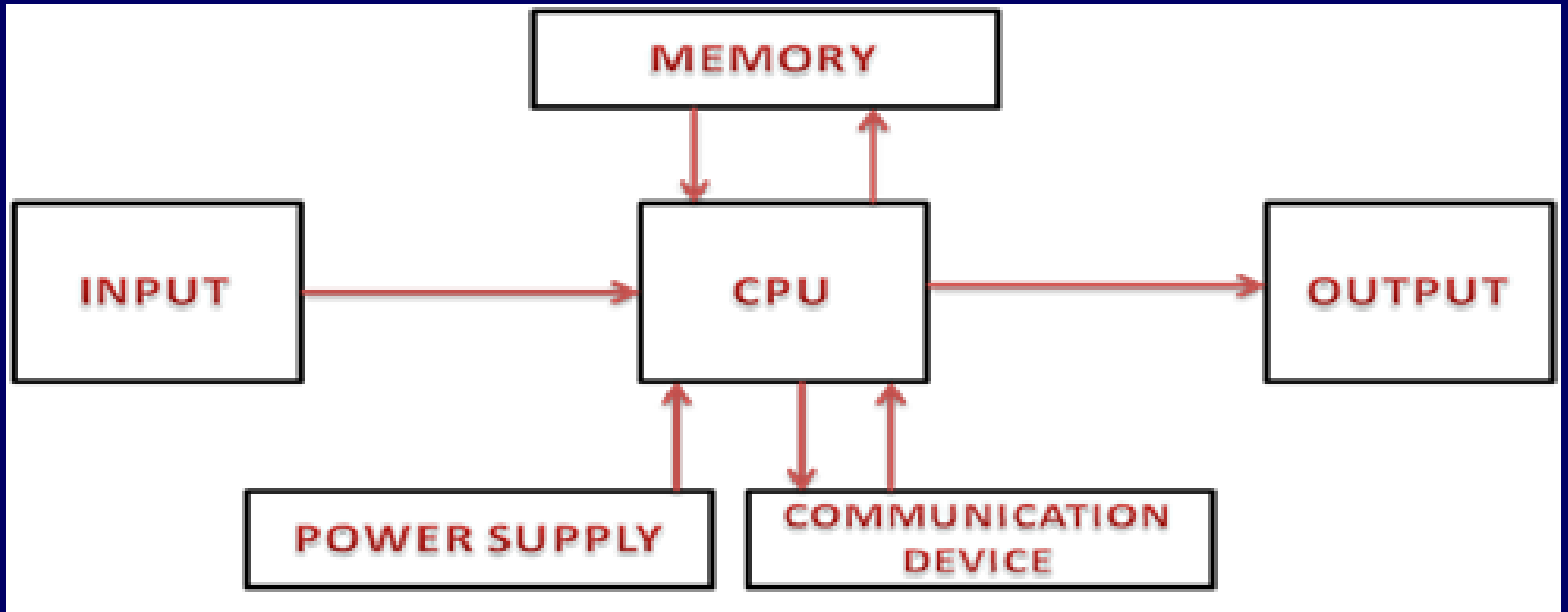


# Programmable Logic Controllers

# GEM 80



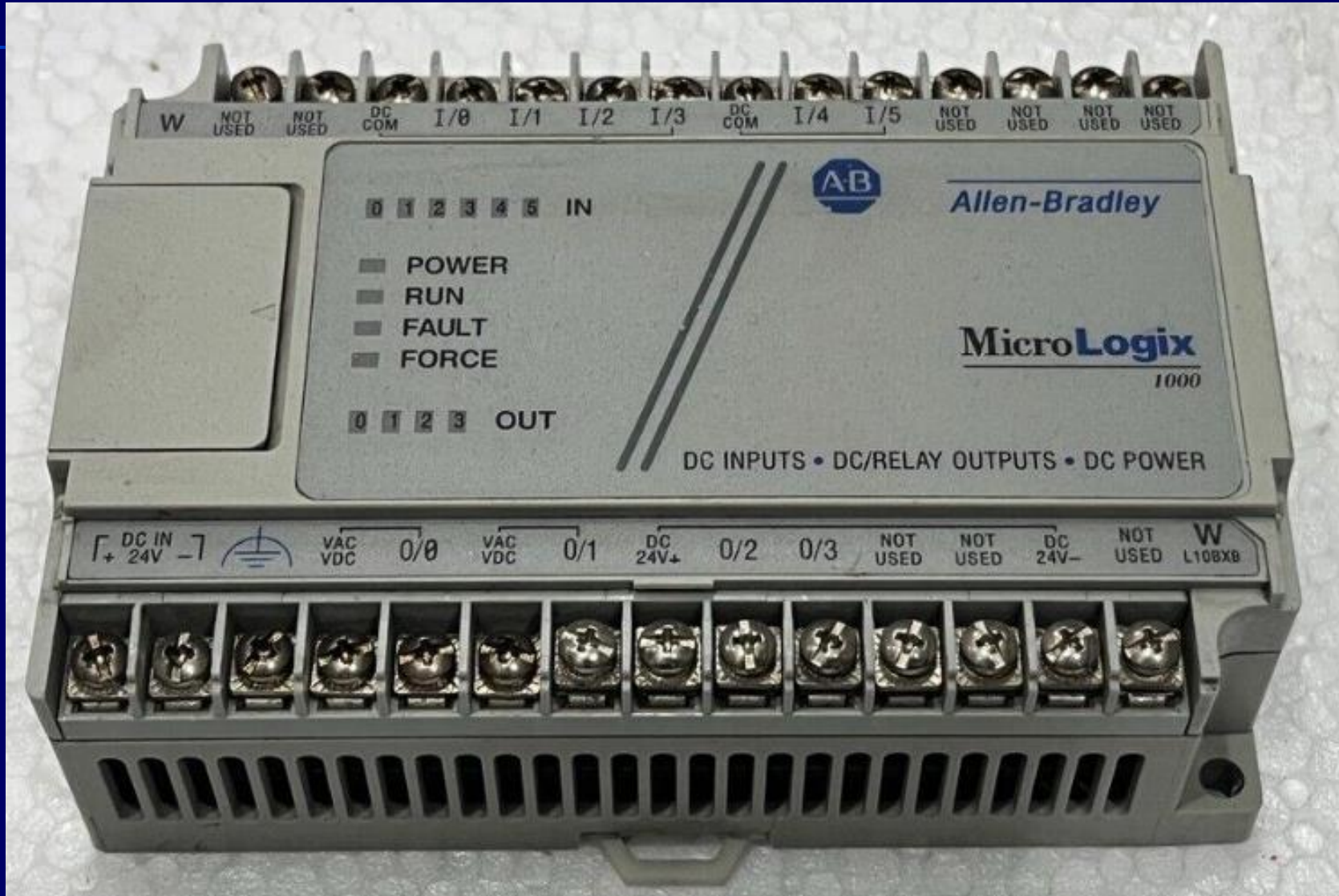
# PLC Block Diagram



# ALAN BRADLEY MicroLogix 1000 (Compact) 20 Inputs / 10 Outputs

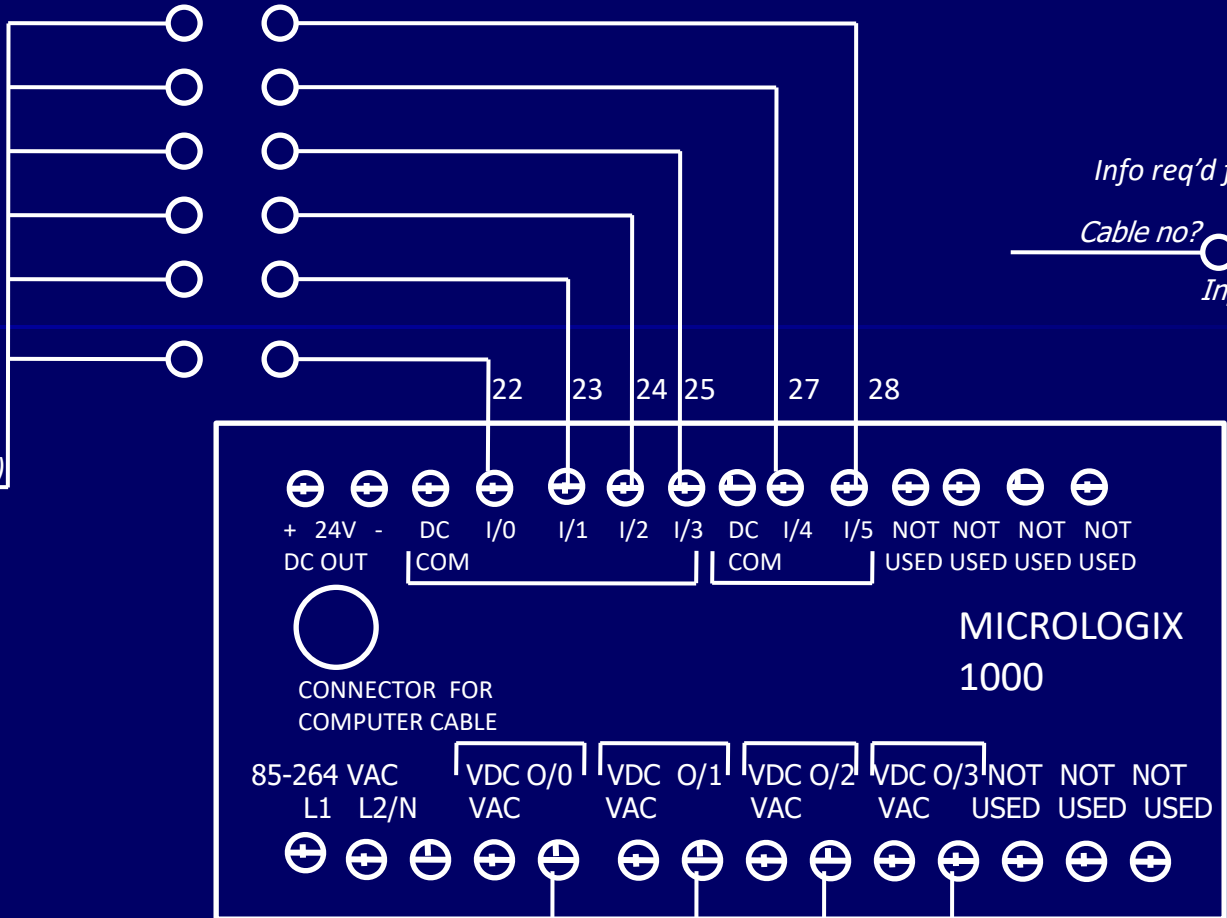


# ALAN BRADLEY MicroLogix 1000 (Compact) 6 Inputs / 4 Outputs



**INPUTS**

29 (+24V DC)



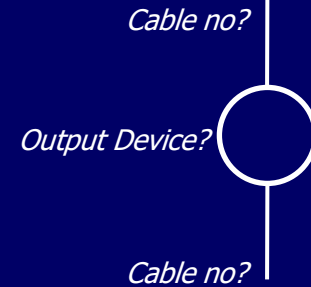
Info req'd for Input Devices



**OUTPUTS**

21 (0VDC COM)

