Fuji Electric

Innovating Energy Technology

Application

Fast response time : Improving process changes detection and plant monitoring efficiency

Fuji Electric supplies The Smart Pressure Transmitter FCX-AII VG Series
with **total response time = 86ms**

Objective

Detect process changes accurately and increase plants monitoring efficiency.

Solution used

Fuji Electric provides the Smart Pressure Transmitters FCX-AII VG Series. It allows a really low response time (<100ms) suitable for fast process monitoring or leak detection.

Applications

The new FCX-AII VG series is SIL2 certified and is best suitable for petrochemical applications as well as many other industry applications.

SIL Compliance with Safety Integrity Levels 2/3 according to IEC 61508

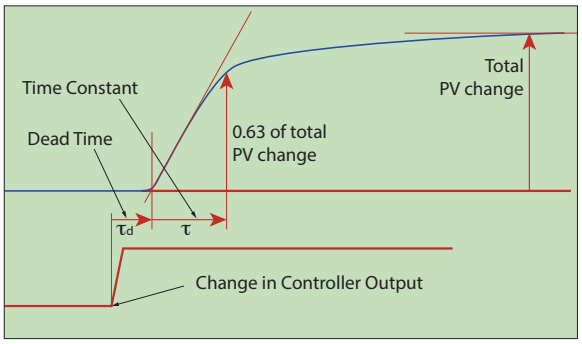
HART COMMUNICATION PROTOCOL HART 7 protocol

Response time principle

The response time is the sum of the dead time (τ_d) and the time constant (τ) and corresponds for the transmitter output signal to reach 63% of the input pressure step applied to the transmitter.

Dead time (τd) :

The dead time is the time for the transmitter to start changing its output signal following an input pressure step.



Time Constant (τ) :

The time constant includes the mechanical and electronic intrinsic response time of the transmitter and acts like a first order low pass filter.
The time constant value is defined when the output signal reach 63% of the corresponding input pressure step.
The time constant is specific to a given transmitter (mechanical and electronic designs).

VG Series Pressure Transmitters

FKC...G

FKG...G

FKA...G

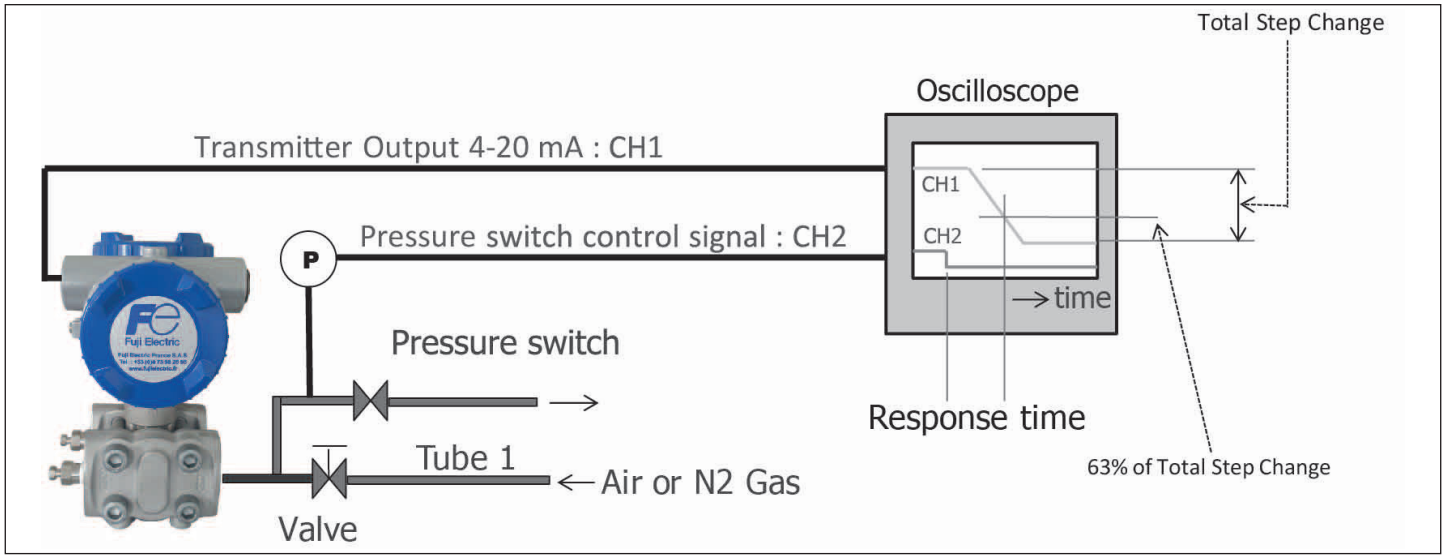
FKP...G

FKH...G

Test Procedure

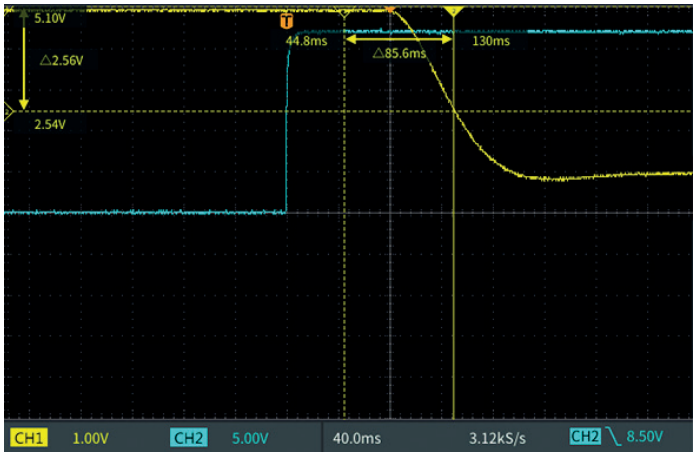
- Record both the 4-20 mA output signal (CH1) and the actuating signal of the pressure switch (CH2) with a scope-meter.
- Open the valve to apply a pressure on the HP side of the transmitter (Air or N2)
- Close the valve to maintain under pressure the HP side of the transmitter.
- Open the pressure switch to depressurize the HP side of the transmitter and create a down step of pressure.
- Measure the Total response time by adding τ_d and τ with scope meter result. The response time of the pressure switch must be know or negligible.

Response Time
<100 ms



Test Results : (with pressure step = 5bar)

- Pressure switch response time : 45ms
- Transmitter dead time : 40ms
- Transmitter time constant : 46ms



TOTAL RESPONSE TIME = τ + τ_d = 86ms (<100ms)

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