

# TEKNIK OTOMASI TIMER Counter

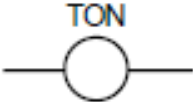

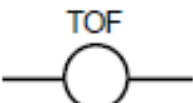
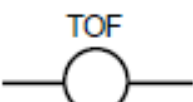
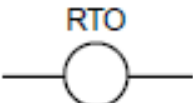
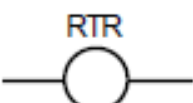
Eka Maulana, ST, MT, Meng.

# Parameter Timer

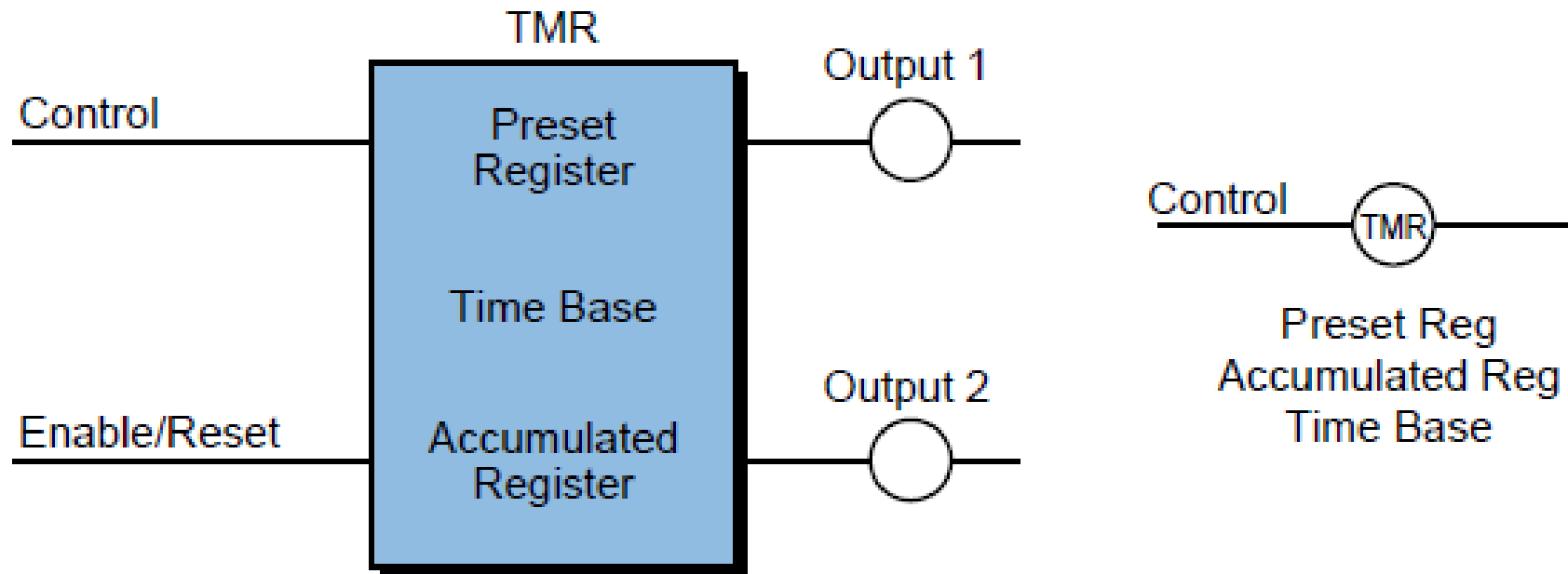
Required Time	Number of Ticks	Time Base (secs)
10 sec	10	1.00
10 sec	100	0.10
10 sec	1000	0.01

Note: Required time = (# of ticks)(Time base)