Info req'd for Output Devices

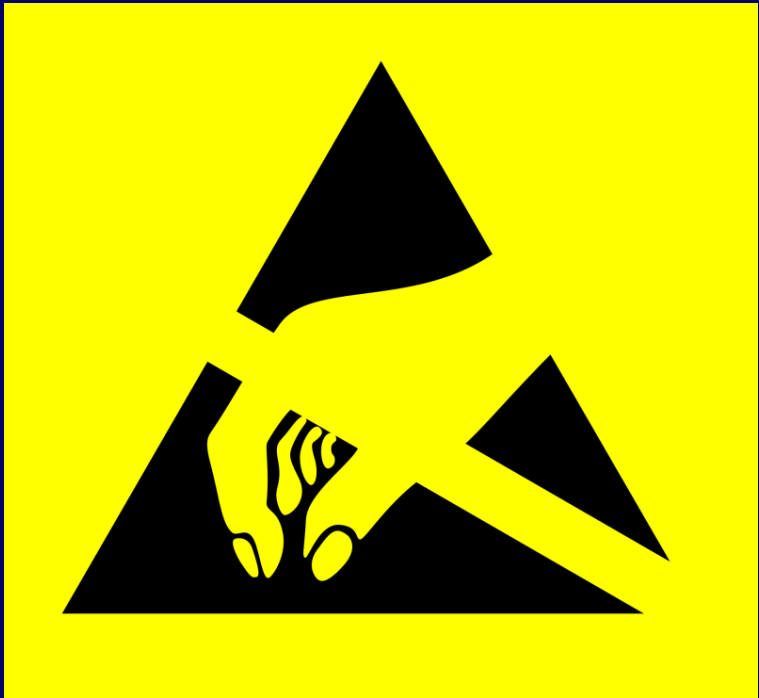


# WIRING DIAGRAM FOR MICROLOGIX 1000 plc

# ALAN BRADLEY SLC500 (Modular Expandable)



# Input Card SLC500 DC Sink

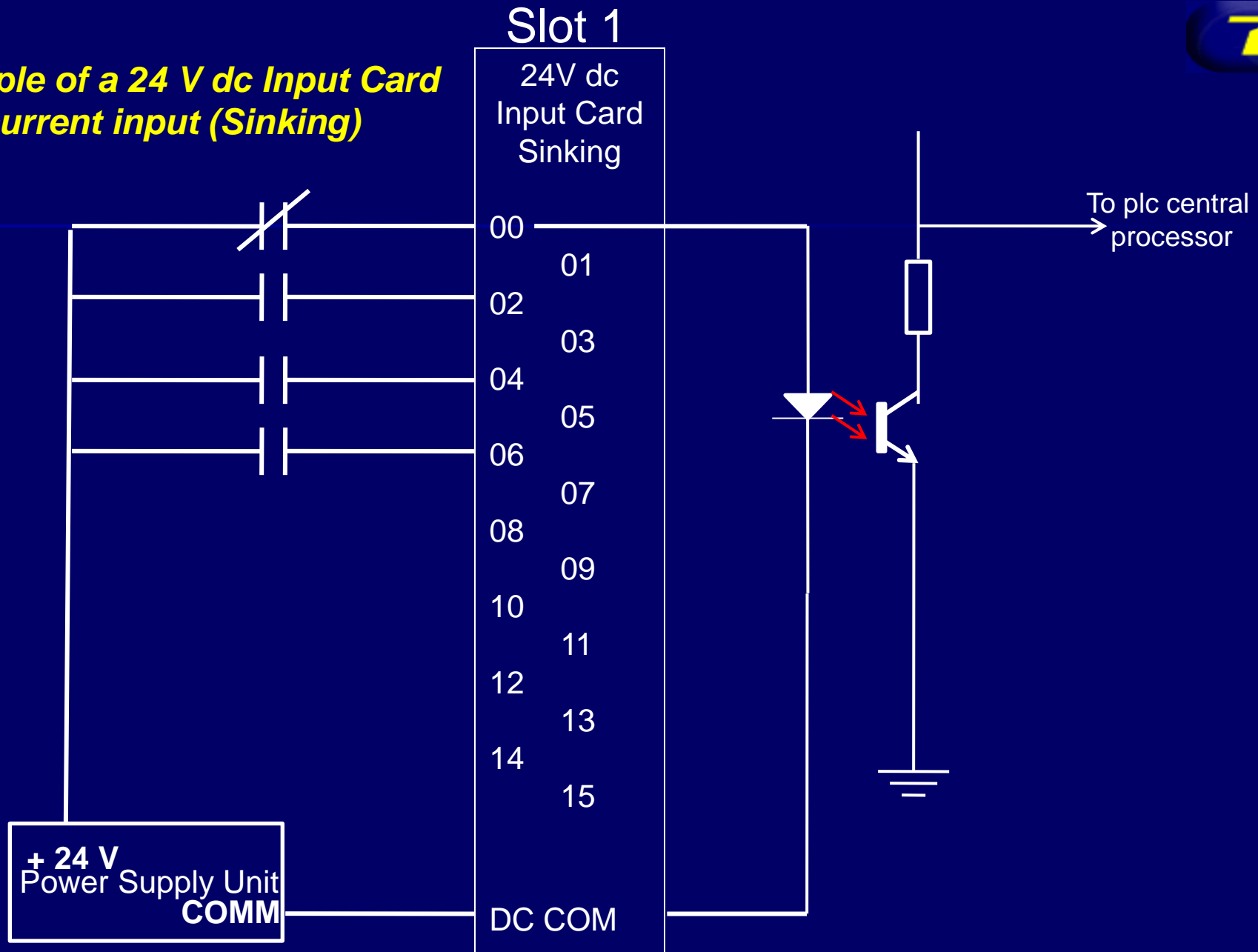




**TYPICAL  
INPUT DEVICES:**

Push Button	
Micro Switch	
Thumbwheel SW	
Level SW	
Flow SW	

