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both pneumatics and hydraulics are applications of fluid power they each use a pump as an actuator are controlled by valves and use fluids to transmit mechanical energy the biggest difference between the two types of systems is the medium used and applications hydraulics and pneumatics are two different types of actuators or mechanical systems that provide movement in machines cars power tools and other products that require power to function both hydraulics and pneumatics work along similar lines but pneumatics run on compressed air and hydraulics run on fluid power first let s start with hydraulics and pneumatic definitions fluid mechanics is that branch of science that deals with the behavior of the fluids at rest as well as in motion pneumatics is a branch of engineering that makes use of gas or pressurized air chapter 5 pneumatic and hydraulic systems oct 16 2006 two types of fluid power circuits most fluid power circuits use compressed air or hydraulic fluid as their operating media while these systems are the same in many aspects they can have very different characteristics in certain ways both pneumatics and hydraulics are applications of fluid power pneumatics uses an easily compressible gas such as air or a suitable pure gas while hydraulics uses relatively incompressible liquid media such as oil most industrial pneumatic applications use pressures of about 80 to 100 pounds per square inch 550 to 690 kpa fluid power is energy transmitted and controlled by means of a pressurized fluid either liquid or gas the term fluid power applies to both hydraulics and pneumatics hydraulics uses pressurized liquid for example oil or water pneumatics uses compressed air or other neutral gases hydraulic systems are fluid power systems that use incompressible liquids typically oil or water to transmit power at high pressures while pneumatic systems are fluid power systems that use compressible gases usually air to transmit power at moderate pressures pneumatics is the science and technology of pressurized air using piped compressed air or a similar gas such as nitrogen to transmit force and energy pneumatic systems use compressed air to transmit power and control motion while hydraulic systems use pressurized fluid usually oil to achieve the same purpose although both systems have similar functions they differ in their operating principles components and applications both pneumatics and hydraulics are applications of fluid technology they each use a pump as an actuator are controlled by valves and use fluids to transfer mechanical energy the biggest difference between the two types of systems is the media used and the applications what are pneumatic systems where hydraulic systems leverage the power of liquid under pressure pneumatic systems use the force of compressed air or gas to do work pneumatic systems are commonly used in industries such as manufacturing automation and construction where tools and processes require bursts of high energy repetitive motion fluidics or fluidic logic is the use of a fluid to perform analog or digital operations similar to those performed with electronics the physical basis of fluidics is pneumatics and hydraulics based on the theoretical foundation of fluid dynamics our broadened capabilities and expertise in fluid control pneumatics precision fluid control and position sensing indication establish emerson as a strategic partner for customers across a vast range of end markets both liquids and gases are considered fluids fluid power system includes a hydraulic system hydra meaning water in greek and a pneumatic system pneuma meaning air in greek first off pneumatic systems use gas to transmit power compressing the gas to do so while hydraulics rely on liquid fluid power since pneumatic applications rely on pressurized systems they cannot produce more than 100 pounds per square inch the primary advantage of pneumatic

systems is that they run on compressed air or gas instead of fluid as a result they are involatile and require no electricity to perform pneumatic actuators are versatile and affordable making them popular for braking systems and pressure sensors pneumatic and hydraulic actuators when one thinks of fluid power they often think of hydraulic systems since our common reference of fluid implies liquid however in engineering and physics the term fluid includes both liquid and gas therefore the category of actuators including pneumatic steam and hydraulic share many similarities both low pressure and high pressure applications are available for fluidic pneumatic circuits having described and explained some of the components used in fluidic and pneumatic circuits it remains to illustrate how they may be assembled into circuits which provide useful and complex functions 1 of relating to or using gas such as air or wind a moved or worked by air pressure b 1 adapted for holding or inflated with compressed air 2 having air filled cavities 2 of or relating to the pneuma spiritual 3 having a well proportioned feminine figure especially having a full bust pneumatically this article describes the construction and operation of fluidic and pneumatic devices in current use as well as the principles of their use in medical devices the designs for an automatic blood pressure cuff inflator a blood pump and a high performance ventilator are presented

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fluid power is energy transmitted and controlled by means of a pressurized fluid either liquid or gas the term fluid power applies to both hydraulics and pneumatics hydraulics uses pressurized liquid for example oil or water pneumatics uses compressed air or other neutral gases

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both liquids and gases are considered fluids fluid power system includes a hydraulic system hydra meaning water in greek and a pneumatic system pneuma meaning air in greek

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first off pneumatic systems use gas to transmit power compressing the gas to do so while hydraulics rely on liquid fluid power since pneumatic applications rely on pressurized systems they cannot produce more than 100 pounds per square inch

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the primary advantage of pneumatic systems is that they run on compressed air or gas instead of fluid as a result they are involatile and require no electricity to perform pneumatic actuators are versatile and affordable making them popular for braking systems and pressure sensors

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pneumatic and hydraulic actuators when one thinks of fluid power they often think of hydraulic systems since our common reference of fluid implies liquid however in engineering and physics the term fluid includes both liquid and gas therefore the category of actuators including pneumatic steam and hydraulic share many similarities

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both low pressure and high pressure applications are available for fluidic pneumatic circuits having described and explained some of the components used in fluidic and pneumatic circuits it remains to illustrate how they may be assembled into circuits which provide useful and complex functions

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1 of relating to or using gas such as air or wind a moved or worked by air pressure b 1 adapted for holding or inflated with compressed air 2 having air filled cavities 2 of or relating to the pneuma spiritual 3 having a well proportioned feminine figure especially having a full bust pneumatically

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