

Automação Industrial



Aula #16

**Controladores Lógicos Programáveis –
CLP's**

Juazeiro Abr 19,2010

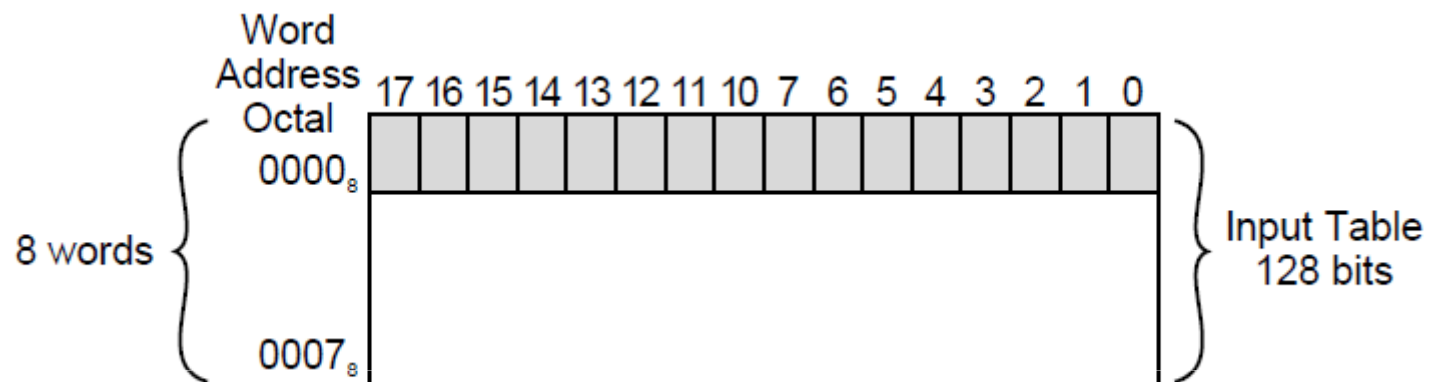
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Nível II – PLCs : *Endereçamento de I/O*

- ✓ Entender a organização da memória ajuda no entendimento do funcionamento dos PLC's.
- ✓ Considere o mapa de memória de aplicação descrito abaixo:
 - memória total 4K – (word : 16 bits)
 - 256 dispositivos I/O – (128 in + 128 out)
 - 128 saída internas
 - 256 registros, selecionados em grupos de 8 words.
 - base octal

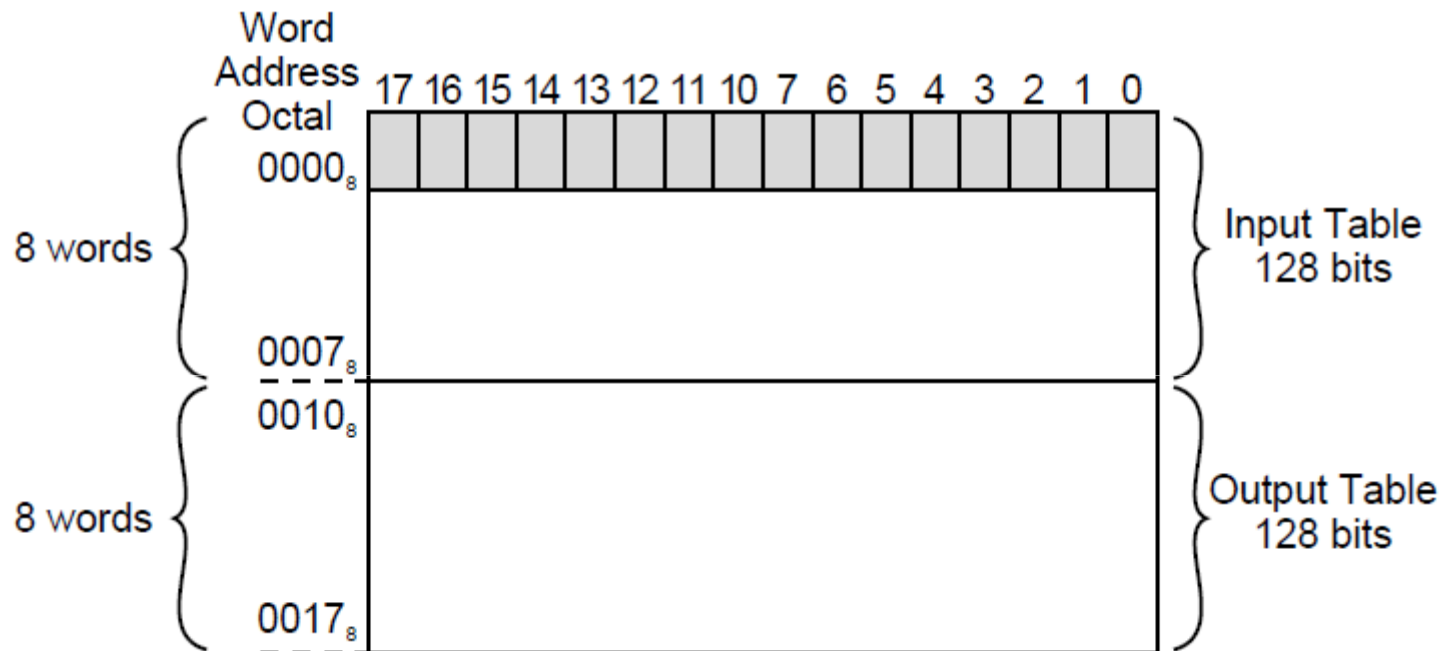
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Nível II – PLCs : *Endereçamento DATA TABLE*



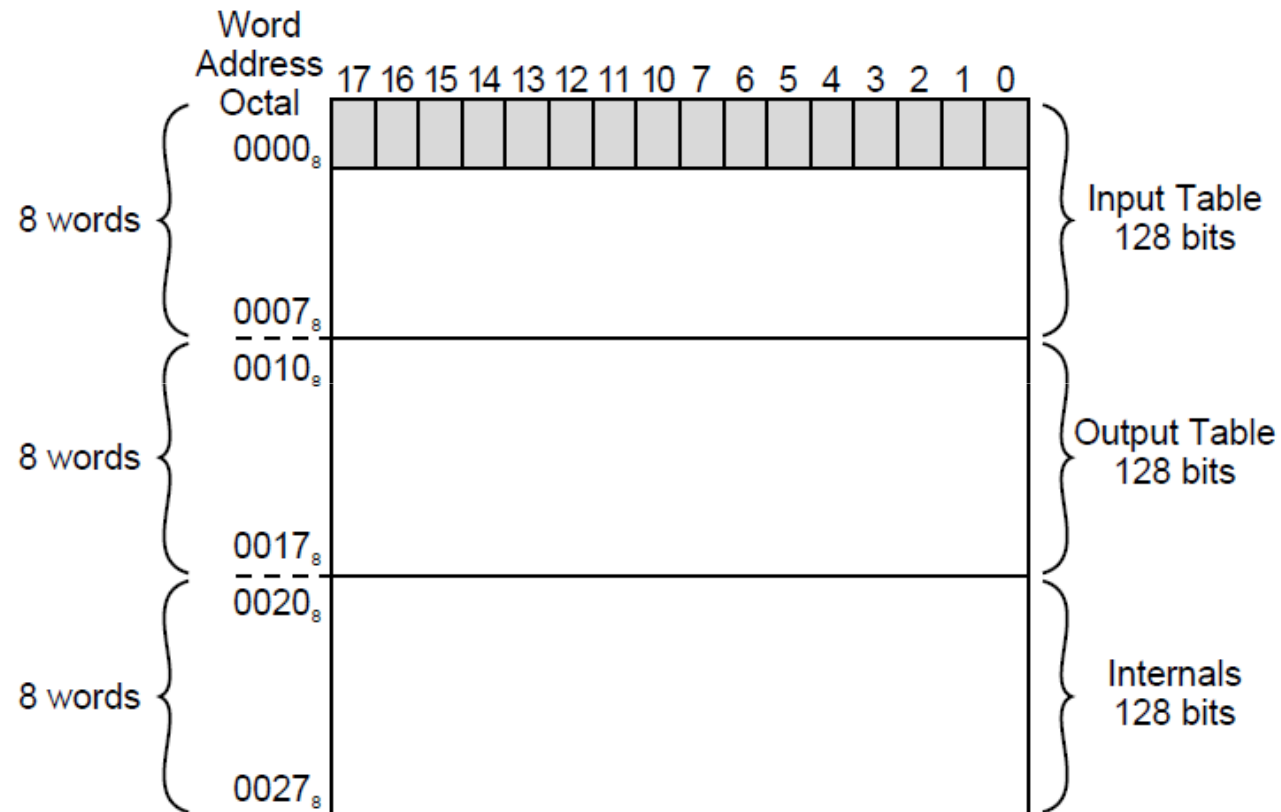
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Nível II – PLCs : *Endereçamento DATA TABLE*



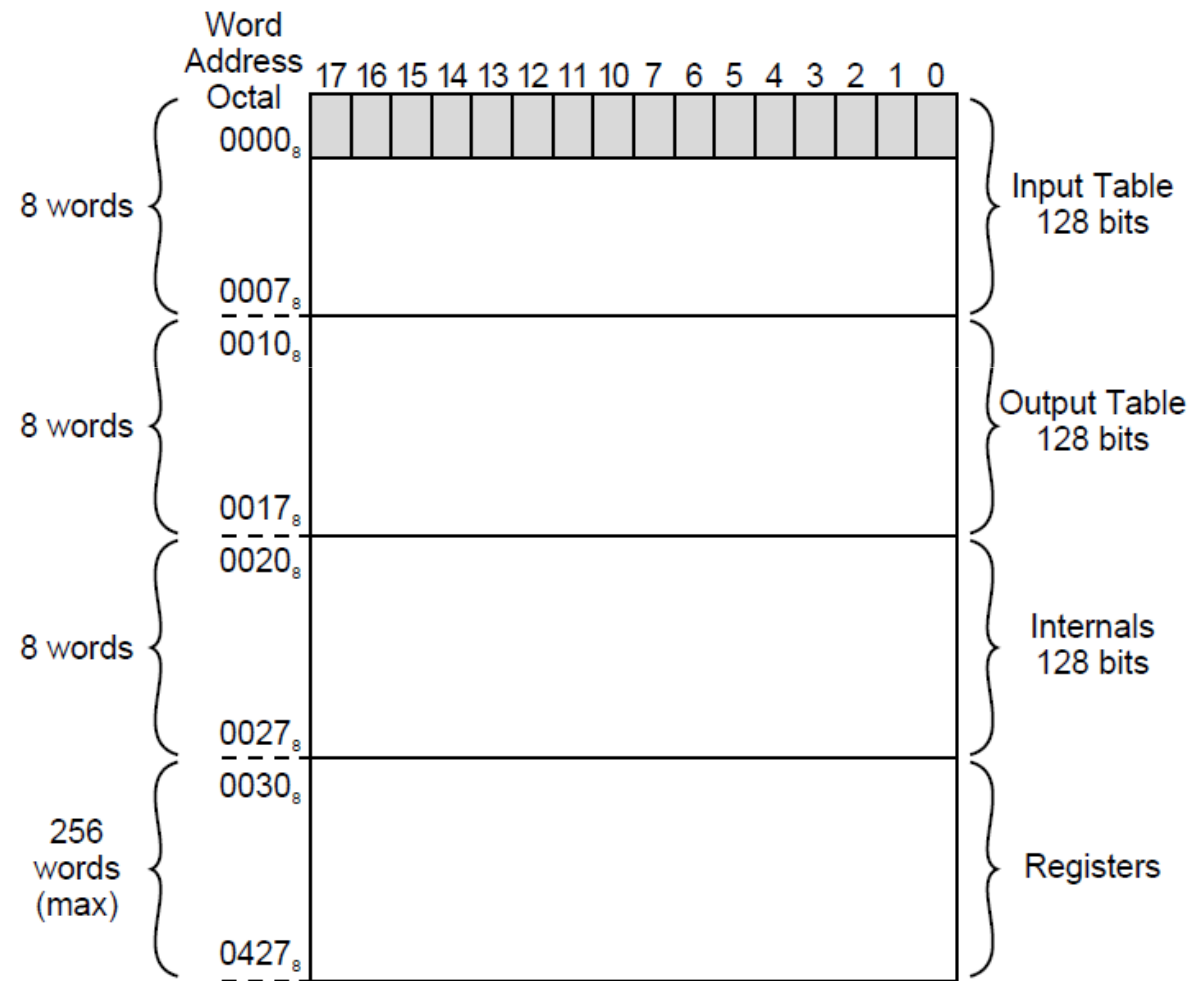
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Nível II – PLCs : *Endereçamento DATA TABLE*



