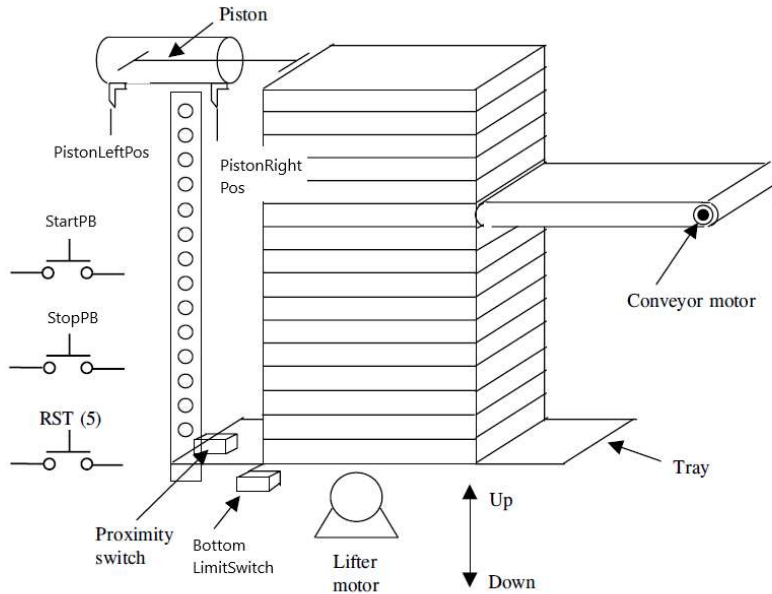# Tray Packing Conveyor

The Lifter motor is used to lift a tray of PCB up, before being pushed by the piston onto the conveyor for packing.

When the start button is pressed, the conveyor motor and the lifter motor will turn on.
The proximity switch will temporarily stop the lifter motor for the piston to push the PCB onto the conveyor belt.

After the PCB is pushed, the piston will retract and the lifter motors starts again.
The whole procedure will repeat itself.

When all PCBs have been pushed onto the conveyor belt, the lifter motor will move down until the limit switch is being acivated. Thereafter, the whole procedure can only be started by the start switch.

```
 1    PROGRAM MAIN
 2    VAR
 3        // push buttons
 4        StartPB: BOOL;
 5        StopPB: BOOL;
 6        ResetButton: BOOL;
 7
 8        // sensors
 9        BottomLimitSwitch: BOOL;
10        ProxSwitch: BOOL;
11
12        PistonLeftPos: BOOL;
13        PistonRightPos: BOOL;
14
15        // HW outputs
16
17        ConveyorRun: BOOL;
18        LifterUp: BOOL;
19        LifterDown: BOOL;
20        LifterStop: BOOL;
21
22        PistonMoveLeft: BOOL;
23        PistonMoveRight: BOOL;
24
25        // Aux. objects
26        rtBottomLS: R_TRIG;
27        rtIndexPcb: R_TRIG;
28
29        tondelayLifterUp: TON;
30        tonDelay1sec: TON;
31
32        rtPistonLeftReached: R_TRIG;
33        ctuPistonLeftMovements: CTU;
34    END_VAR
35
```

1 *Start/stop control*

```
StartPB      StopPB    ctuPistonLeftMovements.Q                                    ConveyorRun
 ─┤ ├─────────┤/├───────────┤/├──────────────────────────────────────────────────────( )─
ConveyorRun
 ─┤ ├─
```

2 *Bottom limit reached*

```
ConveyorRun   BottomLimitSwitch        rtBottomLS
 ─┤ ├───────────┤ ├───────────┌──────────────────┐
                              │      R_TRIG       │
                              │ CLK            Q  │
                              └──────────────────┘
```

3 *Piston left*

```
PistonMoveLeft   PistonLeftPos      rtPistonLeftReached
 ─┤ ├──────────────┤ ├────────┌──────────────────┐
                              │      R_TRIG       │
                              │ CLK            Q  │
                              └──────────────────┘
```

4 *Lifter motor up*

```
rtBottomLS.Q              LifterStop    ctuPistonLeftMovements.Q                    LifterUp
 ─┤ ├──────────────────────┤/├─────────────┤/├──────────────────────────────────────( )─
LifterUp
 ─┤ ├─
rtPistonLeftReached.Q
 ─┤ ├─
```

5 *Proximity switch detects the next index of PCB*

```
ProxSwitch         rtIndexPcb
 ─┤ ├────────┌──────────────────┐
             │      R_TRIG       │
             │ CLK            Q  │
             └──────────────────┘
```

6 *Lift the PCB up one after another*

```
rtIndexPcb.Q   PistonMoveRight                                                    LifterStop
 ─┤ ├─────────────┤/├──────┬──────────────────────────────────────────────────────( )─
LifterStop                 │        tondelayLifterUp
 ─┤ ├──────────────────────┤          ┌──────────────┐
                                      │      TON      │
                                      │ IN         Q  │
                           T#2S ──────┤ PT        ET  │
                                      └──────────────┘
```

7 *Piston Right move*

```
PistonLeftPos   tondelayLifterUp.Q   PistonRightPos                              PistonMoveRight
 ─┤ ├──────────────┤ ├─────┬───────────┤/├──────────────────────────────────────────( )─
PistonMoveRight           │
 ─┤ ├─────────────────────┘
```

8 *Move piston after right position is reached*

```
PistonRightPos   PistonLeftPos                                                    PistonMoveLeft
 ─┤ ├──────────────┤/├──────────────────────────────────────────────────────────────( )─
PistonMoveLeft
 ─┤ ├─
```

9 *Counter preset at 20*

```
rtPistonLeftReached.Q                 ctuPistonLeftMovements
 ─┤ ├──────────────────────┤ CU  ┌──────────────┐
                           │     │      CTU      │
ResetButton   ctuPistonLeftMovements.Q│           Q  │
 ─┤ ├──────────┤ ├─────────┤ RESET│          CV  │
                           │     │               │
                      20 ──┤ PV  └──────────────┘
```

10 *Delay of 1 sec.*

```
ctuPistonLeftMovements.Q     tonDelay1sec
 ─┤ ├──────────────┌──────────────┐
                   │      TON      │
                   │ IN         Q  │
         T#2s ─────┤ PT        ET  │
                   └──────────────┘
```

11 *Lift down*

```
PistonLeftPos   tonDelay1sec.Q                                                    LifterDown
 ─┤ ├──────────────┤ ├───────────────────────────────────────────────────────────────( )─
```