

TEKNIK OTOMASI TIMER Counter

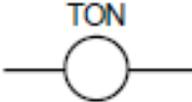
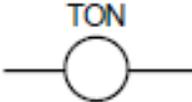
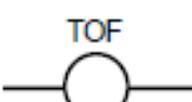
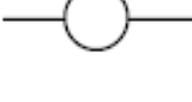
Eka Maulana, ST, MT, Meng.

Parameter Timer

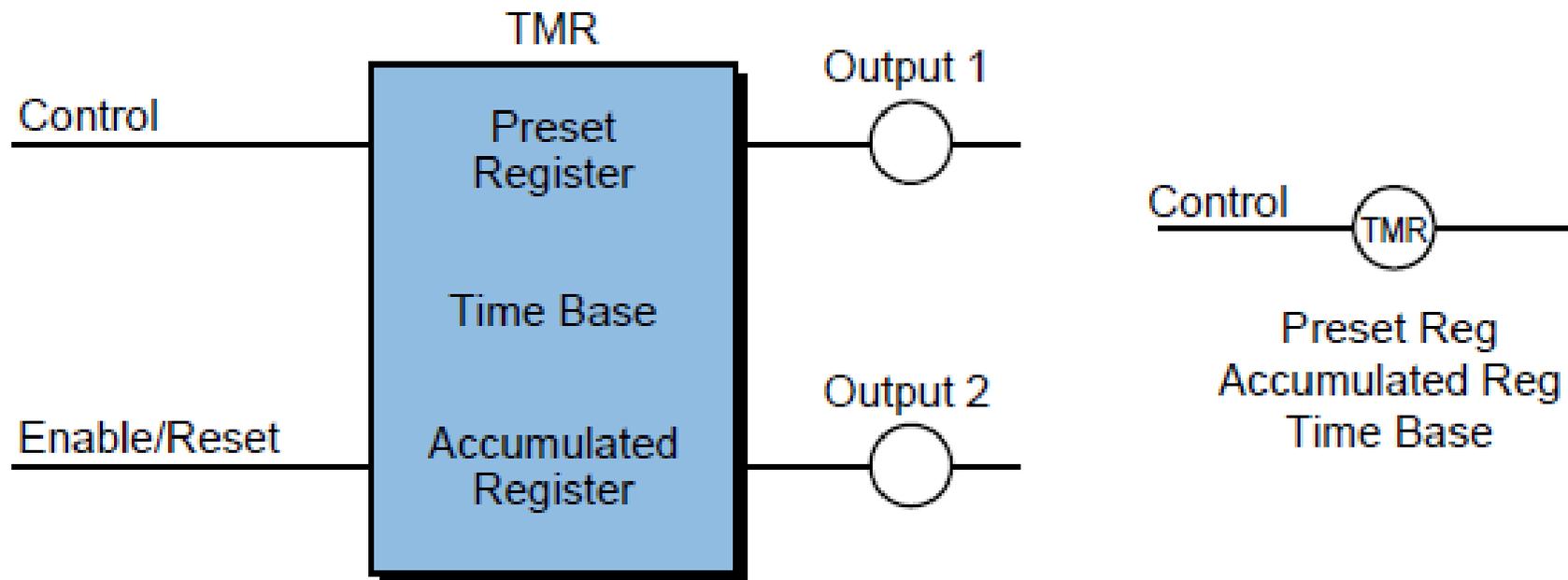
| Required Time | Number of Ticks | Time Base (secs) |
|---------------|-----------------|------------------|
| 10 sec | 10 | 1.00 |
| 10 sec | 100 | 0.10 |
| 10 sec | 1000 | 0.01 |

