

Automation of a variable autotransformer

Technological Research Project

PLC



In our project the PLC is one of the main components. It carries out the regulation with the settings we have defined. It also manages the HMI and runs the program we created.

Power supply



Motor and driving



This electronic board allows to control the motor coupled to the variable auto transformer. It must be powered by 12V or 24V. This electronic board allows the rotation of the motor thanks to the electric signal generated by a PWM. An H-bridge allows the system to change direction.

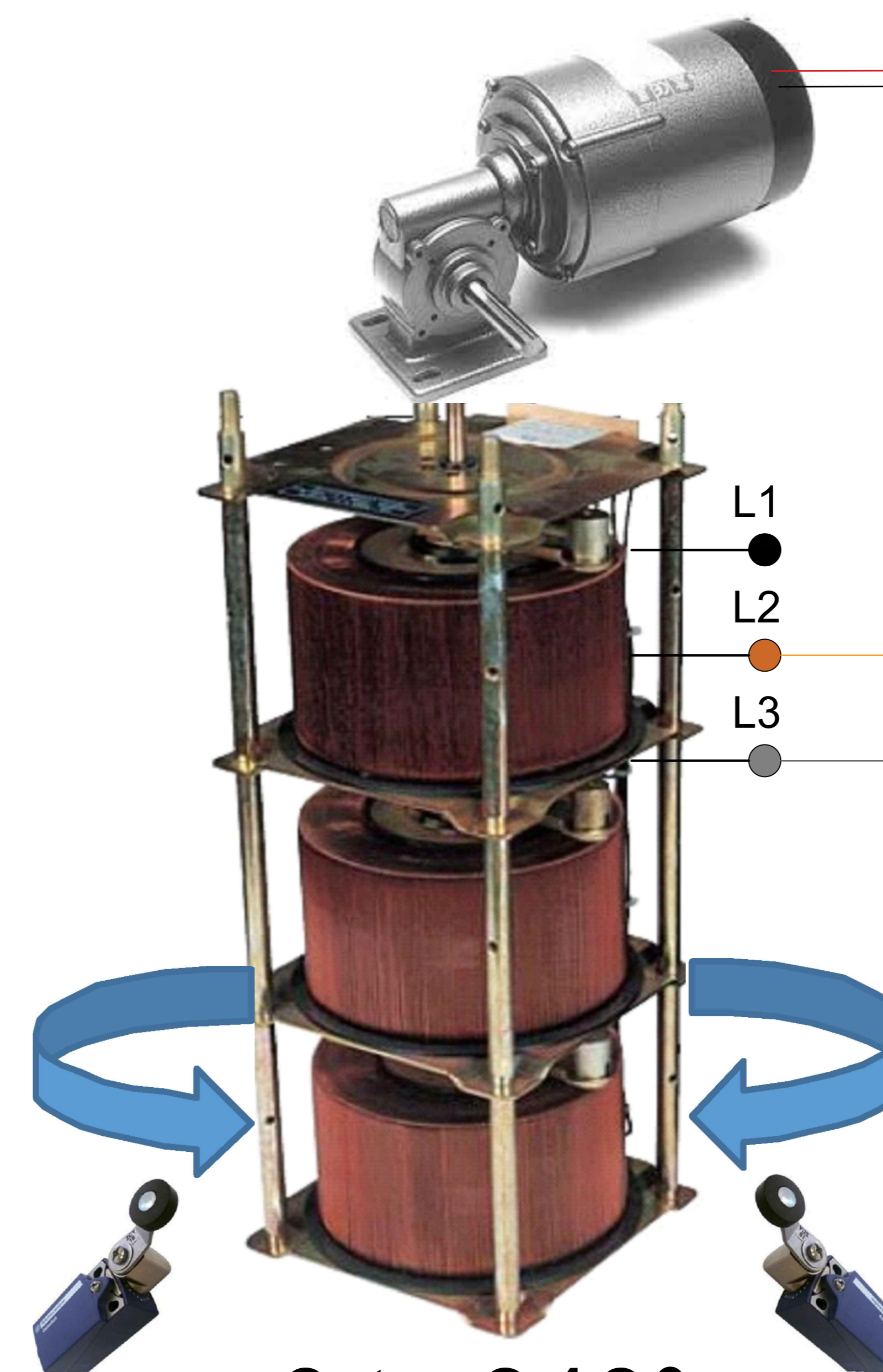
Software

For the realization of this project we used different software programs, such as: Matlab, Simulink, Psim, Tia portal.