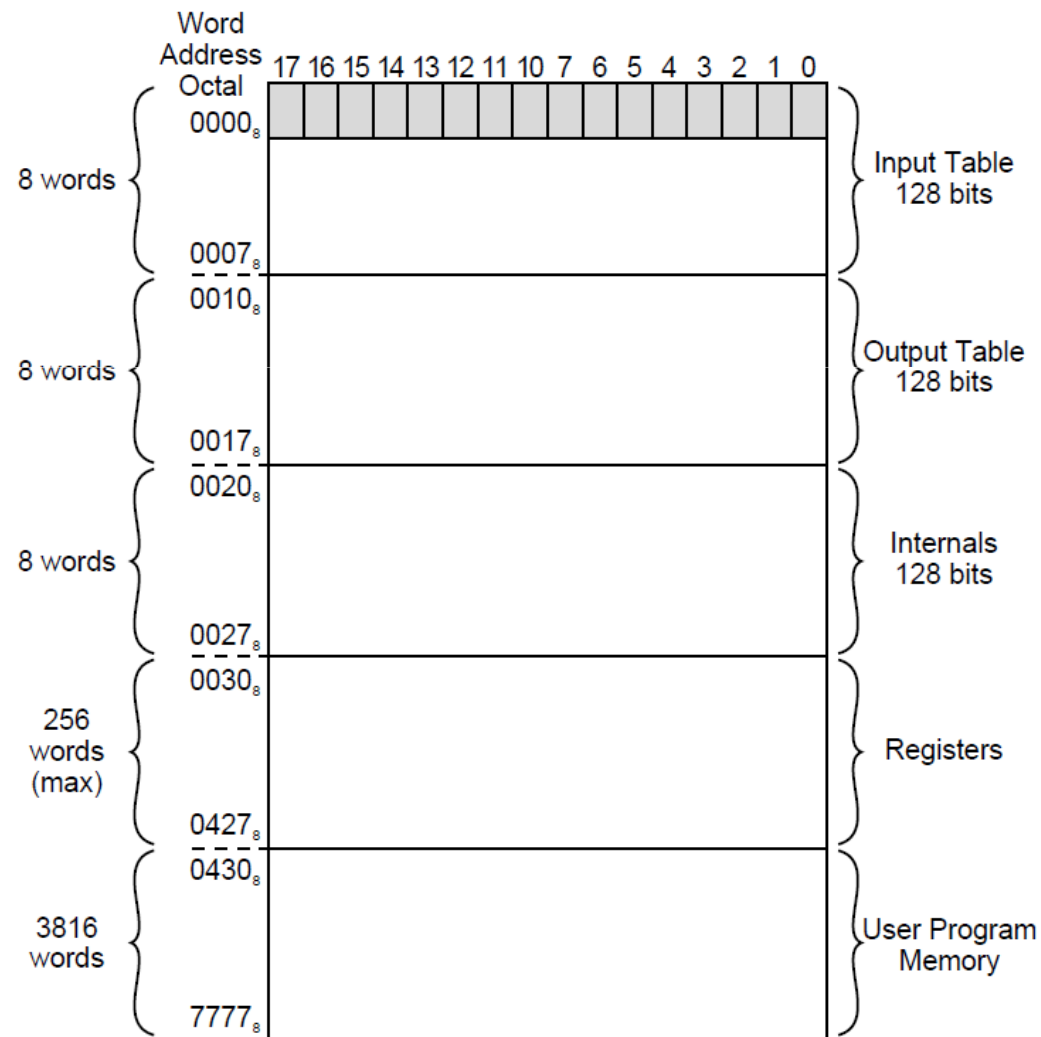
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Nível II – PLCs : *Endereçamento DATA TABLE*



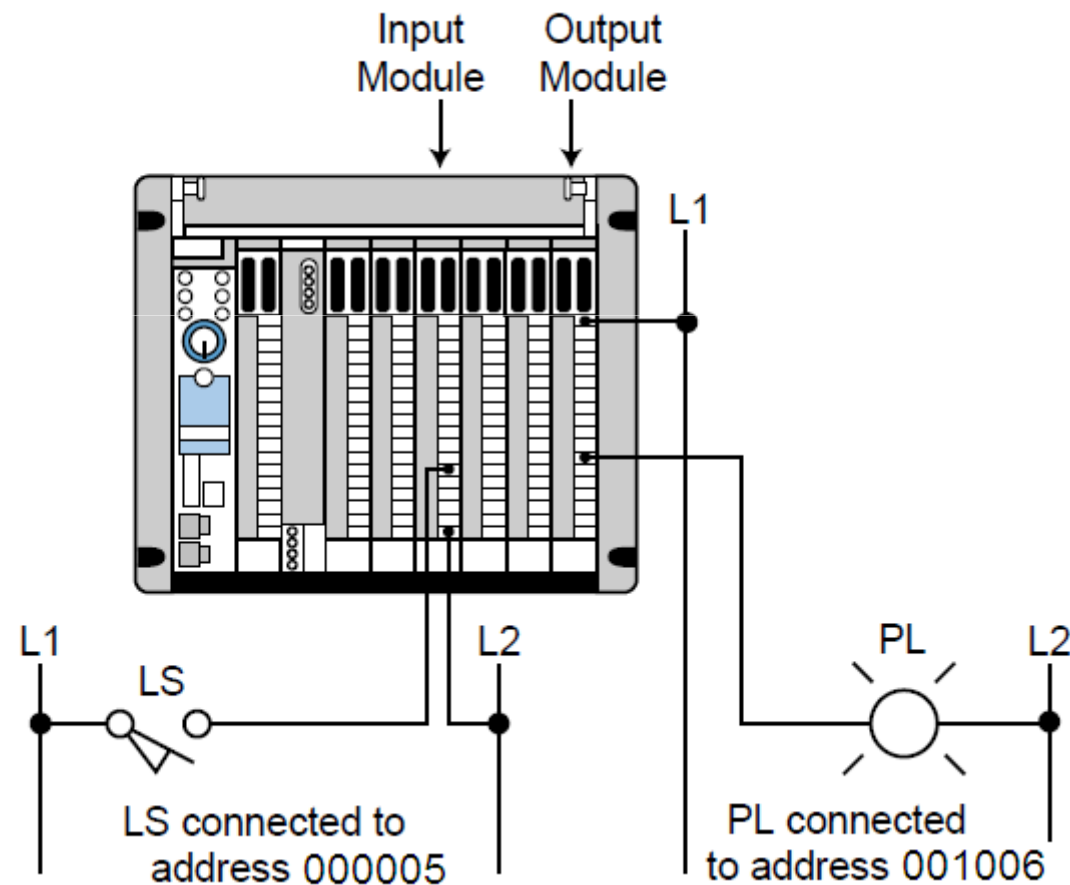
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Nível II – PLCs : *Endereçamento DATA TABLE*



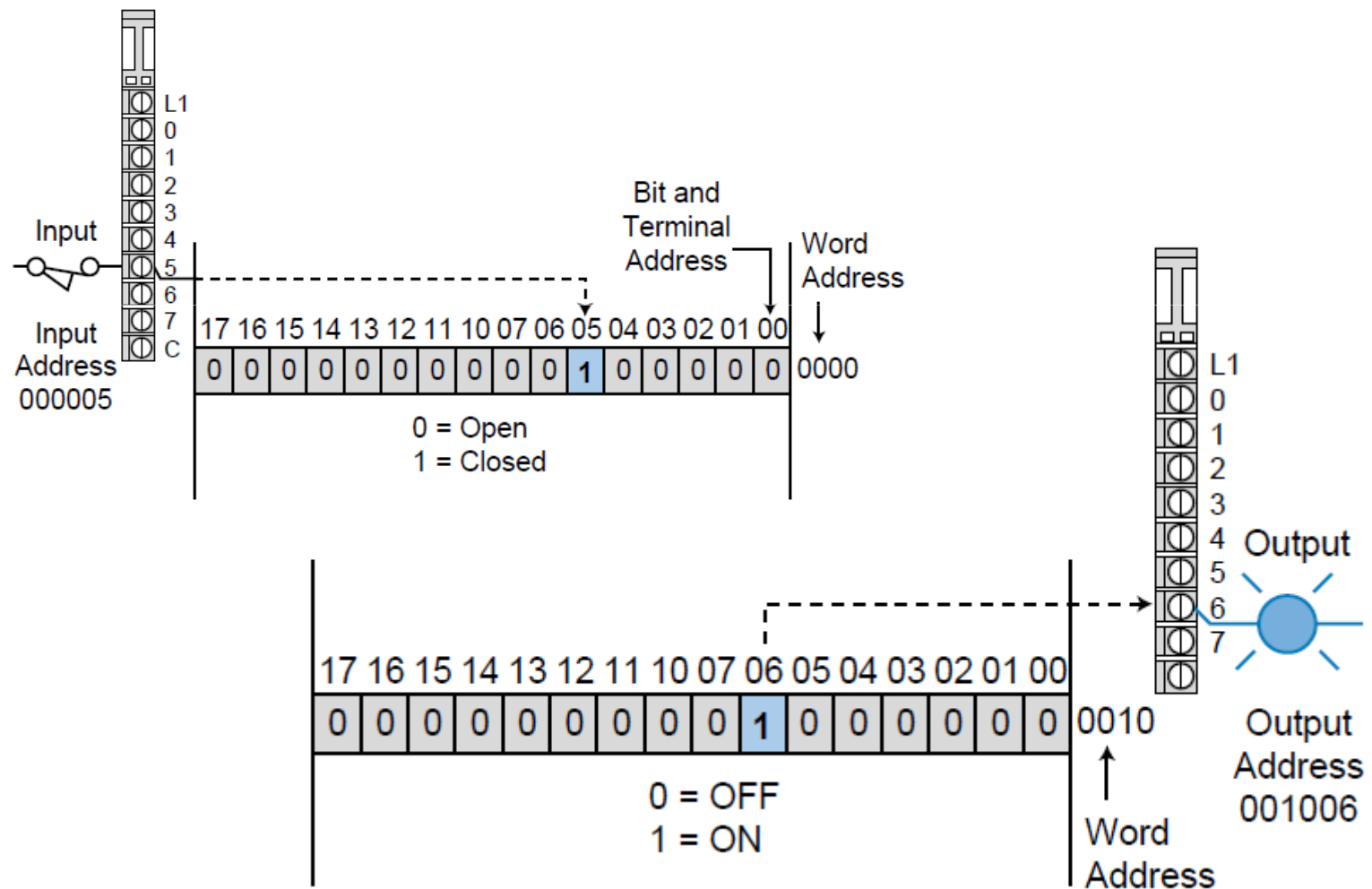
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Nível II – PLCs : *Endereçamento de I/O (físico)*



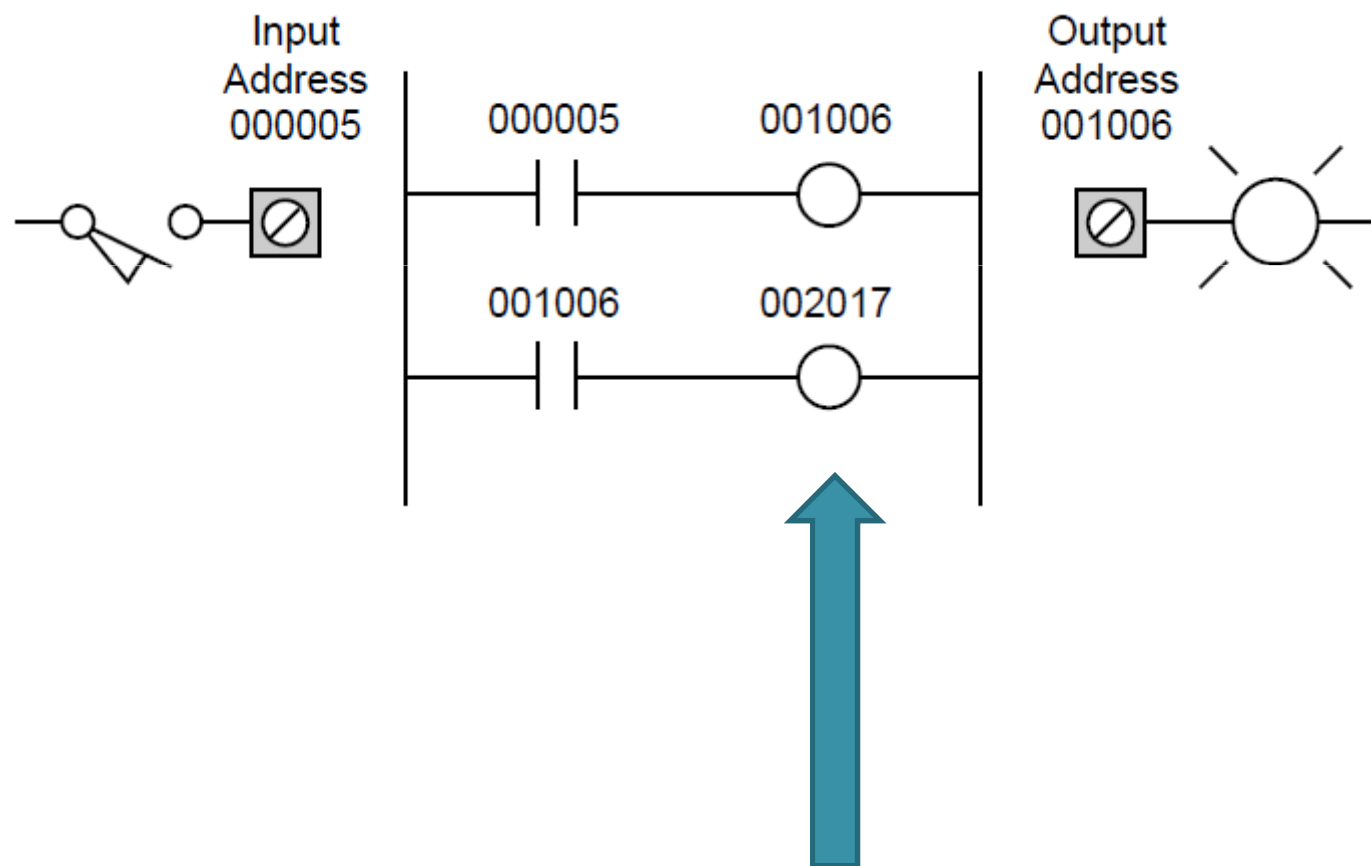
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Nível II – PLCs : *Endereçamento de I/O (físico)*