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

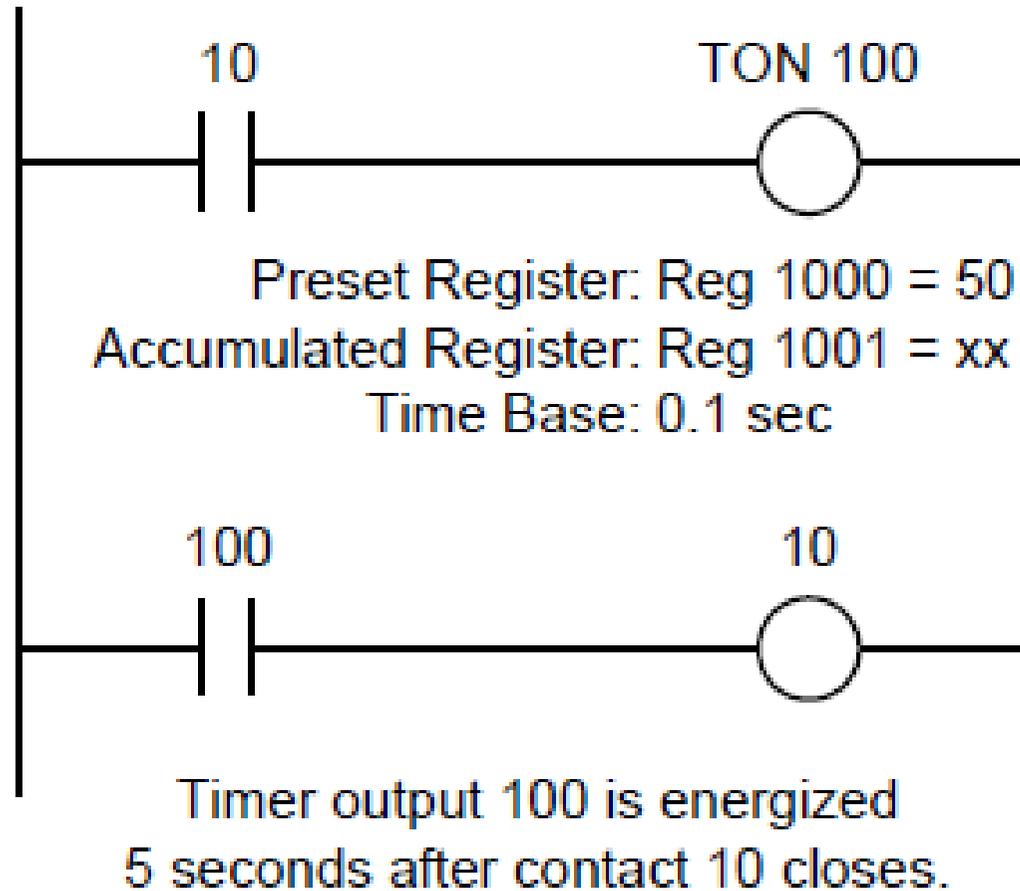
Timer Instruction

| Timer Instructions <i>(Purpose: To provide hardware timer capabilities in a PLC)</i> | | |
|--|--|--|
| Instruction | Symbol | Function |
| 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