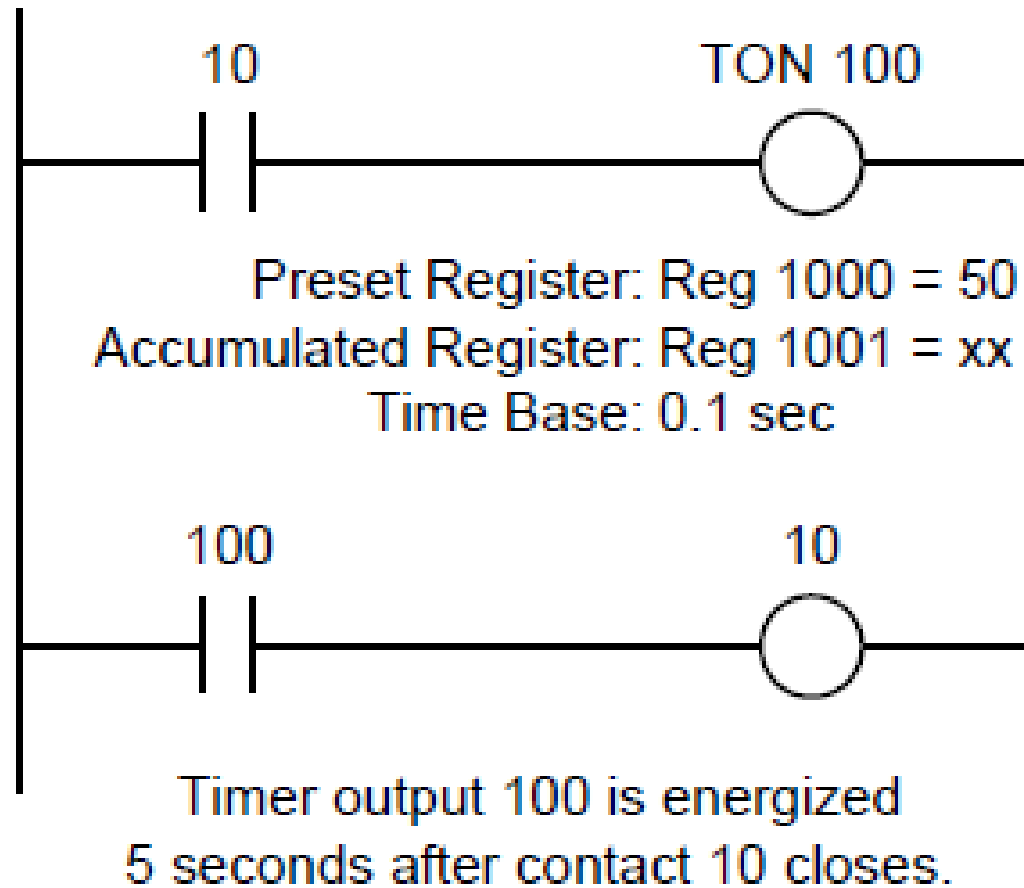
# Timer Instruction

<b>Timer Instructions</b> <i>(Purpose: To provide hardware timer capabilities in a PLC)</i>		
<b>Instruction</b>	<b>Symbol</b>	<b>Function</b>
ON-Delay Energize Timer		Energizes an output after a set time period when logic 1 exists
ON-Delay De-energize Timer		De-energizes an output after a set time period when logic 1 exists
OFF-Delay Energize Timer		Energizes an output after a set time period when logic 0 exists
OFF-Delay De-energize Timer		De-energizes an output after a set time period when logic 0 exists
Retentive ON-Delay Timer		Energizes an output after a set time period when logic 1 exists and then retains the accumulated value
Retentive Timer Reset		Resets the accumulated value of a retentive timer