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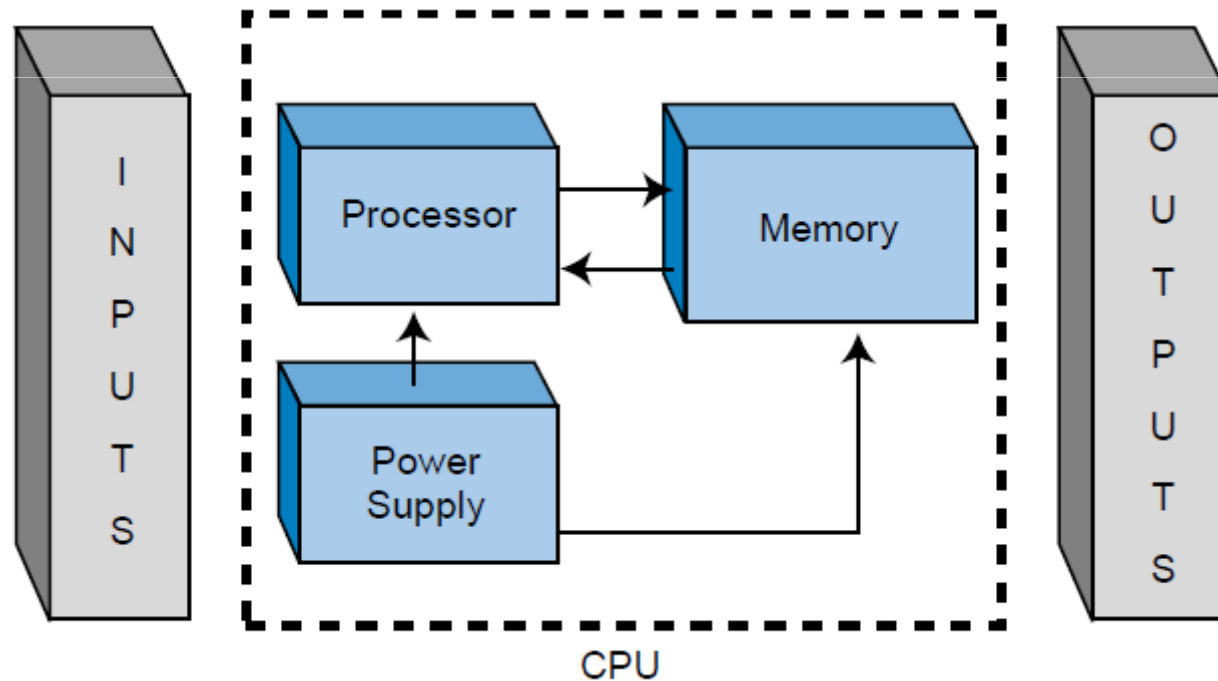
Nível II – PLCs : *Endereçamento de I/O (interno)*



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Nível II – PLCs : *I/O Discretas*

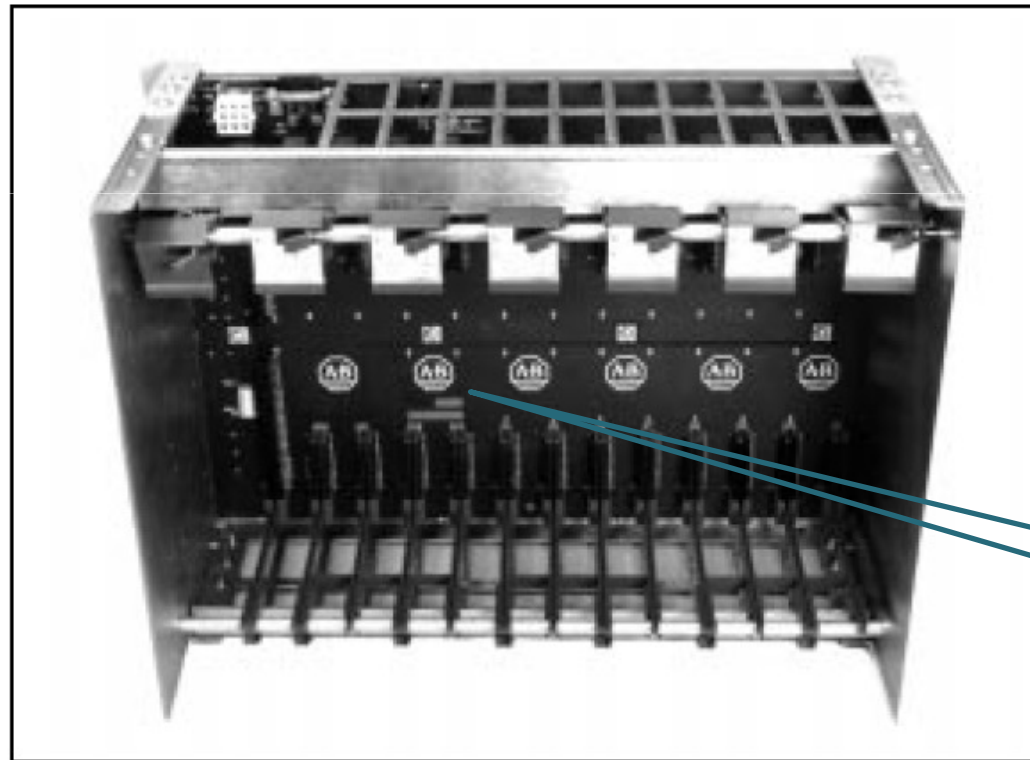
- ✓ Fazem a conexão física entre a CPU e os dispositivos de campo.



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Nível II – PLCs : *I/O Discretas*

- ✓ As interfaces I/O são encaixadas nos *slots* em um *rack*



Courtesy of Allen-Bradley, Highland Heights, OH

back plane

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Nível II – PLCs : *I/O Discretas*

✓ Em geral classificamos os *rack's em 03 tipos:*

➤ master

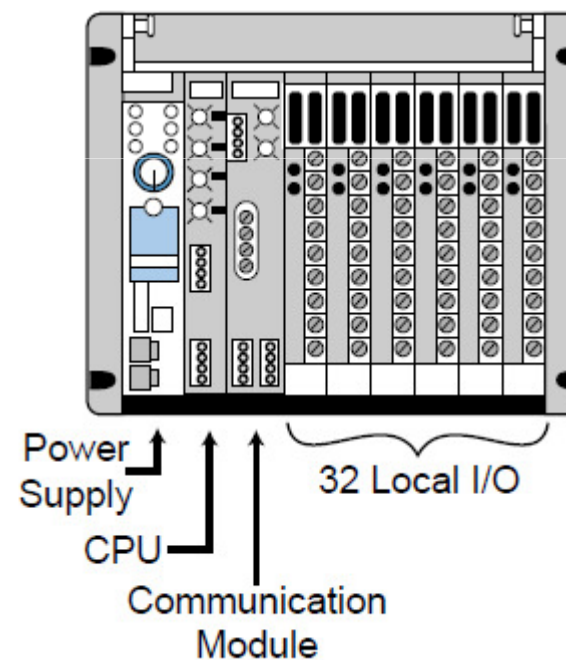
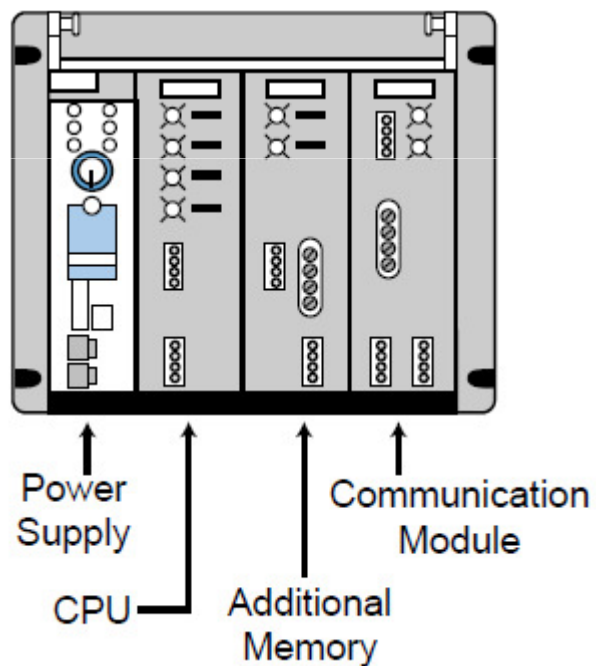
➤ local

➤ remoto

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Nível II – PLCs : *I/O Discretas*

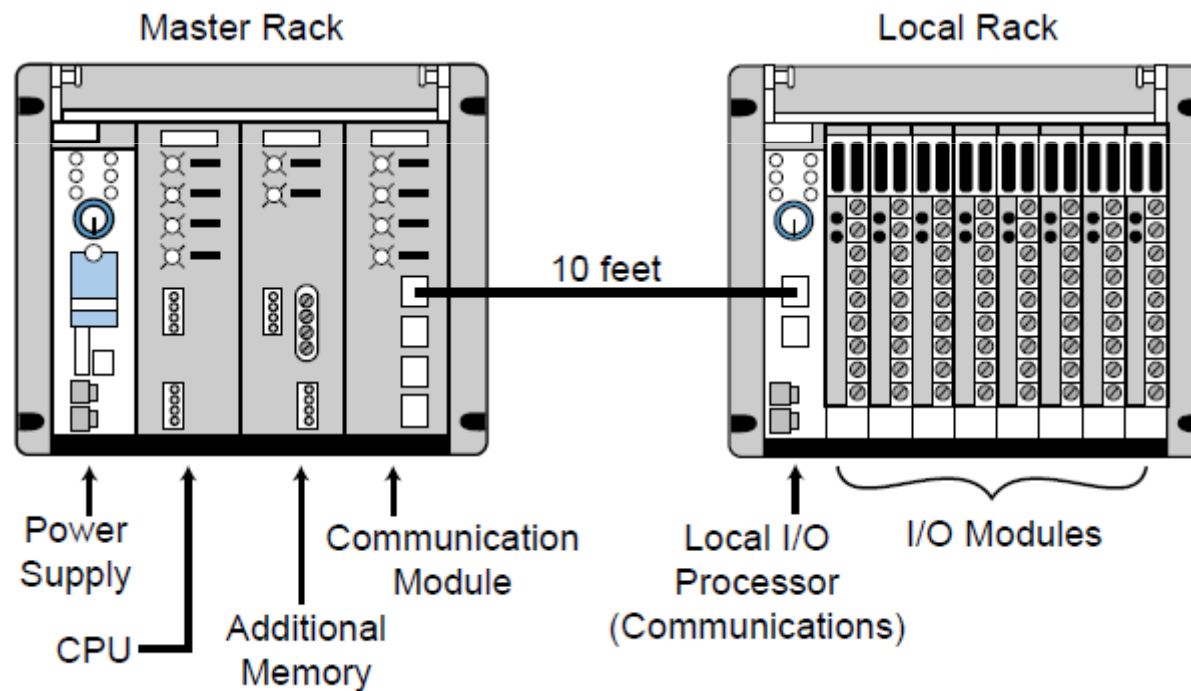
✓ MASTER



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Nível II – PLCs : *I/O Discretas*

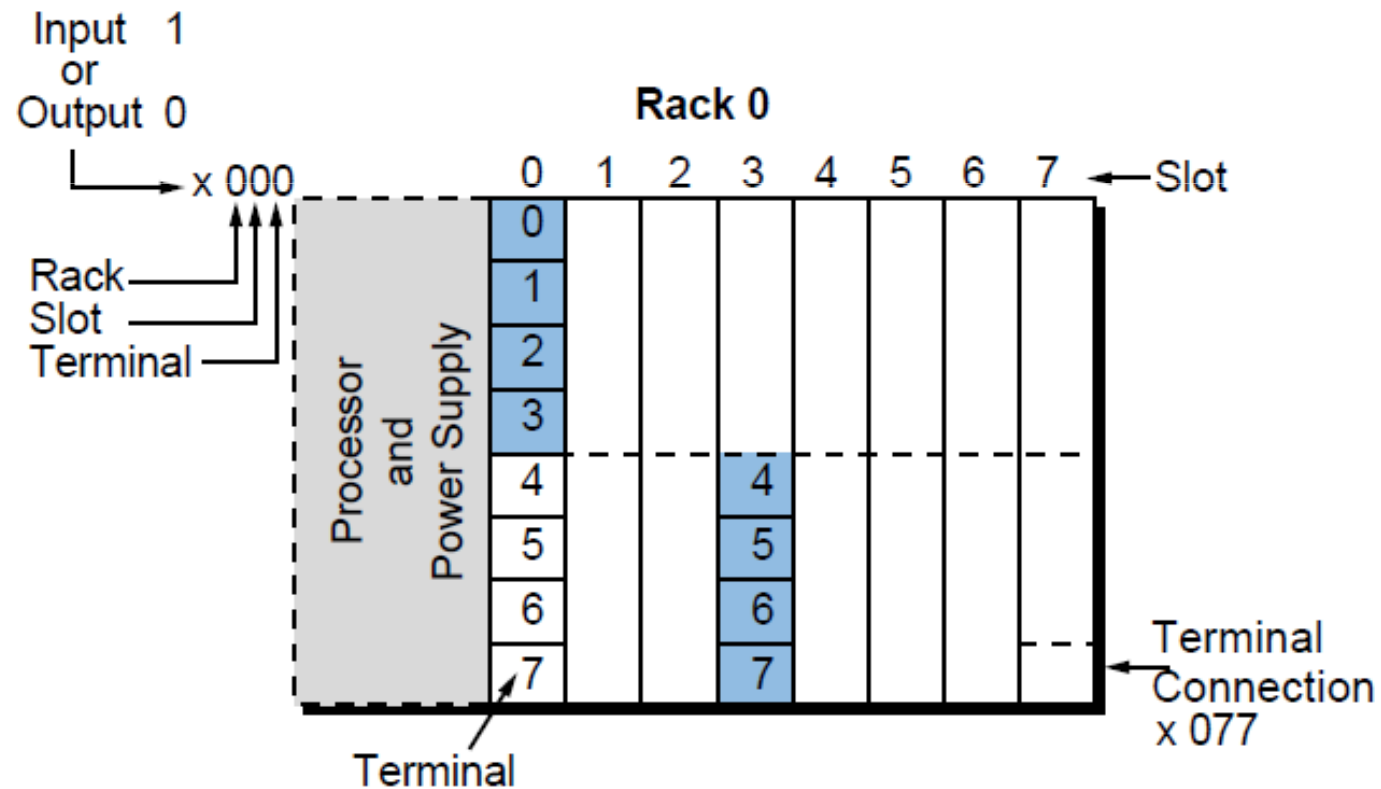
✓ RACK LOCAL / REMOTE



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Nível II – PLCs : *I/O Discretas*