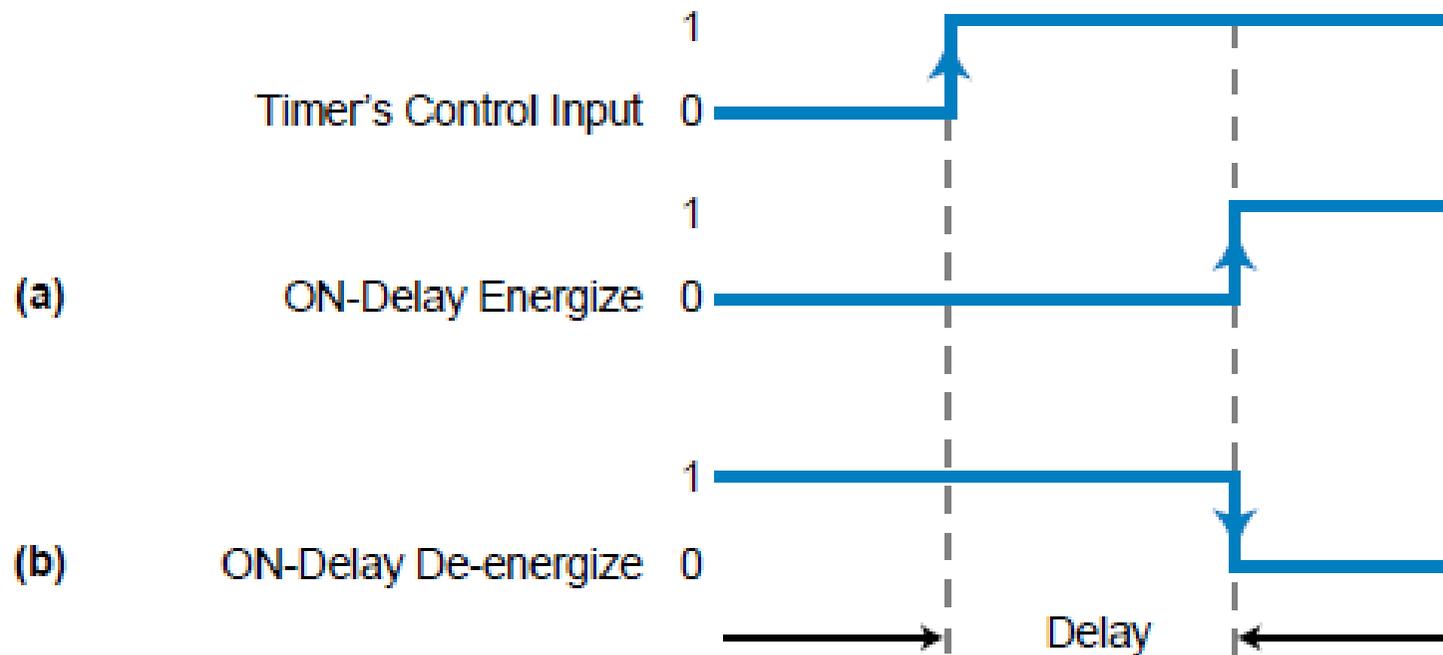
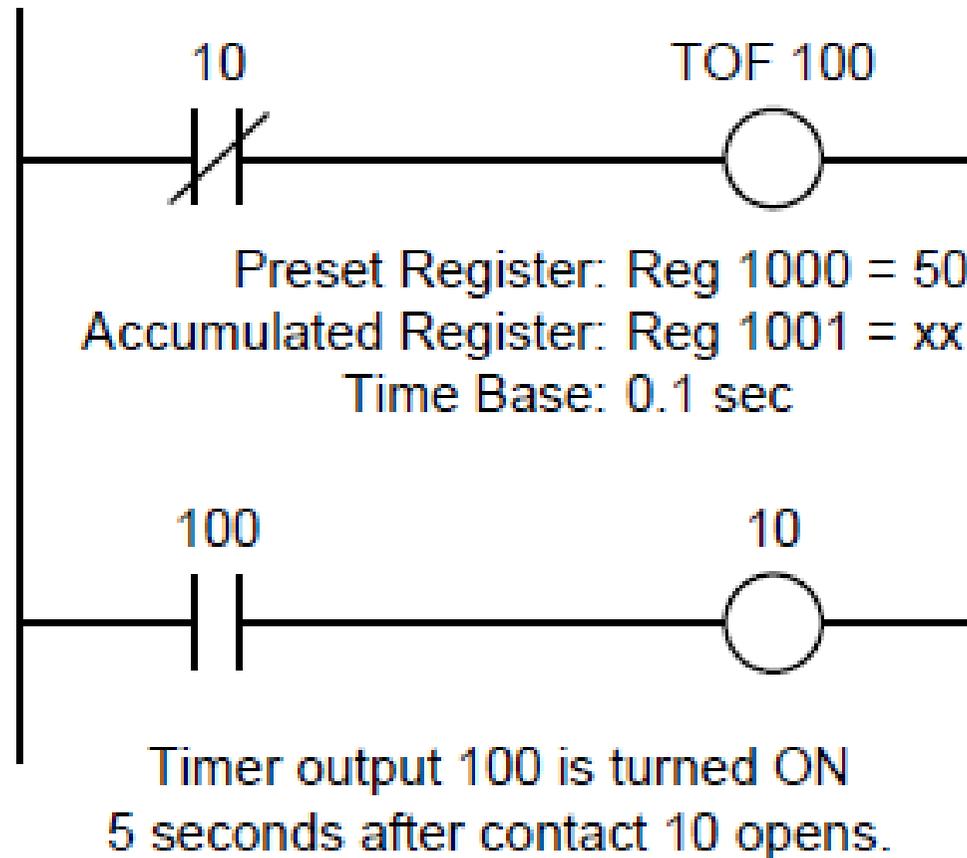
