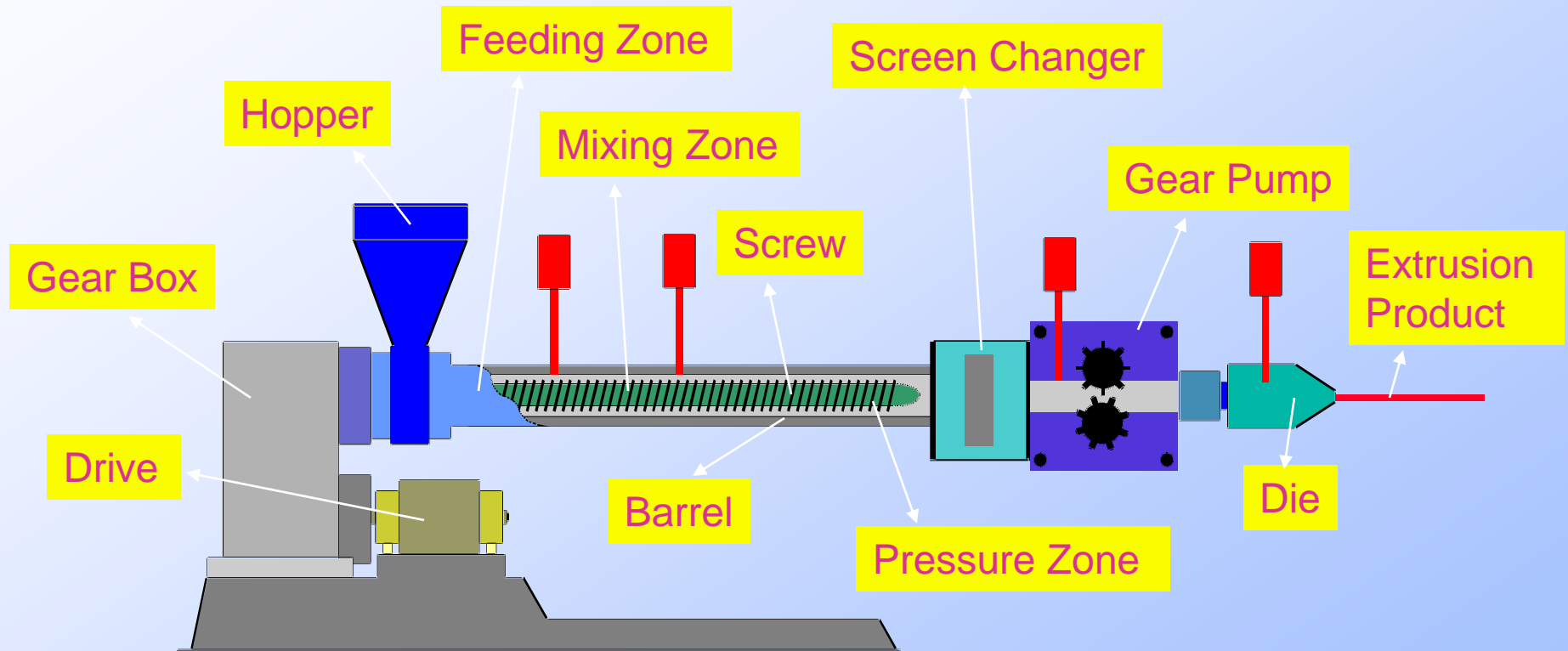
