Application Note for the Aircraft & Aerospace Industry

Contactless flow measurement on the Airbus UK landing gear test rig. The flowmeter had to be suitable for various pipe diameters and materials, and easy to install.

Specifications

- **Installation Type:** Permanent
- **Flow Channels:** One
- **Outputs:** 1x Current
- **Medium:** Hydraulic Oil
- **Pipe Materials:** Steel, Aluminium, Titanium
- **Pipe Diameter:** 9.5 to 38 mm
- **Pressure range:** 5 to 350 bar g
- **Temperature:** Ambient

Application

Airbus UK landing gear test rig. Clamp-on sensors were installed to measure the flow of the hydraulic oil in the landing gears.

Instrument Solution

Fixed installed ultrasonic clamp-on flow-meter KATflow 150 as example of a suitable instrument.

Measurement Task

The problem faced by Airbus UK was to find a high performance flowmeter capable of meeting the demands of their application whilst being easily installed on pipe work in close proximity to existing instrumentation.

In order to be suitable, the flowmeter had to be capable of measuring flow in pipe work ranging from 3/8" (9.5 mm) to 1½" (38 mm) in pipe materials including steel, aluminium and titanium. It was essential for the flowmeter to perform well even with greatly varying process conditions such as a pressure range of 5 bar g to 350 bar g. Furthermore, all readings had to be taken in a very short period of time as the maximum measurement window was only two minutes.

Solution

The solution was supplied in the form of a fixed installed ultrasonic flowmeter similar to the KATflow 150 which takes non-invasive measurements and is thus independent of the varying process conditions.
The Airbus UK hydraulic rigs support the design verification by testing all the landing gear systems employed across the company's aircraft range including the A380. The clamp-on flowmeters were installed as a replacement for traditional inline turbine flowmeters. Testing done with these instruments had shown the turbine meters to be very costly to maintain and unable to cope with the dynamic flow conditions. By using a non-invasive clamp-on flowmeter, long-term system integrity is maintained without compromising the desired level of flow monitoring accuracy.
As the clamp-on sensors are not subjected to the same internal flow conditions as the turbine meters, there is also no risk of deteriorating performance.

Advantages

- **Simple, quick and cost effective installation**
- **Capable of taking readings within a very short period of time**
- **Fully independent from varying process conditions**
- **Capable of adapting to dynamic flow conditions of the liquid**
- **Greater measurement flexibility than inline turbine flowmeter**
- **Zero down-time on test rig and no requirement for regular calibration**

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