**Example of a 24 V dc Input Card with current input (Sinking)**

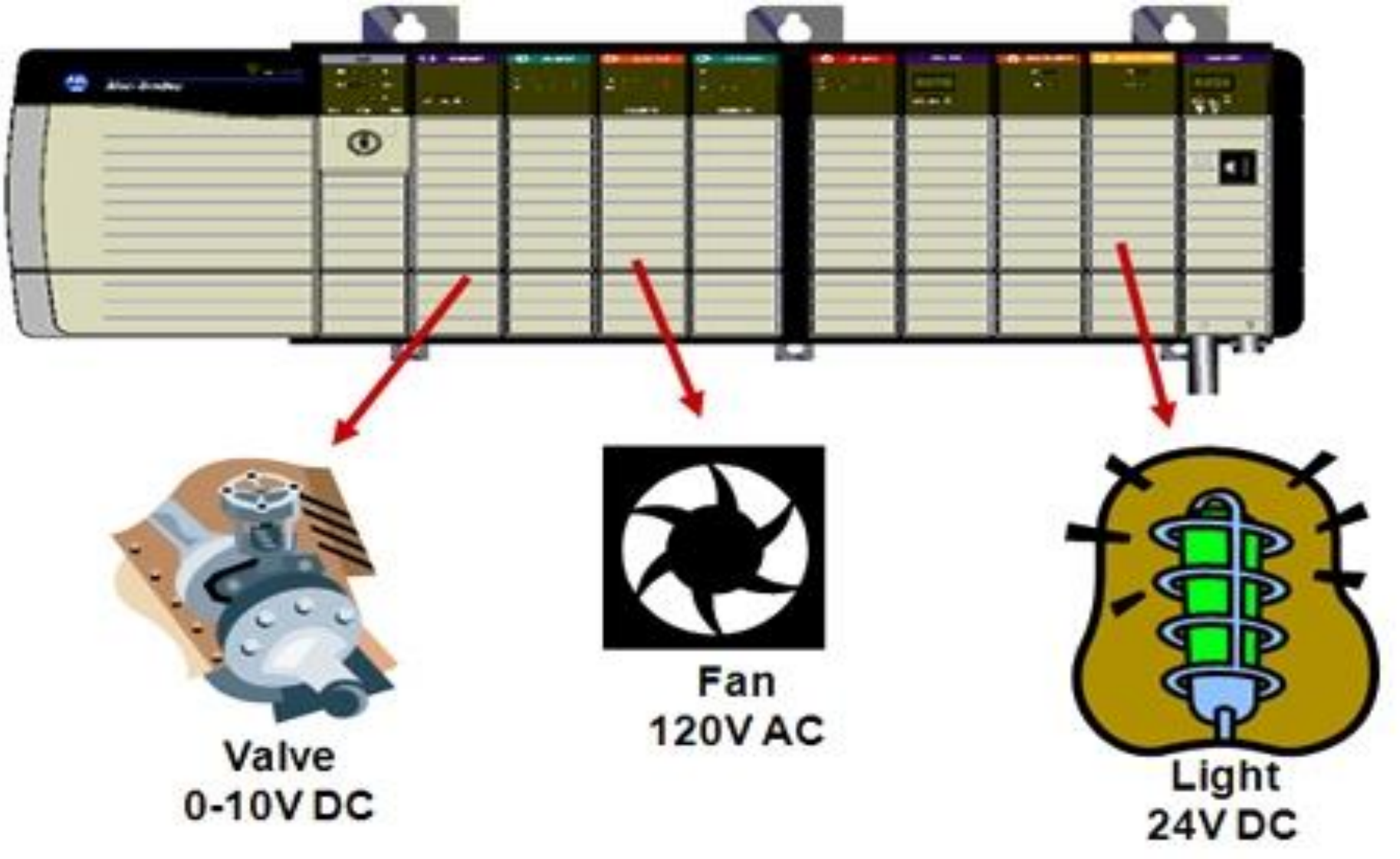


# Output Card SLC500 DC Source

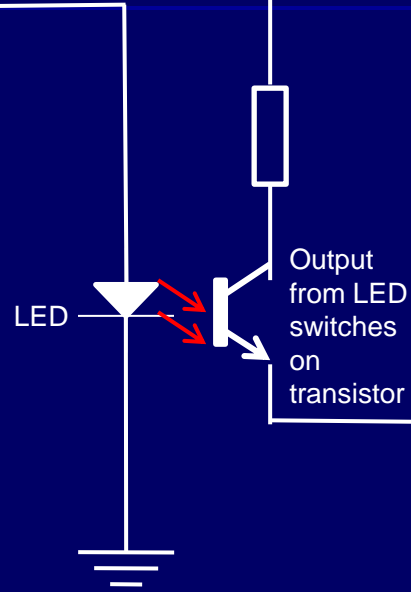


VDC	OUT 0
OUT 1	OUT 2
OUT 3	OUT 4
OUT 5	OUT 6
OUT 7	OUT 8
OUT 9	OUT 10
OUT 11	OUT 12
OUT 13	OUT 14
OUT 15	DC COM

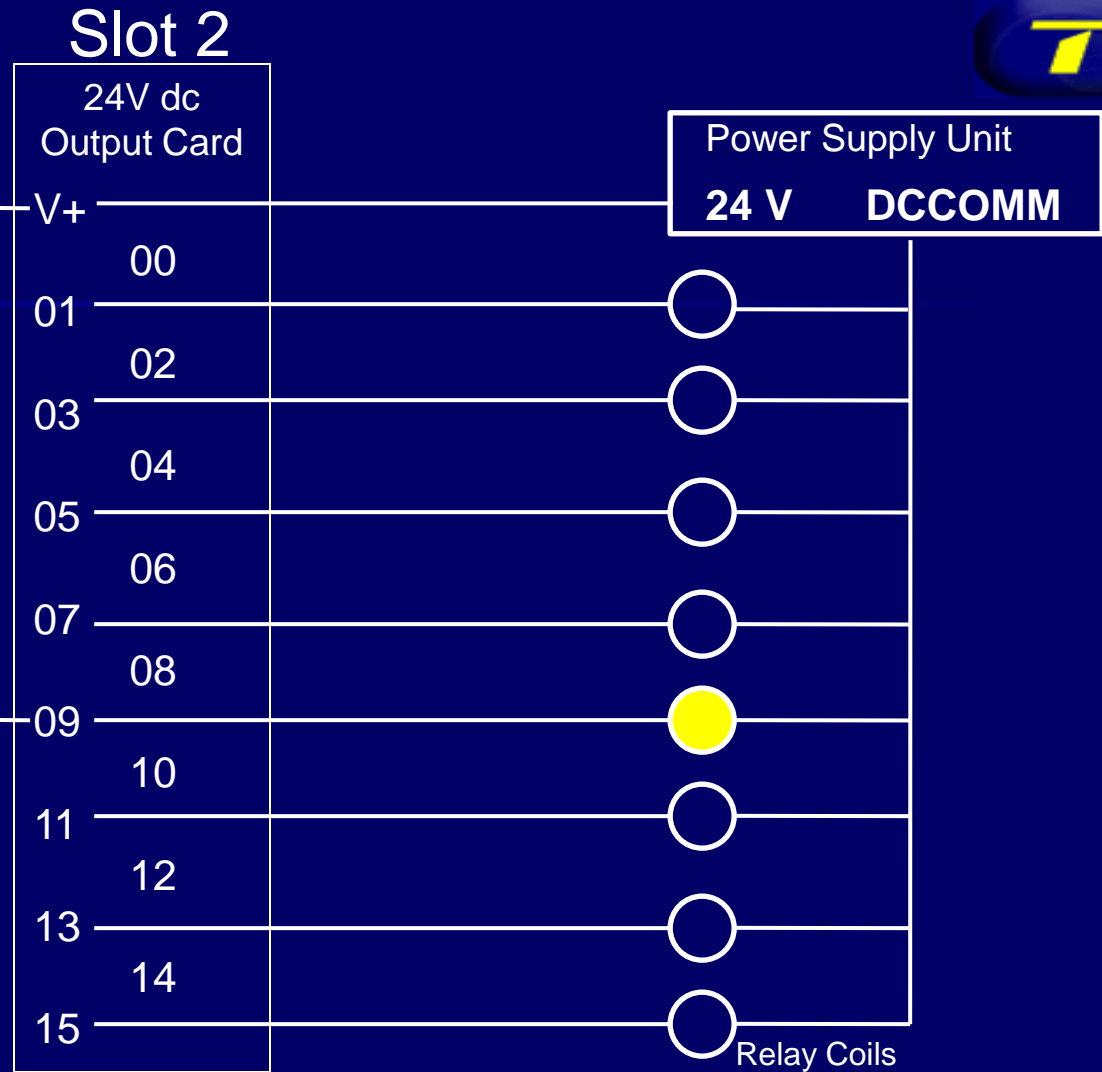
# TYPICAL OUTPUT DEVICES:



