$$\left.\begin{array}{l}\dfrac{T_0}{T}=\left(1+\dfrac{\gamma-1}{2}M^2\right)\\[2ex]\dfrac{P_0}{p}=\left(1+\dfrac{\gamma-1}{2}M^2\right)^{\frac{\gamma}{\gamma-1}}\end{array}\right|\rightarrow\frac{\dot{m}}{A}=P_0\sqrt{\frac{2\gamma}{(\gamma-1)(R_g\cdot T_0)}\left[\left(\frac{p_1}{P_0}\right)^{\frac{2}{\gamma}}-\left(\frac{p_1}{P_0}\right)^{\frac{\gamma+1}{\gamma}}\right]}$$

$$\frac{A_1}{A_2}=\frac{\dfrac{\dot{m}}{A_2}}{\dfrac{\dot{m}}{A_1}}=\frac{P_0\sqrt{\dfrac{2\gamma}{(\gamma-1)(R_g\cdot T_0)}\left[\left(\dfrac{p_2}{P_0}\right)^{\frac{2}{\gamma}}-\left(\dfrac{p_2}{P_0}\right)^{\frac{\gamma+1}{\gamma}}\right]}}{P_0\sqrt{\dfrac{2\gamma}{(\gamma-1)(R_g\cdot T_0)}\left[\left(\dfrac{p_1}{P_0}\right)^{\frac{2}{\gamma}}-\left(\dfrac{p_1}{P_0}\right)^{\frac{\gamma+1}{\gamma}}\right]}}=\frac{\sqrt{\left[\left(\dfrac{p_2}{P_0}\right)^{\frac{2}{\gamma}}-\left(\dfrac{p_2}{P_0}\right)^{\frac{\gamma+1}{\gamma}}\right]}}{\sqrt{\left[\left(\dfrac{p_1}{P_0}\right)^{\frac{2}{\gamma}}-\left(\dfrac{p_1}{P_0}\right)^{\frac{\gamma+1}{\gamma}}\right]}}$$

$$\left(\frac{A_1}{A_2}\right)^2=\frac{\left[\left(\dfrac{p_2}{P_0}\right)^{\frac{2}{\gamma}}-\left(\dfrac{p_2}{P_0}\right)^{\frac{\gamma+1}{\gamma}}\right]}{\left[\left(\dfrac{p_1}{P_0}\right)^{\frac{2}{\gamma}}-\left(\dfrac{p_1}{P_0}\right)^{\frac{\gamma+1}{\gamma}}\right]}=\frac{P_0^{\frac{2}{\gamma}}\left[\left(\dfrac{p_2}{P_0}\right)^{\frac{2}{\gamma}}-\left(\dfrac{p_2}{P_0}\right)^{\frac{\gamma+1}{\gamma}}\right]}{P_0^{\frac{2}{\gamma}}\left[\left(\dfrac{p_1}{P_0}\right)^{\frac{2}{\gamma}}-\left(\dfrac{p_1}{P_0}\right)^{\frac{\gamma+1}{\gamma}}\right]}=\frac{\left[p_2^{\frac{2}{\gamma}}-\dfrac{P_0^{\frac{2}{\gamma}}}{P_0^{\frac{\gamma+1}{\gamma}}}\cdot p_2^{\frac{\gamma+1}{\gamma}}\right]}{\left[p_1^{\frac{2}{\gamma}}-\dfrac{P_0^{\frac{2}{\gamma}}}{P_0^{\frac{\gamma+1}{\gamma}}}\cdot p_1^{\frac{\gamma+1}{\gamma}}\right]}=\frac{\left[p_2^{\frac{2}{\gamma}}-\left(\dfrac{1}{P_0^{\frac{\gamma-1}{\gamma}}}\right)\cdot p_2^{\frac{\gamma+1}{\gamma}}\right]}{\left[p_1^{\frac{2}{\gamma}}-\left(\dfrac{1}{P_0^{\frac{\gamma-1}{\gamma}}}\right)\cdot p_1^{\frac{\gamma+1}{\gamma}}\right]}$$

$$\left(\frac{A_1}{A_2}\right)^2=\frac{\left[P_0^{\frac{\gamma-1}{\gamma}}\cdot p_2^{\frac{2}{\gamma}}-p_2^{\frac{\gamma+1}{\gamma}}\right]}{\left[P_0^{\frac{\gamma-1}{\gamma}}\cdot p_1^{\frac{2}{\gamma}}-p_1^{\frac{\gamma+1}{\gamma}}\right]}\rightarrow A_1^2\cdot\left[P_0^{\frac{\gamma-1}{\gamma}}\cdot p_1^{\frac{2}{\gamma}}-p_1^{\frac{\gamma+1}{\gamma}}\right]=A_2^2\cdot\left[P_0^{\frac{\gamma-1}{\gamma}}\cdot p_2^{\frac{2}{\gamma}}-p_2^{\frac{\gamma+1}{\gamma}}\right]$$

$$A_1^2\cdot P_0^{\frac{\gamma-1}{\gamma}}\cdot p_1^{\frac{2}{\gamma}}-A_2^2\cdot P_0^{\frac{\gamma-1}{\gamma}}\cdot p_2^{\frac{2}{\gamma}}=A_1^2\cdot p_1^{\frac{\gamma+1}{\gamma}}-A_2^2\cdot p_2^{\frac{\gamma+1}{\gamma}}\rightarrow P_0^{\frac{\gamma-1}{\gamma}}\left(A_1^2\cdot p_1^{\frac{2}{\gamma}}-A_2^2\cdot p_2^{\frac{2}{\gamma}}\right)=A_1^2\cdot p_1^{\frac{\gamma+1}{\gamma}}-A_2^2\cdot p_2^{\frac{\gamma+1}{\gamma}}$$

$$P_0^{\frac{\gamma-1}{\gamma}}=\frac{A_1^2\cdot p_1^{\frac{\gamma+1}{\gamma}}-A_2^2\cdot p_2^{\frac{\gamma+1}{\gamma}}}{A_1^2\cdot p_1^{\frac{2}{\gamma}}-A_2^2\cdot p_2^{\frac{2}{\gamma}}}\rightarrow\boxed{P_0=\left(\frac{A_1^2\cdot p_1^{\frac{\gamma+1}{\gamma}}-A_2^2\cdot p_2^{\frac{\gamma+1}{\gamma}}}{A_1^2\cdot p_1^{\frac{2}{\gamma}}-A_2^2\cdot p_2^{\frac{2}{\gamma}}}\right)^{\frac{\gamma}{\gamma-1}}=\left[\frac{\left(\dfrac{A_1}{A_2}\right)^2\cdot(p_1)^{\frac{\gamma+1}{\gamma}}-(p_2)^{\frac{\gamma+1}{\gamma}}}{\left(\dfrac{A_1}{A_2}\right)^2\cdot(p_1)^{\frac{2}{\gamma}}-(p_2)^{\frac{2}{\gamma}}}\right]^{\frac{\gamma}{\gamma-1}}}$$