cm ³) |
| Approval | Flame proof, TIIIS, d2G4 |
| Protection Class | IP65 |
| Installation | <p>CS should be installed horizontally on the side wall of a tank.</p> <p>CS1103 thread connection: Thread JIS B0203 R1-1/2</p> <p>CS1203 flange, low pressure: 10K 80A RF, flange JIS B2220 10K 100A RF, flange JIS 2220 3" 150lbs RF, flange ANSI 16.5 4" 150lbs RF, flange ANSI 16.5</p> <p>CS1603 flange, high pressure: 10K 80A RF, flange JIS B2220 20K 80A RF, flange JIS B2220 10K 100A RF, flange JIS B2220 20K 100A RF, flange JIS B2220 3" 150lbs RF, flange ANSI B16.5 3" 300lbs RF, flange ANSI B16.5 4" 150lbs RF, flange ANSI B16.5 4" 300lbs RF, flange ANSI B16.5</p> |
| Material | Stainless-steel (JIS SUS304) |
| Cable Entry | PF(G)1/2, PF(G)3/4 |
| Weight | <p>CS1103: Approx. 1kg</p> <p>CS1203: Approx. 4.4kg (depends on Process Connection)</p> <p>CS1603: Approx. 5.4g (depends on Process Connection)</p> |
| Paint Color | Silver |

Dimensions

CS1103 (Thread Type)

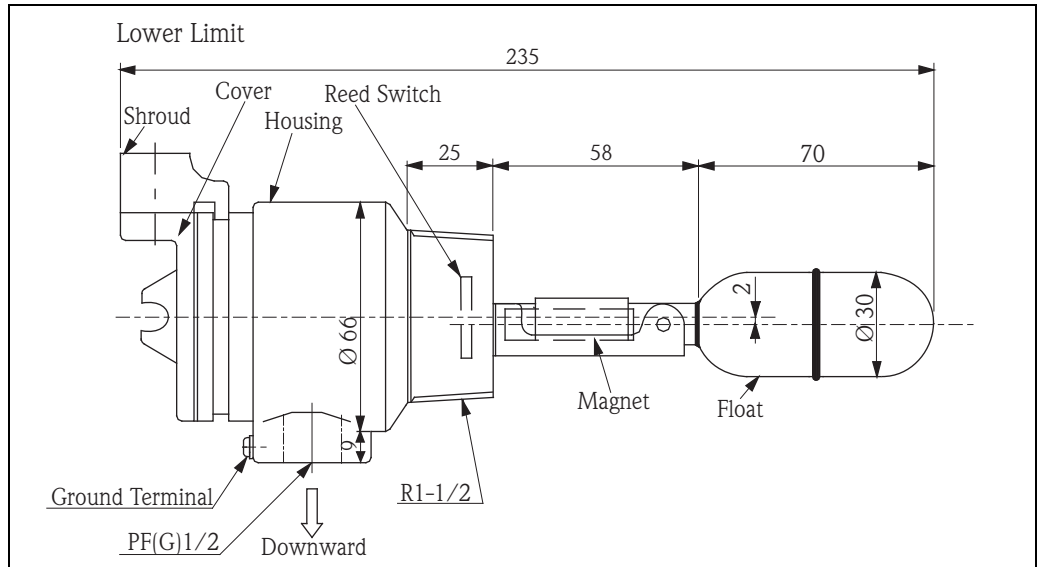


Figure 2: CS1103 Dimensions

CS1203 (Flange Type, Low Pressure)

