

Experiment #2
PLC Input – Output Wiring Methods

OBJECTIVES

After successfully completing this laboratory, you should be able to:

- Read and explain the nameplate of DELTA’s PLC DVP Series Model.
- Make different types of PLC input wiring.
- Make different types of PLC output wiring.
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1. Basic Information

1.1. DELTA’s PLC DVP Series Model Explanation

DELTA’s PLC DVP Series has main processing units and extension units. The main processing units offer 14-60 points and the extension units offer 8-32 points. The maximum input/output can be extended up to 128 points. It also can be used on applications according to INPUT/OUTPUT points, power sources, output modules; digital/analog exchanges (A/D & D/A converter). In addition, DVP SS Series has the special modules (AD/DA/PT/TC/XA) used for extending its functions and the maximum special modules can be extended up to 8 units.

▪ **Nameplate Explanation**

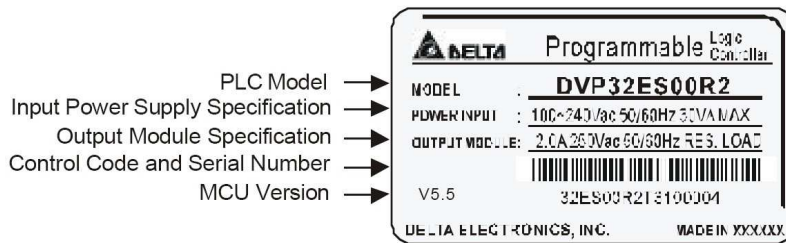
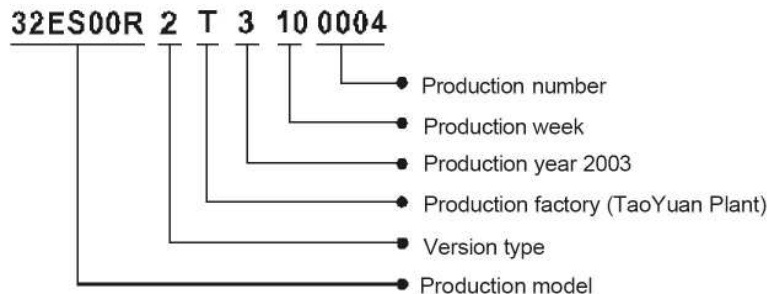


Fig. 1.2 Delta programmable logic controller name plate

▪ **Serial Number Explanation**



1.3. Wiring Guidelines

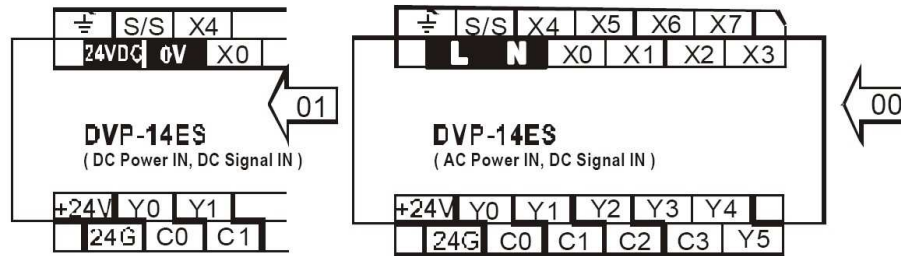


Fig. 2.4 DVP-14ES PLC terminal layout

1.3.1 Power Input Wiring

Figures 2.5 and 2.6 show various possible external power connections for DVP PLC. When wiring AC power, the ‘Live’ cable should be connected to the ‘L’ terminal and the ‘Neutral’ cable should be connected to the ‘N’ terminal. When wiring DC power, the ‘positive’ cable should be connected to the ‘+’ terminal and the negative should be connected to the ‘-’ terminal. At no time should the power supply terminals be connected to any other terminal on the PLC.

- AC Input Type

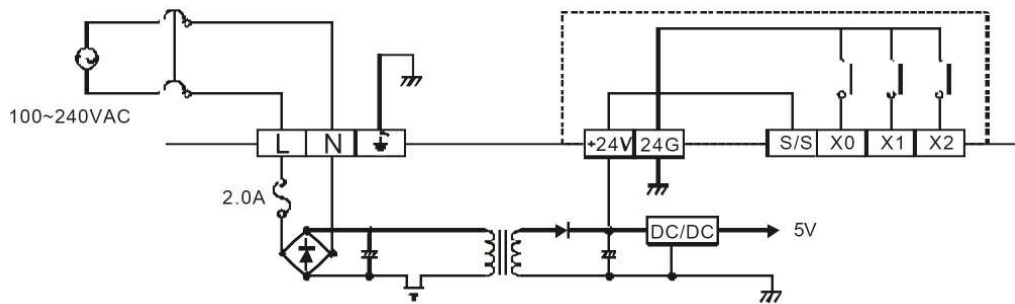


Fig. 2.5 AC input type PLC wiring

The +24V supply output is rated at 0.4 Amperes. DO NOT connect external power supply to this terminal.

