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UNIVERSITÀ DEGLI STUDI DI BERGAMO



Università degli Studi  
di Bergamo

**Automazione Industriale**

Laboratorio 2



Sistema che presenta un pulsante di **start**, una luce di colore **verde** ed esegue **un'operazione**.

Premuto il pulsante di start viene eseguita l'operazione per 20 secondi.  
Una volta terminata viene accesa la luce verde.

Dopo 15 secondi di luce verde il sistema ritorna in attesa del prossimo start.



Sistema che simula il comportamento di un motore dotato di protezione e allarme.

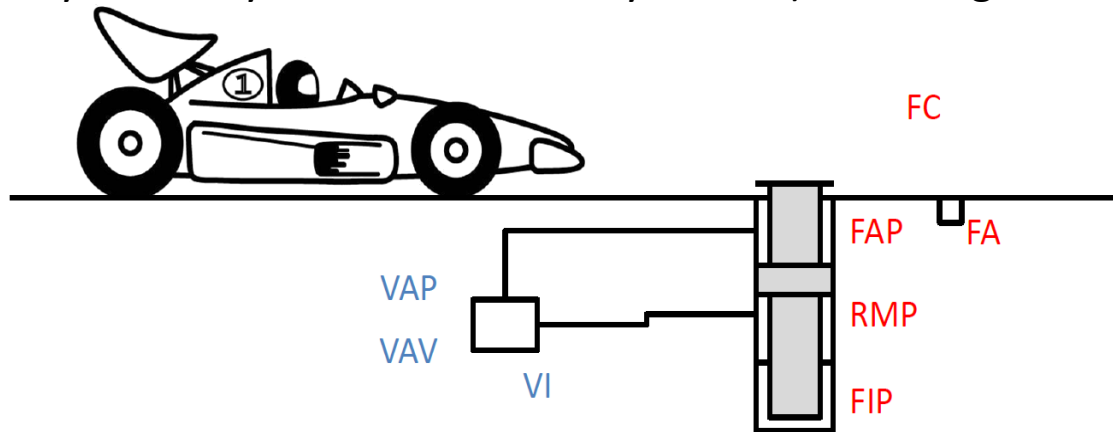
Premo il tasto di **avvio**:

- Se non vi è la protezione scatta l'**allarme**
- Se vi è la **protezione** il motore si avvia

Se durante l'allarme inserisco la protezione, l'allarme si ferma.

Il **motore** una volta avviato rimane acceso per 30 secondi. Se durante questi secondi viene premuto il tasto di **stop**, il motore viene fermato.

The device, installed on the pit stop pad, aims to lift a racing car during the tire change (through a hydraulic cylinder controlled by a valve). The diagram is as follows:

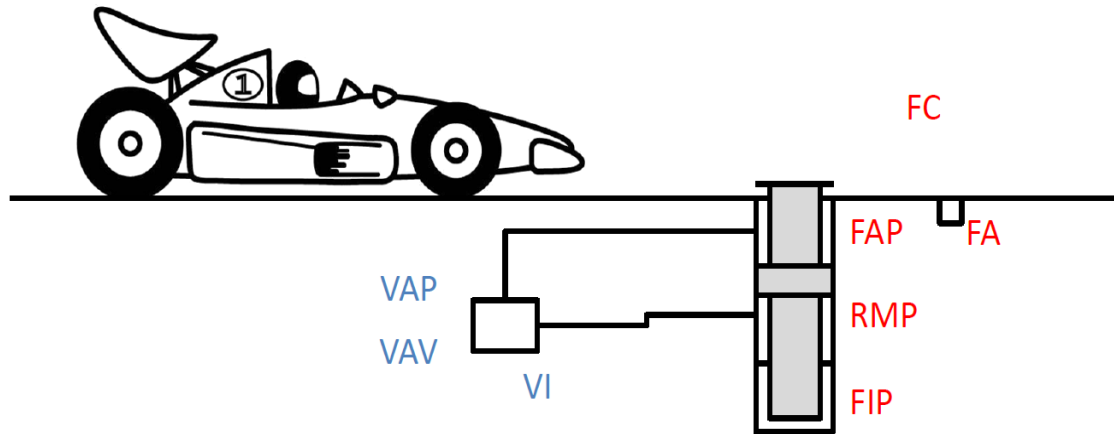


Inputs:

- FIP - Reverse piston limit switch (0 not activated - 1 activated)
- RMP - Half stroke piston achievement (0 piston extended by less than half stroke - 1 piston extended by more than half stroke)
- FAP - Forward piston limit switch (0 not activated - 1 activated)
- FA - Car photocell (0 car not present - 1 car present)
- FC - End of tire change (0 gearbox in progress - 1 gearbox not in progress)

Outputs:

- VAP – flat forward mode (slow)
- VAV – fast forward mode (fast)
- VIV – reverse mode



