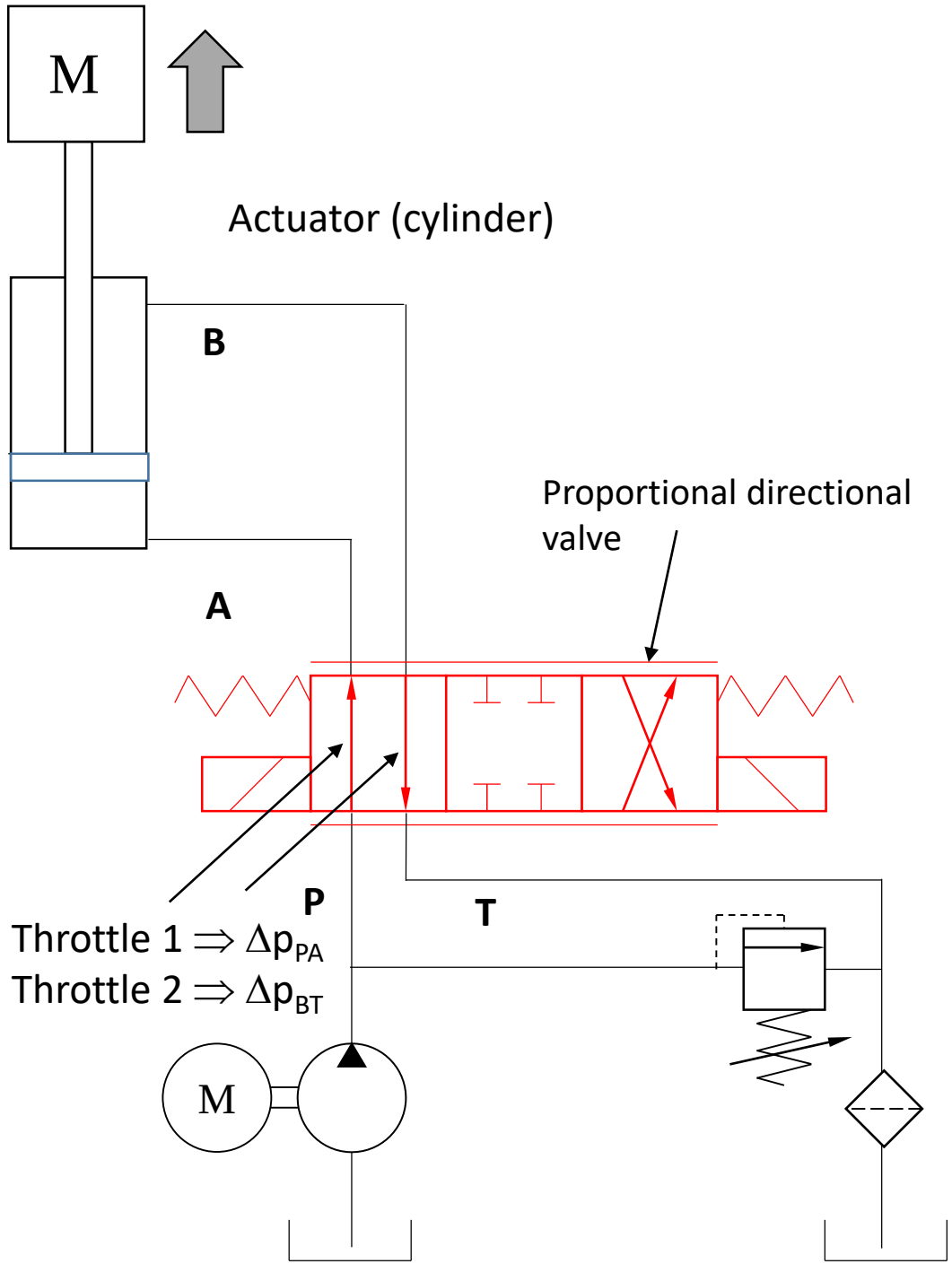
Direct-Driven Hydraulic Actuator Package Project

State of the art technology in Fluid Power both in industrial and mobile systems is to utilize **Proportional directional valves** in system control.

From the controllability point of view these systems work very well. This is sufficient in many cases.

However, if we think of the **energy efficiency** of the system, this kind of control is not favourable since the operation of **Proportional directional valves** is still based on **throttling of flow** which means **pressure losses and power losses.**

Thus, an ideal way to control the flows and actuator motions would be without throttling valves. One of the current research trends in that field is so called **Direct Driven Hydraulics**.
This means controlling of flow directly with the **rotational speed of an electric motor** which operates the pump.
These systems typically need expensive power electric devices like inverters and special motors.
We have a more cost effective approach for a student project!



Direct-Driven Hydraulic Actuator Package

- Combined Actuator Package Design
  - Miniature Electric Motor and Power Electronics, 5 kW
  - Hydraulic Pump/Motor
  - Pressure Accumulator
  - Sensors
- Control rotational speed of electric motor $\Rightarrow$ pump flow $\Rightarrow$ velocity of the actuator $\Rightarrow$ velocity or/and position of the actuator (feedback) controlled by utilizing sensors
- Energy efficient design!
  - No throttling valves
- Cost effective approach
- **Project**
  - First version of the system existing
  - $\Rightarrow$ system development
  - $\Rightarrow$ performance demonstration

Turnigy RotoMax 50cc Size Brushless Outrunner Motor