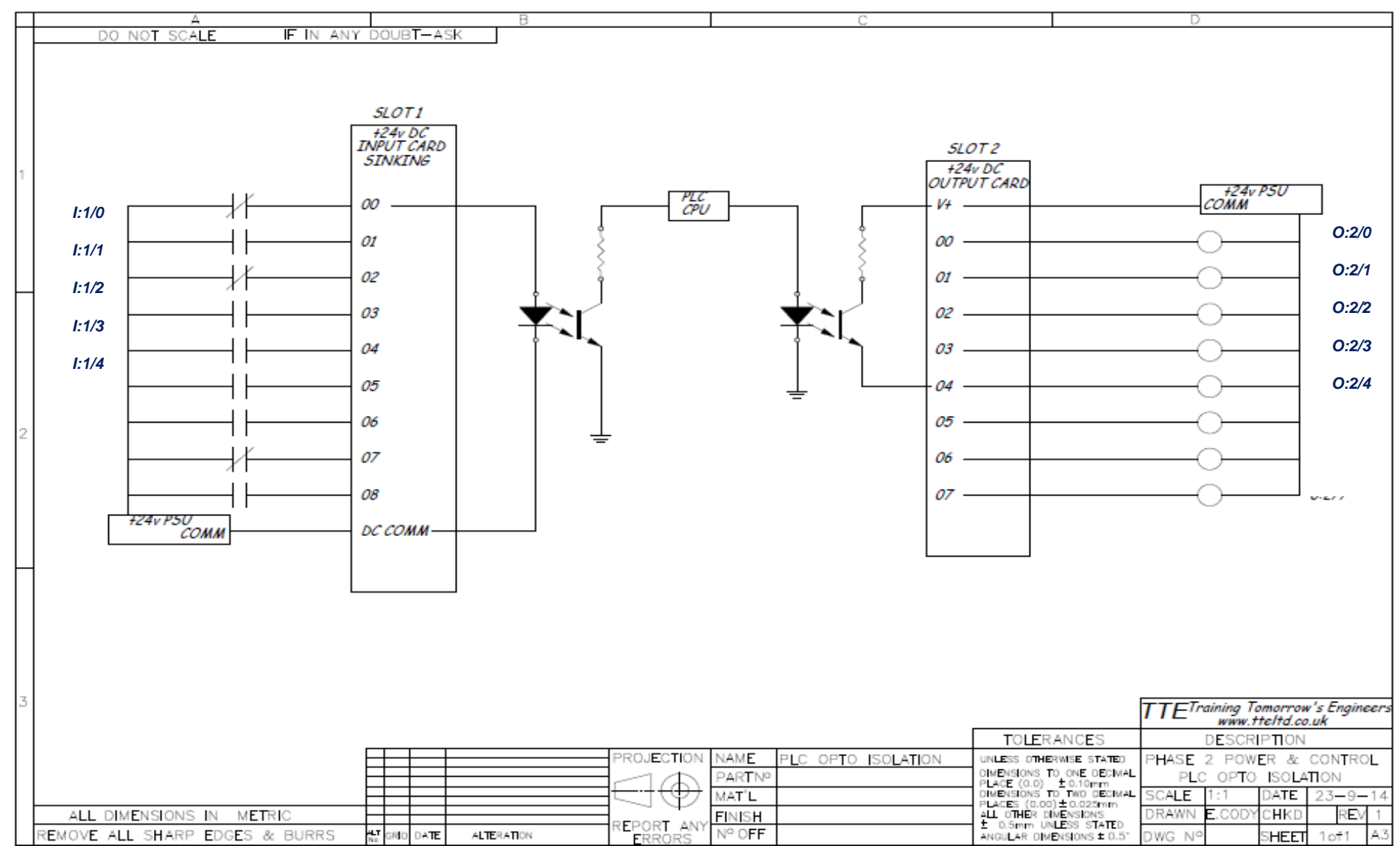
Output from the plc central processor unit to output device located at Terminal 9 e.g. control relay



**Example of a 24 V dc Output Card with current output (Sourcing)**



# OPTICAL ISOLATION:

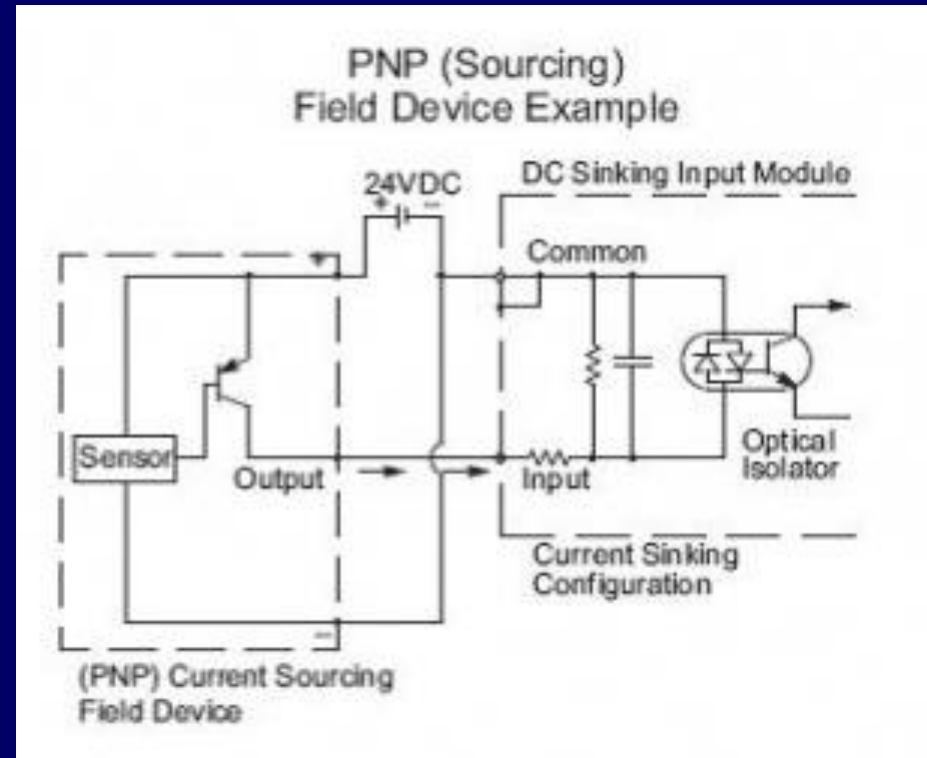
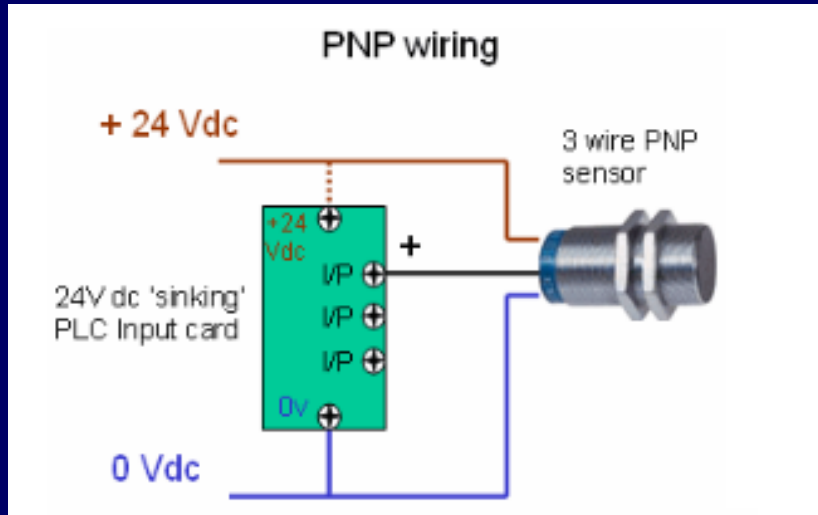