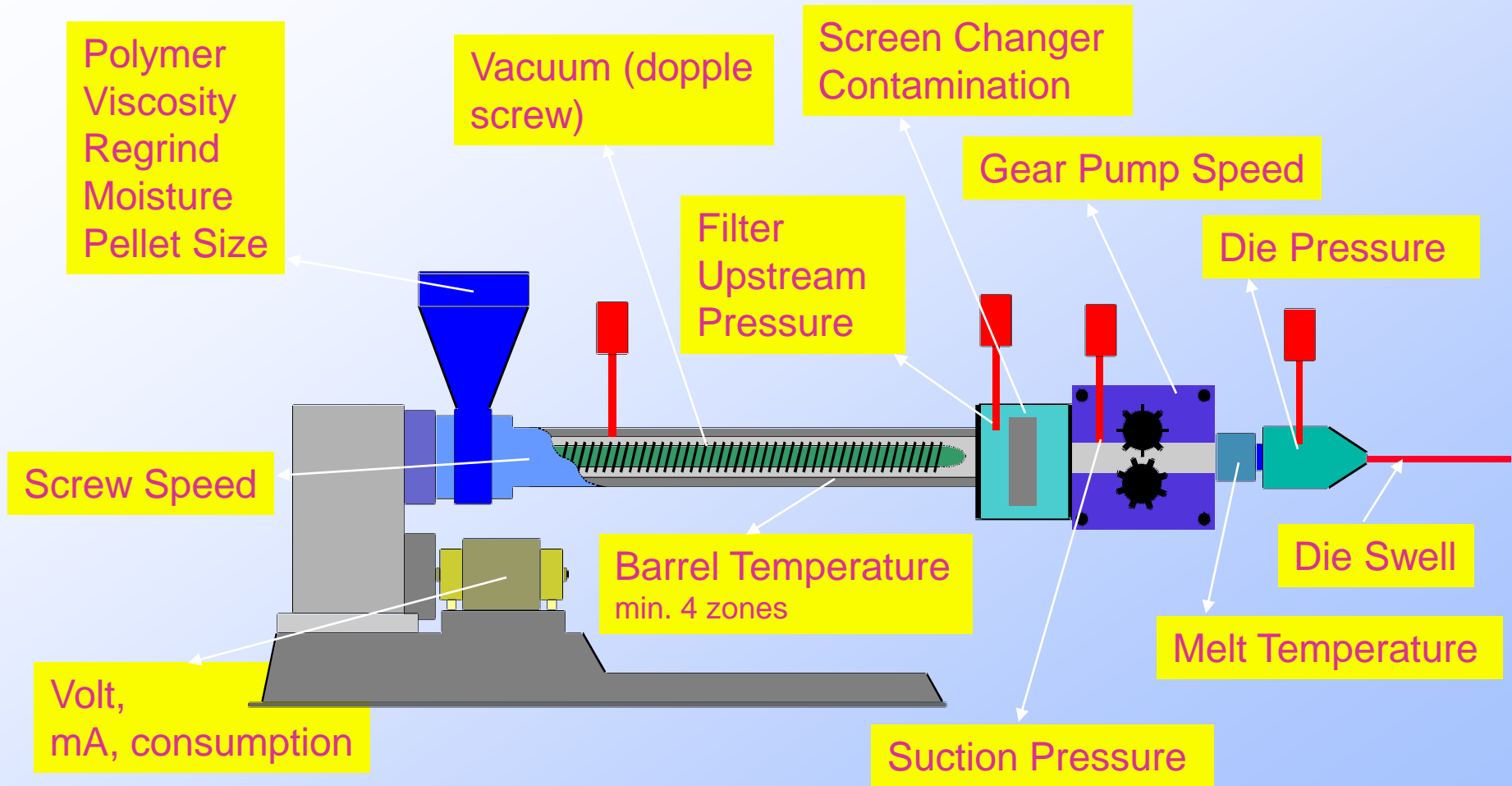