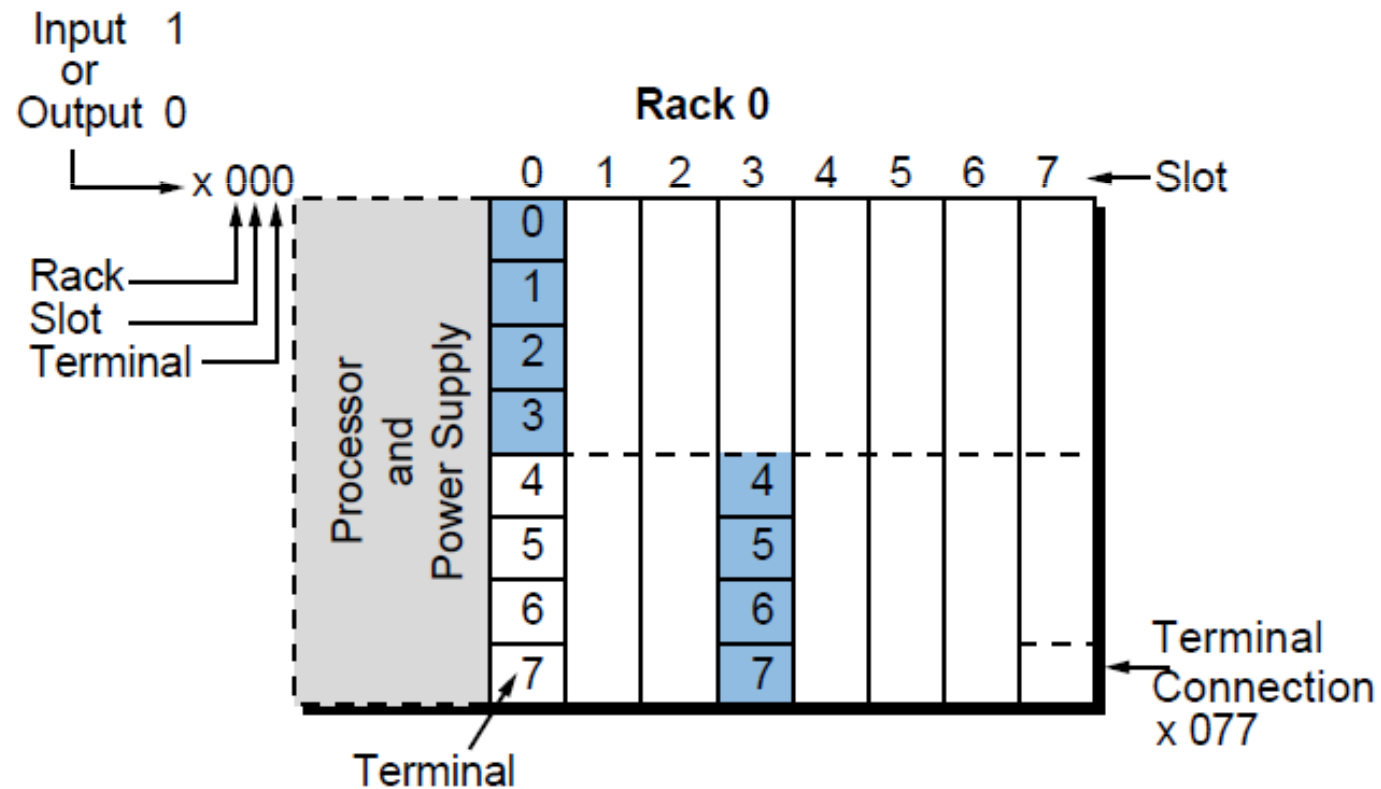
✓ MAPEAMENTO DOS MÓDULOS I/O



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Nível II – PLCs : *I/O Discretas*

✓ MAPEAMENTO DOS MÓDULOS I/O



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Nível II – PLCs : *I/O Discretas*

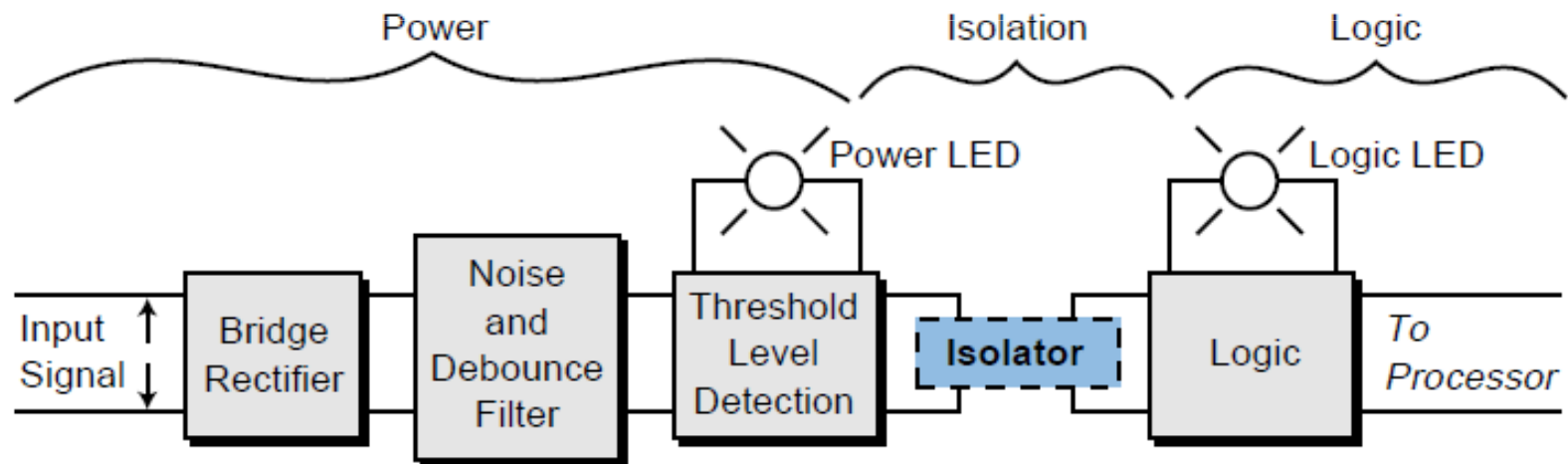
✓ TIPOS DE ENTRADAS DISCRETAS

- 24 , 48, 120 e 230 volts AC/DC
- TTL
- 5-50V (sink/source)
- entradas isoladas

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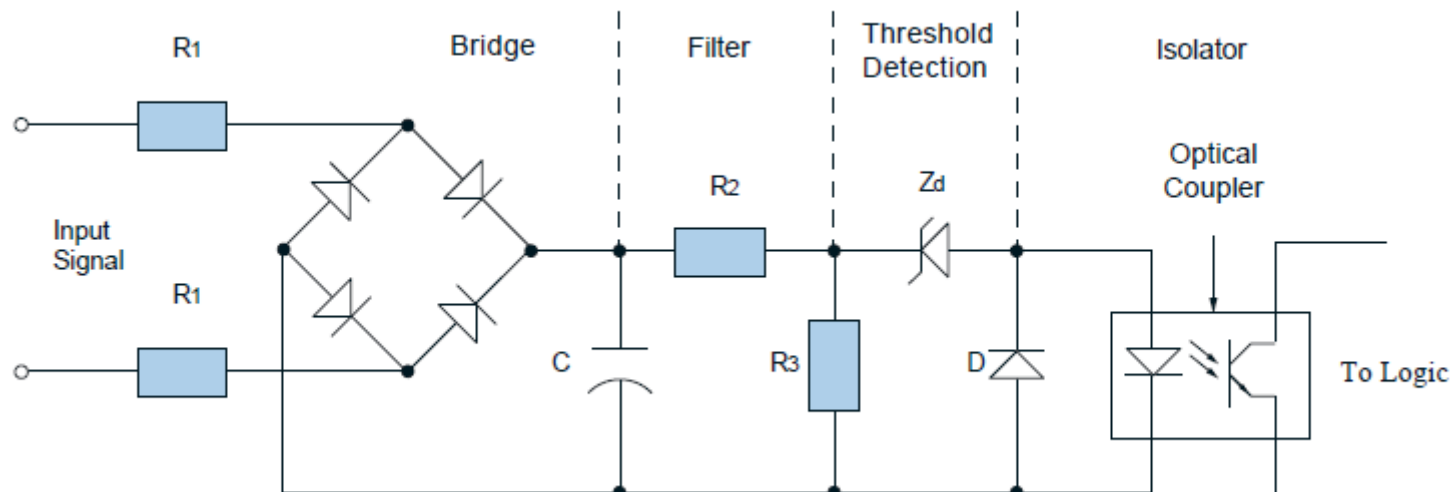
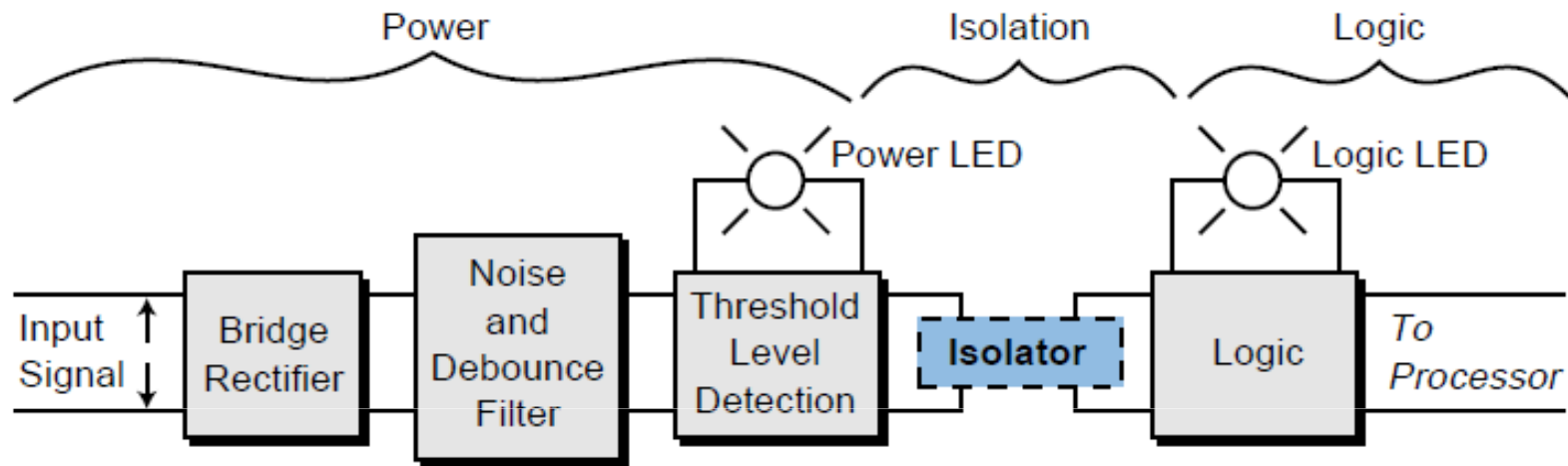
Nível II – PLCs : *I/O Discretas*

✓ Entradas discretas AC/DC



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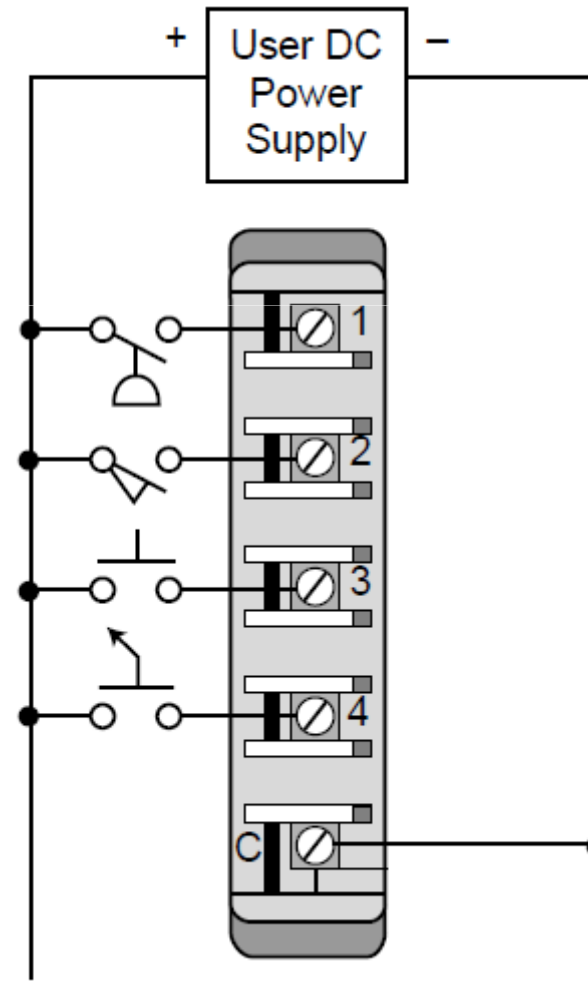
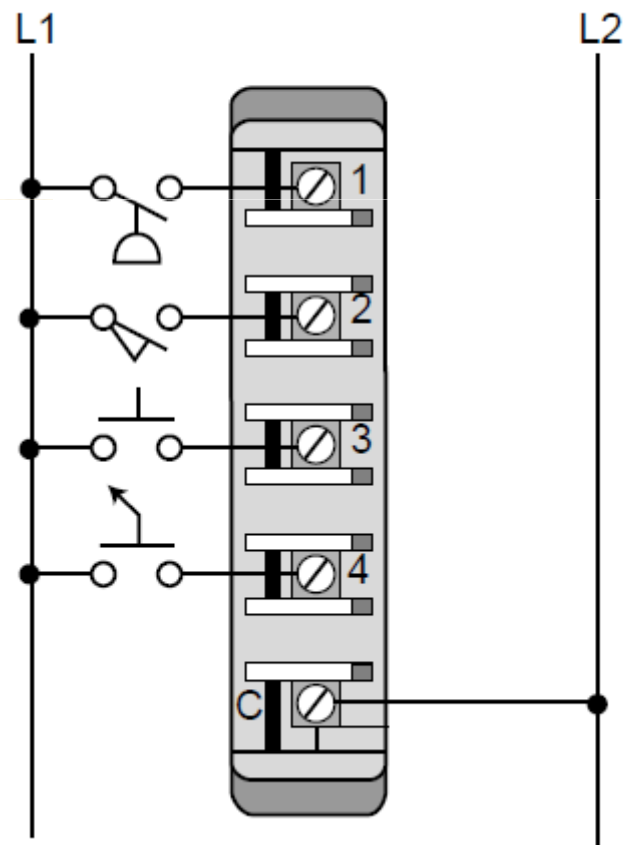
Nível II – PLCs : *I/O Discretas*