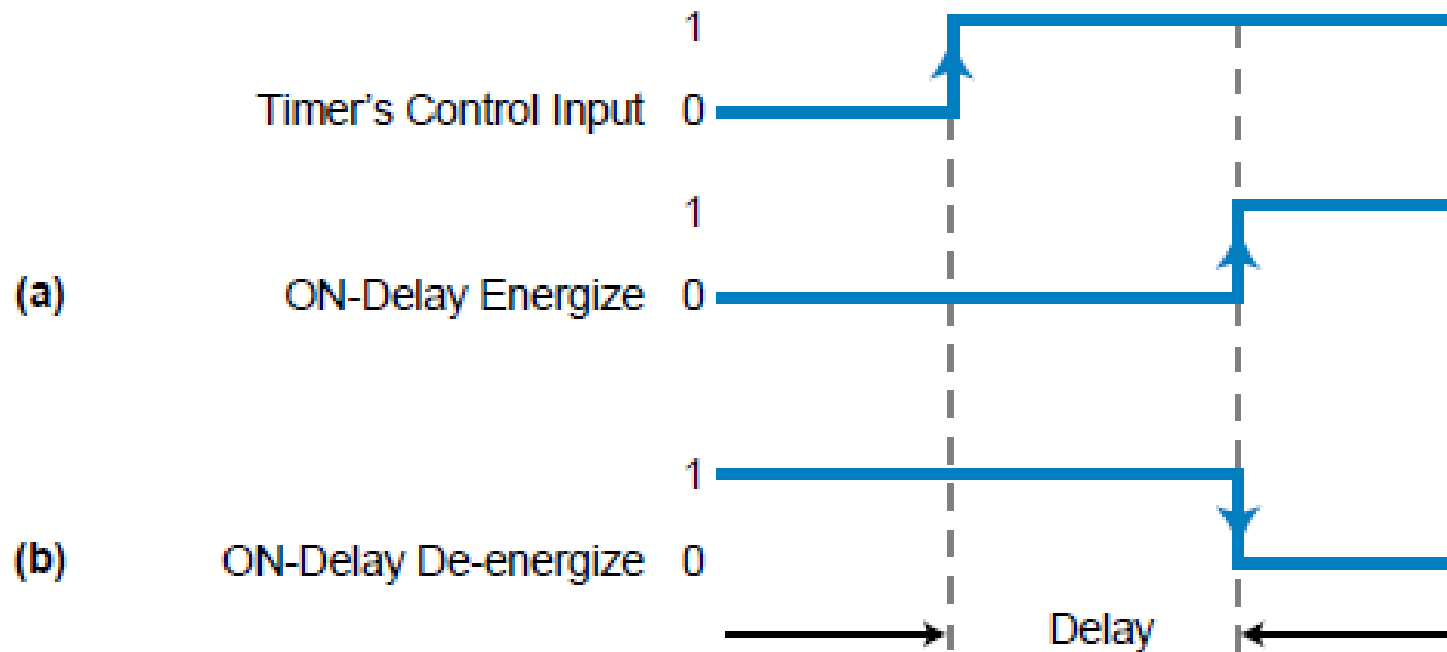
# Block Format & ladder Format



# On Delay Energized Timer (TON)

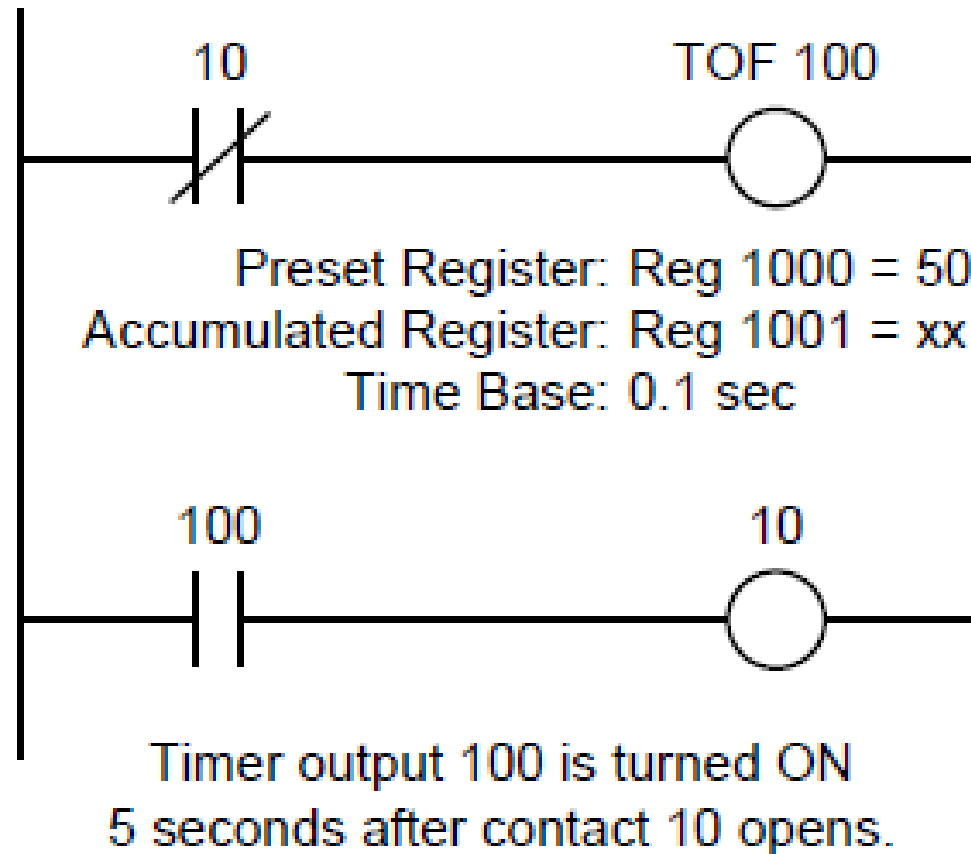


# TON Energized & De-energized

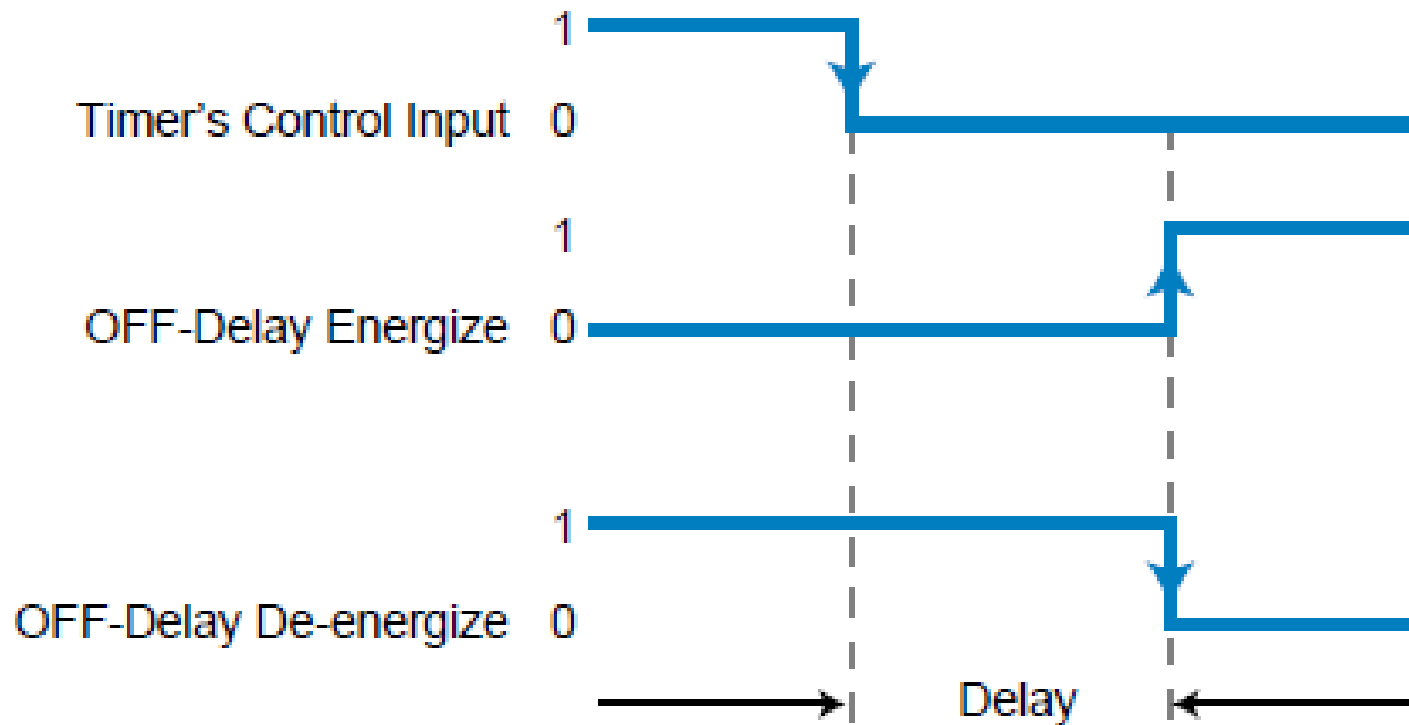


