Application example

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Instantaneous massflow measurement at starting engine

Measurement items : instantaneous flow rate, temperature, pressure, density, mass, massflow, rotation speed, sound

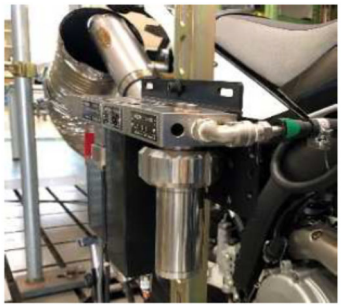
Application : evaluation for various engines of automobile, farm machine, construction machine, using as input data for creating transient model in MBD

Purpose

So far, it has not been available to capture the rise of fuel consumption when restarting engine from idling stop. We will confirm how much the new flow measurement system can respond to the changes of instantaneous flow rate compared to the old one in this experiment.

Overview

Measure the instantaneous mass flow rate when starting a motorcycle engine once, and compare the measurement results with the new and old systems.

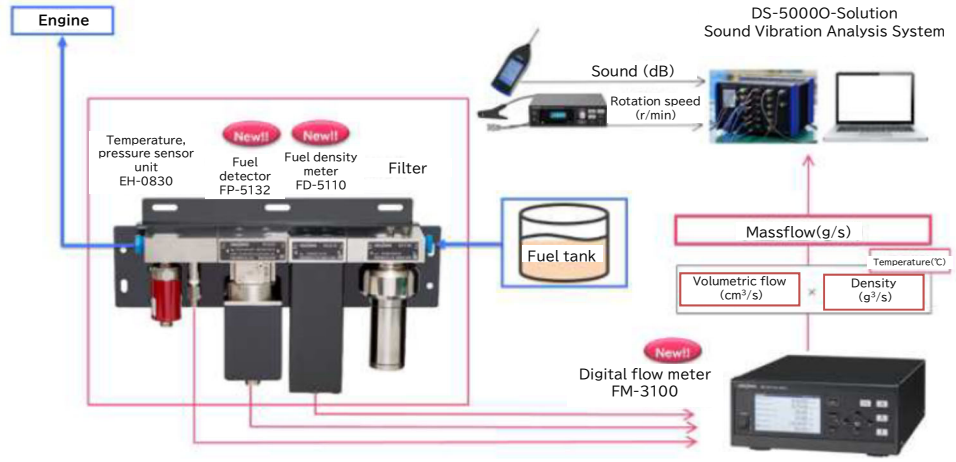


	Flow detector	Density meter	Flow meter
①New	FP-5132	FD-5110	FM-3100
②Old	FP-213S	Nil	FM-2500A

*The new system can calculate in real time with compensation function.

*The minimum pipe length prevents the fuel temperature change and reduces the error.

Measurement system



Precautions for installation

- Try not title the detector (upright ±15°)
- Install as close to the engine as possible and shorten the length of the piping (to minimize the temperature change)
- Shield heat with heat insulation material (to avoid transmitting engine heat to the detector)
- Align the height of piping connection port (to prevent air entering into)

Measurement result

Compared to the old model, the new model (FP-5132+FD-5110+FM-3100) was able to capture the rise of fuel consumption at start-up.

<Performance differences>

・Resolution
FP-213S(1200 P/R) → FP-5132(2400 P/R)

・Output speed
FP-2500A(100 ms) → FM-3100(1 ms)

→New model is suitable for test that repeats idling stop and engine starting, transient mode test, and input data for creating transient model in MBD