DYNISCO
PROCESS IMPROVEMENT FOR THE PLASTICS INDUSTRY

The Extrusion Process



Process Variables



Applications of Melt Pressure Measurement

Use of melt pressure measurement in an extrusion process will improve quality of the extrudate, extrusion efficiency and machine and personnel safety

Typical Applications:

- at the die
- at the screen
- at the gear pump inlet
- along the extruder barrel
- rheological nozzles

Pressure Measurement, Pressure Control at the Extrusion Die

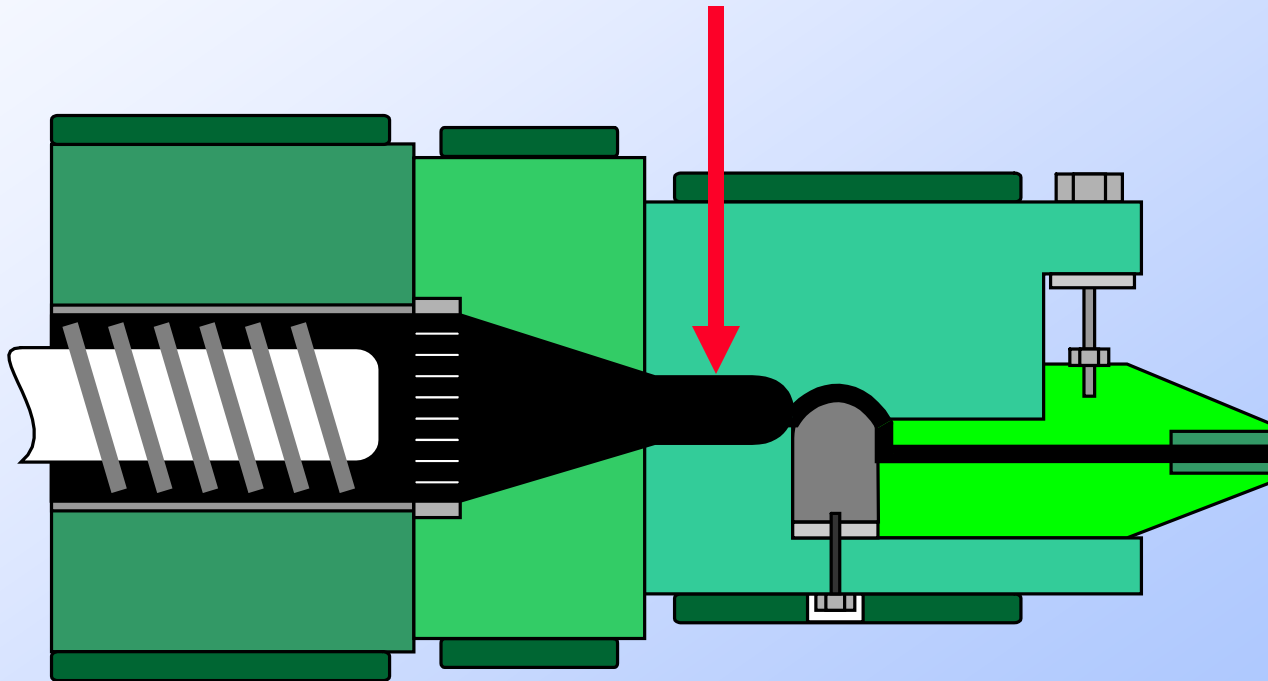
- ◆ Die pressure measurement is the most important pressure measurement in the process