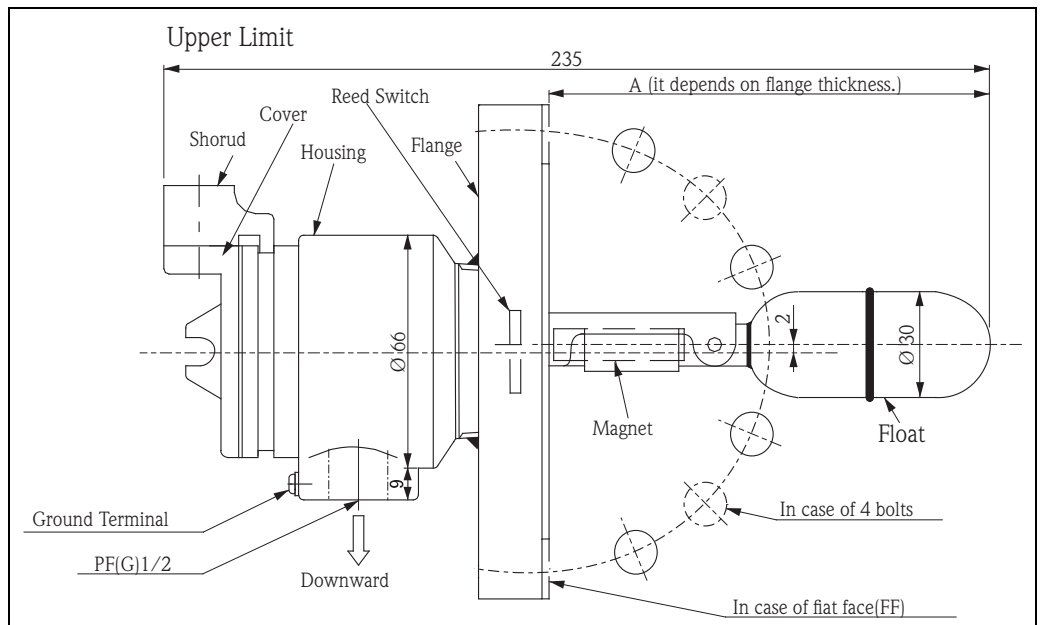


Figure 3: CS1203 Dimensions

CS1603 (Flange Type, High Pressure)