FUSE Protection: there are internal fuses on all DVP PLCs. However, the fuse does not guarantee the prevention of DVP PLC damage, but it will provide added protection.

- DC Input Type

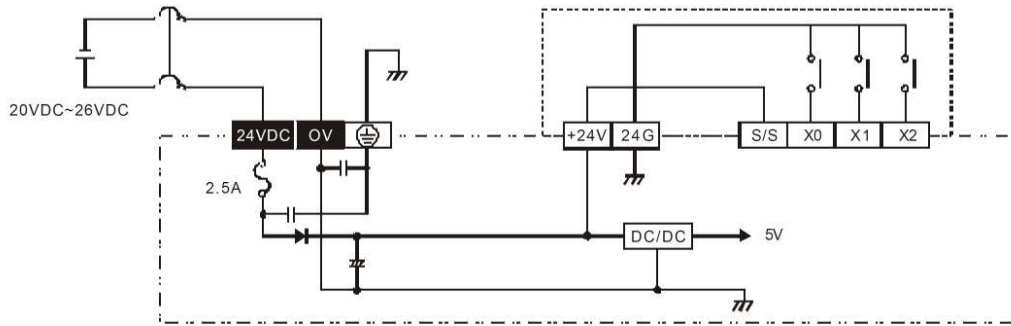


Fig. 2.6 DC input type PLC wiring

1.3.2 Input Point Wiring

All versions of the DVP PLC have Input / Output circuits that can connect to a wide variety of field devices. DC Input PLCs have two modes of operation: SINK and SOURCE.

Sink = Current flows into the common terminal S/S
Source = Current flows out of common terminal S/S

For example, we simply connect the common terminal S/S to the supply source(+). By adding the switch, between the supply(-) and the input, we have completed the circuit. Below are two circuit diagrams showing both the sinking and sourcing inputs.

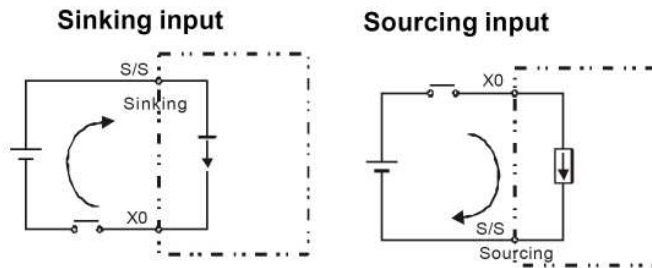


Fig. 2.7 Sinking and sourcing inputs

	Input Point Loop Equivalent Circuit	Wiring Loop
DC Type (DC Signal IN) SINK Mode		<p style="text-align: center;">Sink Type</p>
DC Type (DC Signal IN) SOURCE Mode		<p style="text-align: center;">Source Type</p>

1.3.3 Output Point Wiring

There are three kinds of DVP-Series PLC outputs: Relay, SSR and Transistor. All relays used in DVP series PLC have passed the standard of IEC 947-5-1 under AC-15 (the rated current and voltage) specification for a cycle test of 6050 times.