- ◆ Dimensional stability of the extrudates is directly related to the pressure entering the die
- ◆ Variations in the raw materials, screw/barrel wear, marginal temperature control and drive motor variations will affect extruder output and therefore, die pressure

Pressure Measurement, Pressure Control at the Extrusion Die

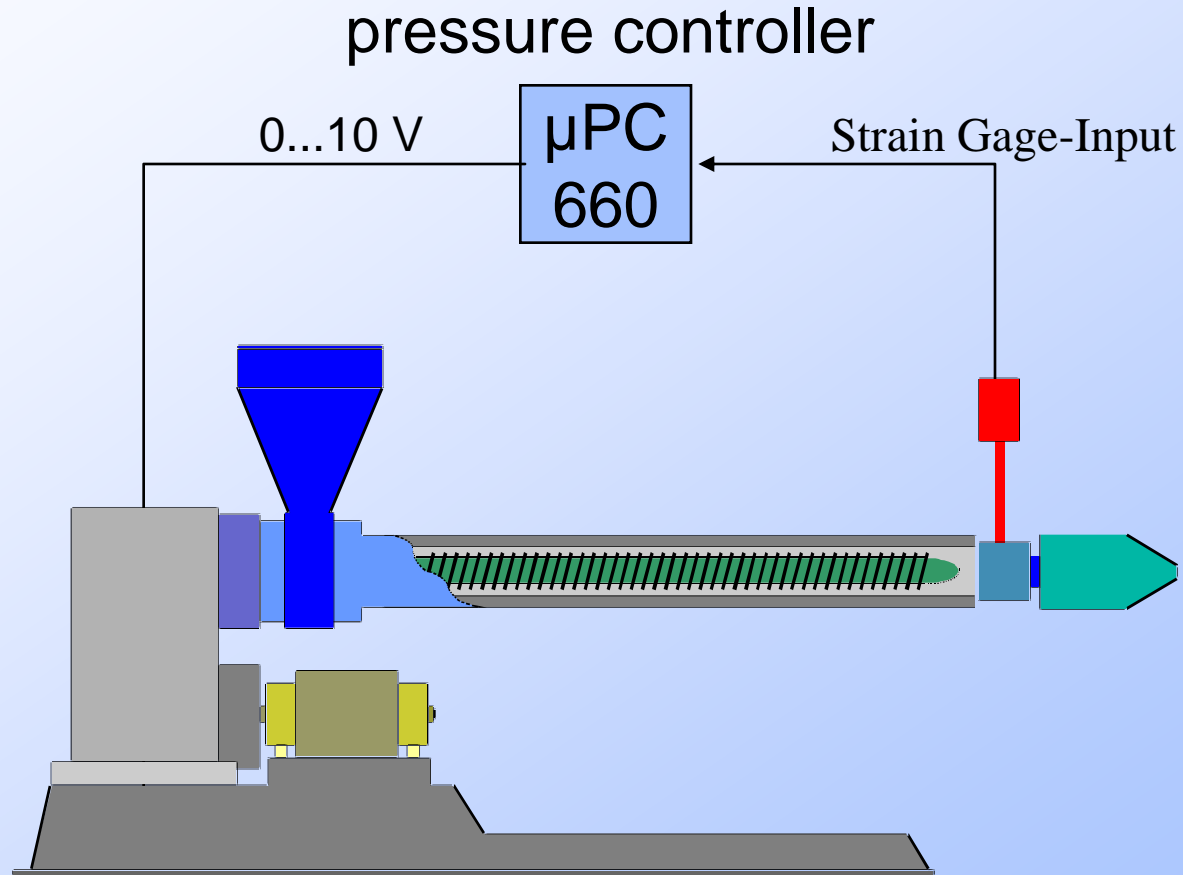
- ◆ Die Pressure measurement (series PT460) coupled with a dynisco pressure controller μ PC660, provides a closed-loop pressure control system
- ◆ Steady die pressure is achieved by continually adjusting the extruder screw speed, resulting in a dimensional stable product

