ITT

Neo-Dyn®

An ITT Neo-Dyn® Differential Switch Application

In June of 2008, NASA announced a prestigious multimillion-dollar contract to Oceaneering Space Systems (OSS). The contract was awarded to OSS and a team of six sub-contractors to redesign and produce the first new spacesuits for the nation's Astronaut Corps since the 1980's-era suits used aboard the space shuttle. The new suits must be capable of protecting astronauts during launch, re-entry and possible abort phases of flights to the Space Station and the moon. NASA officials said the contract could lead to the production of 109 suits by 2018 – 85 for the space operations and 24 for operations to the moon.

One of the sub-contractors working on spacesuit design had been in regular communication with ITT Neo-Dyn® before the contract announcement. A team of engineers were developing a special vacuum chamber in which to test the capabilities of various aspects of new suit design, but were having problems finding a relief valve that would work under such low pressure settings. They found their answer by using a Neo-Dyn® 160P42CC6B differential pressure switch.

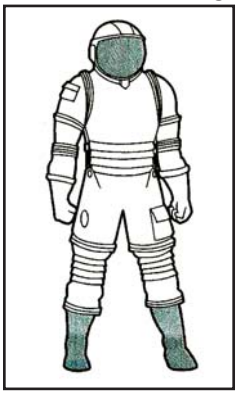
The following is the description of the benefits of our switch as described by a NASA engineer, further illustrating the problems they were having until they decided on ITT.

"I will tell you the problem I am having and why I am interested in your product. I am building a test setup for a prototype unit. Service fluid is 90%+ O2 with a small amount of trace gasses. My test setup which includes most of my plumbing is inside a vacuum chamber at about 0.1 torr. My main problem is that my test setup is processing fluid at low pressure, under 7 psia, and the difference between my working pressure and the max allowable pressure is 0.7 psid. I am having trouble finding a relief valve that can deliver a consistent cracking pressure while achieving a desired flow rate when a relief valve's usual tolerance of +/- 5%, plus having to achieve a certain flow rate at 10% over cracking pressure per ASME code, means that my relief valve setting would have to be about half a psi above of my operating pressure. A small fluctuation in pressure could cause my relief valve to crack but not relieve enough to fully seat, creating a small but significant leak in my system.

Using a pressure differential switch set to go off at or near my max allowable pressure will open a solenoid valve to relieve the system. In this case my reference pressure (chamber pressure) can change and I will have no problem if I change my working pressure appropriately. It is my pressure differential which has the potential to damage my system and that is 0.7 psi. Basically, I can't find relief valves that will work under these conditions without setting them at the bottom end of their operational range, or finding one that will work at these pressures but will relieve the necessary flow rate. There is also the possibility that due to the small opening of most relief valves, when working at such low pressures, the sudden release of gas into vacuum could cause the small opening to ice up, due to the sudden expansion of gas, and then sublimate. Depending on how long it takes to sublimate, my relief valve could remain stuck open due to the ice not allowing it to reseat."

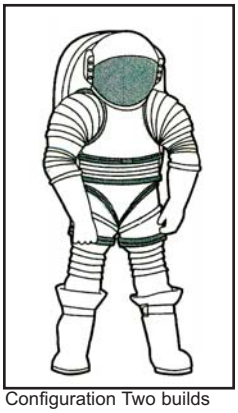
The problem was solved when a Neo-Dyn® Series 160P differential switch was installed in their system, replacing the relief valve and providing improved testing of our Space Corp's new suits.

Launch and Landing



Configuration One would be worn during launch and landing operations, the loss of pressurization in the crew compartment and certain extravehicular activities.

Suitable for moonwalks



Configuration Two builds on Confirguration One and is designed to support lunar surface operations. On short moon trips, the suit will support a week's worth of moonwalks.

Source: **NASA**

Engineered for life

For more information, please visit www.neodyn.com