**Figure 9-45.** Timing diagram for **(a)** an ON-delay energize timer and **(b)** an ON-delay de-energize timer.

# Off Delay (TOF)



# TOF Energized & De-energized



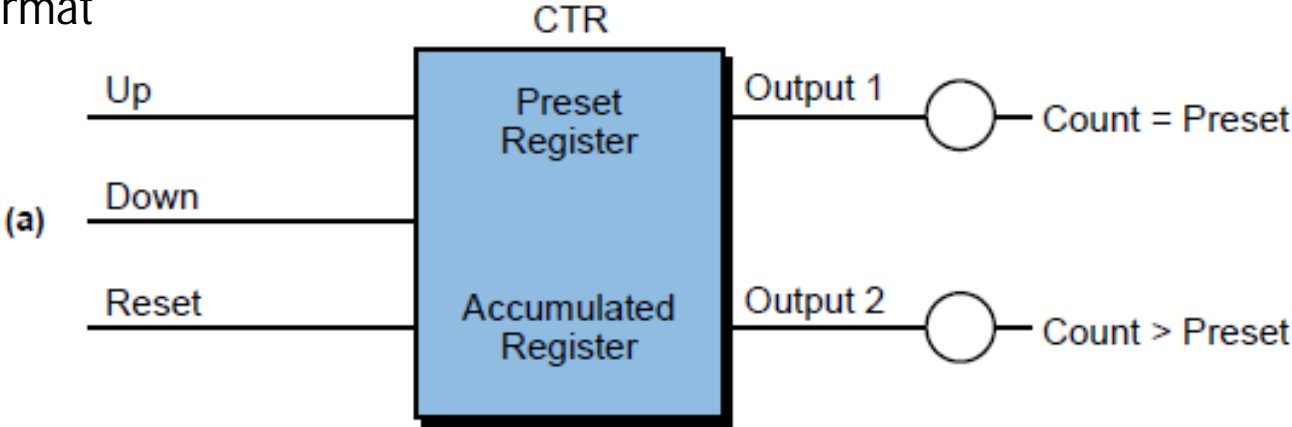


# Contoh

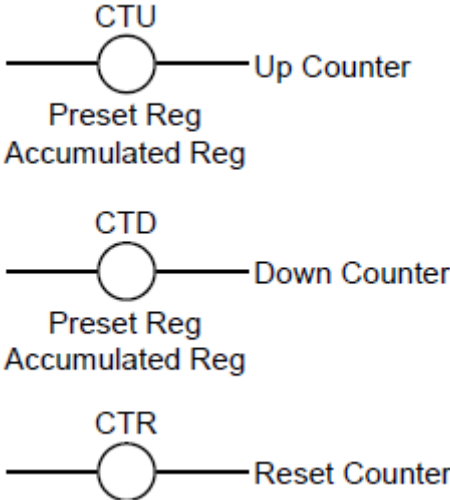
- Rancang Ladder diagram untuk dua buah lampu yang menyala dan mati setiap 2 detik bergantian dengan tombol start dan stop untuk mengendalikan.

# COUNTER

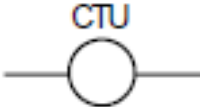
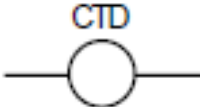
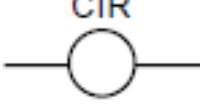
Block Format



