



Lowest Cost Of Ownership Close-Coupling Techniques For Enhanced Instrument Mounting Solutions

White Paper



ENGINEERING YOUR SUCCESS.

Introduction

The Evolution of Primary Isolation Valves for Instrumentation Pressure Measurement



Spencer Nicholson

Spencer is product manager for Parker has over 35 years experience in valve technology development

Innovations in the design of primary isolation valves and manifolds for mounting pressure instrumentation can deliver significant advantages to both instrument and piping engineers, ranging from significantly enhanced measurement accuracy, to simpler installation and reduced maintenance.

Parker Hannifin has created a comprehensive range of instrument manifold mounting solutions for pressure instrumentation applications, employing close-coupling techniques which reduce or eliminate impulse lines and tube fittings to improve overall instrument performance and reliability.

What is close-coupling?

There is no formal definition for close-coupling, but it has come to mean any instrument mounting system that enables a user to more closely or directly connect an instrument to a process connection and eliminating more traditional process isolation valves

The overriding objective of this is to optimise the accuracy of measurement, by eliminating the long runs of tubing, tube fittings and bends and joints between process pipe and instrument that can cause pressure drops, and gauge/ impulse line errors.



CCIMS differential pressure orifice flow solution

Transmitter 'hook-ups' are often configured individually for each application, and can be large, heavy and difficult to install. By replacing such arrangements with purpose-designed close-coupled manifold/mounting solutions, users are able to optimise accuracy and reap a whole range of additional benefits such as:

- **Increased transmitter accuracy and repeatability by eliminating impulse lines**
- **Reduced size and weight, less stress on the process pipework**
- **Easy winterisation, no heat traced impulse lines to power up or freeze**
- **Faster installation, and the option of transmitter assembly and testing**
- **Reduced maintenance, and higher instrument up time**
- **Elimination of threaded connections**
- **Simpler design with fewer components and fewer leak paths**
- **No risk of impulse lines blocking, as impulse lines are eliminated**
- **Pre-engineered compact design eliminates the need for impulse line field design**



CCIMS level differential pressure measurement solution

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— Spencer Nicholson,
Product Manager

Faster process measurement

‘Hook-ups’ for pressure transmitters often involve the custom configuration of complex arrangements of tubing, with multiple connections and valves. Measurement errors can be introduced as a result of long length impulse lines. These errors are frequently compounded by the use of different tube, fitting and valve components whose diameters may vary throughout an instrument installation.

Inaccuracies can distort the pressure impulse signal, causing errors of up to 15% (on flow measurements for example).

Traditional ‘hook-up’ for a differential pressure transmitter

This traditional solution (above right) uses two sets of valve



Traditional hook-up

assemblies to create the double block and bleed valves, which are connected with impulse lines and connectors to the instrument manifold.

It involves numerous discrete components, with all the associated costs and assembly time, and introduces bends that cause attenuation and turbulence that can affect measurement accuracy. If not carefully specified, other measurement accuracy problems can arise from differences in bore diameters of the various components, and unequal lengths of tubing.

The close-coupled alternative

- **Short and straight flow path to instrument from the process, increases transmitter accuracy**

- **Integration of the manifold (for example) into primary isolation duty incorporating Double Block and Bleed or other if required, eliminating numerous leak paths**

- **No hook-up drawings or Bill of Materials are required by the user or system designer to create an instrument hook-up close coupled products from Parker Hannifin can be assimilated to modular “plug and play” insertable solutions**

- **Assembly takes only minutes compared to hours with a conventional impulse line system**
- **Low maintenance system, which is very easy to maintain if required**
- **Smaller and lighter assembly placing much less stress on the pipework**



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