

Lab #2

Remote Operation of the injection molding machine

Objective:

learn how to operate the injection molding machine from the remote control client.

Equipment:

- Computer: a generic computer with Windows system (Win 7 or Win 10) installed
- IP camera: Panasonic BL-C111
- WLAN: Internet Connectivity
- Microcontroller: Arduino Mega 2560(ATMEGA)
- Injection Molding Machine: Dake

Safety Rules:

1. Turn off power supply BEFORE disconnecting the power line.
2. Don't touch any power source when your hands are wet.
3. Don't touch the equipment as it will get hot and cause burns.

Task 1: Learn how to access the remote control client

1. Turn on the power of the injection molding machine.
2. Open a browser and enter 18.19.11.80.
3. The user interface (frontend) of the application is a single-page app built using the Jinja template engine and rendered by the Flask.
4. The event handling on the frontend is handled by the Socket IO JavaScript module.
5. A CSS grid design is adopted to have better flexibility on the layouts. It makes arranging and aligning elements much easier, as well as that it can fit into varying screen sizes.

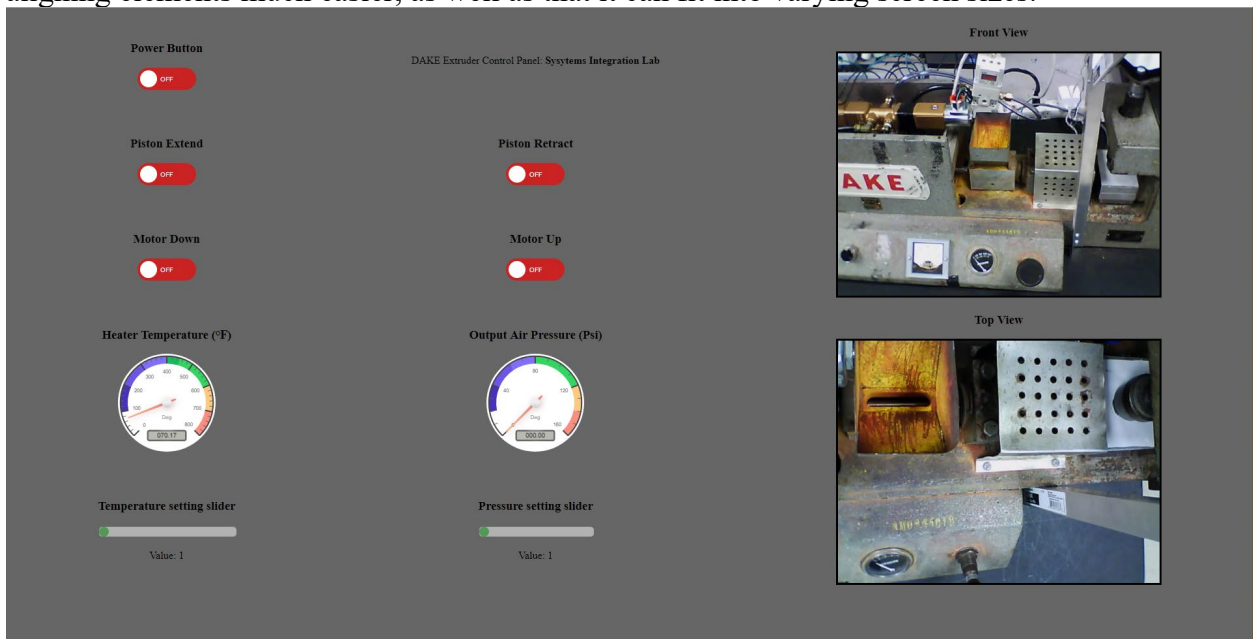


Figure 1 Graphic user interface of the remote control system

6. The user interface features several control switches for power, piston, and motor, along with temperature and pressure monitoring displayed in an analog-like dial similar to the actual

physical gauge. There are also sliders to control the temperature and pressure of the equipment remotely. The views from cameras are also inserted into the page.

Task 2: Study the operations on the remote control client

1. From top to bottom, on the left side.
 - 1) Power button
 - 2) Piston control buttons, extend and retract
 - 3) Mold clamp motor buttons, up and down
 - 4) Heater temperature gauge and air pressure gauge
 - 5) Heater temperature control slider and pressure setting slider.
2. On the right, there are two camera views for visual feedback on what is happening and will help in assisting the user.
3. Users could have the following operations
 - 1) The user can power on and off the main power of the equipment.
 - 2) The user has control over two sets of the actuators: a pair of solenoid valves to control the piston, as well as the control of the motor to tighten and untighten the mold.
 - 3) The user also has control over the pressure output and the temperature output which can be done using the corresponding sliders. The current temperature and pressure are shown on the analog gauges.
 - 4) The user gets a real-time remote video monitoring of the equipment on the interface.
4. To use the remote-control injection machine system, the administrator needs firstly to turn on the main power and the server computer, connect the compressed air to the inlet of the equipment, and then launch Flask web app.
 - 1) In any computer connected to the same network as the server open a web browser and navigate to the address of the webserver to access the UI which looks like below.
 - 2) Click the power button slider to turn the power on for the system.
 - 3) Use the pressure and temperature sliders to set the desired temperature and pressure.
 - 4) Clamp the mold with the motor control (keep going down until reaching the end).
 - 5) Once the desired settings are reached and the material is ready to be injected to the mold turn the valve to the right.
 - 6) Extend the piston to start injecting.