At the Die

PT460



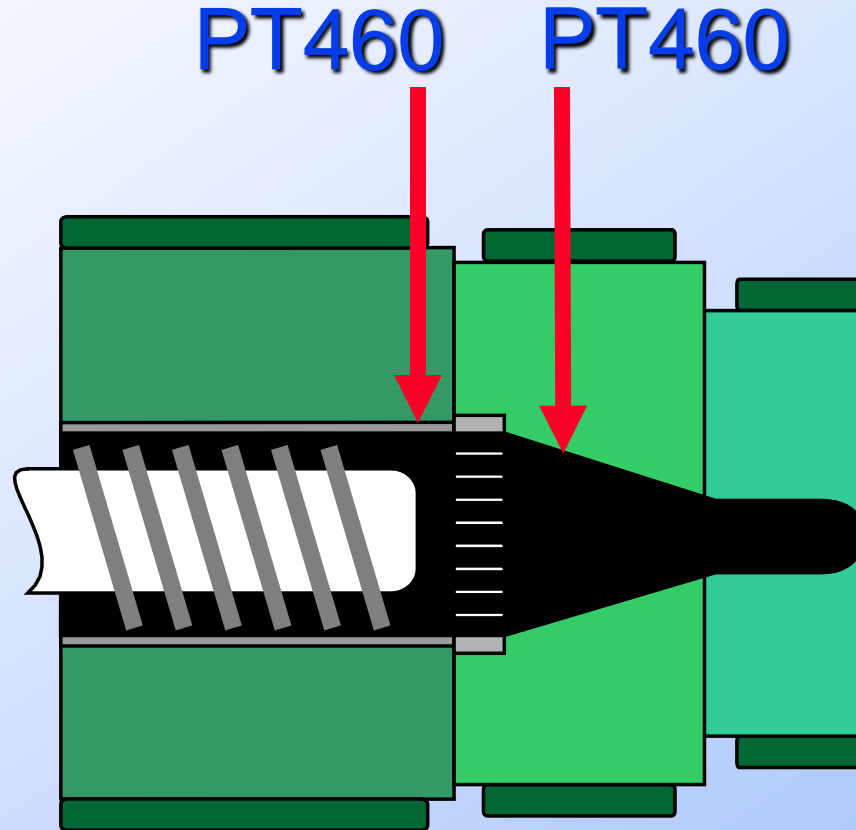
Closed Loop Pressure Control



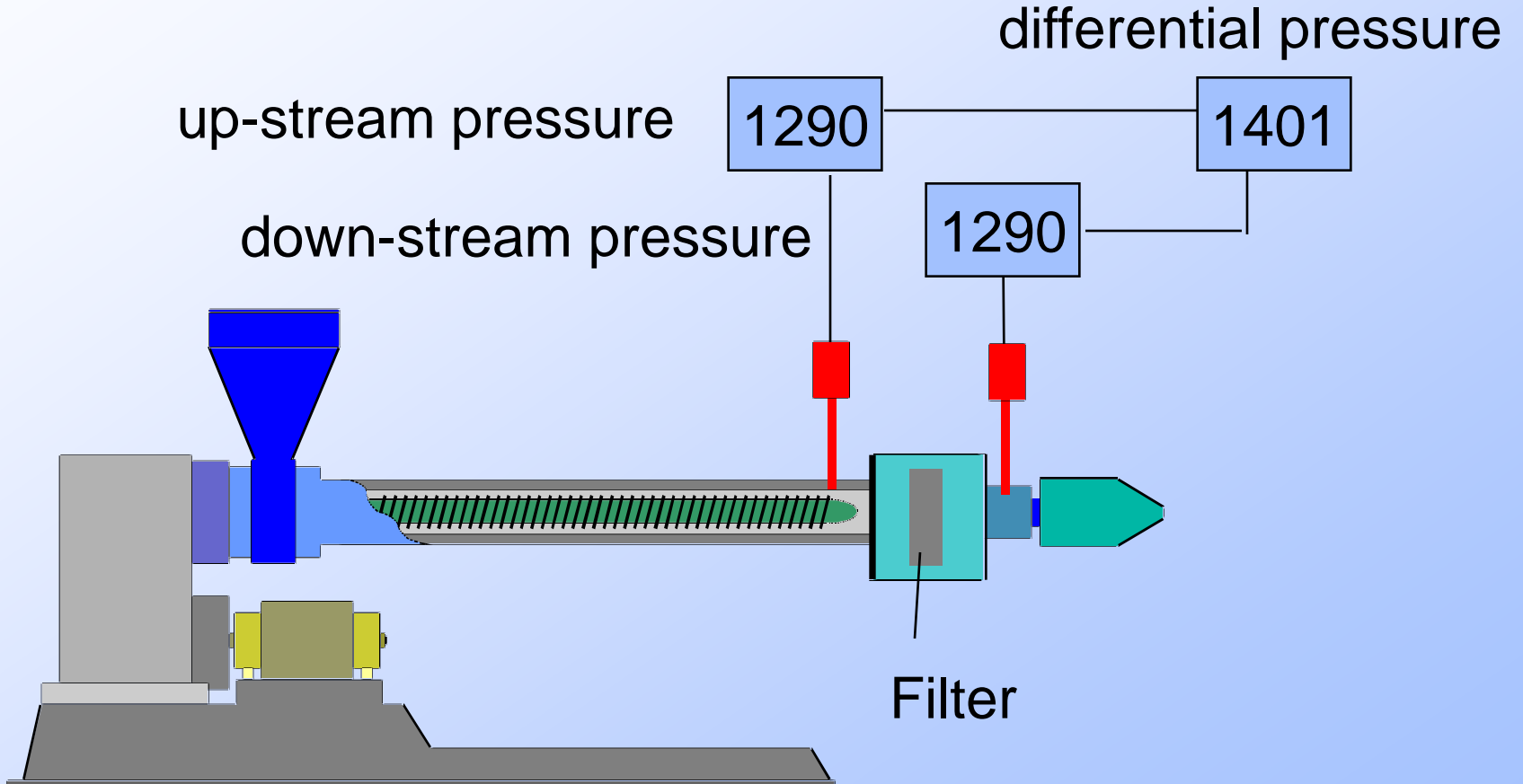
Pressure measurement at the screen

- ◆ Contamination can clog the screen and cause a pressure drop at the die, dimensional – unstable products result
- ◆ In closed loop control the upstream pressure is increased to compensate the pressure drop – dangerous high pressure result
- ◆ differential pressure measurement (sensor upstream and sensor downstream) can indicate clogged filter for manual filters or switch automatic filters
- ◆ PT 460 series is recommended

