

Powertrain and Control

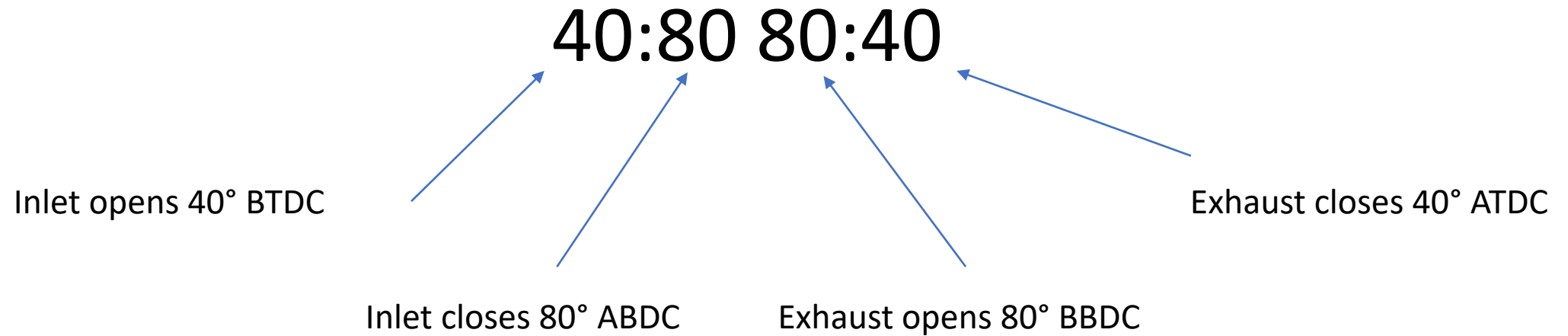
M5X00404

Week 5

Introduction

- Look at inlet/exhaust cams and timing.
- Recap last weeks valve dynamics calculations and finish Excel work.

Inlet/Exhaust Cams



- Inlet valves open for $40^\circ + 180^\circ + 80^\circ = 300^\circ$ duration.
- Exhaust valve opens for $80^\circ + 180^\circ + 40^\circ = 300^\circ$ duration.

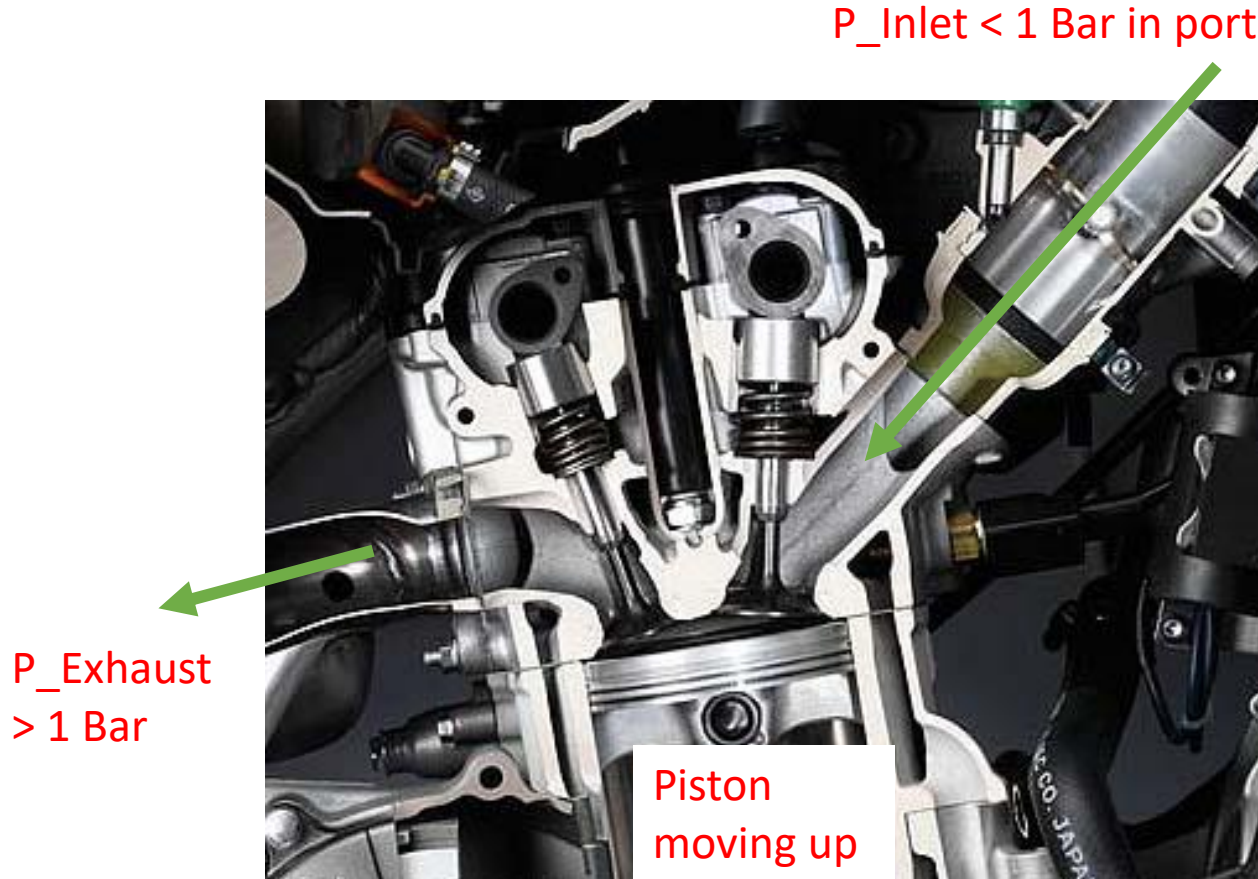
Pressures



Bernoulli states, $P + \frac{1}{2} \rho V^2 + \rho gh = \text{Constant}$

From this, the higher the speed the lower the pressure.

Pressures



- If you have low RPM with a lot of overlap then –
 1. There will be low gas speed in the exhaust so no real suction effect.
 2. At full gas P_{Inlet} equals around 1 Bar.
 3. P_{Exhaust} without suction may be greater than one bar due to restrictions in the exhaust, therefore gasses will likely flow back up the inlet and later get sucked back into the cylinder, which equals bad combustion.
- Partially closed throttle around town –
 1. No suction effect in exhaust.
 2. Restricted inlet causes reduced pressure in the inlet so there is even more reverse flow into the inlet.