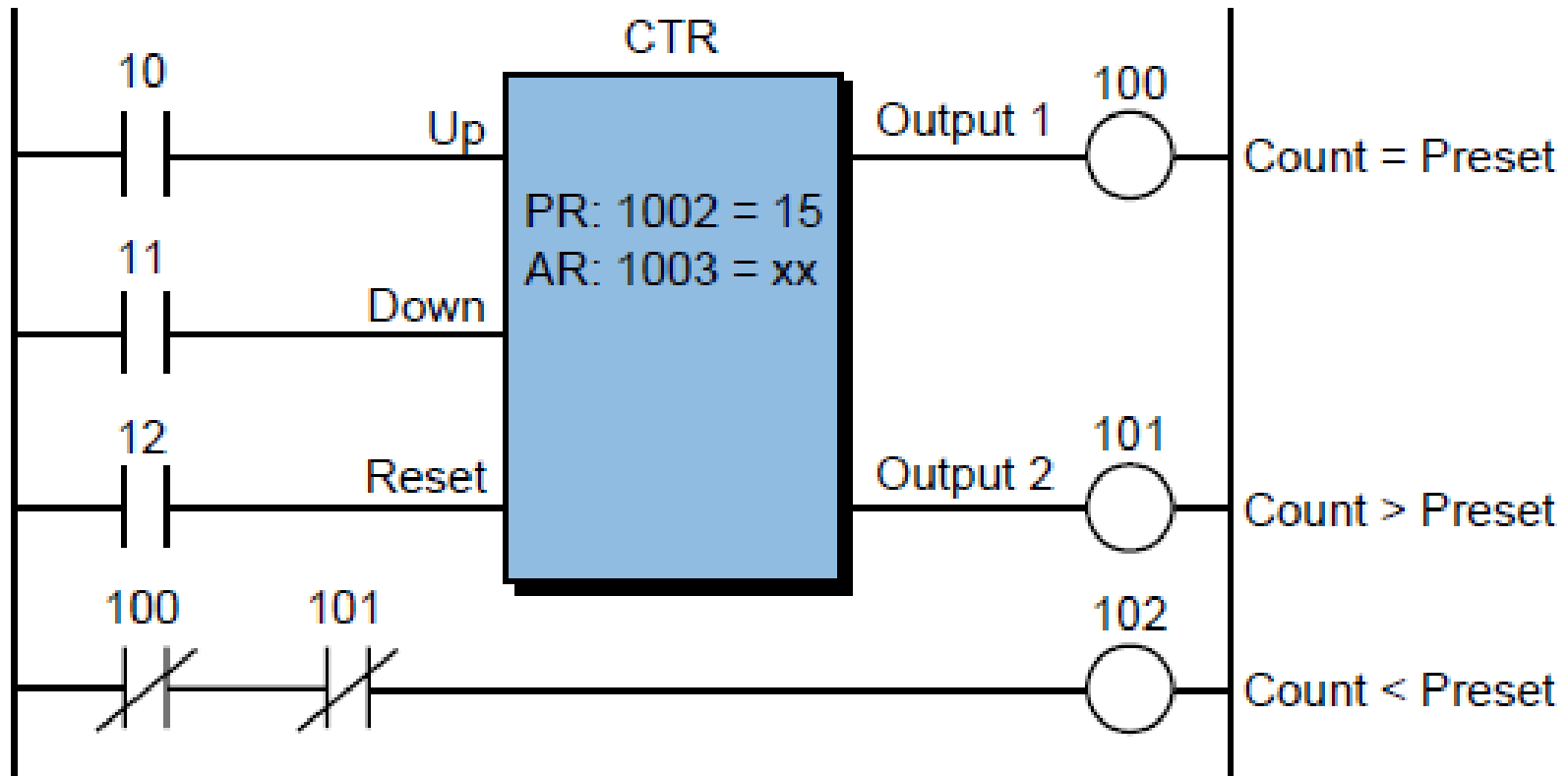
Ladder Format



# Instruksi COUNTER

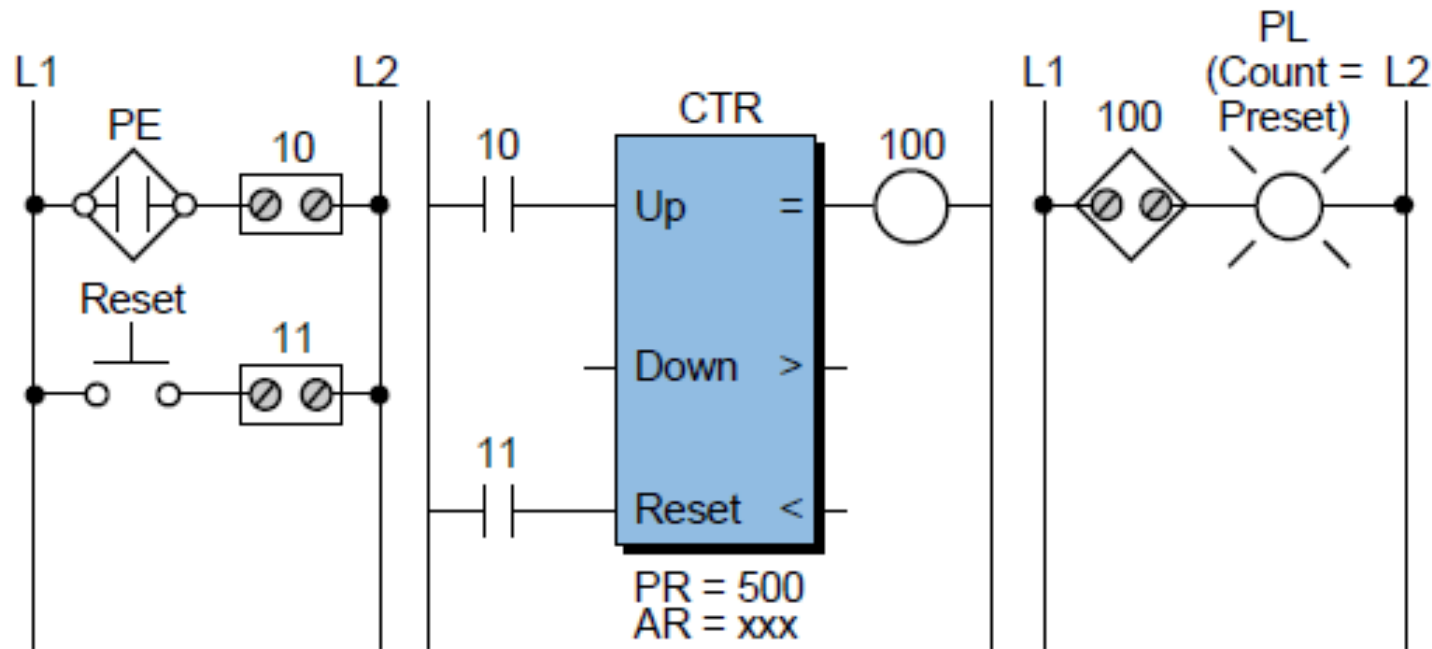
<b>Counter Instructions</b> <i>(Purpose: To provide hardware counter capabilities in a PLC)</i>		
<b>Instruction</b>	<b>Symbol</b>	<b>Function</b>
Up Counter		Increases the accumulated register value every time a referenced event occurs
Down Counter		Decreases the accumulated register value every time a referenced event occurs
Counter Reset		Resets the accumulated value of an up or down counter