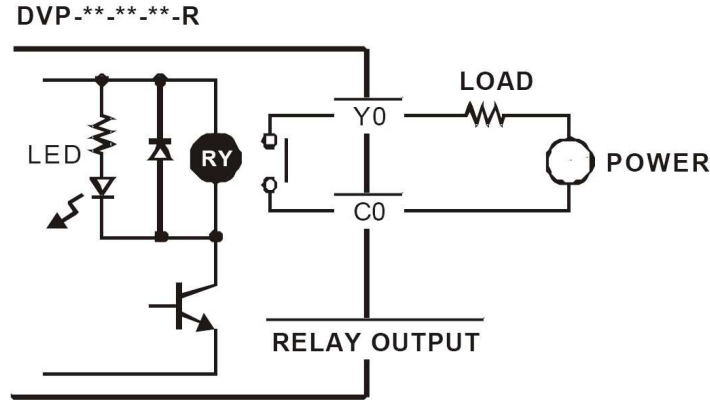


Fig. 2.8 Rely output type PLC wiring

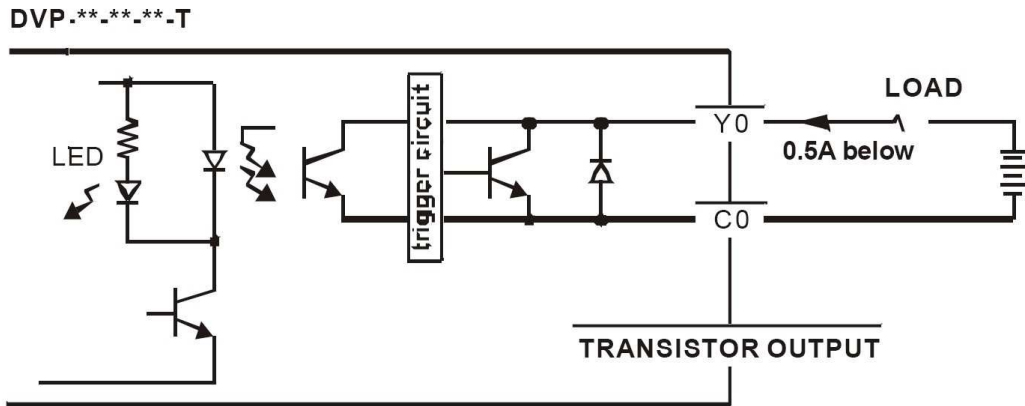


Fig. 2.9 Transistor output type PLC wiring

Be careful with the connection of the common terminals when wiring output terminals. For example, when wiring DVP14ES00R, note that there are six normally-open SPST relays available. They are organized into 4 groups with individual commons. The figure below shows the relays and the internal wiring of the PLC. Note that each group is isolated from the other groups:

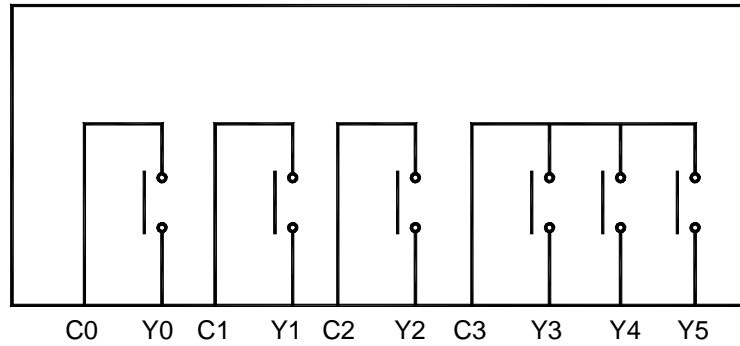


Fig. 2.10 relays groups and the internal wiring of the PLC.

▪ **Relay Output Wiring Methods**

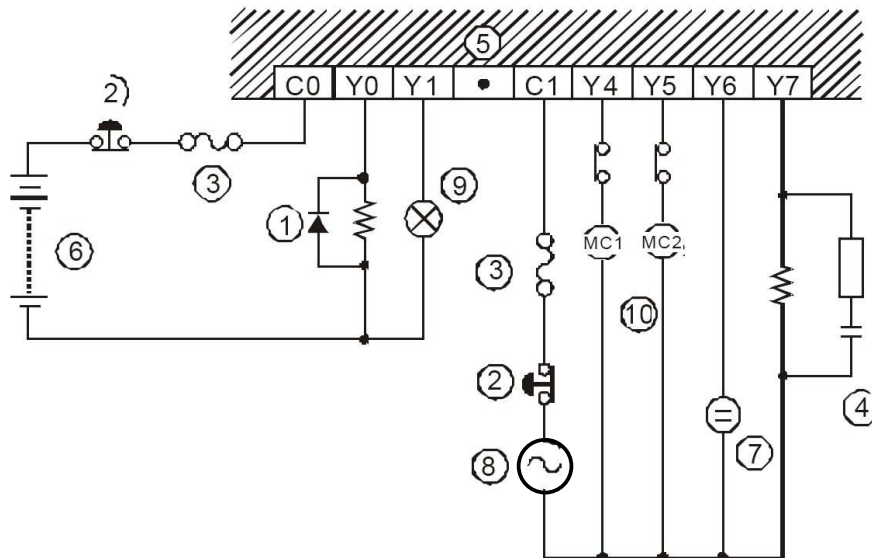


Fig. 2.11 Relay Output Wiring Methods

1. Surge absorbing diode: increases relay contact life.
2. Emergency stop: use an external switch.
3. Fuse: 5 to 10A for every 4 output points to protect the PLC's.
4. output circuit.
5. Surge absorber: reduces noise on AC inductive loads.
6. Unused terminal: do not connect.
7. DC supply.
8. Neon lamp.
9. AC supply.
10. Incandescent lamp.
11. Mutually exclusive outputs: Use external hardware interlocks, as well as those in the PLC program, for maximum safety.