Cylindrical Float

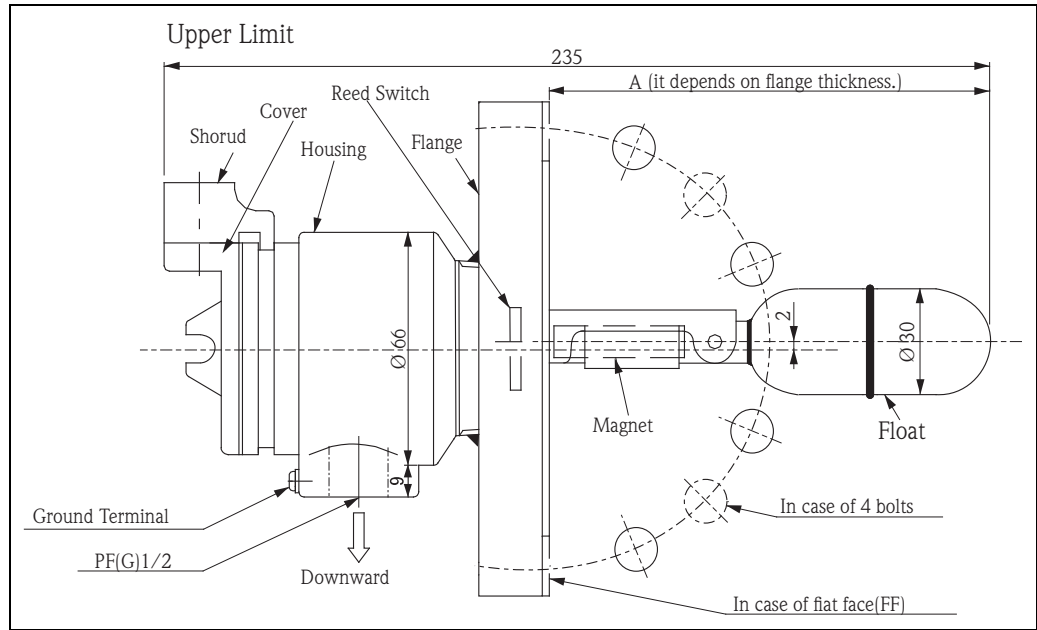


Figure 4: Cylindrical Float Dimensions

Spherical Float

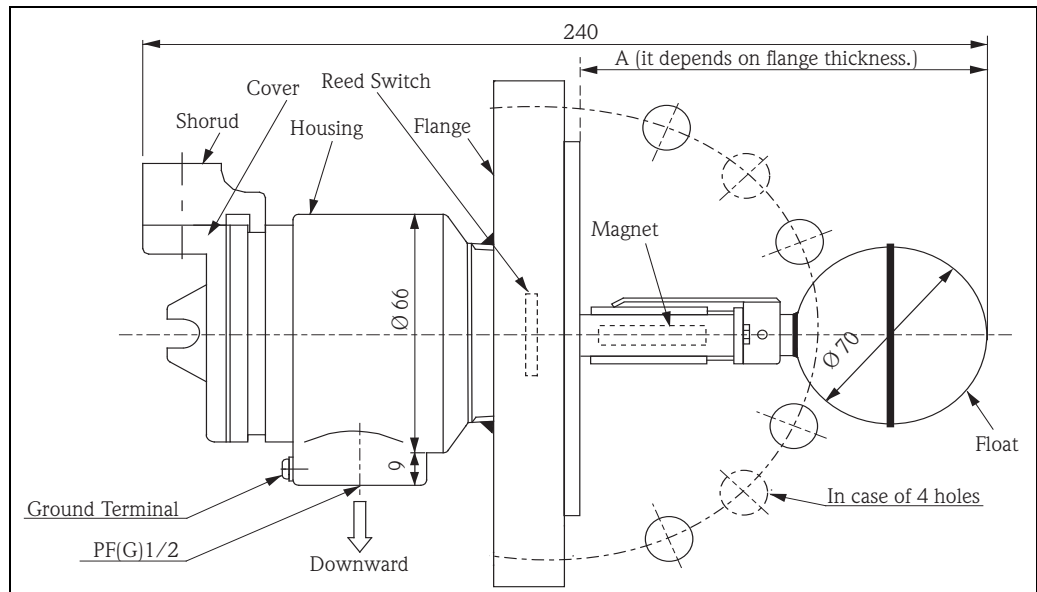


Figure 5: Spherical Float Dimensions

Operation Condition: Installation

Thread Type Installation

CS should be mounted horizontally in the tank side wall. The standard connection for CS is thread type (R1-1/2), which is installed by welding a CS socket. Inner diameter of the socket should be 45mm or more. Using a smaller diameter may result in CS malfunction.

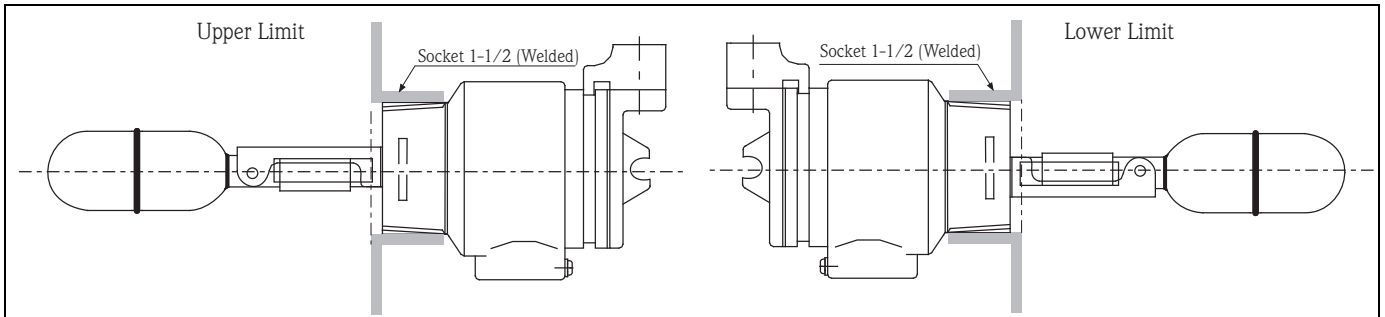


Figure 6: Thread Type Installation

Flange Type Installation

Prepare a size 3B or larger nozzle when using a flange type connection. Prepare a size 4B or larger nozzle when installing a spherical float.