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Nível II – PLCs : *I/O Discretas*

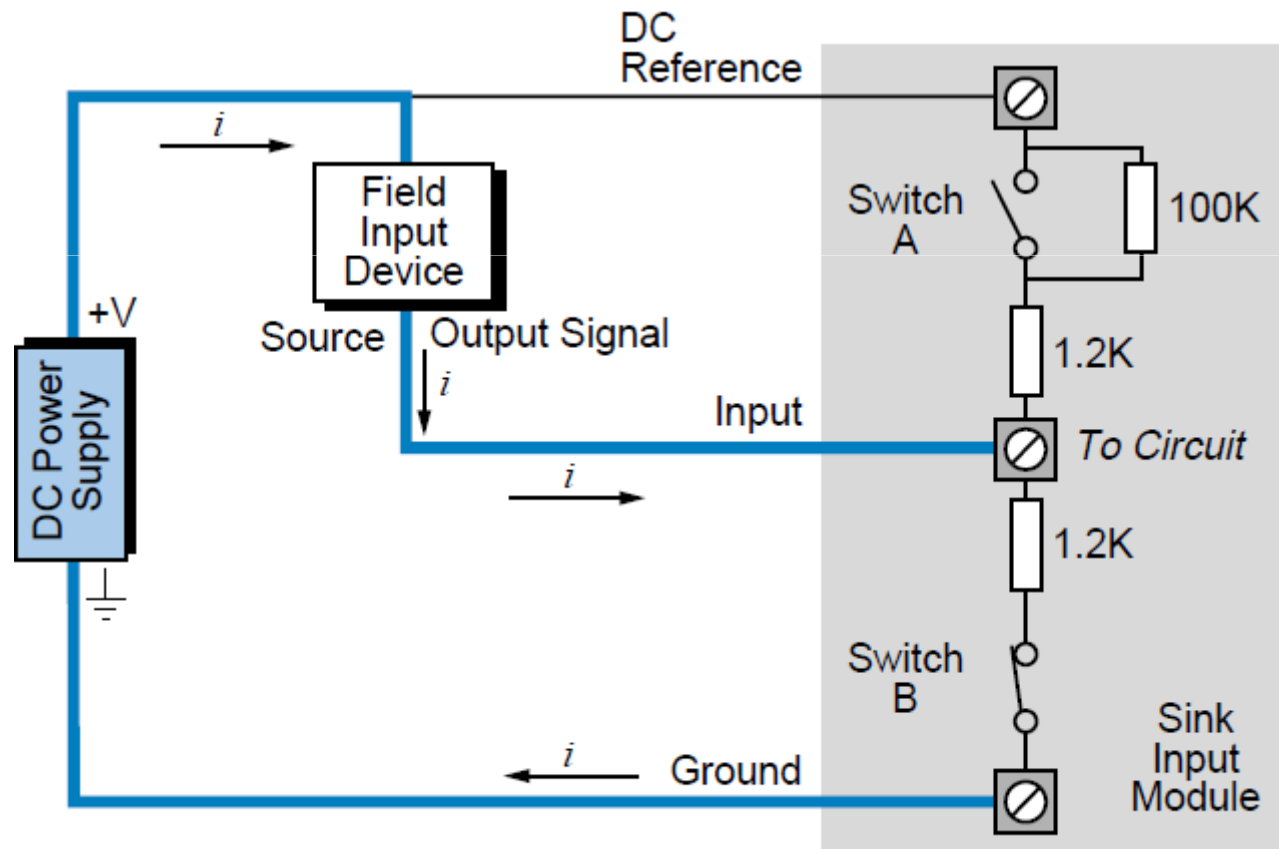
✓ Entradas discretas AC/DC : conexões



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Nível II – PLCs : *I/O Discretas*

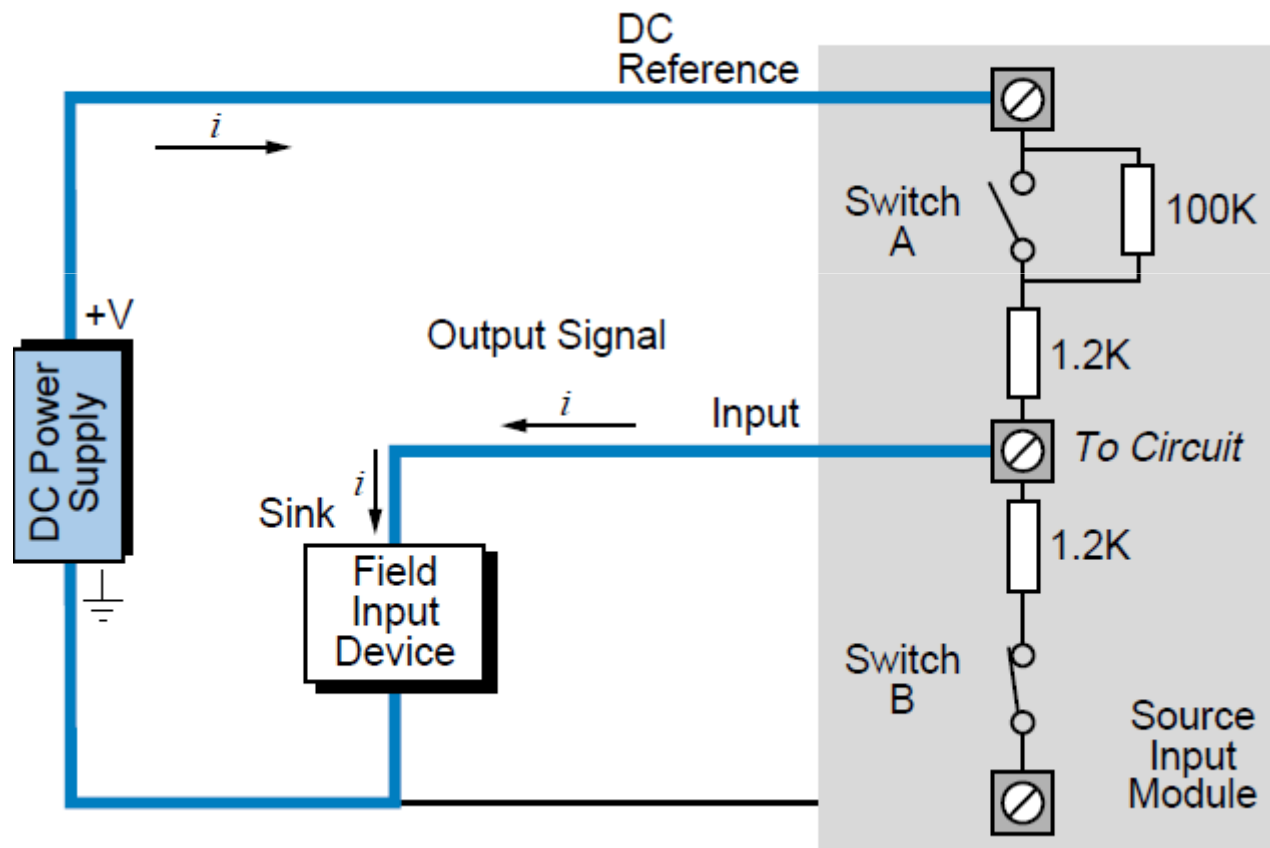
✓ Entradas discretas DC : (sink/source)



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Nível II – PLCs : *I/O Discretas*

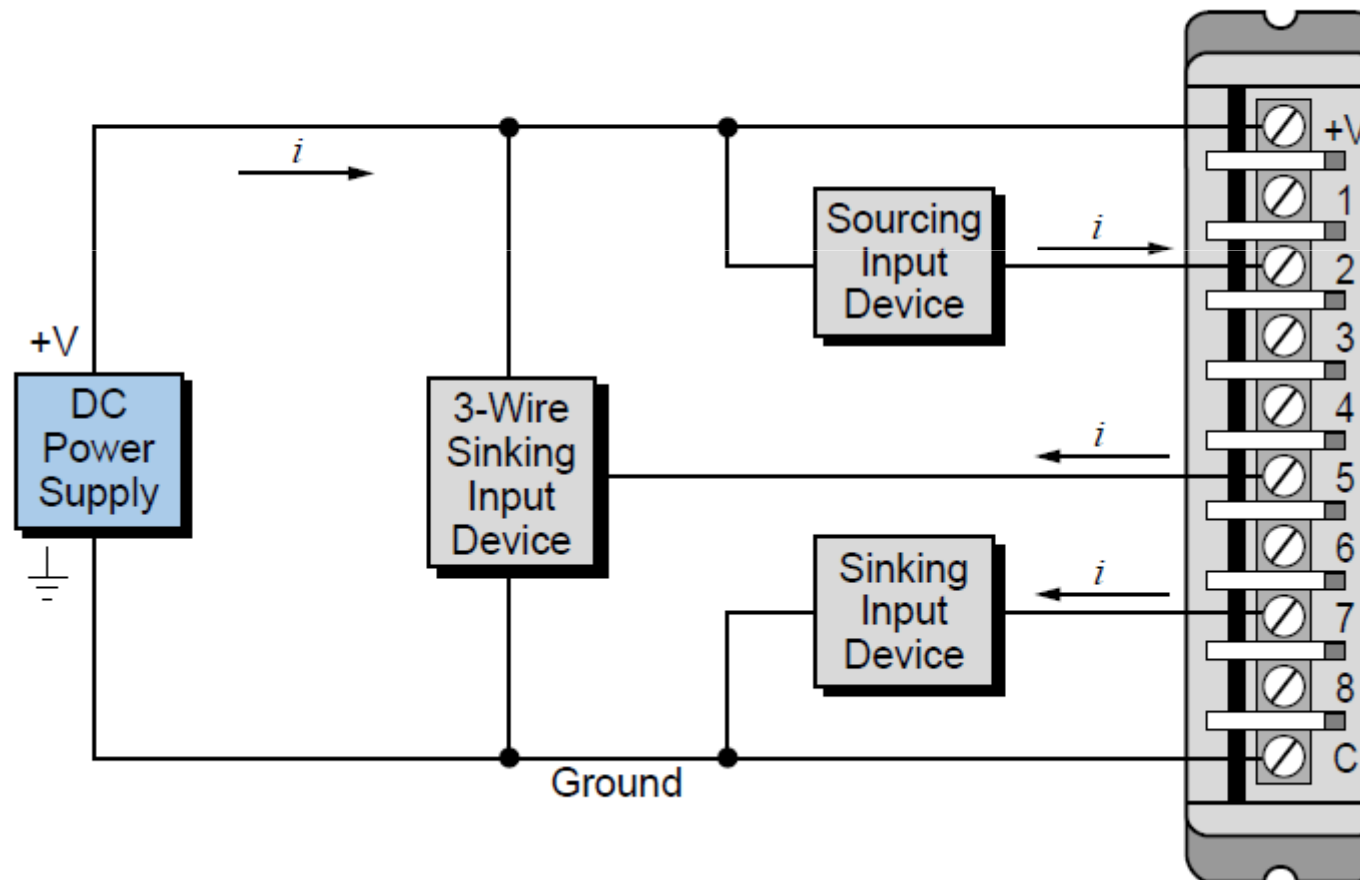
✓ Entradas discretas DC : (sink/source)



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Nível II – PLCs : *I/O Discretas*