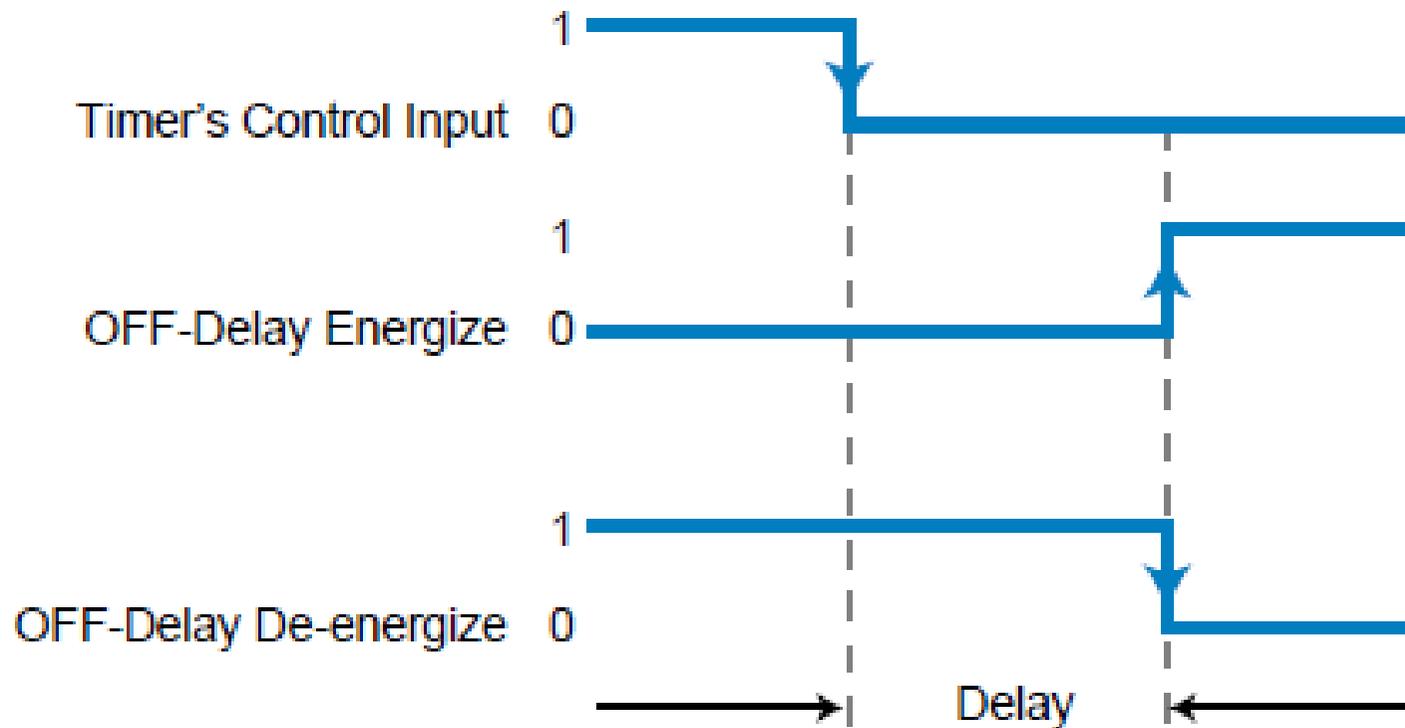


