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PRESS ANNOUNCEMENT

Titan Enterprises Explains Possible Reasons for Flowmeter Failure During Installation

“Why Has My Pulse Flow Meter Sensor Failed?”

The majority of flow meters with a pulse output use a rotating element with internal magnets. These magnets trigger a solid-state sensor giving a pulse output proportional to the liquid flow rate.

Titan Enterprises Ltd, who has been designing and manufacturing flowmeters for over 40 years, explains some of the reasons why these sensors might fail and what can be done to prevent damage that can lead to costly repairs and process downtime.

High quality Hall effect sensors are typically used within Titan's pulse precision flow measurement devices. The sensors operate between 4.0Vdc and 30Vdc, however, there are a number of scenarios that will cause the Turbine and Oval Gear flow meters to fail, even though the installer believes the flow device has been installed correctly.

If a flow sensor fails, it may be for one of the following reasons:

- **Incorrect Wiring:** Care must be taken when wiring the sensor power supply and pulse output of the flowmeter. The sensor is unable to cope with incorrect wiring -

reverse polarity or short circuiting can cause the sensor to fail suddenly, completely and permanently.

- **Unregulated Power Supply:** Exceeding the maximum 30Vdc to the Hall Effect sensor will damage the unit. A good quality regulated **DC** power supply is recommended for powering a pulse flow meter.
- **Electrical Interference / Voltage Spikes:** Other connected equipment containing inductors (coils), or electromagnetic components (such as solenoid valves or pumps) can produce high voltage spikes when switching. These spikes can be a hundred to thousands of volts and if on the same circuit, will damage the flowmeter sensor beyond repair.

Electrical interference can also occur even without a direct connection if cabling is routed close to high-power equipment.

A failure mode that is commonly seen, is where a simple solenoid valve is operated on the same power supply as the flowmeter. When the solenoid de-energises in 1ms it produces a spike of 100s of Volts. Some of this voltage spike feeds through to the sensor, momentarily exceeding the 30Vdc maximum of the sensor causing it to fail.

What can be done to prevent catastrophic failures in flow measuring systems?

Neil Hannay, Senior R&D Engineer with Titan Enterprises observes: “The majority of damage tends to be caused during the installation of the flowmeter. Minor errors can result in a non-operational meter before the customer has even started, leading to costly repairs or replacements, as well as process downtime, that can be avoided.”

Titan Enterprises produce over 70,000 flowmeters each year that are used in a wide variety of industries, processes and applications, so troubleshooting for customers is not uncommon, particularly for those who are unfamiliar with Titan’s flow metering products.

Neil says: “Titan provides written data and instruction sheets with all our flow meters, and we have also published some [installation tutorial videos](#) to help our customers and prevent any mis-wiring that can damage the units.”

The following installation checklist will go a long way to preventing common causes of pulse flow meter sensor failure:

- Take care wiring the flow meter into the system**
Ensure polarity is correct and pull up resistors are fitted correctly before powering the flow measurement unit.
- Install on a dedicated regulated instrument power supply**
Always use a reputable regulated power supply to ensure the correct voltage is supplied to the meter.
- Operate on 12Vdc or lower**
Operating on a lower voltage gives headroom for any unavoidable voltage fluctuations and improves resilience to smaller voltage spikes.
- Do not share power supply with solenoid valves or pumps**
The sensor power supply should not be shared with any equipment containing solenoids, motors or transformers that give any significant inductive load.
- Avoid high power cables**
Install wiring away from high power cables and avoid switching equipment where possible to prevent interference.
- Install a local power supply or an inline filter**
If the above practices are not possible and external interference is a possibility, fit an inline DC EMI (ElectroMagnetic Interference) filter or a local voltage regulator.
- Fit snubber network or flyback diodes to inductive devices**
This can help to control any unavoidable voltage spike to an acceptable level.

For further information on Titan's flowmeter and instrumentation range or to discuss any process and technical issues, please contact Titan Enterprises on +44 (0)1935 812790 or sales@flowmeters.co.uk. Visit our website at www.flowmeters.co.uk/

Drawing upon over 40-years of flowmeter innovation - Titan Enterprises Ltd is a leading manufacturer of high-performance flow measurement solutions, including the Atrato ultrasonic flowmeter, Oval Gear flowmeters, low flow Turbine flow meters and a flow instrument range. Titan's company philosophy of "pushing the envelope by trying to do things a little different and better" has resulted in sales of over 2 million flowmeters and components into 50 countries worldwide and a repeat purchase percentage of 95%. All flow meters produced by Titan Enterprises are designed and manufactured to ISO9001 and calibrated to an uncertainty of $\pm 0.25\%$.

May 2022

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Illustrative image (available on request)



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