# Input Sensors:



# Input Sensors:

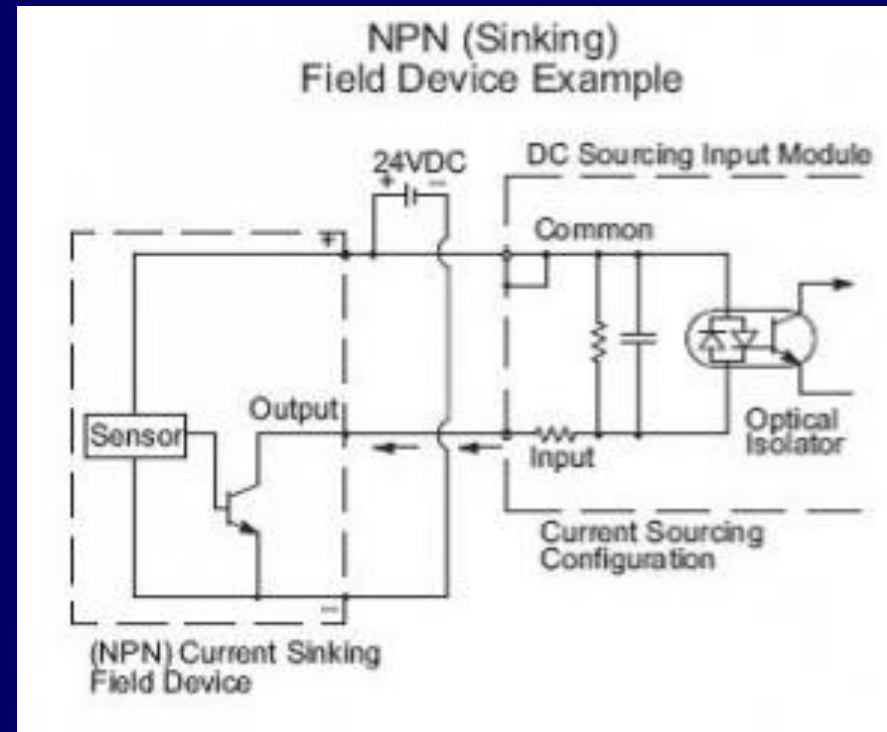
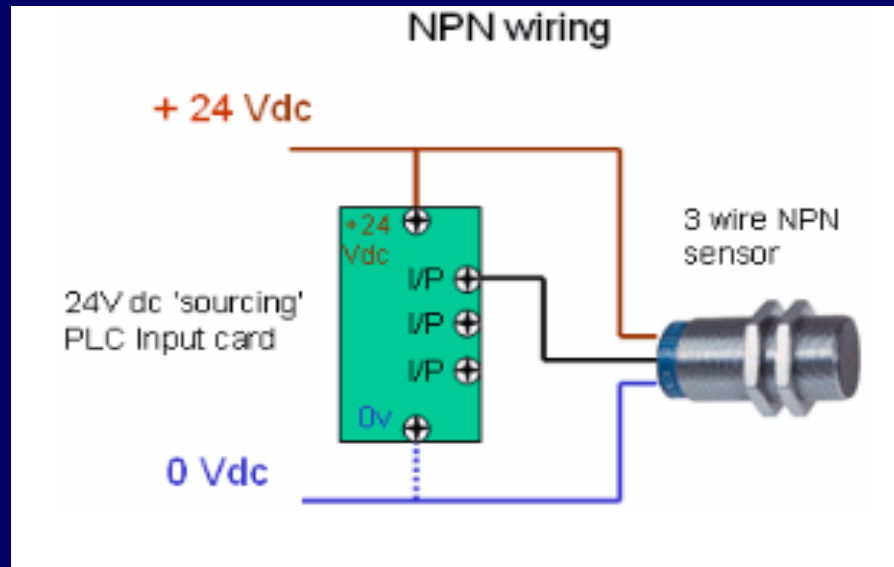
Input sensors can also be Sourcing