Figure 9-45. Timing diagram for (a) an ON-delay energize timer and (b) an ON-delay de-energize timer.

Off Delay (TOF)



TOF Energized & De-energized

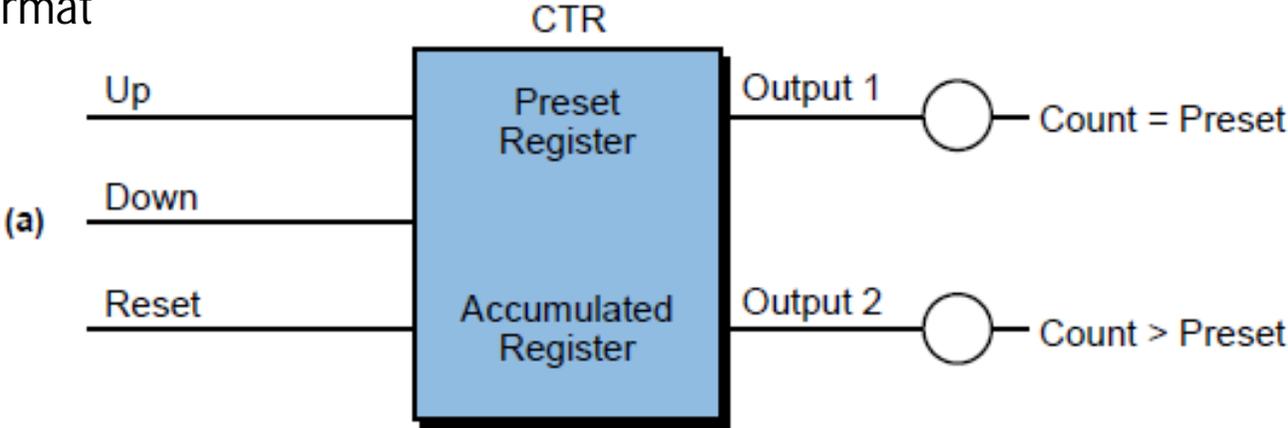


Contoh

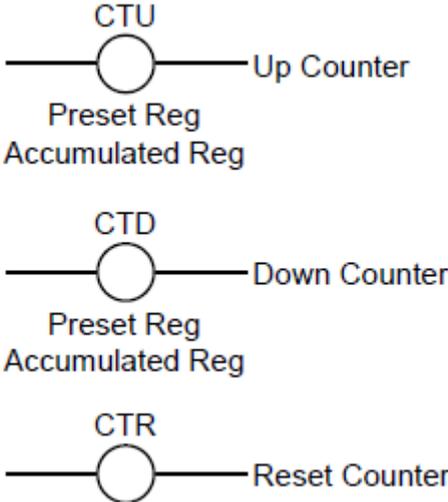
- Rancang Ladder diagram untuk dua buah lampu yang menyala dan mati setiap 2 detik bergantian dengan tombol start dan stop untuk mengendalikan.

COUNTER

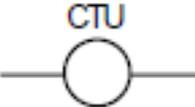
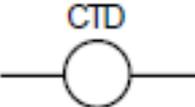
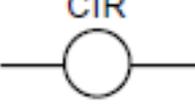
Block Format