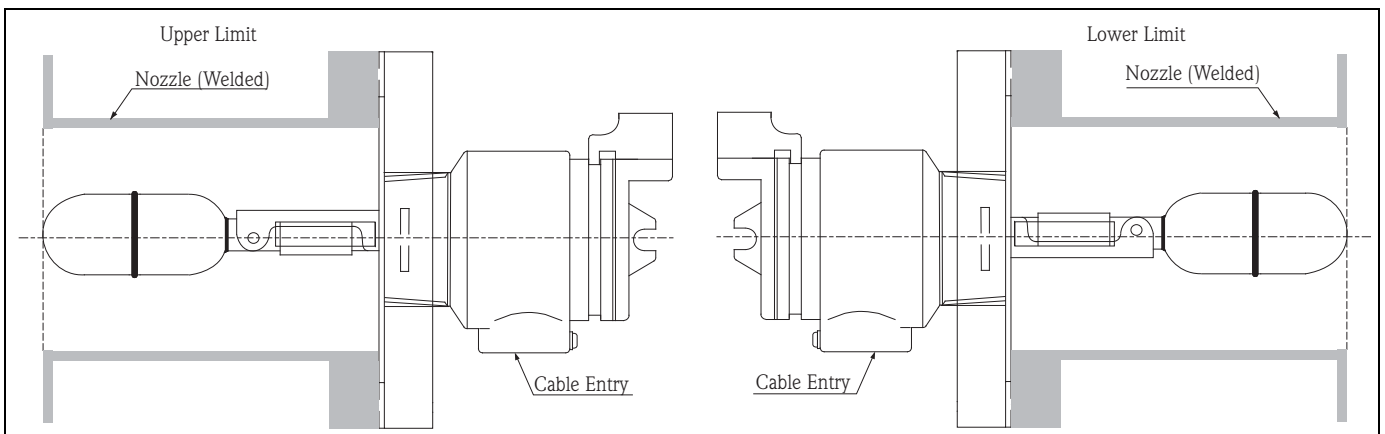


Figure 7: Cylindrical Float

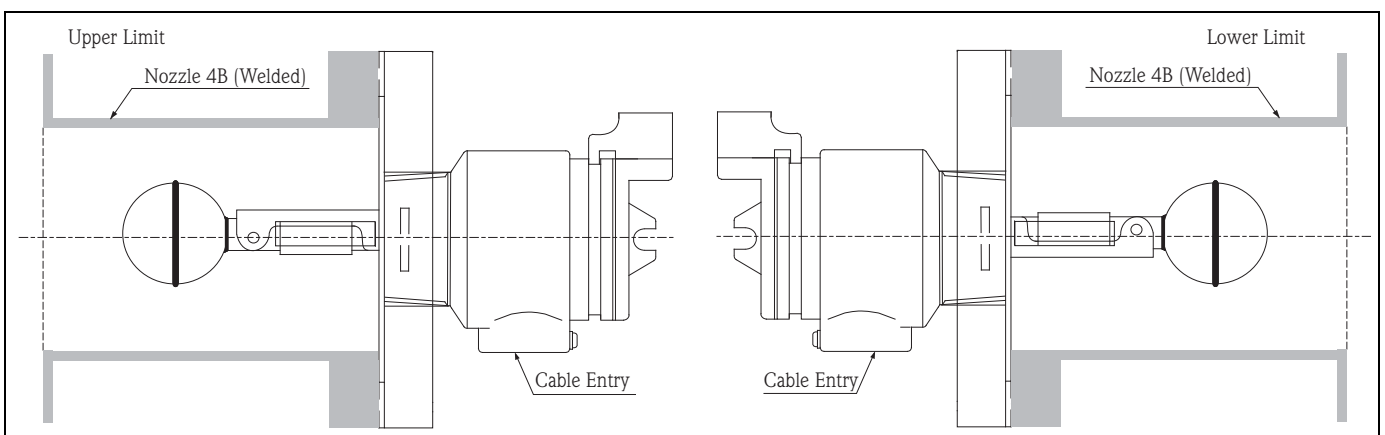


Figure 8: Spherical Float

Application

- Contact signal for control pump and valve
- Contact signal for overflow protection
- CS is suitable for pressure vessels
- CS is available for ex-proof type.