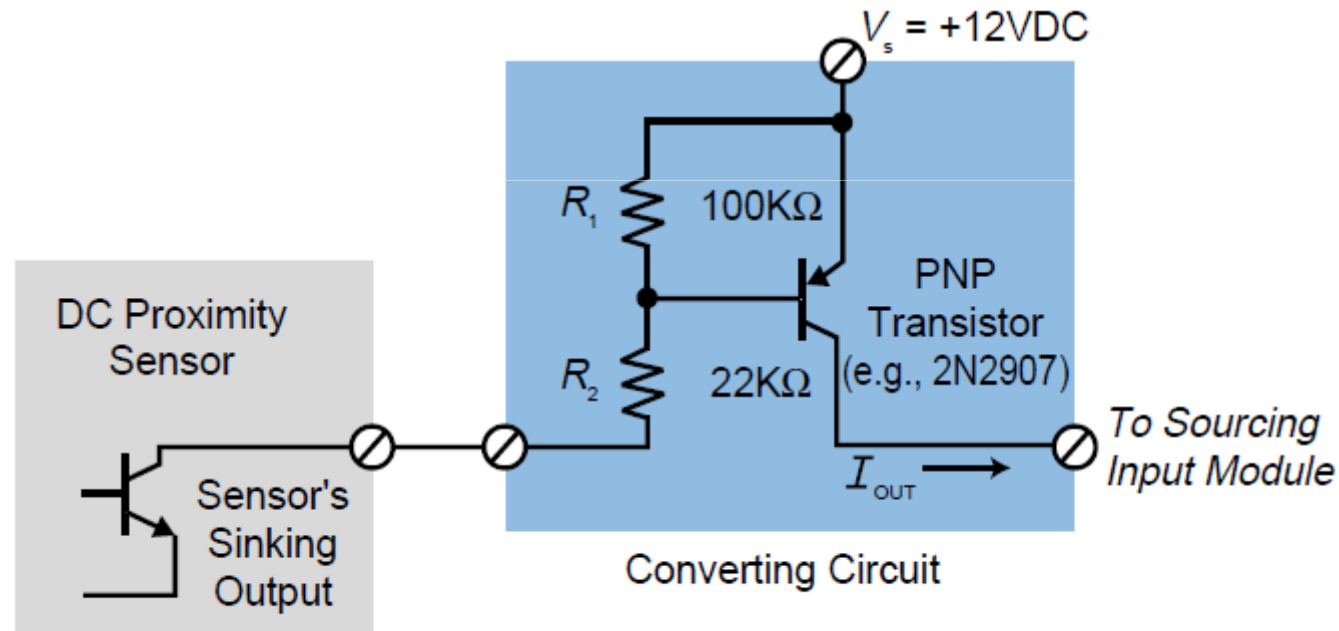
✓ Entradas discretas DC : (sink/source)



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Nível II – PLCs : *I/O Discretas*

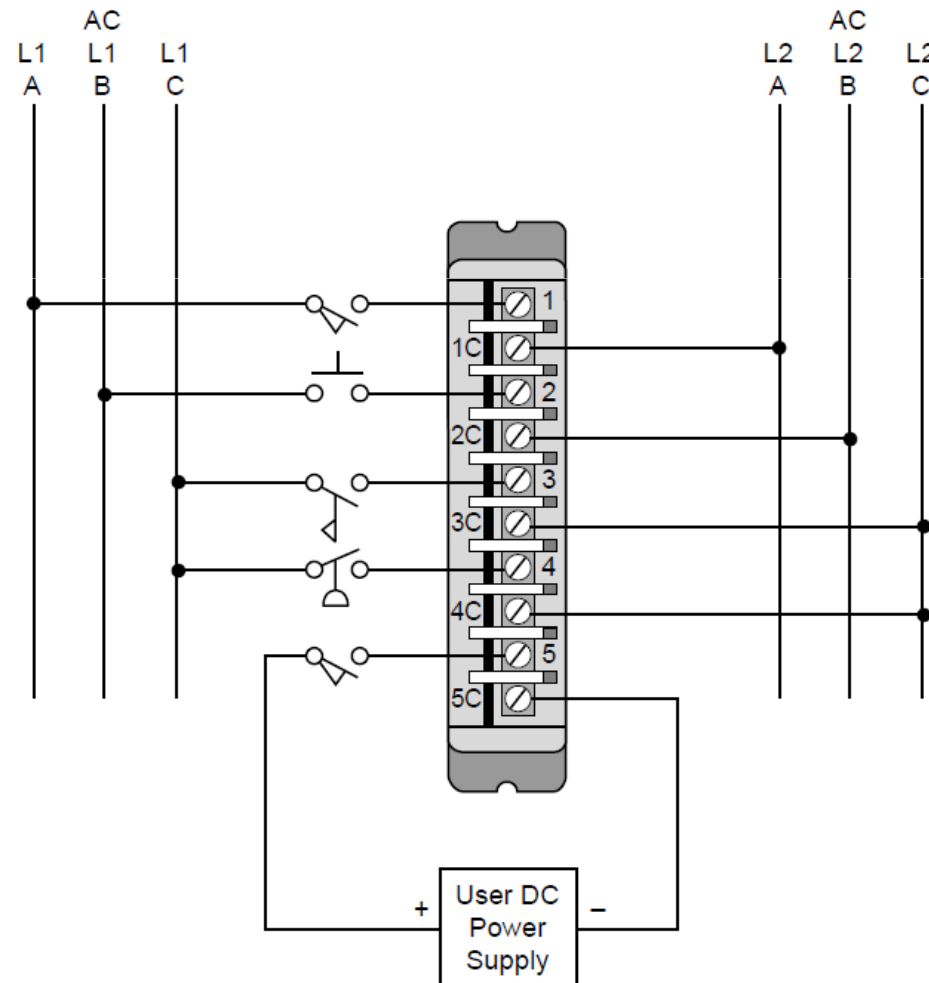
✓ Entradas discretas DC : (sink/source)



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Nível II – PLCs : *I/O Discretas*

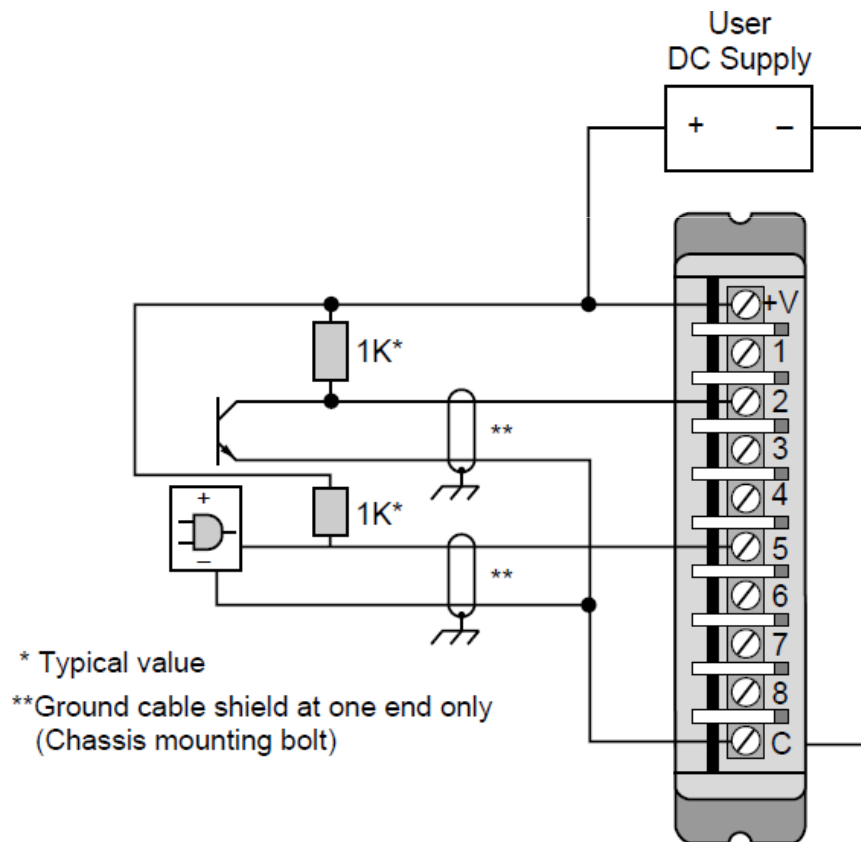
✓ Entradas discretas AC/DC : (isoladas)

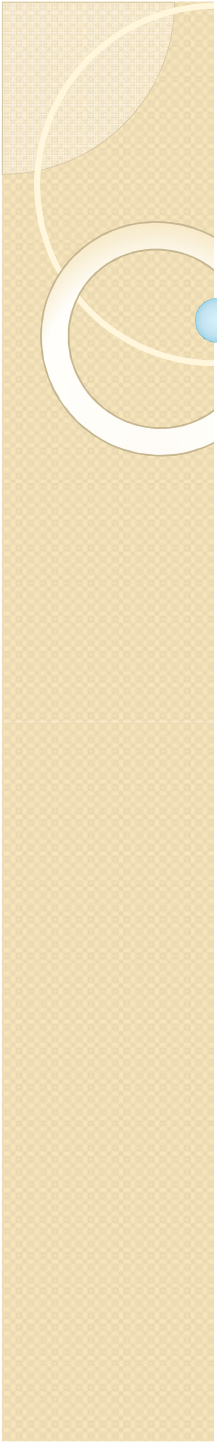


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Nível II – PLCs : *I/O Discretas*

✓ Entradas discretas TTL





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Nível II – PLCs : Componentes básicos de controle

- ✓ Uma grande variedade de componentes são usados em circuitos de controle.
- ✓ Estes componentes variam em complexidade desde indicadores luminosos a sistemas avançados que monitoram, protegem e controlam motores AC.

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Nível II – PLCs : Componentes básicos de controle

✓ A interação entre estes componentes é definida por:

- conexões (*hard-wired logic*).
- software armazenado (*controle lógico*)

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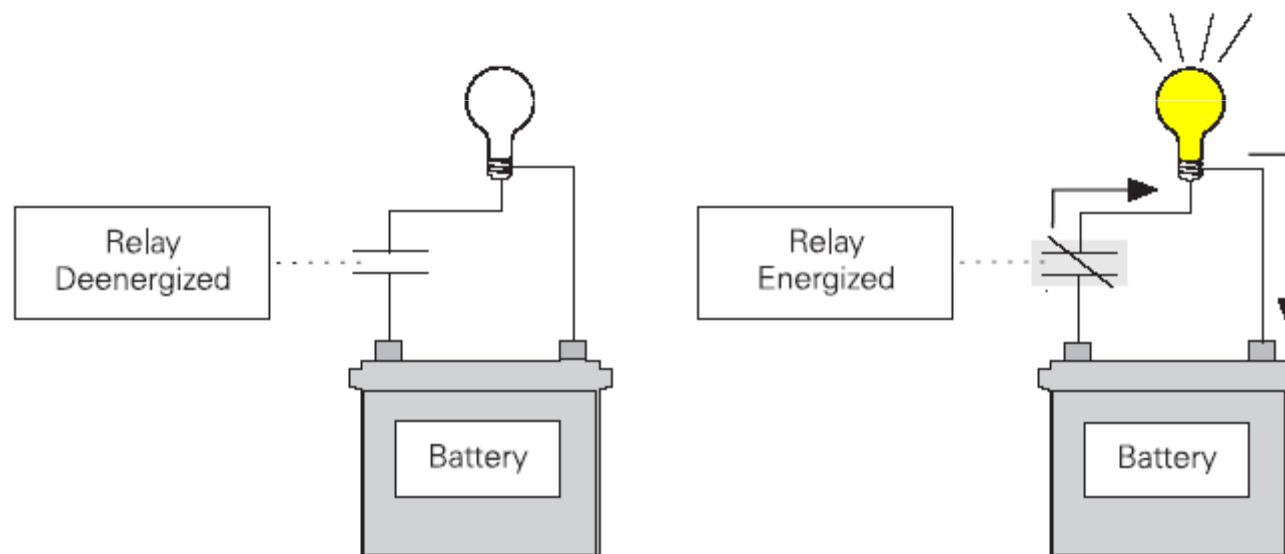
Nível II – PLCs : Componentes básicos de controle

- ✓ Para ter uma visão das ligações e da lógica fazemos o uso dos *diagramas de controle lógico*.
- ✓ Muitos componentes incorporam contatos:
 - normalmente aberto ($NO - NA$)
 - normalmente fechado ($NC - NF$)

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Nível II – PLCs : Componentes básicos de controle

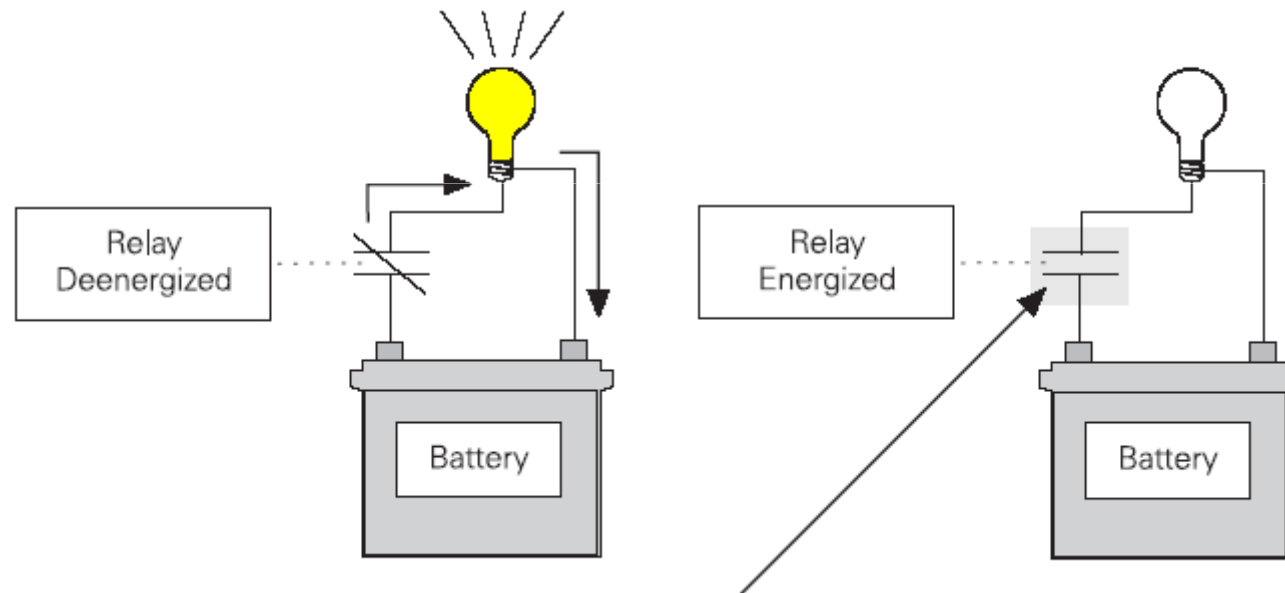
➤ normalmente aberto (*NO* – *NA*)



