Quickstart

Gladiator Vibration Smart Switch Series

The forks of the vibration switch are driven to vibrate like a 'tuning fork'. When material touches the forks, their vibration is changed and output will switch in response. The output has adjustable hysteresis and delays for 'on' or 'off' switching.

A test function is available to remotely confirm the probe integrity by switching the relay contacts.

The Gladiator Smart Switch Series includes communications capability for remote adjustment, control and monitoring.
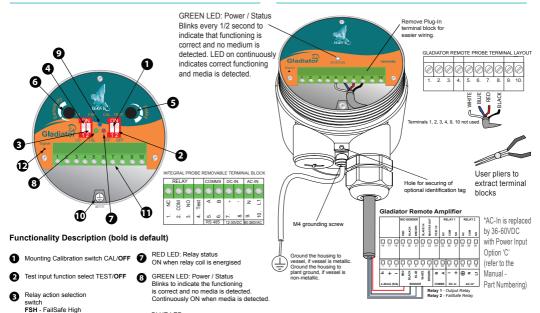
Principle of Operation

A stainless steel tuning fork is driven by piezo ceramic elements, causing it to vibrate at its resonant frequency. When the material to be detected covers the fork, vibrations are damped.

The changed vibration is sensed electronically, and the processed signal is used to switch a relay for indication or control purposes.

Integral Probe Functionality Layout

GREEN LED: Power / Status Blinks every 1/2 second to indicate that functioning is correct and no medium is detected. LED on continuously indicates correct functioning and media is detected.

Functionality Description (bold is default)

❶ Mounting Calibration switch CAL/**OFF**

❷ Test input function select TEST/**OFF**

❸ Relay action selection switch
FSH - FailSafe High
FSL - FailSafe Low

❹ HI / LO sensitivity switch

❺ Delay Potentiometer (0-20 sec) (Default 0 sec. at minimum position)

❻ Sensitivity Potentiometer Default **50% = 12 o'clock**

❼ RED LED: Relay status ON when relay coil is energised

❽ GREEN LED: Power / Status Blinks to indicate the functioning is correct and no media is detected. Continuously ON when media is detected.

❾ BLUE LED: Blinking indicates calibration function is on. Continuously ON indicates failed calibration.

❿ AC Ground - must be used for AC powered installations

⓫ Removable terminal block - plug in type

⓬ Signal voltage test point - Not used in Gladiator Conductivity products

Remote Probe to Amplifier Wiring

Remove Plug-In terminal block for easier wiring.

GLADIATOR REMOTE PROBE TERMINAL LAYOUT

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
				WHITE	BLUE	RED	BLACK		

Terminals 1, 2, 3, 4, 9, 10 not used.

User pliers to extract terminal blocks

Hole for securing of optional identification tag

M4 grounding screw

Ground the housing to vessel, if vessel is metallic. Ground the housing to plant ground, if vessel is non-metallic.

Gladiator Remote Amplifier

*AC-In is replaced by 36-60VDC with Power Input Option 'C' (refer to the Manual - Part Numbering)

Relay 1 - Output Relay
Relay 2 - FailSafe Relay

Cable type between Amplifier and Probe

- 4 conductor shielded twisted pair instrument cable
- Conductor size dependent on cable length
- BELDEN 3084A, DEKORON or equivalent
- Max: BELDEN 3084A = 500m (1640ft)
- Max: DEKORON IED183AA002 = 350m (1150ft).

Setup Procedure

Smart Probe Version

1. Mount the unit in its actual position.
Make sure that external ground wire is connected between the outside ground screw on the Gladiator housing and the roof/wall/side of the silo/tank/vessel/chute. (For non metallic tanks make sure that external ground wire is connected between the same outside ground screw on the housing and the general plant ground potential).

2. Check where the actual level is relative to the probe. Make sure that product is not touching the probe forks.

3. Turn the power on. The green LED will either stay on for 2 seconds then begin flashing or stay on permanently to indicate operation.

4. Select the required relay contact action.
The Relay can switch 'ON' or 'OFF' as the product approaches the probe and switch 'ON' or 'OFF' in response to an instrument failure (for details see page 10). Set the relay action selection switch position (FSL or FSH) depending on your requirements.

5. Cancel influence of mounting. Do not proceed with this step unless the product is not touching the probe forks.

Switch the Mounting Calibration switch to 'CAL' (ON) position. The Blue LED will blink to indicate that mounting calibration is now in progress.

Wait for at least 10 sec. then switch the mounting calibration switch to 'OFF' position. The blue LED should turn off after a short time. The Blue LED

will stay on if there was a calibration error. If this is the case please check that the probe forks are not touching the product or the mounting, then try the calibration again. If mounting calibration was successful the blue LED should be off and the Green LED should blink every 2 sec.

Unit is now able to cancel influence of mounting and probe history has been cleared.

6. Select the sensitivity. There are two adjustments controlling the sensitivity of the switch point:

6.1. The 'HI/LO' sensitivity switch is used to set your unit depending on the specific gravity/ bulk density of the product to be measured. This switch sets the range of adjustment possible with the sensitivity potentiometer.

If the material to be detected has a low specific gravity/bulk density - set the switch to 'HI' (ON) - default. If material to be detected has a high specific gravity/bulk density - set switch to 'LO'. If you are not aware of the specific gravity/bulk density of your material – set the switch to 'HI' (ON) - default.

6.2 The sensitivity potentiometer. Set the potentiometer according to your requirements. A 12 o'clock setting (50%) - default, will cover the majority of instances - for the remaining instances, turning the potentiometer clockwise will increase sensitivity. Increasing sensitivity maybe necessary if the product is not detected when touching the probe.

7. Select the time delay. Set the required delay using the Delay potentiometer. (Default is 0 sec. at minimum position) Turn the potentiometer clockwise if any delay is required. Maximum rotation is ¾ of a revolution. Max delay is 20 sec. The selected delay will be used for both an ON delay and an OFF delay.

8. Test function (used to check for malfunction of unit from remote position, PLC, SCADA etc). Select the desired Test function by switching the 'Test' switch (Default = 'OFF').

'TEST' (ON) Position: Test function is selected. Test terminal (terminal number 4 of Smart probe) is used as an input to the unit. The test function allows you to check the functionality of the unit. Applying a ground wire to the Test terminal will change the state of the relay. It will hold this state until the ground is removed, then it will change back to the standard running mode. If the unit was in a Fail mode then the relay will not change status.

'OFF' (Default) Position: Fail safe output function is selected. Test terminal (terminal number 4 of Smart probe) will function as an open drain drive. This can be used to drive a relay or an active low PLC input to detect a Fail condition. In normal operation mode the Test terminal will output Zero Volts (Short to GND). In Fail or unpowered mode the Test terminal will be open circuit.
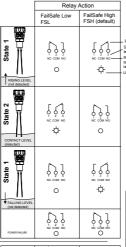
*See the manual for further information.

Wiring

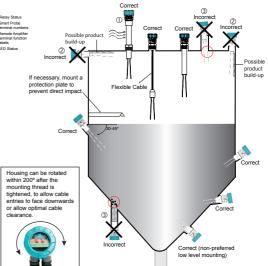### Relay Functions

Level Switch Contact Action
Relay - for Smart Probe version
Relay 1 - for Remote version

FailSafe Switch Contact Action
Relay 2 - Remote version only.
For Smart Probes the 'Test' terminal can act as a solid state output with a similar function.

Mounting

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