At the Screen



Differential Pressure



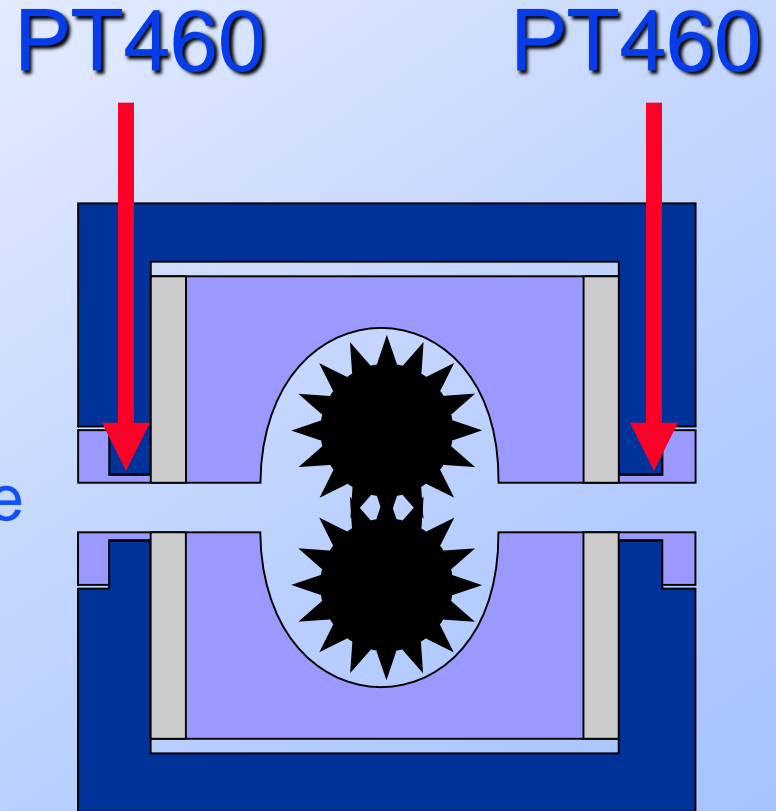
Pressure measurement at the pump inlet

- ◆ a polymer gear pump needs constant flow of polymer for lubrication therefore minimum inlet pressure (20 .. 70 bar) must be monitored
- ◆ closed loop inlet pressure control
 - eliminates long term inlet pressure drift
 - reduces short term inlet pressure fluctuations
 - reduces the average inlet pressure
 - increases safety of operation
- ◆ PT 460 series is recommended