Alarm

When level float switch is combined with an annunciator, it can illuminate an alarm lamp and sound an alarm buzzer.

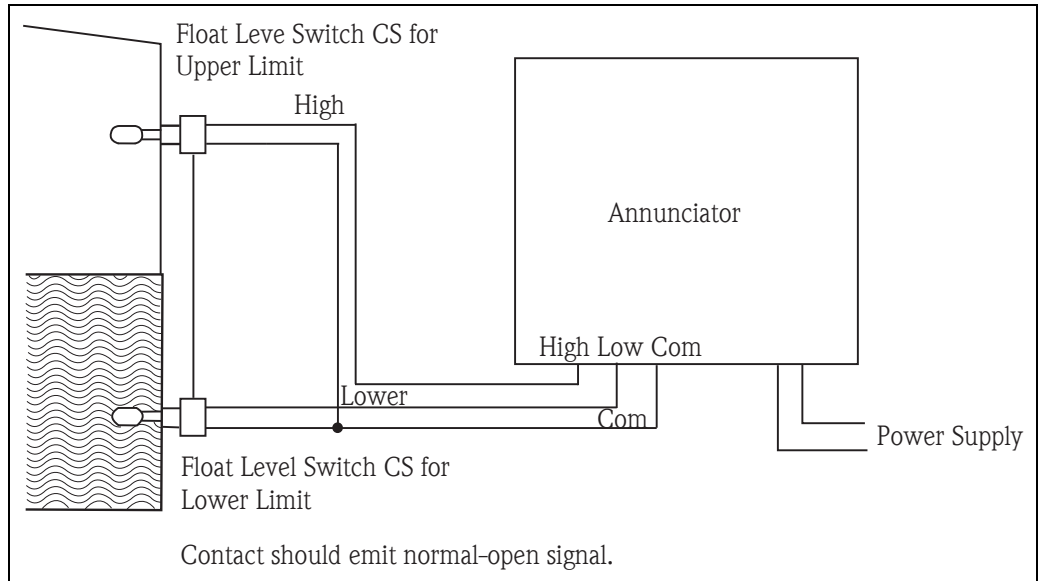


Figure 9: Float Level Switch for Alarm

Control of Pump and Valve

When the level float switch is combined with Nivotester FTW325, no control circuit is required. Valves can be opened or closed by connecting the contact output directly to a pump or valve from Nivotester FTW325.

