Valve actuated by electric stepper motor-based linear drive

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Actual cryogenic valves are mostly driven by pneumatic actuators. PLC generated electrical analogue or digital signals are guiding control valves via an electro-pneumatic positioner and shut-off valves by switching an electromagnetic pneumatic pilot valve. However, a pneumatic air supply system is complicated and the complexity increases with the number of valves and the geographical expansion. Furthermore, a pneumatic air supply system has a very low energy efficiency, needs continuous servicing and requires space. Thus, operation and capital costs for an electro-pneumatic system to actuate valves are high.

There are new developments in in the refrigeration, natural gas and energy industries which use pneumatic free electric driven control and shut-off valves.

Based on the positive service experiences, innovative cryogenic and warm valves, actuated by an electric stepper motor-based linear actuator were developed. The development includes also the electronic control module with specific algorithms for the full valve functionality. Valve safety function fail open or fail closed as well as many further control advantages are available. Using of electric stepper motor-based linear actuators for cryogenic and warm valves allows a highly-simplified installation for cryogenic systems. These advantages open a high potential to reduce operation and capital costs remarkably.

Examples of such valves will be shown and described. Development perspectives will be discussed.