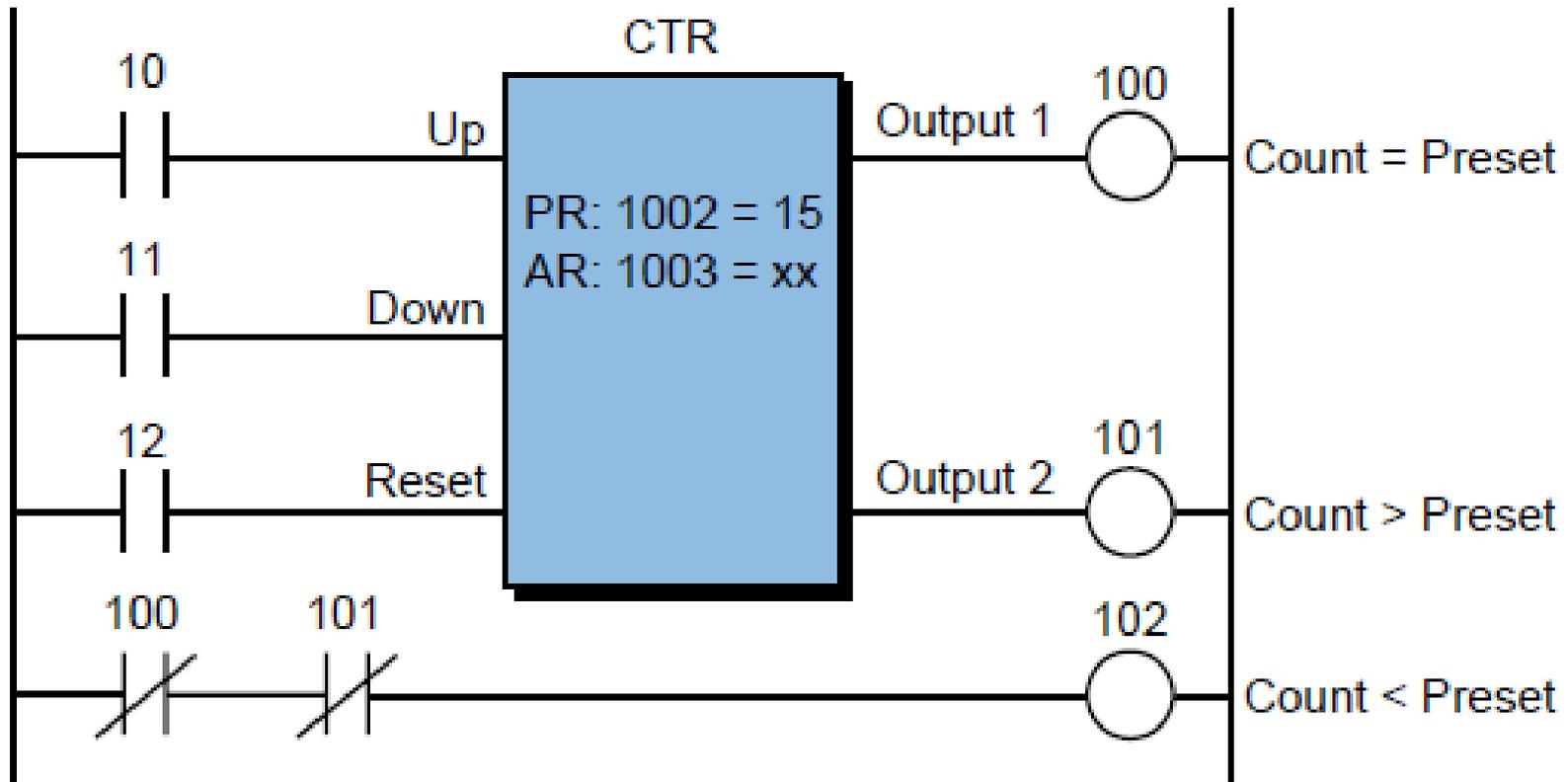
Ladder Format



Instruksi COUNTER

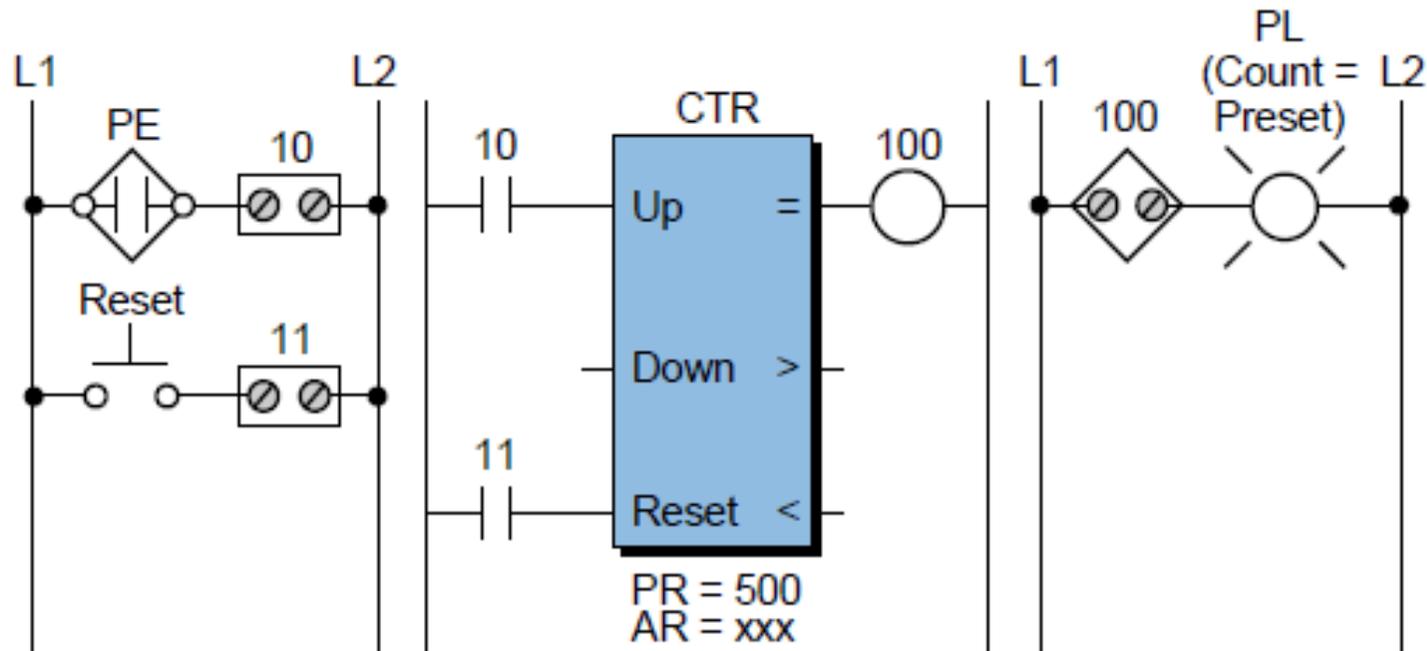
| Counter Instructions <i>(Purpose: To provide hardware counter capabilities in a PLC)</i> | | |
|--|--|---|
| Instruction | Symbol | Function |
| Up Counter |  | Increases the accumulated register value every time a referenced event occurs |
| Down Counter |  | Decreases the accumulated register value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