Motor

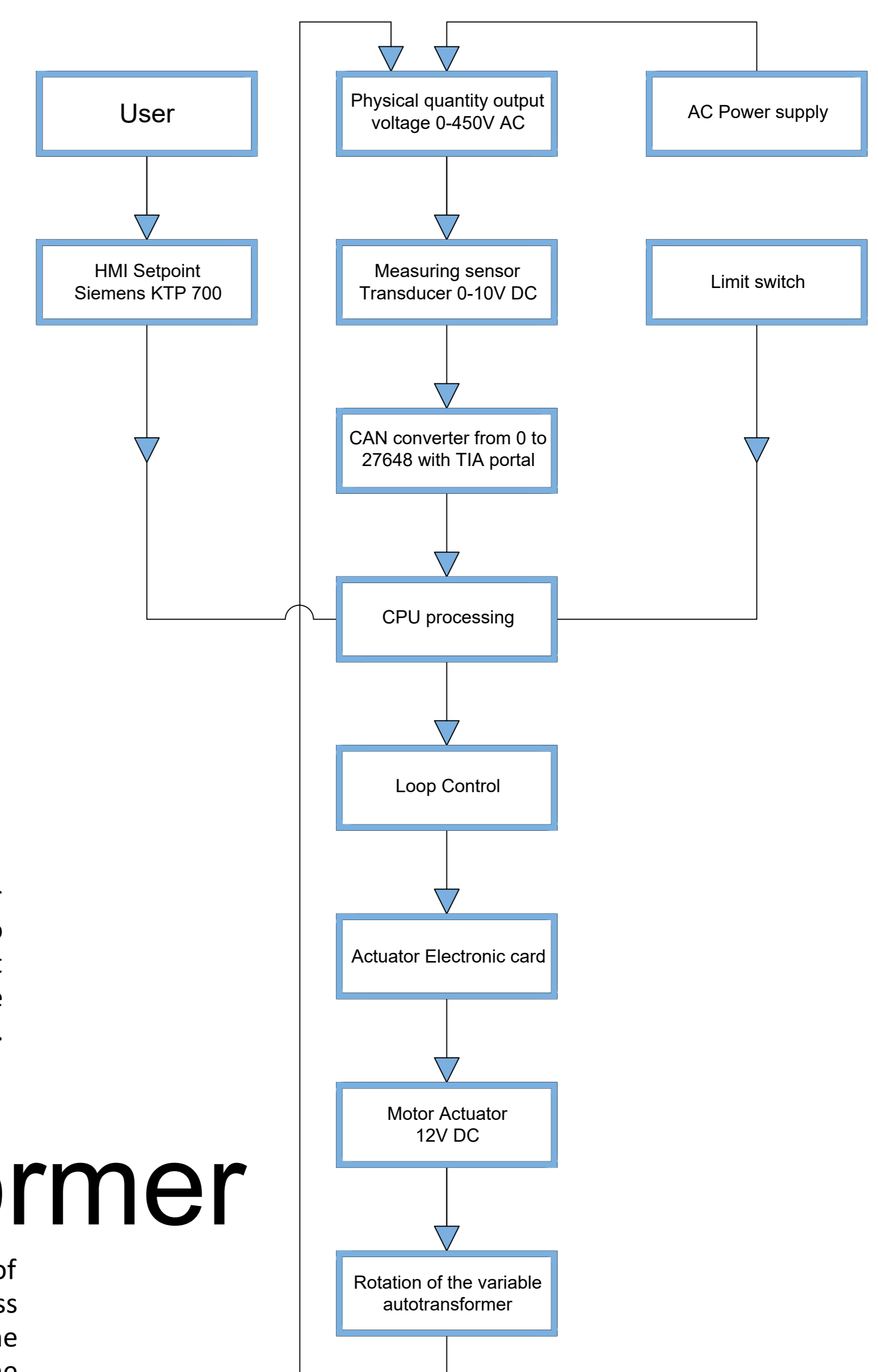
The motor used for the project is a 12V DC wiper motor. The advantage is that it has a high torque.



