

# PLC Programming – Assignment: State model – Garage door

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Date: 2017-01-08

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## 1 Assignment

Make **two different state models** to specify the logic operation and controls for the following lifting door system (Garage door), in two separate cases.

Function:

- Controlling a lifting door (e.g. Garage door) open / close (up / down)
- Push buttons (case1: S3..S5 or case2: S6) are used to control the door, depending the case
- Limit switches (S1 and S2) are used to stop the door motion at the extremes
- If none of the outputs (O\_Up, O\_Dn) is not ON, the door is stand still (Stopped).
- Both outputs may not be ON at the same time.
- Inputs:
  - S1 : Door limit switch, **up** extreme
  - S2 : Door limit switch, **down** extreme
  - S3 : Push button, **up** request
  - S4 : Push button, **stop** request
  - S5 : Push button, **down** request
  - S6 : Push button, **change** request (**state, direction, stop**)
- Outputs:
  - O\_Up : Door rises up when this is true.
  - O\_Dn : Door closes (moves down) when this is true.



Figure 1 Examples of garage lifting doors (<http://www.roltex.fi/fi/tuotteet/ovituotteet/nosto-ovet/ldn/>)

### 1.1 Make State model for case 1

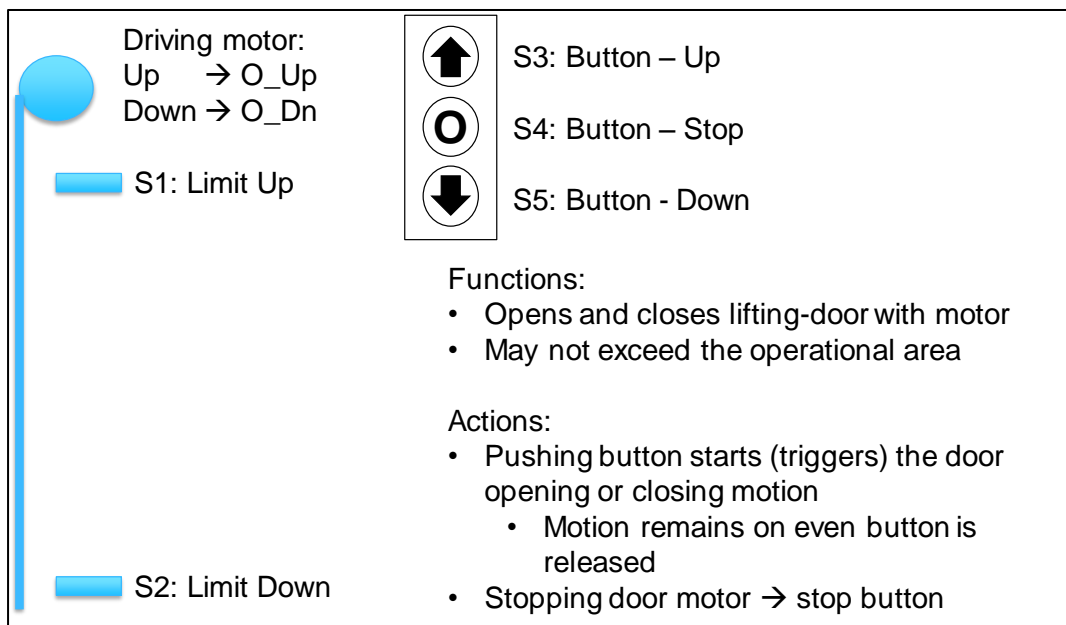


Figure 2 Sensors, actuators and user interface for Garage door

## 1.2 Make State model for case 2

How the situation changes (state model changes) if the human interface is changed as one single button?

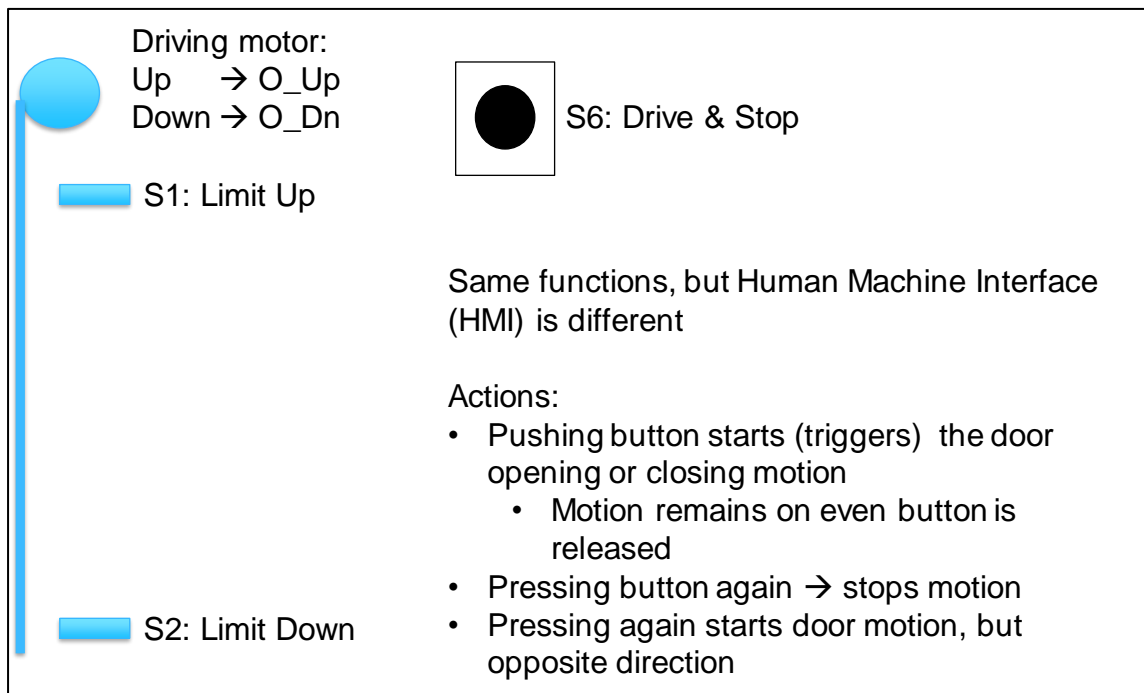


Figure 3 Sensors, actuators and user interface (one button) for a Garage door