9. Control valve actuators

9.1 General

The control effectiveness of a control loop is unquestionable determined by the weakest element of the chain. This is often the valve actuator. If one presupposes a continuity of the control valve characteristic i.e. an inherent characteristic curve without turning points, the quality of the actuator is, for an attainable control effectiveness, in most cases, more important than the quality of the valve characteristic curve.
The following chapter illustrates the different actuator principles, explains the authoritative parameters for an actuator selection and focuses above all on the calculation of the required actuator thrust and the selection of a suitable actuator type. A purely static or quasi static consideration however is not sufficient to describe the complicated interactions between the control valve and the actuator. Rather dynamic forces must also be considered for critical applications. Unfortunately, there are no obligatory references available in the corresponding literature which will permit a generalization and a simple calculation method with regard to dynamic forces. Therefore the given recommendations are based on the calculation of the SAMSON group experts, their valve sizing software and the authors.

The majority of all industrial control valves installed worldwide is even today still driven by pneumatic diaphragm actuators. This actuator type is therefore of course in the center of interest and attention.

9.1.1. Actuator types

A first criterion in the distinguishing of different actuator types is the style and the manner in which the actuator thrust is generated. Here the user can select from the following actuating principles:

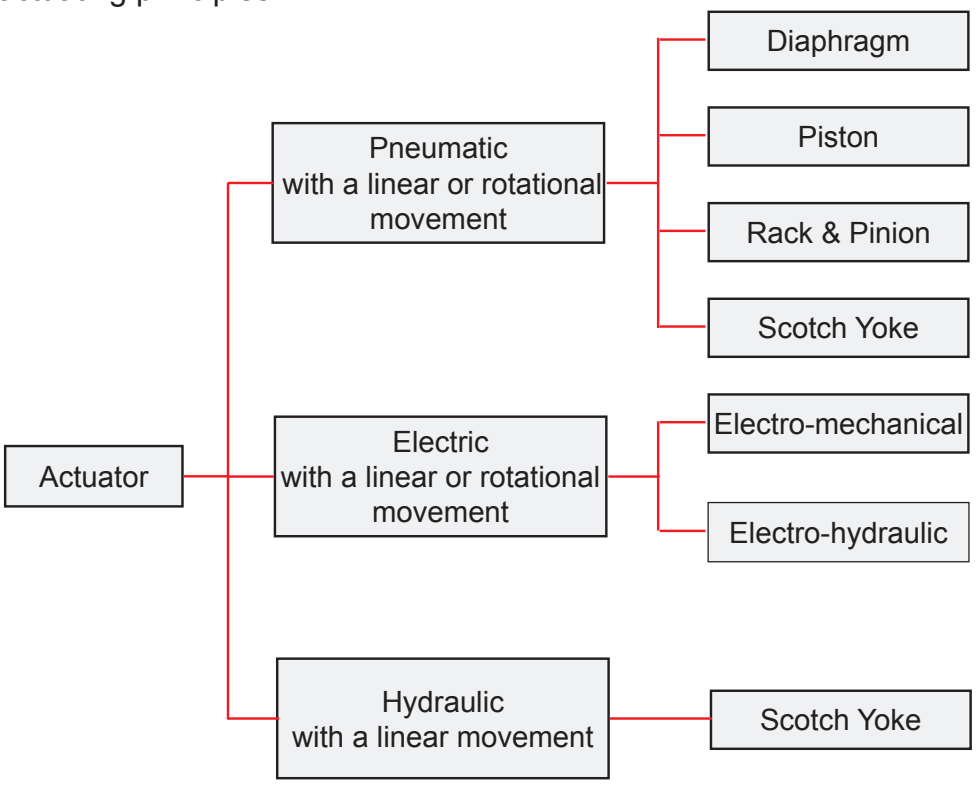

Figure 9.1.1.-1: Actuator types