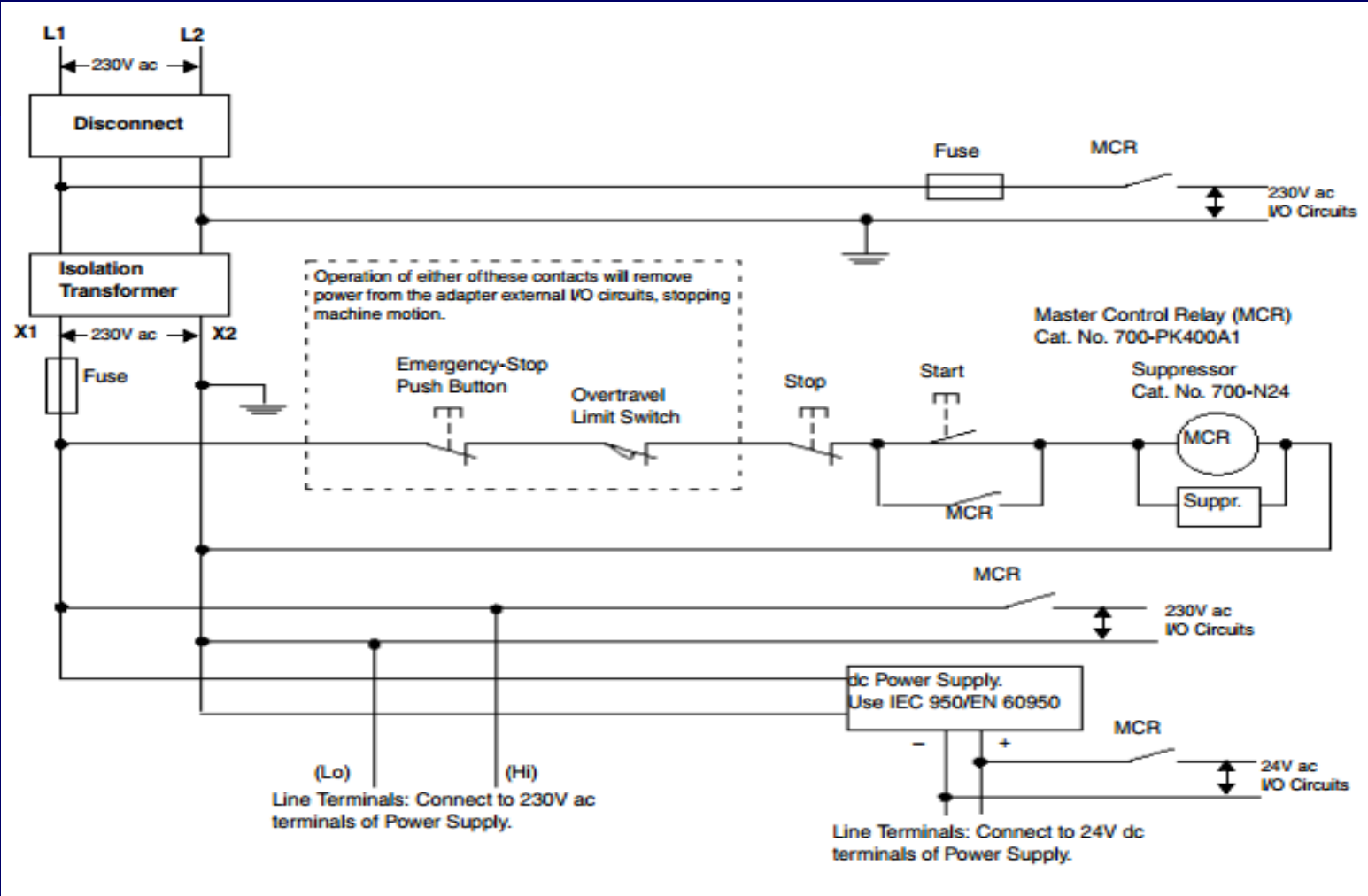


# Input Sensors:

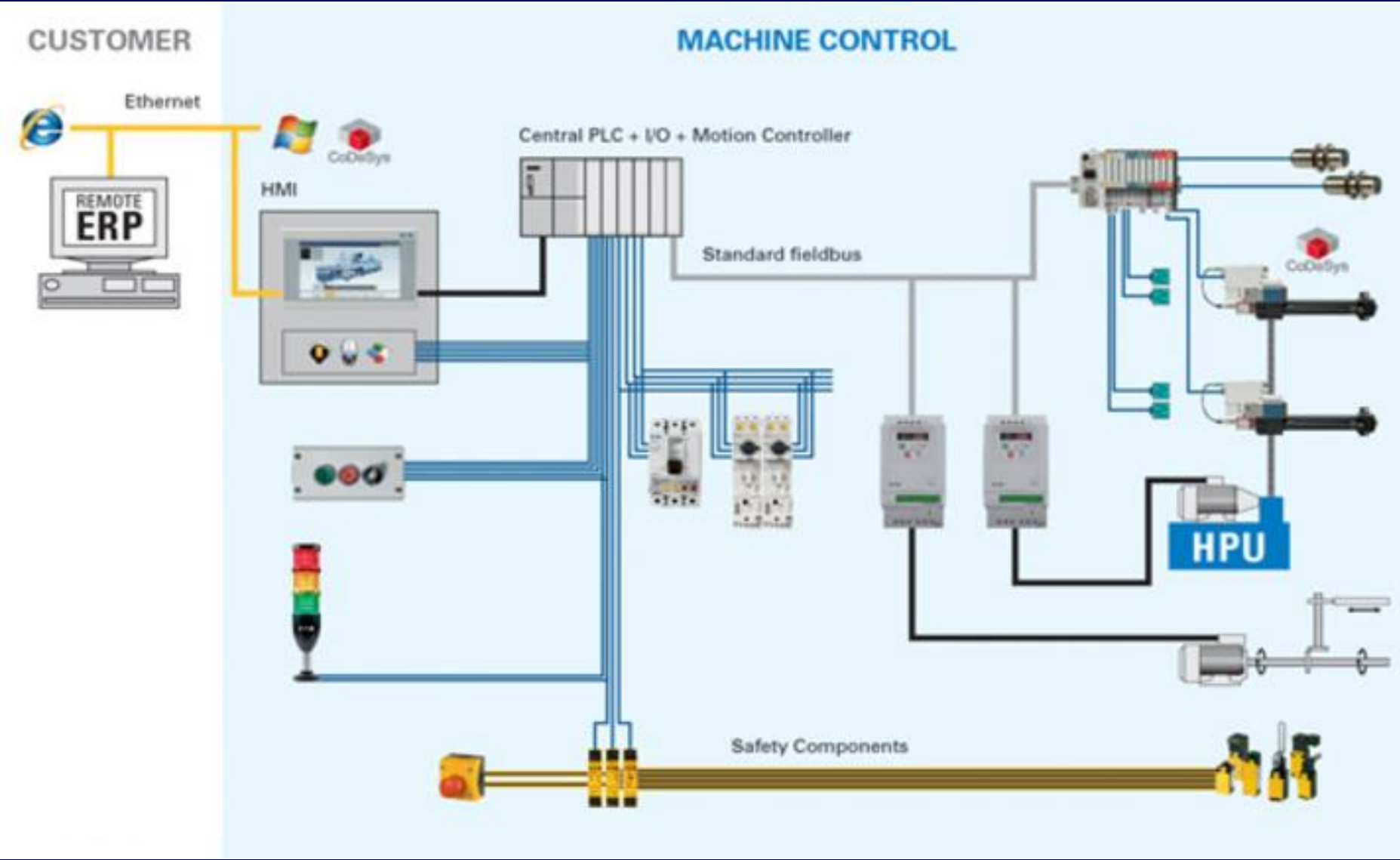
## Or Sinking



# Using Emergency-Stop Switches.



Do not program emergency-stop switches in the controller program only. Any emergency-stop switch should turn off all machine power by turning off the master control relay.



# Communications

Before any ladder programs can be investigated, modified or written into the PLC's CPU, we must first establish a Comms link between our User Interface - (HMI, T-Bar, PC or a Laptop) and the PLC's CPU.

With the Allen Bradley SLC 500 or Micrologix 1000 PLC's this communication link is set up using:

Rockwell Automation software program RSLINX



# Comms Cables.

Various connection types and cables can be used, but in TTE the common PLC connector is RS232



laptops may have RS232 and or RJ45 ethernet, even HDMI but common is USB A so we need adaptors



All connector adaptors and cables will need setting up in the communications driver settings as required by each PLC type.

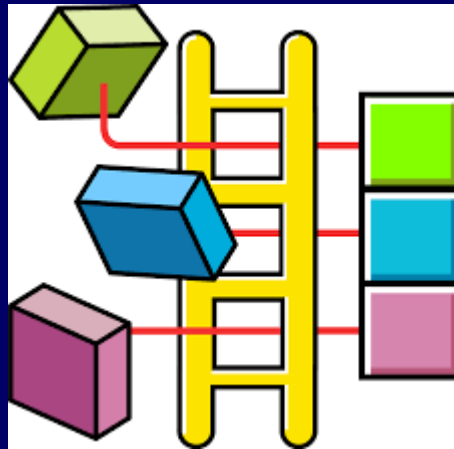
# Setting up Comms

Once a cable connection has been established between the PLC and the User Interface, we can use RSLINKS software to establish communications.



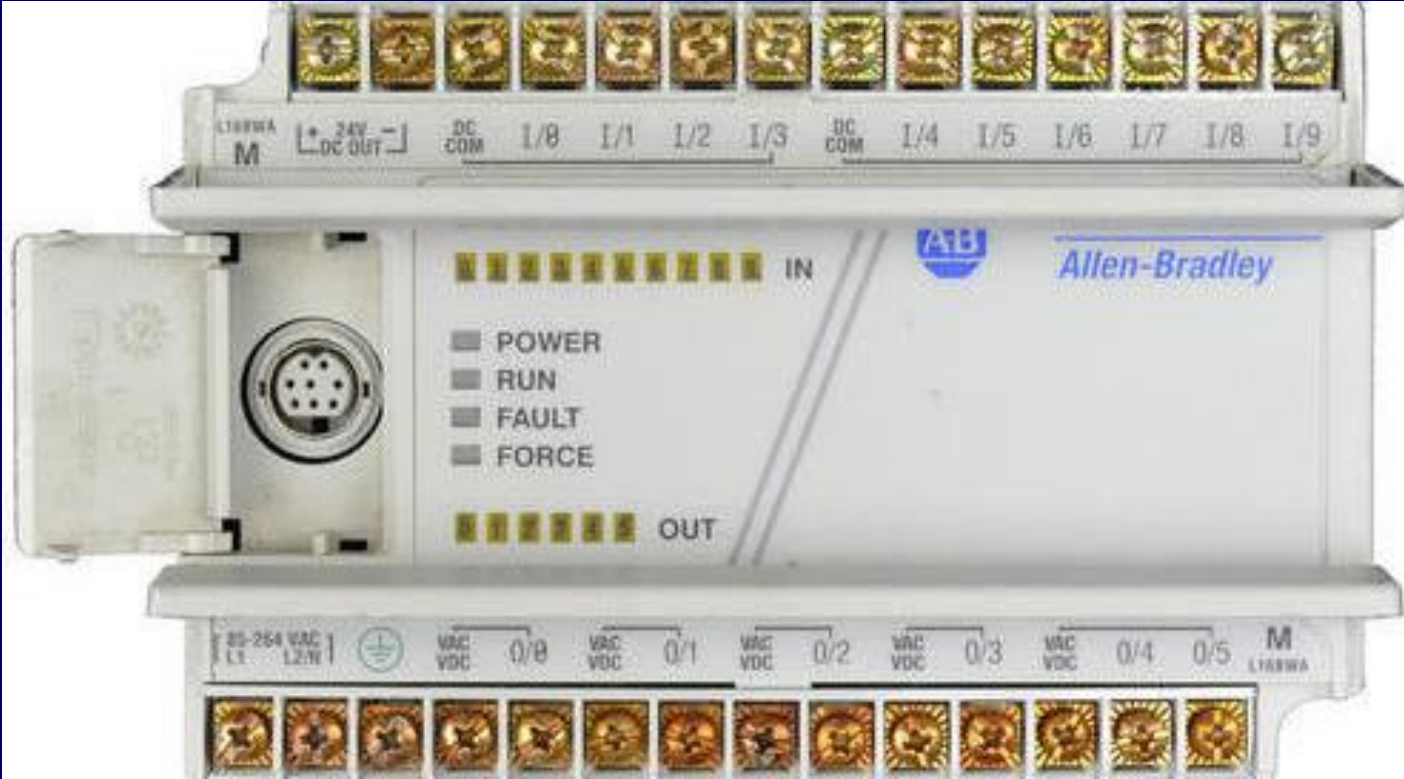
# Setting up Comms

Then using the PLC programming software tool (Rs Logix 500) we can configure the software to match our hardware build.



# Frame Layout Micrologix 1000

CPU and all Inputs and Outputs Slot → 0





# Software Config Micrologix 1000

The screenshot shows the RSLogix Micro Starter Lite software interface. The main window title is "RSLogix Micro Starter Lite". The menu bar includes "File", "View", "Comms", "Tools", "Window", and "Help". The toolbar contains various icons for file operations and communication. The status bar shows "OFFLINE", "No Forces", "No Edits", "Forces Disabled", and "Driver: (unknown)". The main workspace displays a ladder logic diagram with a "User" bit and "Timer/Counter" and "Input/Output" sections.