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Nível II – PLCs : Componentes básicos de controle

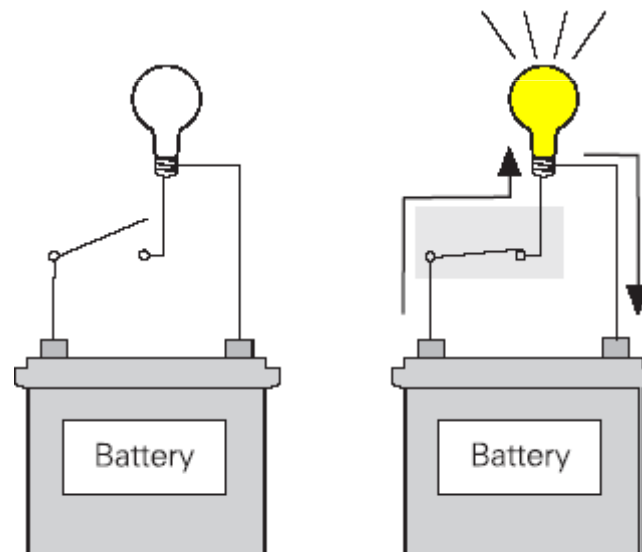
➤ normalmente fechado ($NC - NF$)



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Nível II – PLCs : Componentes básicos de controle

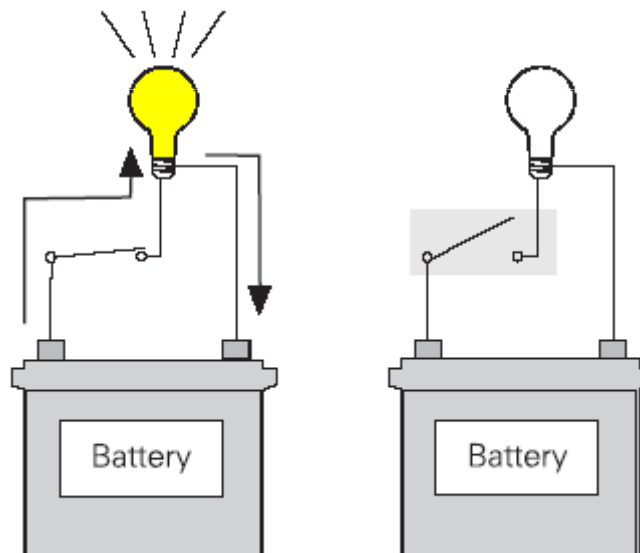
➤ chave normalmente aberta (*NO* – *NA*)



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Nível II – PLCs : Componentes básicos de controle

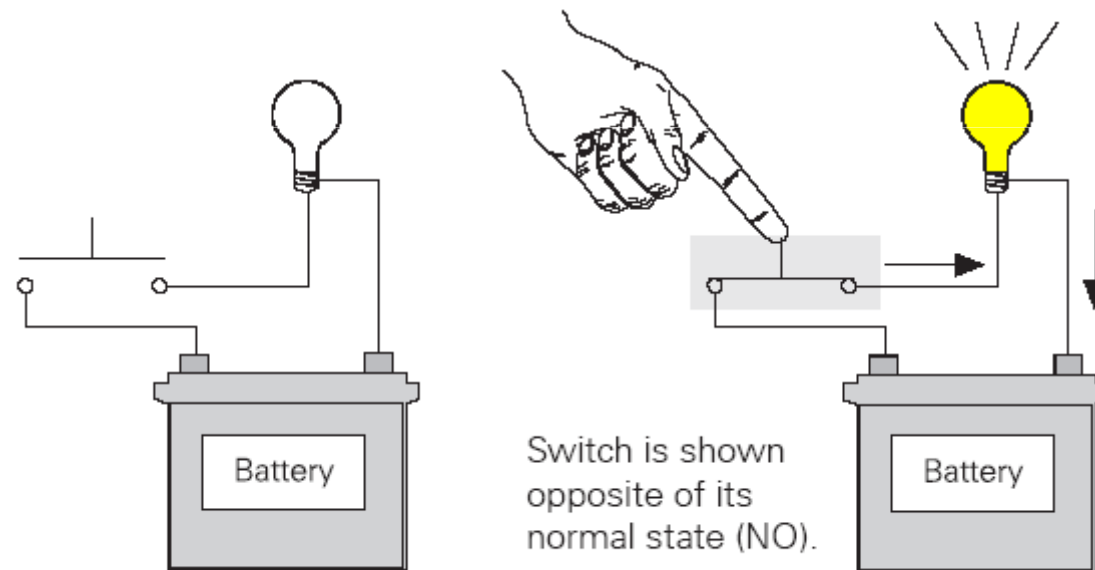
➤ chave normalmente fechada ($NC - NF$)



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Nível II – PLCs : Componentes básicos de controle

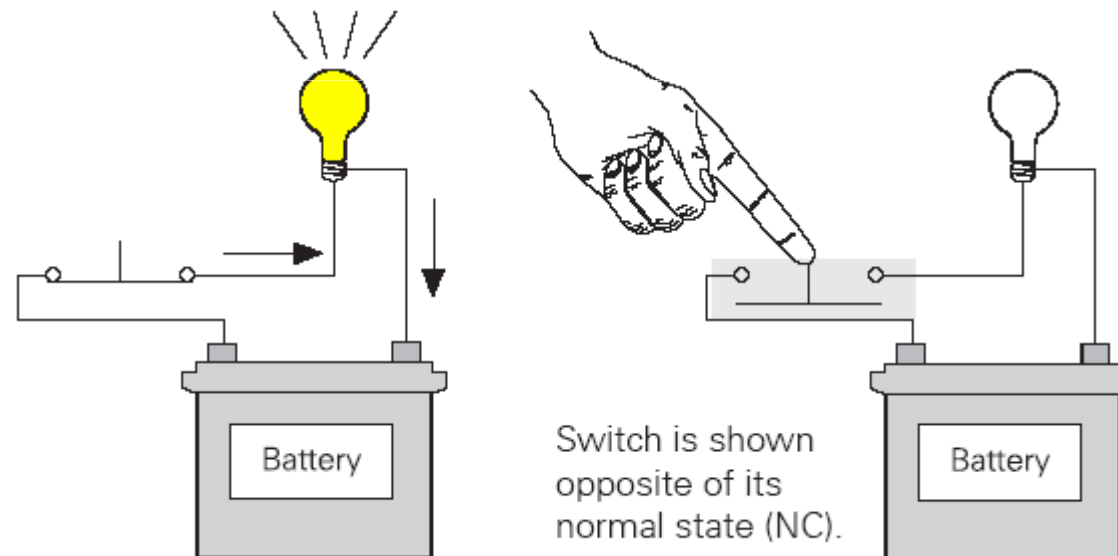
➤ pushbutton normalmente aberto (*NO* – *NA*)



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Nível II – PLCs : Componentes básicos de controle

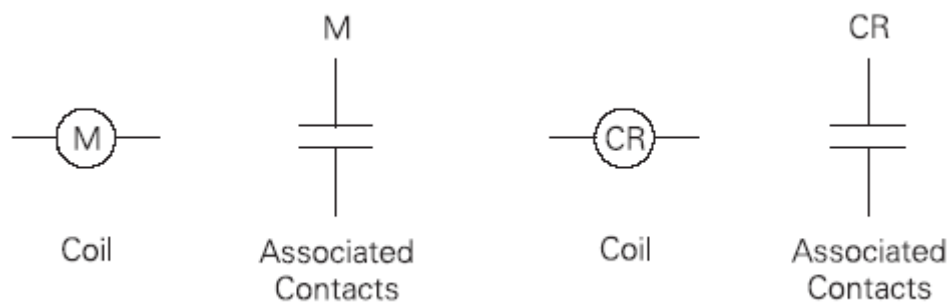
➤ pushbutton normalmente fechado ($NC - NF$)



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Nível II – PLCs : Componentes básicos de controle

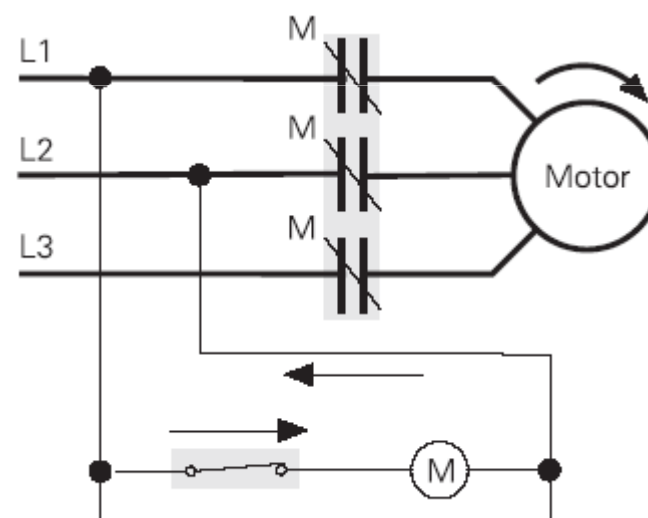
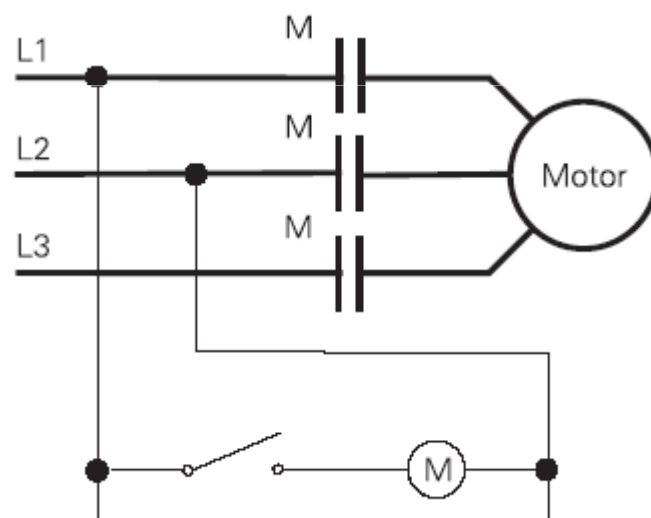
➤ bobinas



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Nível II – PLCs : Componentes básicos de controle

➤ aplicações bobinas

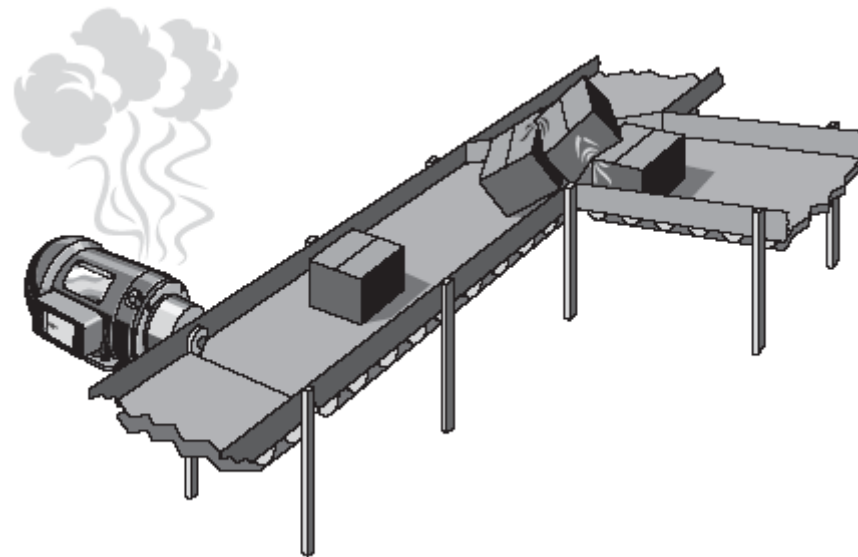


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Nível II – PLCs : Componentes básicos de controle

✓ relés de sobrecarga

- **Overload relays** – são utilizados para proteger a carga quando ocorre aquecimento excessivo.



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Nível II – PLCs : Componentes básicos de controle

✓ luz piloto

➤ indica o estado do sistema.