Counter Function Block

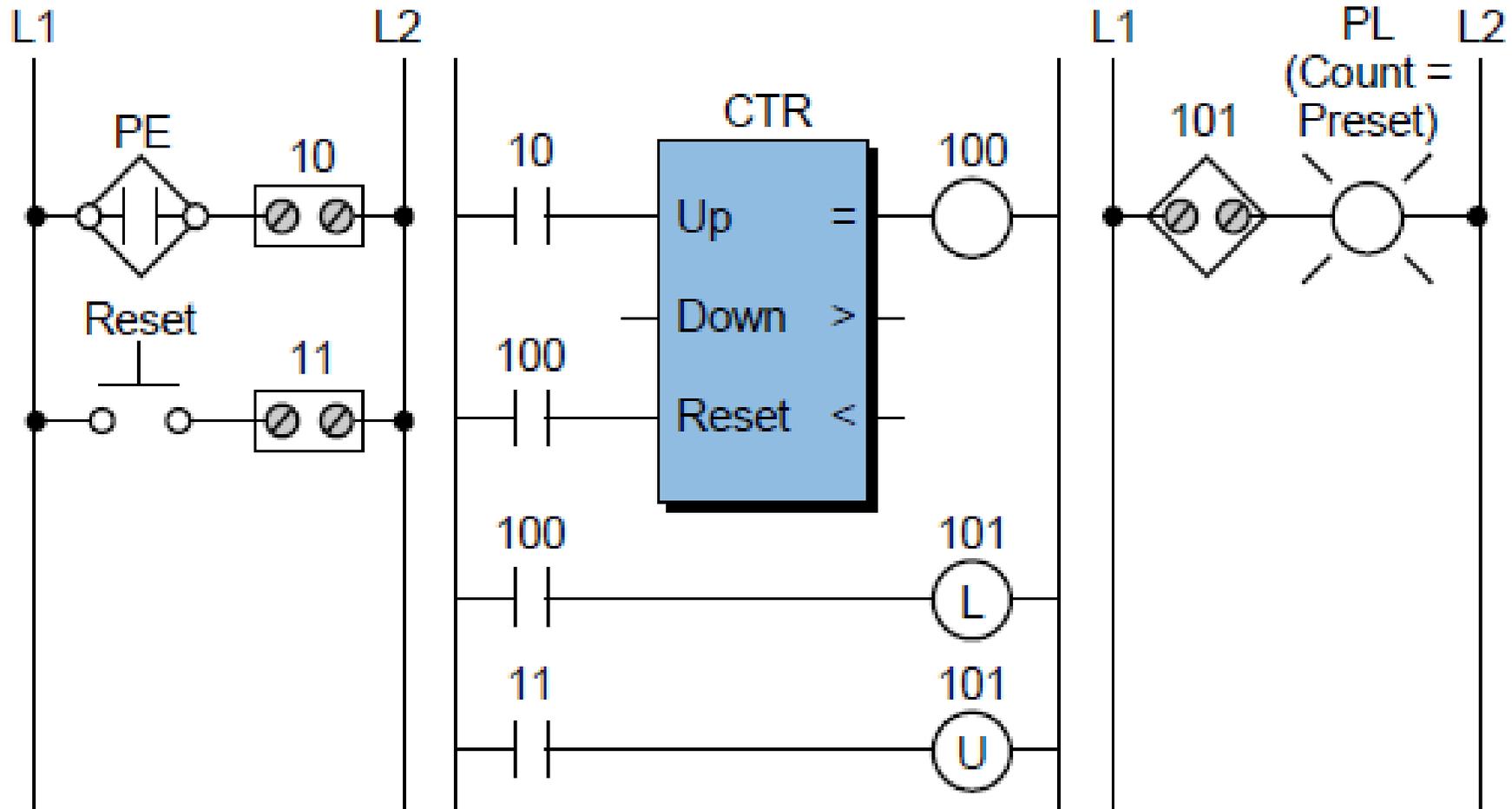


Contoh

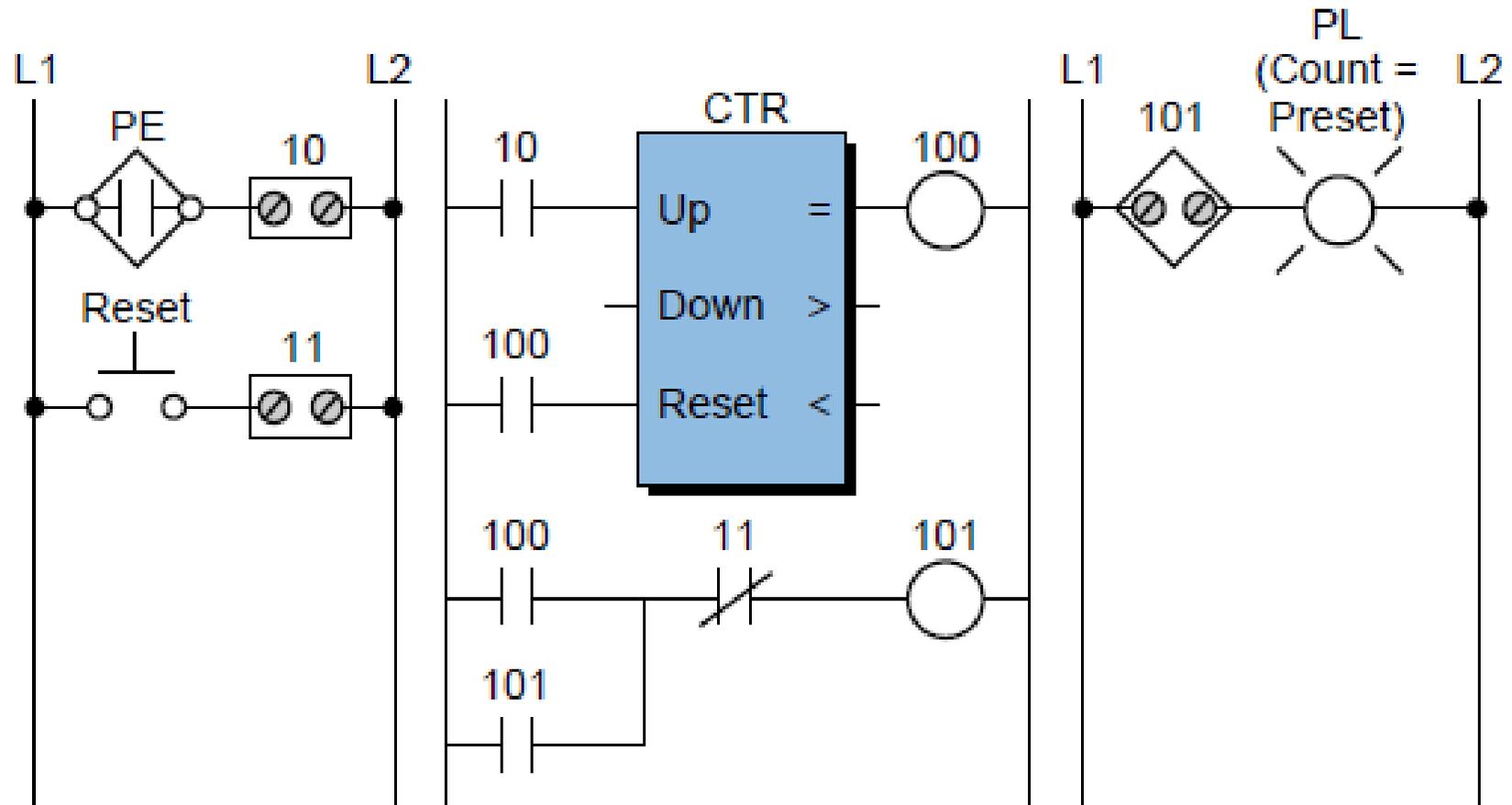
- Input Photoelectric eye (PE) digunakan untuk mendeteksi keberadaan benda. Nilai counter yang diinginkan adalah 500. Modifikasi rangkaian berikut hingga bisa otomatis reset setiap hitungan mencapai 500. tambahkan juga output untuk indikator bahwa hitungan 500 tersebut terpenuhi.



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)