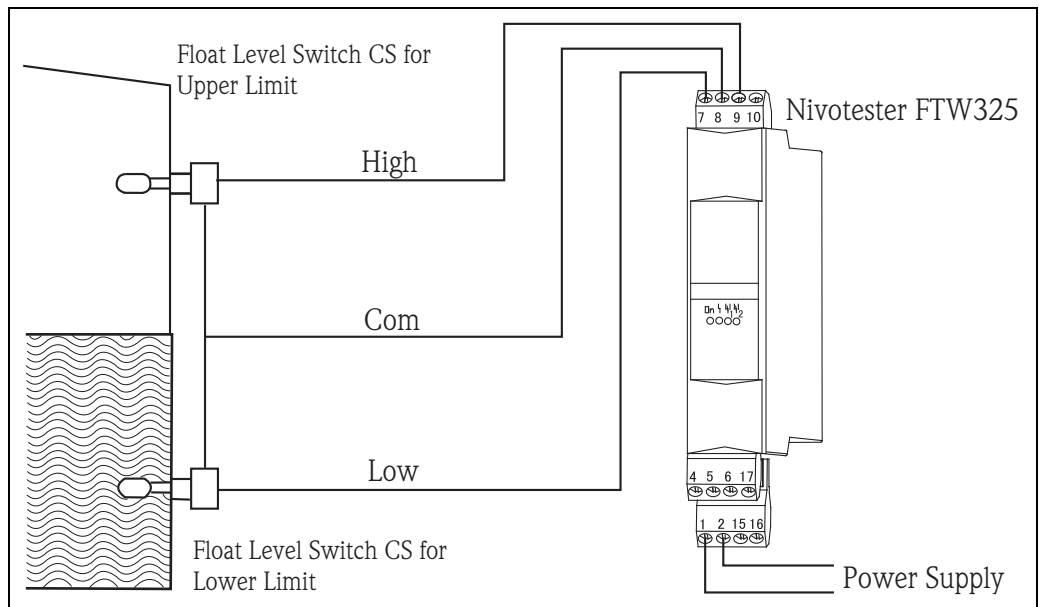


Figure 10: Float Level Switch for Pump and Valve

Certificates and Approvals

| | |
|--------------------|-------------------|
| Ex Approval | TIIS TIIS d2G4 |
|--------------------|-------------------|

| | |
|-------------------------|------|
| Protection Class | IP65 |
|-------------------------|------|

Order Information

CS1103

| | | | | |
|----------------|--|--|--|------------|
| 010 | Function: | | | |
| | 0 | Standard function | | |
| | 1 | Non standard function | | |
| 020 | Process Connection: | | | |
| | 0 | Thread JIS B0203 R1-1/2 | | |
| | 9 | Special version, TSP-no.to be spec. | | |
| 030 | Material Process Connection; Float: | | | |
| | J1 | SCS13; SUS304, cylindrical | | |
| | J9 | Special version, TSP-no.to be spec. | | |
| 040 | Approval: | | | |
| | 2 | Flame proof d2G4 E ^{*1} , IP65 | | |
| | 3 | Flame proof d2G4 EB ^{*2} , IP65 | | |
| | 9 | Special version, TSP-no.to be spec. | | |
| 050 | External Chamber: | | | |
| | 0 | Not used | | |
| | 9 | Special version, TSP-no.to be spec. | | |
| 060 | Switch Position: | | | |
| | 1 | High | | |
| | 2 | Low | | |
| 070 | Cable Entry: | | | |
| | 0 | PF(G)1/2 | | |
| | 1 | PF (G)3/4 cable gland, TF16-11 | | |
| | 2 | PF (G)3/4 cable gland, TF16-12 | | |
| | 3 | PF (G)3/4 cable gland, TF16-9 | | |
| | 4 | NPT1/2 | | |
| | 9 | Special version, TSP-no.to be spec. | | |
| CS1103- | | | | Order code |

*1 TIIS d2G4 (E)

*2 TIIS d2G4 + cable gland (EB)

Standard

| Old | New |
|------------------|-------|
| PT male thread | R |
| PT female thread | Rc |
| PS | Rp |
| PF | PF(G) |