0 to 340°

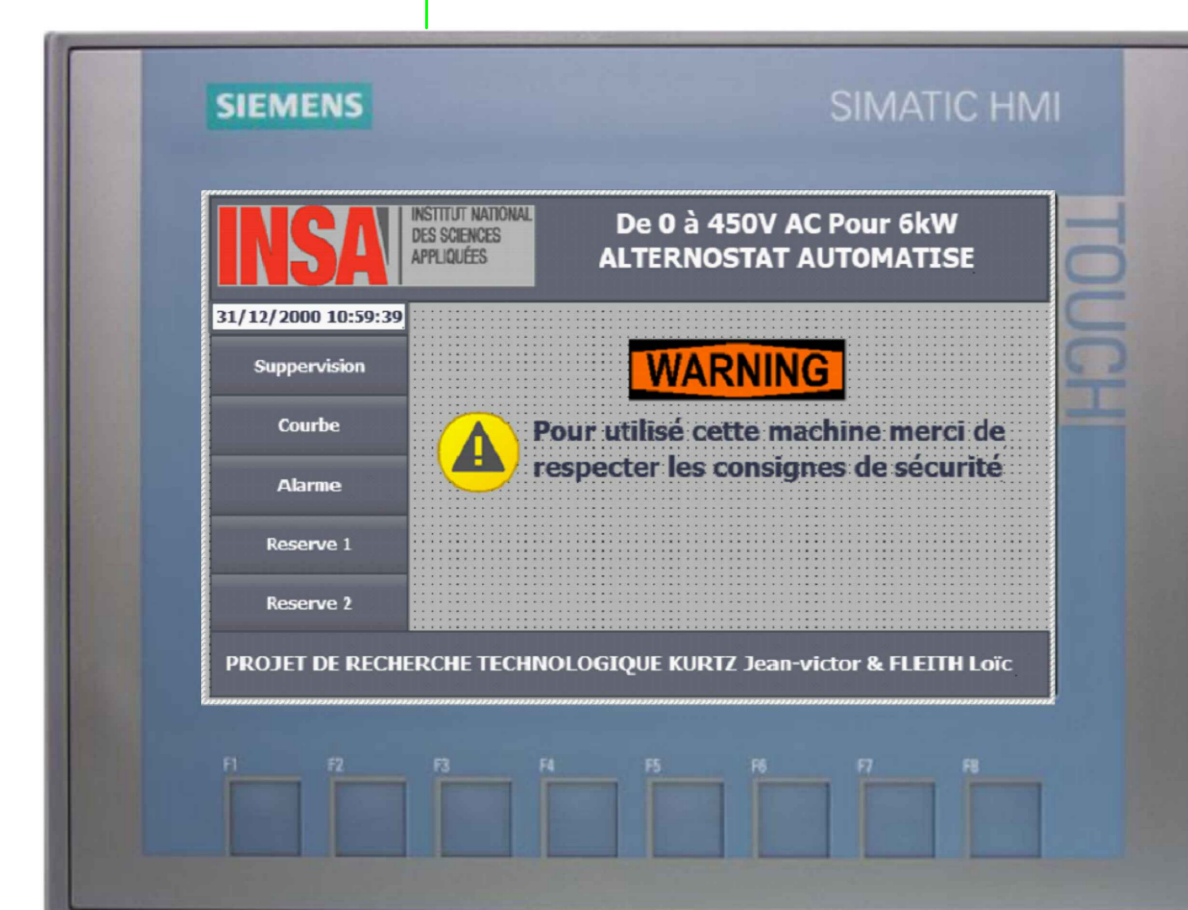
Grafcet

This diagram illustrates the most important steps of our project. There are three parts in this graphcet: Operational part on the left, Information processing part in the middle, Hardware part on the right.



HMI

The HMI allows visulation and communication between the PLC and humans. It is the one which reports the setpoint and current value information. It also allows to visualize the deviation, and the state of the regulation.



End Switch

The end switches allow the system to stop when it reaches the mechanical stop. Their purpose is to avoid overtravel so as not to damage the equipment.

Transducer

The voltage transducer is an AC voltage sensor that gives us an image of the actual voltage into a standard voltage managed by our PLC. It therefore converts the output value of the variable autotransformer into an analog signal. This signal is between 0 and 10V DC.

Autotransformer

The variable autotransformer is the main part of the project. It allows the voltage variation across the voltage outputs. It is set in motion by the motor and controlled by the user through the HMI.