The "Select Processor Type" dialog box is open, showing a list of processor options. The "Processor Name" field is set to "UNTITLED". The list of processors is as follows:

Processor Name	Processor Type
Bul.1763	MicroLogix 1100 Series B
Bul.1763	MicroLogix 1100 Series A
Bul.1761	MicroLogix 1000 Analog
Bul.1761	MicroLogix 1000 DH-485/HDSlave
Bul.1761	MicroLogix 1000

The "Communication settings" section at the bottom of the dialog box includes:

- Driver: (unknown)
- Processor Node: 1 (Octal (=1 Decimal))
- Reply Timeout: 10 (Sec.)
- A "Who Active.." button is also present.

B3:0/2

OFFLINE No Forces

No Edits Forces Enabled

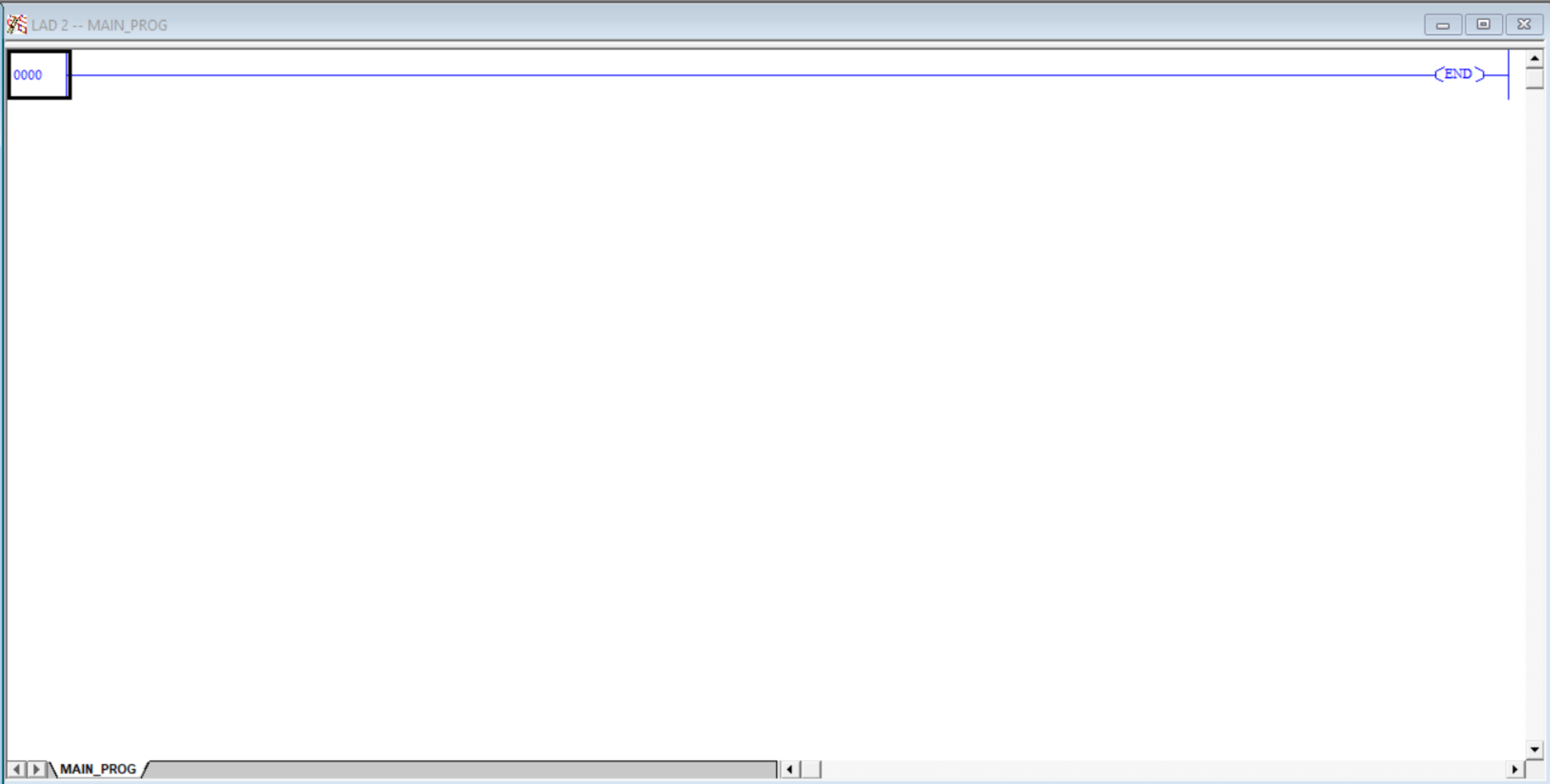
Driver: (unknown) Node: 1d

3 E 3/E <> << >> OHS OSR OSF DDT FBC

User Bit Timer/Counter Input/Output Compare

UNTITLED

- Project
  - Help
  - Controller
    - Controller Properties
    - Processor Status
    - IO Configuration
    - Channel Configuration
  - Multipoint Monitor
  - Program Files
    - SYS 0 -
    - SYS 1 -
    - LAD 2 - MAIN\_PROG
    - LAD 3 - USER\_FAULT
    - LAD 4 - HSC\_INT
    - LAD 5 - STL\_INT
    - LAD 6 -
    - LAD 7 -
    - LAD 8 -
    - LAD 9 -
    - LAD 10 -
    - LAD 11 -
    - LAD 12 -
    - LAD 13 -
    - LAD 14 -
    - LAD 15 -
    - LAD 16 -
  - Data Files
    - Cross Reference
    - O0 - OUTPUT
    - I1 - INPUT
    - S2 - STATUS
    - B3 - BINARY
    - T4 - TIMER