CS1203

| | | | | |
|----------------|--|---|--|------------|
| 010 | Function: | | | |
| | 0 | Standard function | | |
| | 1 | Non standard function | | |
| 020 | Process Connection: | | | |
| | 1 | 10K 80A RF, flange JIS B2220 | | |
| | 3 | 10K 100A RF, flange JIS B2220 | | |
| | 5 | 3" 150lbs RF, flange ANSI B16.5 | | |
| | 7 | 4" 150lbs RF, flange ANSI B16.5 | | |
| | 9 | Special version, TSP-no.to be spec. | | |
| 030 | Material Process Connection; Float: | | | |
| | J2 | SUS304; SUS304, cylindrical | | |
| | J9 | Special version, TSP-no.to be spec. | | |
| 040 | Approval: | | | |
| | 2 | Flame proof d2G4 E* ¹ ,IP65 | | |
| | 3 | Flame proof d2G4 EB* ² ,IP65 | | |
| | 9 | Special version, TSP-no.to be spec. | | |
| 050 | External Chamber: | | | |
| | 0 | Not used | | |
| | 9 | Special version, TSP-no.to be spec. | | |
| 060 | Switch Position: | | | |
| | 1 | High | | |
| | 2 | Low | | |
| 070 | Cable Entry: | | | |
| | 0 | PF(G) 1/2 | | |
| | 1 | PF (G)3/4 cable gland, TF16-11 | | |
| | 2 | PF (G)3/4 cable gland, TF16-12 | | |
| | 3 | PF (G)3/4 cable gland, TF16-9 | | |
| | 4 | NPT1/2 | | |
| | 9 | Special version, TSP-no.to be spec. | | |
| CS1203- | | | | Order code |

*¹ TIIS d2G4 (E)

*² TIIS d2G4 + cable gland (EB)

Standard

| Old | New |
|------------------|-------|
| PT male thread | R |
| PT female thread | Rc |
| PS | Rp |
| PF | PF(G) |

CS1603

| | | | | |
|----------------|--|--|--|------------|
| 010 | Function: | | | |
| | 0 | Standard function | | |
| | 1 | Non standard function | | |
| 020 | Process Connection: | | | |
| | 1 | 10K 80A RF, flange JIS B2220 | | |
| | 2 | 20K 80A RF, flange JIS B2220 | | |
| | 3 | 10K 100A RF, flange JIS B2220 | | |
| | 4 | 20K 100A RF, flange JIS B2220 | | |
| | 5 | 3" 150lbs RF, flange ANSI B16.5 | | |
| | 6 | 3" 300lbs RF, flange ANSI B16.5 | | |
| | 7 | 4" 150lbs RF, flange ANSI B16.5 | | |
| | 8 | 4" 300lbs RF, flange ANSI B16.5 | | |
| | 9 | Special version, TSP-no.to be spec. | | |
| 030 | Material Process Connection; Float: | | | |
| | J2 | SUS304; SUS304, cylindrical | | |
| | J3 | SUS304; SUS316, spherical | | |
| | J9 | Special version, TSP-no.to be spec. | | |
| 040 | Approval: | | | |
| | 2 | Flame proof d2G4 E ^{*1} , IP65 | | |
| | 3 | Flame proof d2G4 EB ^{*2} , IP65 | | |
| | 9 | Special version, TSP-no.to be spec. | | |
| 050 | External Chamber: | | | |
| | 0 | Not used | | |
| | 9 | Special version, TSP-no.to be spec. | | |
| 060 | Switch Position: | | | |
| | 1 | High | | |
| | 2 | Low | | |
| 070 | Cable Entry: | | | |
| | 0 | PF(G) 1/2 | | |
| | 1 | PF (G)3/4 cable gland, TF16-11 | | |
| | 2 | PF (G)3/4 cable gland, TF16-12 | | |
| | 3 | PF(G)3/4 cable gland, TF16-9 | | |
| | 4 | NPT1/2 | | |
| | 9 | Special version, TSP-no.to be spec. | | |
| CS1603- | | | | Order code |

*1 TIIS d2G4 (E)

*2 TIIS d2G4 + cable gland (EB)

Standard

| Old | New |
|------------------|-------|
| PT male thread | R |
| PT female thread | Rc |
| PS | Rp |
| PF | PF(G) |

Documentation

Technical Information

TI 373F

Technical Information Nivotester FTW325

Operating Instructions

BA01011G

Operating Instructions Float Level Switch CS1103/CS1203/CS1603

KA199F

Compact Instructions Nivotester FTW325

Endress + Hauser Yamanashi Co., Ltd.
862-1 Mitsukunugi Sakaigawa-cho
Fuefuki-shi Yamanashi,
406-0846 Japan

Phone: ++81 55 266 4964
Fax: ++81 55 266 4969
<http://www.endress.com>