- **Transistor Output Wiring Methods**

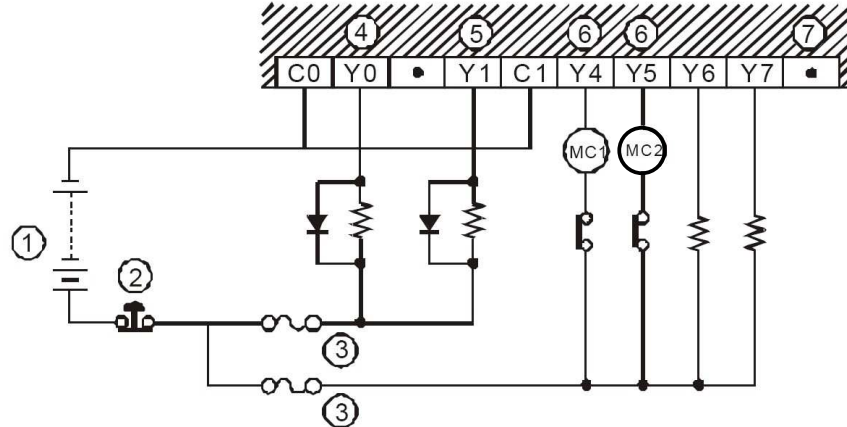


Fig. 2.12 Transistor Output Wiring Methods

1. DC supply.
2. Emergency stop.
3. Fuse.
4. If Y0 is used as a pulse train output with PLSY, use a pull up resistor to ensure the output current is greater than 0.01A for correct operation.
5. If Y1 is used with PWM, use a pull up resistor to ensure the output current is greater than 0.01A for correct operation.
6. Mutually exclusive outputs: use external hardware interlocks, as well as those in the PLC program, for maximum safety.
7. Unused terminal: do not connect.

2. Equipments

- DVP14ES00R
- 1x10A mcb.
- 230V(coil), 50Hz, 10A Relay
- Green and red indicator lamp.
- NO and NC pushbuttons.
- ON-OFF switch.
- Flexible wires.
- Single phase power source.
- Control board.

3. Procedure

1. Assemble the components of the control circuit on the control board and make the required wiring and connections as shown in figure 2.13.

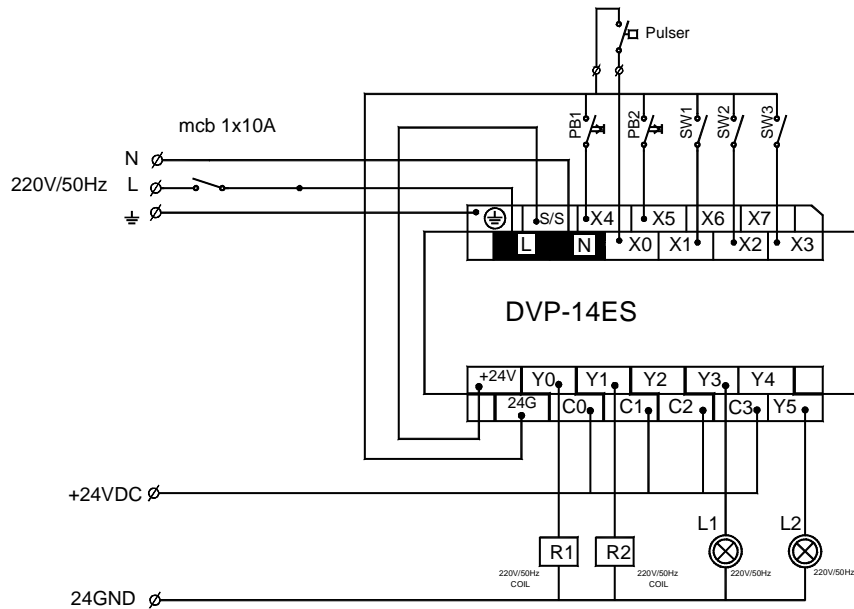
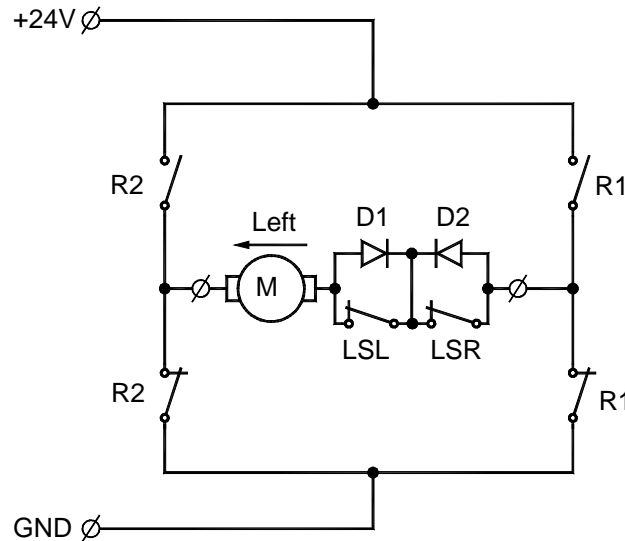


Fig. 2.13 The power circuit diagram for a direct on line starter

2. Make the required wiring and connections for the power circuit as shown in figure 2.14.



3. Once you are finished with the connections, call the instructor to check it for you and make sure that it is correct.