# Counter Function Block

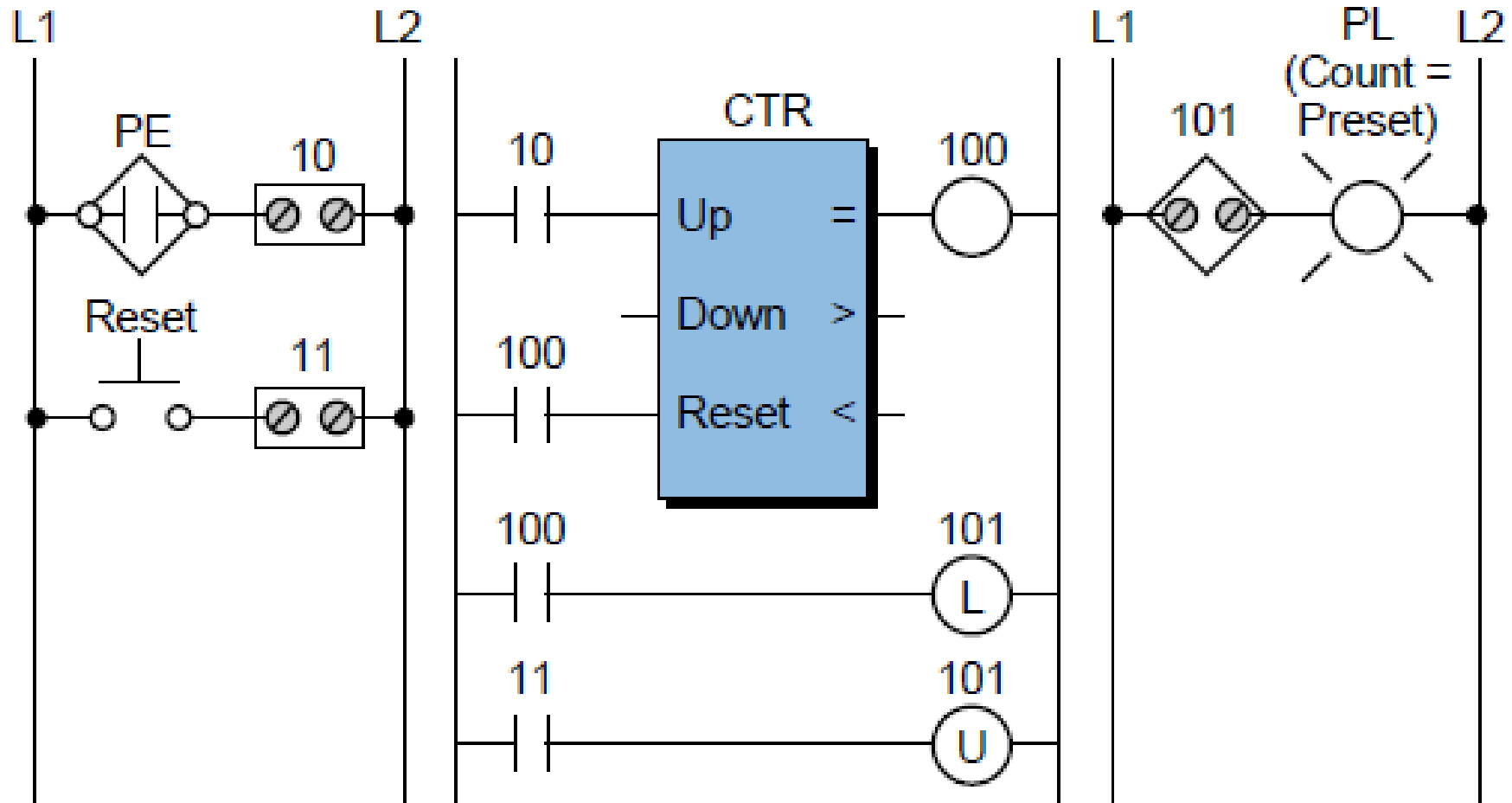


# Contoh

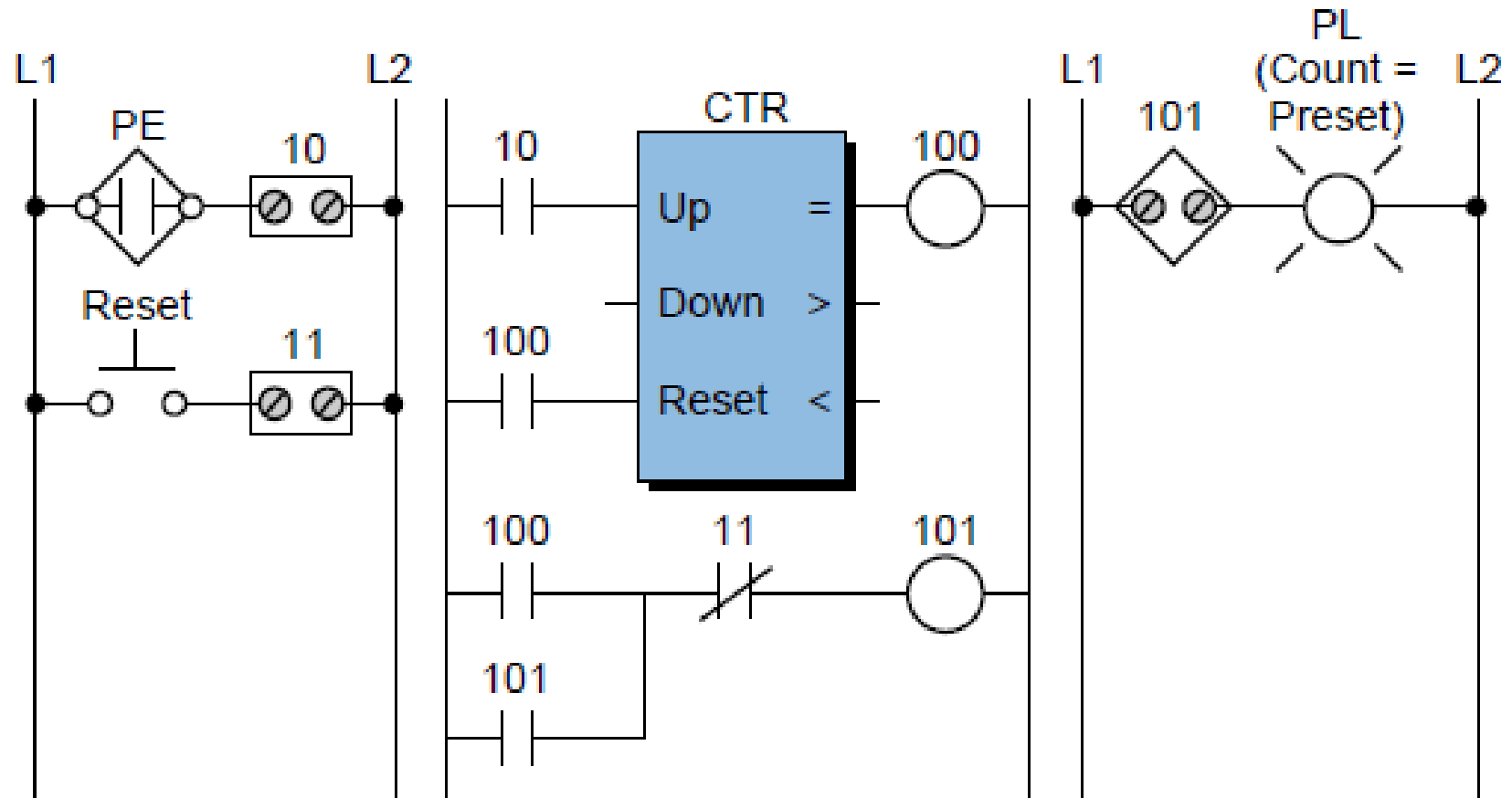
- Input Photoelectric eye (PE) digunakan untuk mendeteksi keberadaan benda. Nilai counter yang diinginkan adalah 500. Modifikasi rangkaian berikut hingga bisa otomatis reset setiap hitungan mencapai 500. tambahkan juga output untuk indikator bahwa hitungan 500 tersebut terpenuhi.



# Solusi



# Perancangan dengan interlock



# Contoh Soal

- Rancang Ladder diagram untuk Counter penghitung benda dalam kotak yang melintas melalui konveyor, kotak tersebut berisi 20 item. Hitung juga jumlah kotak yang melintas melalui konveyor (batas kotak sebanyak 10 buah). Jika kotak yang tertata diambil, maka counter down akan aktif. Lengkapi masing2 kondisi dengan lampu indikator jumlah maksimal terpenuhi.



# Latihan

- Rancang Ladder diagram untuk tiga buah lampu (RGB). Lampu merah menyala selama 2 detik, kemudian lampu hijau menyala 4 detik, selanjutnya lampu merah menyala 6 detik.  
(dilengkapi tombol start dan Stop)