

Re: need to create 0 to 30 pounds linear force

Re: need to create 0 to 30 pounds linear force

Source: <http://sci.tech-archive.net/Archive/sci.electronics.design/2008-01/msg04511.html>

- *From:* "acannell@xxxxxxx" <acannell@xxxxxxx>
 - *Date:* Mon, 28 Jan 2008 14:41:21 -0800 (PST)
-

On Jan 22, 8:29 am, "Bob Eld" <nsmontas...@xxxxxxxxxx> wrote:

<acann...@xxxxxxx> wrote in message

news:d0c8ff67-447d-4f39-a7dd-fd73294ad4dd@xx

OKAY:

sorry i left out the throw

i imagine the throw will be less than 5mm..

let me explain the application:

i want to make a programmable adjustable fuel pressure regulator for a car

you take a normal fuel pressure regulator, which is basically a ball and spring valve where the spring sets the pressure

if you were able to push on the spring, then you can further increase the regulated pressure

Re: need to create 0 to 30 pounds linear force

SO, my regulator will have a spring to set the MINIMUM pressure, and some kind of electrically controlled "force" which will push on the spring to increase the pressure to whatever it needs to be

the "closed loop" will measure the RESULTANT fuel pressure, NOT the force of the actuator

my application would require a minimum pressure of about 30 lbs, with the ability to go up to 60 lbs, so the spring will give me the minimum, and this electrically controlled "force" device will supply the remainder, as needed

pneumatic systems arent an option because they add too much complexity to the system

i thought about using a normal rotary motor but it seemed like it would be too slow...i could be wrong though. a motor connected to a threaded rod in a tube might work, but i dont know how much torque the motor would need and it might need to be geared down, and it might be slow....but it MIGHT WORK..i may have to look into that

So for openers, you are talking about pressure, not force. The actual force is probably far less than a pound depending on the orifice area where the ball seats, right? No way do you need 30lb of force as originally claimed.

Simple solution: Place a screw behind the spring to adjust the force on the spring. Attach a gear to the screw. Drive the screw gear with a small DC motor with a pinion gear on its shaft. The pinion engages the screw gear. The purpose of the gear and pinion is to give a gear ratio to increase the motor torque on the screw keeping the motor small and the system simple.

When there is no current in the motor, the pressure will remain at it's setting and can remain forever consuming no power. Motor current in one direction will drive the screw toward higher pressure while current in the other direction will drive the screw to lower pressure.

Connect the motor in your pressure control loop with appropriate amplification and compensation using pressure as the control variable as you state.

Re: need to create 0 to 30 pounds linear force

Provide two limit switches on the screw travel to keep the screw from bottoming out and stalling the motor at each end of travel.

Don't make this a bigger deal than it needs to be.– Hide quoted text –

– Show quoted text –

Wait a second here.....i'm not so sure I dont need 30 lbs of force if i want to regulate 30 psi, for instance...the fluid being regulated has to "lift up" the ball in the orifice, and if there is 30 lbs on that ball you get 30 psi, yes?

I took apart the fuel pressure regulator that I will be modifying with the linear force actuator. Its got a 3/4" diameter spring that I could see easily taking 50 lbs of force to get it to the compressed length that it was before i sawed open the regulator... (the stock pressure is 50psi)

it still remains for me to put the opened up regulator on the car and see if i can modulate the fuel pressure with a much smaller force..but something tells me no since that same place I will be putting pressure to modulate the pressure is where that hefty spring was..