CONTROL OF MOTION

- On/Off Control (bang-bang)
- Proportional Control
 - Closed loop
 - Open loop

ON/OFF CONTROL

- Boolean Arithmetic
- Pneumatic logic elements
- Electric Control

- relays

Programmable Logic Controllers (PLC)



BOOLEAN ARITHMETIC

- 0 and 0 = 0 (0 0 = 0) $///_{-}$
- 0 and 1 = 0 (0 1 = 0) ____
- 1 and 1 = 1 (1 1 = 1) _____
- 0 or 0 = 0 (0 + 0 = 0)
- 0 or 1 = 1 (0 + 1 = 1)
- 1 or 1 = 1 (1 + 1 = 1)• not 0 = 1 (0 = 1)



DIGITAL LOGIC EXPRESSIONS

O_CUT = (I_PARTRDY•I_CYLRETRACT + O_CUT•I_CYLEXTEND)•I_ESTOP

O_CUT = I_PARTRDY•I_CYLRETRACT•I_ESTOP + O_CUT•I_CYLEXTEND•I_ESTOP

When part is ready, cylinder is retracted, and emergency stop is not on, then cut while cylinder is not fully extended and emergency stop is not on.

PNEUMATIC LOGIC ELEMENTS

- Directional control valve (p.235-242)
- Shuttle valve OR function
- Twin pressure valve -AND function
- Other functions
 Check valve
 - Speed control valve
 - Time delay valve







PNEUMATIC SCHEMATICS

Not actuated



PNEUMATIC SCHEMATICS

Actuated



EXAMPLE PNEUMATIC CIRCUIT