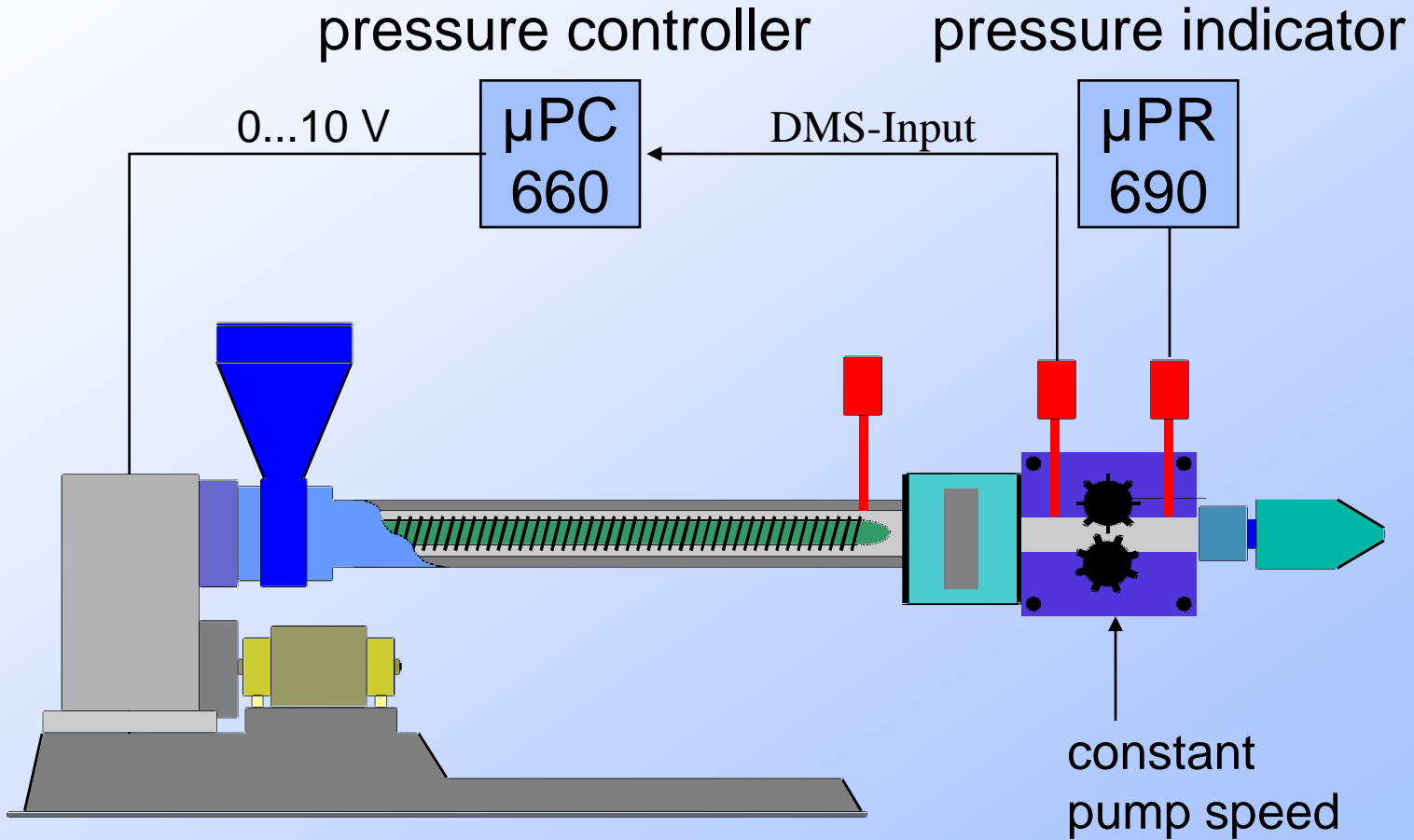
At the Pump

Suction Pressure Settings

- min. 20 .. 70 Bar for lubrication
- Differential Pressure < 250 bar
- Suction Pressure < Output Pressure



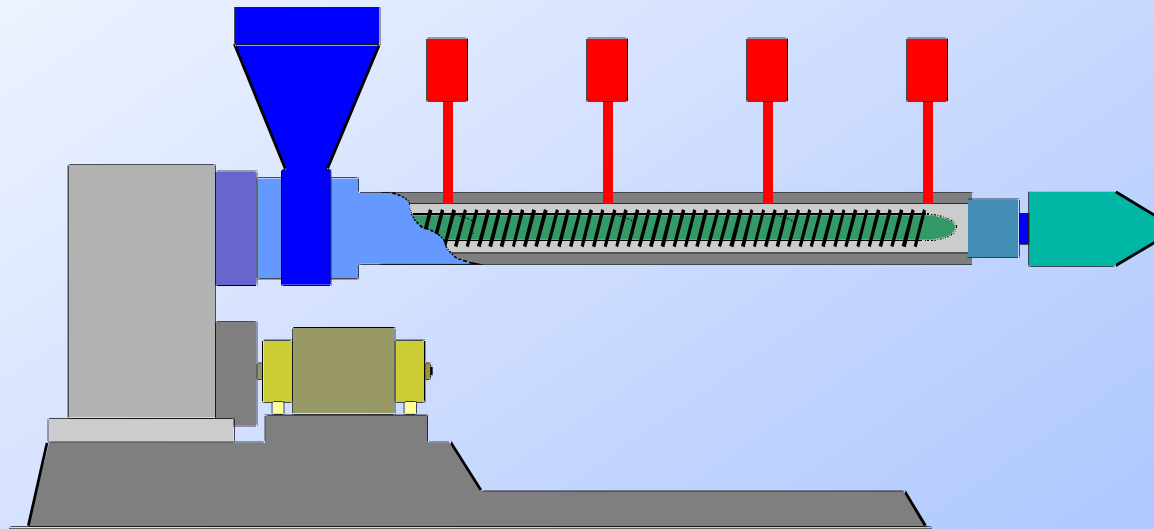
Pressure Control



Pressure measurement along the barrel

- ◆ research and development of screw designs
- ◆ evaluation of plastic materials
- ◆ screw selection for specific processes
- ◆ the transducers for this application needs to combine high accuracy and durability in a single unit
- ◆ the diaphragm may get in contact with semi-molten polymer
- ◆ PT460XL series is recommended

Along the Barrel



THANK YOU...