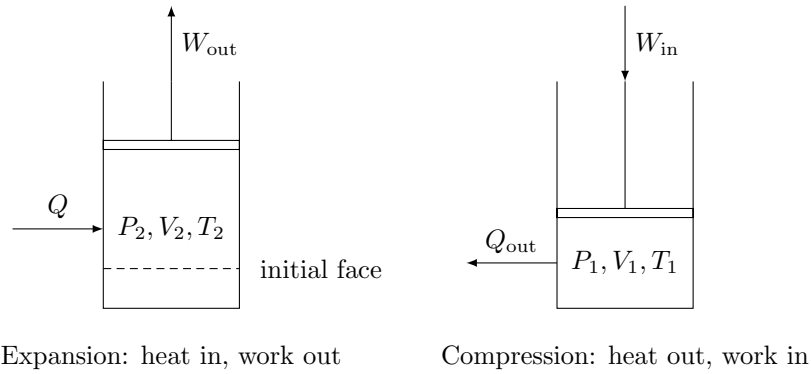
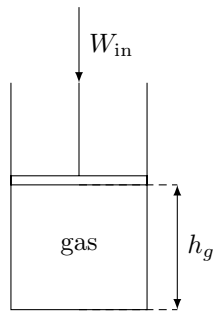


Piston–cylinder: a movable closed-system boundary



The trapped gas occupies the space below the piston. Position is a fraction of cylinder height, measured upward from the bottom to the lower piston face. The dashed line marks a lower initial piston position. The piston face and rod move together; heat and work arrows connect to the gas boundary and rod tip.

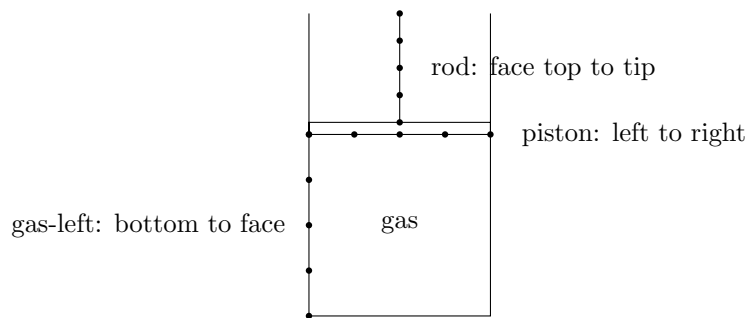
These are illustrative states and independently specified energy directions. Heating need not cause expansion, and compression need not reject heat. The diagram does not solve an equation of state or infer a process from position. For constant cross-sectional area A , gas volume is $V = Ah_g$ and boundary work in a quasistatic process is $W_{\text{by}} = \int P dV$.



Adiabatic compression: heat arrow omitted

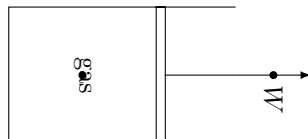
Suppressing a flow retains its percentage coordinates for later author-supplied annotations. No special stroke thickness is applied by the module.

Percentage anchors and native TikZ composition

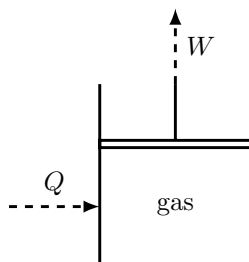


Samples at 0, 25, 50, 75 and 100 percent

Gas-region anchors track the actual gas height. The full-height axis and wall families retain their original geometry. The top boundary family spans the open mouth, so it is a virtual guide rather than a drawn cap.



A rotated apparatus carries its gas, piston, rod, flow endpoints and percentage coordinates with it. Author-provided labels remain ordinary TikZ nodes.



The final system demonstrates a document-selected line width and dashed flows. The package itself inherits the surrounding native TikZ width and draws in black and white. Style hooks allow the document to choose other appearances.