B3:0/2

OFFLINE No Forces

No Edits Forces Enabled

Driver: (unknown) Node: 1d

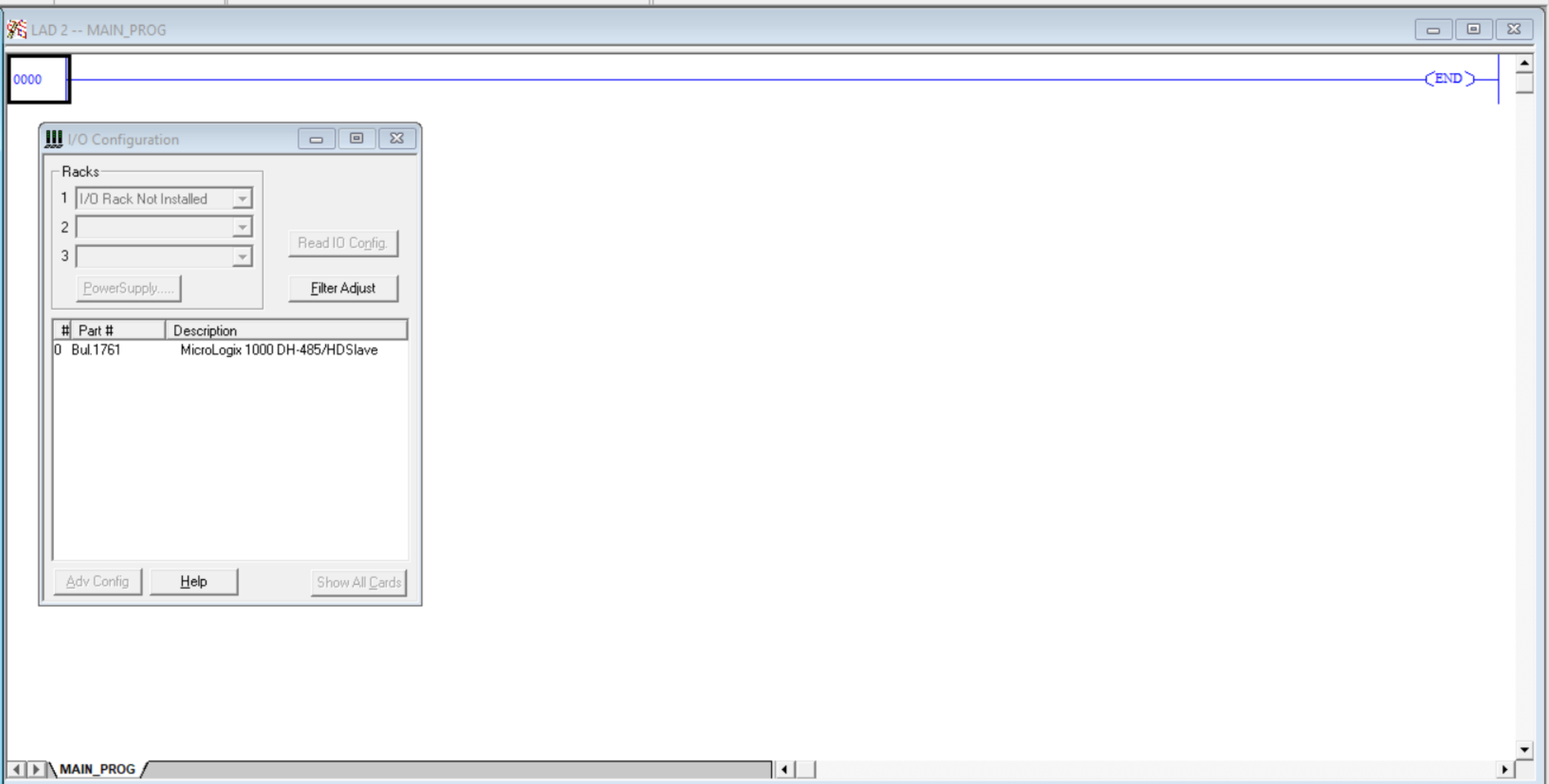
3 E 3/E <> << >> ONS OSR OSF DDT FBC

User Bit Timer/Counter Input/Output Compare

UNTITLED

LAD 2 -- MAIN\_PROG

- Project
  - Help
  - Controller
    - Controller Properties
    - Processor Status
    - I/O Configuration**
    - Channel Configuration
  - Multipoint Monitor
  - Program Files
    - SYS 0 -
    - SYS 1 -
    - LAD 2 - MAIN\_PROG
    - LAD 3 - USER\_FAULT
    - LAD 4 - HSC\_INT
    - LAD 5 - STL\_INT
    - LAD 6 -
    - LAD 7 -
    - LAD 8 -
    - LAD 9 -
    - LAD 10 -
    - LAD 11 -
    - LAD 12 -
    - LAD 13 -
    - LAD 14 -
    - LAD 15 -
    - LAD 16 -
  - Data Files
    - Cross Reference
    - O0 - OUTPUT
    - I1 - INPUT
    - S2 - STATUS
    - B3 - BINARY
    - T4 - TIMER



I/O Configuration

Racks

1 I/O Rack Not Installed

2

3

Read IO Config.

PowerSupply.....

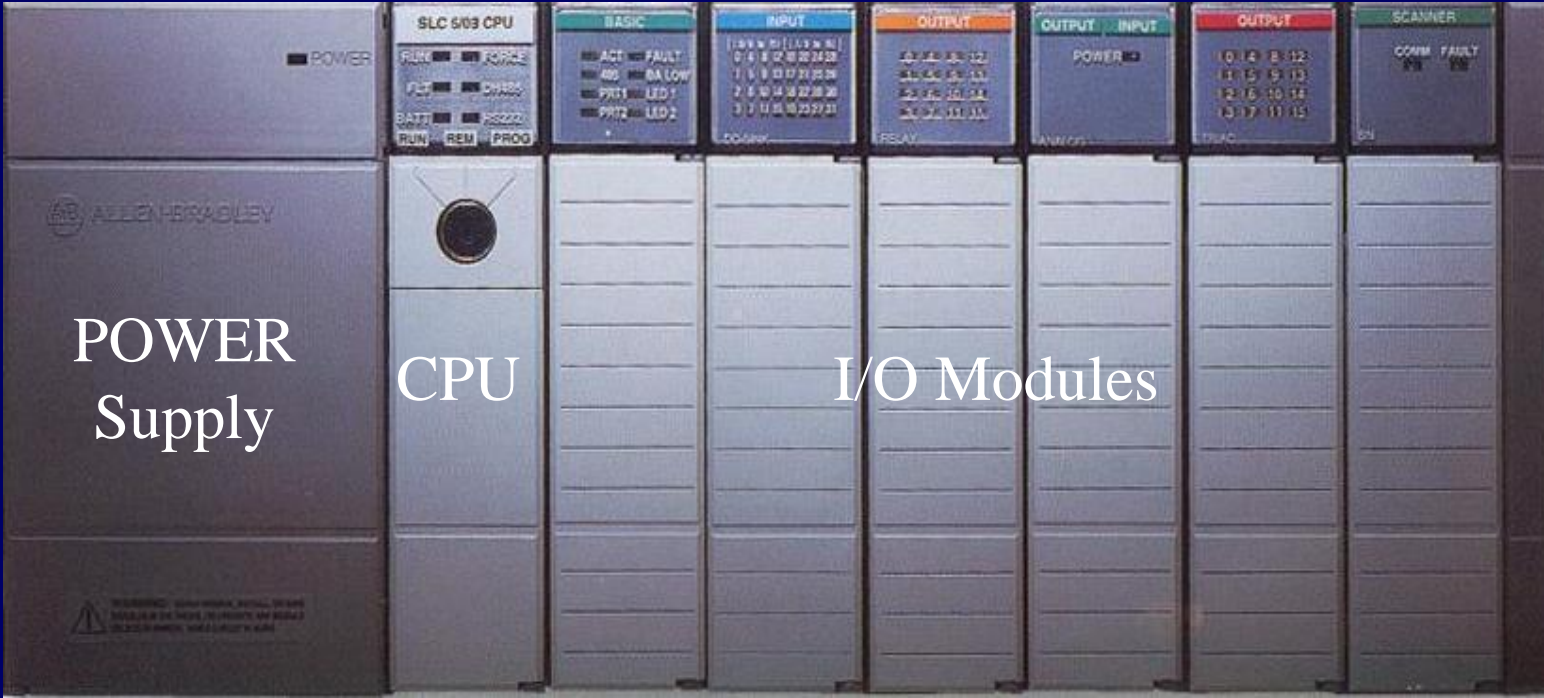
Filter Adjust

#	Part #	Description
0	Bul.1761	MicroLogix 1000 DH-485/HDSlave

Adv Config Help Show All Cards

# Frame Layout SLC500

Slots →      0      1      2      3      4      5      6



# Software and Hardware Config SLC 500

OFFLINE | No Forces | No Edits | Forces Disabled | Driver: AB\_ETH-1 | Node: 0d | User | Bit | Timer/Counter | Input/Output | Compare

**Project Tree:**

- Project
  - Help
  - Controller
    - Controller Properties
    - IO Configuration**
    - Summary Configuration
  - Multipoint Monitor
  - Program Files
    - SYS 0 -
    - SYS 1 -
    - LAD 2 -
  - Data Files
    - Cross Reference
    - O0 - OUTPUT
    - I1 - INPUT
    - S2 - STATUS
    - B3 - BINARY
    - T4 - TIMER
    - C5 - COUNTER
    - DC - CONTROL

**I/O Configuration Dialog:**

Racks:

- 1 1746-A4 4-Slot Rack
- 2 I/O Rack Not Installed
- 3 I/O Rack Not Installed

Buttons: PowerSupply...., Read IO Config.

#	Part #	Description
0	1747-L551	5/05 CPU - 16K Mem. OS501
1	1746-IB16	16-Input (SINK) 24 VDC
2	1746-OB16	16-Output (TRANS-SRC) 10/50 VDC
3		

**Current Cards Available:** Filter: All IO

Part #	Description
1746-I*8	Any 8pt Discrete Input Module
1746-I*16	Any 16pt Discrete Input Module
1746-I*32	Any 32pt Discrete Input Module
1746-O*8	Any 8pt Discrete Output Module
1746-O*16	Any 16pt Discrete Output Module
1746-O*32	Any 32pt Discrete Output Module
AMCI-153x	AMCI Series 1500 Resolver Module
AMCI-1561	AMCI Series 1561 Resolver Module
1746-BAS-5/01	BASIC Module - 500 - 5/01
1746-BAS-5/02	BASIC Module - M0/M1 capable
1746-BAS-T	BASIC Module - 500 - 5/01
1746-BAS-T	BASIC Module - M0/M1 capable
1747-BSN	Backup Scanner Module
1746-BTM	Barrel Temperature Module
1747-DCM-1/4	Node Adapter Module (1/4 Rack)
1747-DCM-1/2	Node Adapter Module (1/2 Rack)
1747-DCM-3/4	Node Adapter Module (3/4 Rack)
1747-DCM-FULL	Node Adapter Module (Full Rack)
1747-DCM-7	Distributed I/O Scanner 7 I/O Block

Buttons: Adv Config, Help, Hide All Cards

# Ladder Programming