Red
Indicator Light

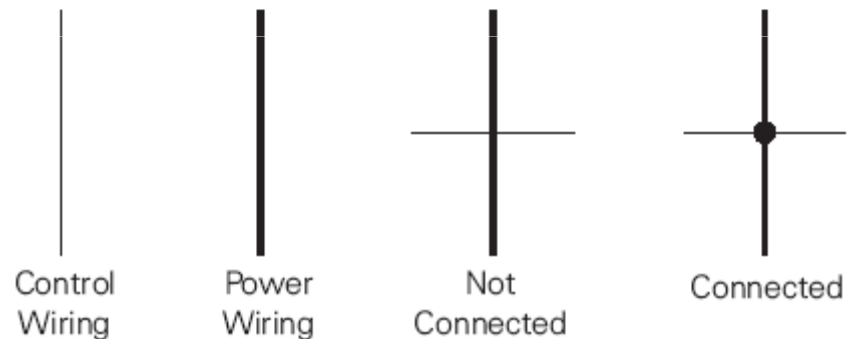


Amber
Indicator Light

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Nível II – PLCs : Componentes básicos de controle

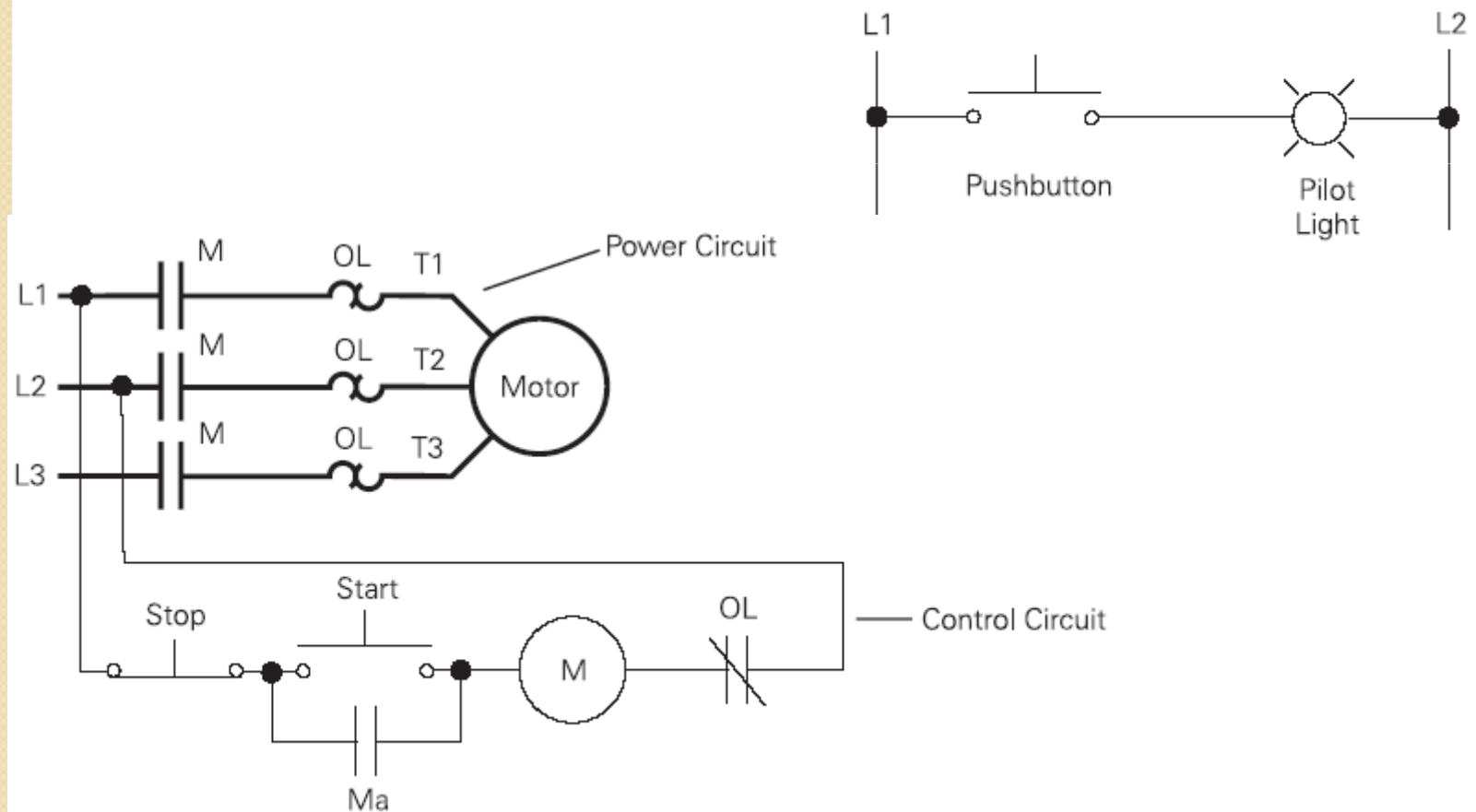
✓ diagrama de linhas - ladder



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Nível II – PLCs : Componentes básicos de controle

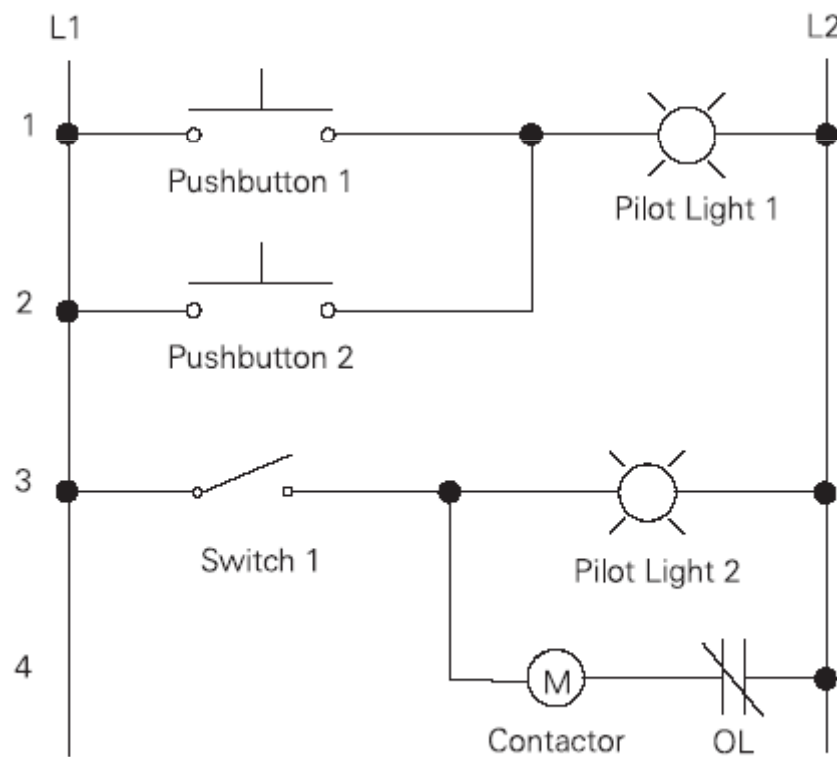
✓ diagrama de linhas - ladder



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Nível II – PLCs : Componentes básicos de controle

✓ diagrama de linhas - ladder



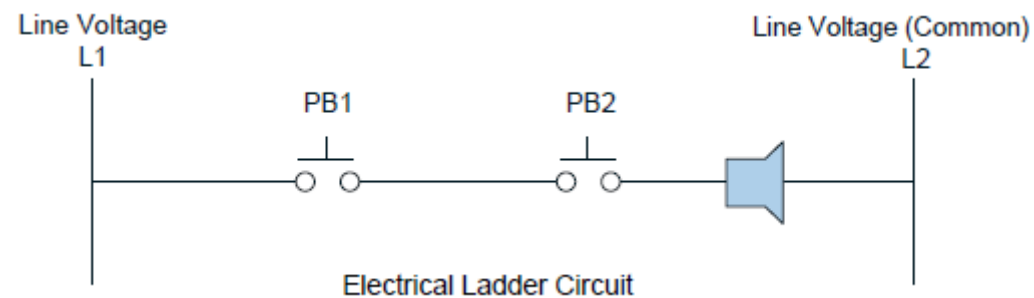
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Nível II – PLCs : Componentes básicos de controle

✓ portas lógicas - AND



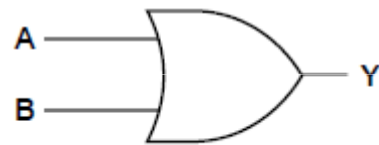
AND Truth Table		
Inputs		Output
A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1



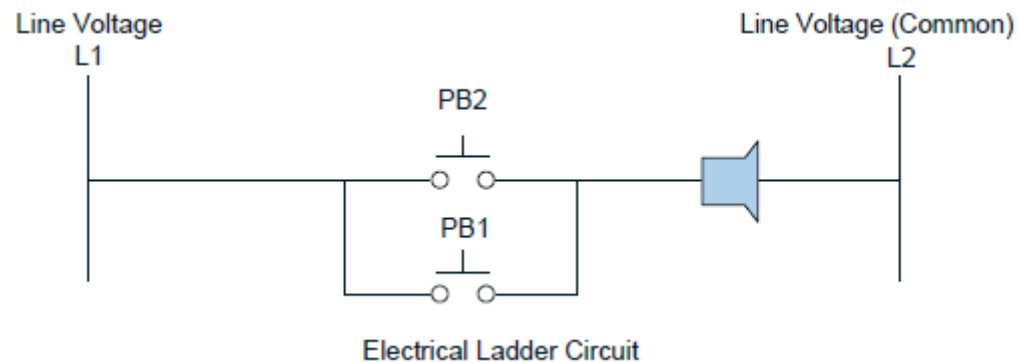
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Nível II – PLCs : Componentes básicos de controle

✓ portas lógicas - OR



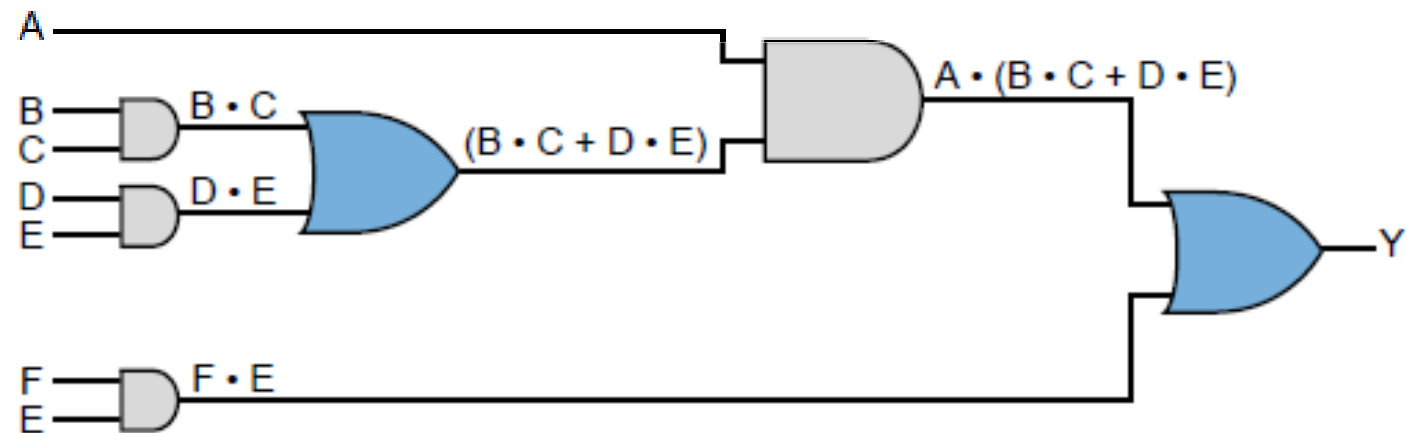
OR Truth Table		
Inputs		Output
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1



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Nível II – PLCs : Componentes básicos de controle

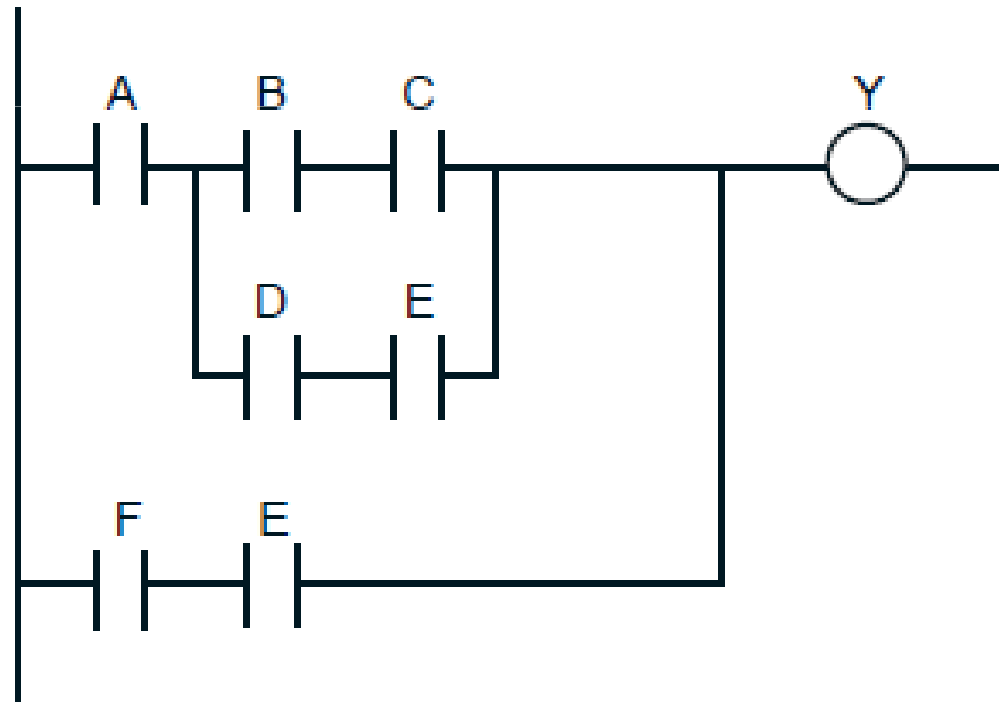
✓ exemplo

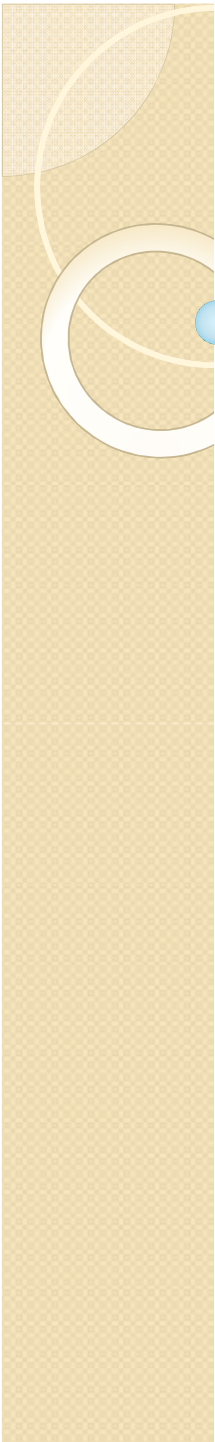


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Nível II – PLCs : Componentes básicos de controle

✓ exemplo-solução





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Nível II: PLC's

F I M