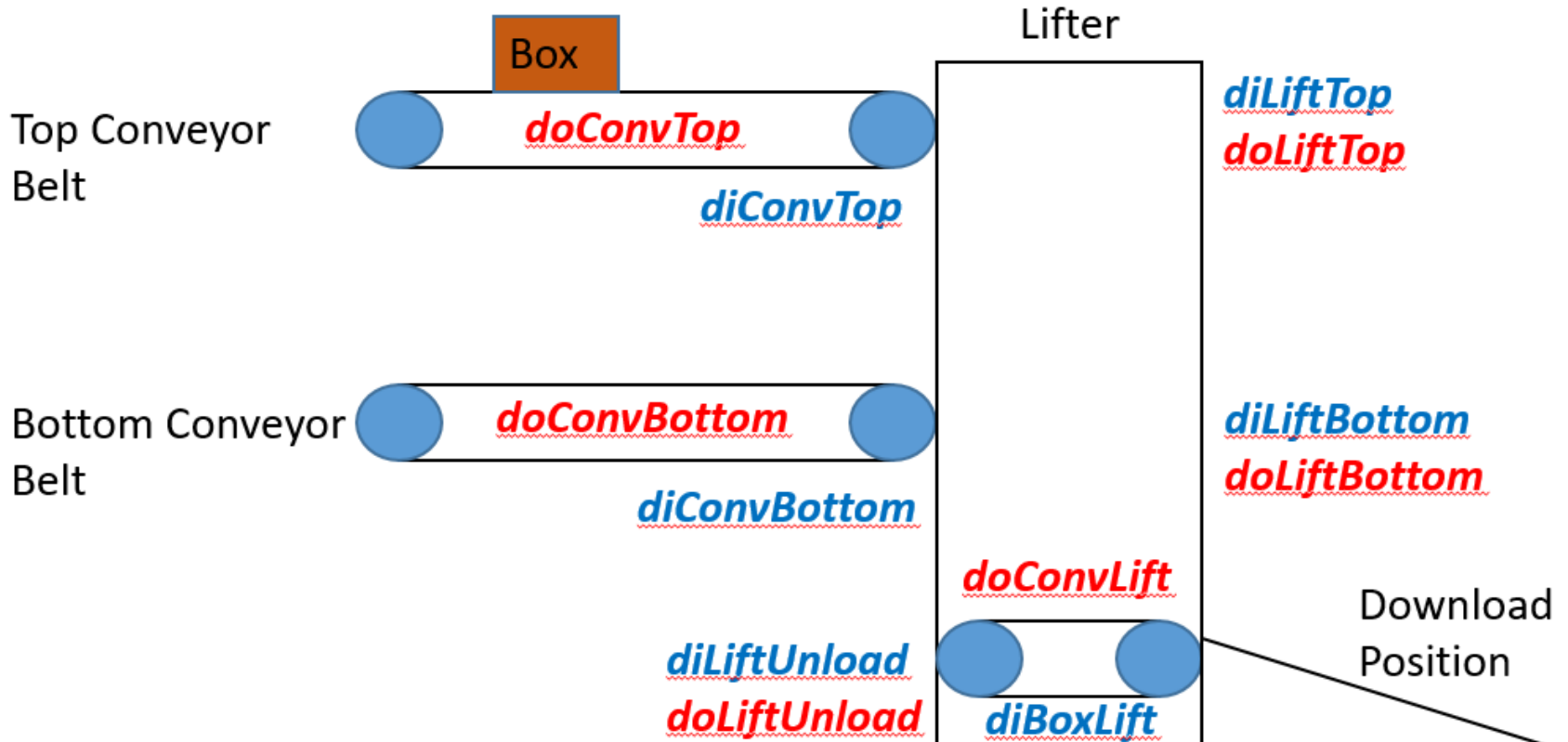
The basic operation is as follows:

- The car is placed in the pitch, so that the photocell detects it
- The piston starts lifting in flat forward mode (assuming it starts from the FIP condition) until RMP is reached.
- Piston moves up to FAP in fast forward mode
- The piston stays in place until the end stops the tire change.
- Piston returns to FIP with VI control

Set the program so as to force the piston to return in the case of  $FA = 0$  (in any condition it is found).



Develop a control software for an elevator system.





## Work cycle

Two conveyor belts (**doConvTop**, **doConvBottom**) are used for moving boxes toward an elevator, which consists also of a conveyor belt that can move vertically up and down.

If one of the stationary belt's laser beam is cut (**diConvTop**, **diConvBottom**), that belt stops and a request for the elevator is sent.

If the elevator is available, it moves to the requested position (**doLiftTop**, **doLiftBottom**).

When the elevator reaches the requested position (**diLiftTop**, **diLiftBottom**), the elevator's conveyor is started (**doConvLift**) and moves until the box is completely loaded in the elevator (**diBoxLift**).

The elevator moves then to the unloading position (**doLiftUnload**). When the position is reached (**diLiftUnload**), the box is unloaded by starting the elevator conveyor belt again.

As soon as the box is unloaded, the elevator is available for responding to the next request.

REMEMBER: di stands for Digital Input, do stands for Digital Output