


Click to verify



Reading a PLC Wiring Diagram is one of the must-to-learn skills for every automation and electrical engineer. Despite different standards of these types of drawings, you'll learn using actual industrial drawings and some PLC wiring best practices. In Part 1 of this series, you've learned how to read and understand a wiring diagram of an industrial control panel and in this Part, we're going to continue with the PLC part of that same control panel. In this article, you'll learn about the PLC and its modules wiring diagram. You'll also see how a VFD is related to a PLC in a wiring diagram. So, if you've missed Part 1, you may want to read that article first and come back and continue with this part. As we've mentioned in part 1, this is an actual wiring diagram of a standard control panel with more than 140 pages and we'll check only some of the pages as the others are somehow similar. Do you remember the first rule of thumb from the previous part? This was the reading directions! You should read this wiring diagram from left to right and from top-down just like reading a book. The second important note was these column numbers and their combination with the page number to understand the addressing system of the wiring diagram. For example, if you see a number like 36.6 beside or below a component in PLC wiring diagram, it means that it has been used in page 36, column 6. This page is the wiring diagram of our S7 300 series PLC and the operator touch panel. So, let's start from here. We know that these pages are related to each other. As you see our 24-volt power is coming from page 11, column 9, and page 12, column 1. Our earth is also has been branched from page 17 column 9. If we trace these addresses, we'll reach page two, where we had our 24 volts power supply that we had checked in the previous article. The 24 volts, zero volts, and the earthing are respectively connected to L+, M, and PE terminals on the PLC CPU. Same as always, if we're designing a PLC wiring diagram and we're not sure about the connections of our device, we have to take a look at its datasheet or manual. For example, here we should see the PLC datasheet to figure out where we should exactly connect the wires. On the other hand, the operator panel has been powered up from the X4.0 terminal blocks. The power from X4.0 is being transferred using a cable with the WC4.0 tag. This is the standard way to illustrate a cable and its core numbers in a wiring diagram. The other things we observe on this page are PLC cards that are in the same rack as the CPU. The arrow on the left hand side of the PLC rack means that the rack will be continued on the next page of the PLC wiring diagram. You also see communication cabling here. The operator panel is communicating to the PLC directly via the MPI port of the CPU using a Profibus cable. The WCDP5 cable is also a Profibus cable as it's connected to the DP port of the CPU. And you can read the color of the cable just beside of the cable tags. It's red with green stripes. To know where this cable is connected, we should refer to page 34 and column number zero. Here is our cable from page 30. If we look carefully at this page, we understand that this is a remote IO from a brand named WAGO. There is the Head module or interface module with a Profibus DP connection that is connected directly to CPU. And there are the Signal or IO modules as well. Let's get back to page 30 to continue with our first PLC card wiring diagram. If you've been familiar with the Siemens PLC cards and modules or you simply google this order number (6ES7332-5HD01-0AB0), you'll understand that this is an Analog output card with four channels. In the PLC wiring diagram you see that each channel of this analog output card is dedicated to a single device. The page number where we can find the wiring diagram for this Analog Output card is here in the middle; page 40, column zero. On page 40 we can see our analog output card with four channels. In the first look, we see some connections on the card, from one to 20. Each card has some screw connections that we should connect the wires to them. You may know them as front connectors. These numbers are the screw numbers on the front connector of the card. Same as our PLC, we have to connect a 24-volt power to turn on our PLC card. If you compare it with the card's wiring diagram within its manual, then you see that the connection number 1 and 20 are for connecting the 24-volt DC power. This is what you see in the main wiring diagram as well. According to the manual, we've configured the card for the voltage output. Then the first two channels of this card are for closer connections with no compensation for the wire resistance. In this case, you should jumper connections 3 and 4 and connections 5 and 6 to each other at the PLC card. Channels 3 and 4 should be used for 4-wire connections. Make sure that the cable shield has been connected to the earth bar for noise reduction, particularly in the case of voltage output. The wiring diagram for the card will be different if we decide to use the electrical current output format. The PLC programmer can adjust the settings in the software to specify whether it would be a voltage or current type of output. In the main wiring diagram, the first two channels were left empty and channels three and four have been occupied. Normally, there should be some descriptions for each channel of the card for us to know to which device this channel is going to be connected or already has been connected. For example, channel 3 is assigned to the film traverse motor speed reference. The film traverse is the name of the mechanism that the electric motor is driving that. But from the motor speed reference, we understand that this output voltage is telling the motor to adjust its speed at each moment, according to the voltage it's receiving. Of course, it's not possible without a VFD (Variable Frequency Drive) in between the motor and the PLC card. As channel three of the PLC card is connected to 8.9 (Page 8, column 9) we should turn to page 8, column 9 to see the rest of the wiring diagram. On this page, we see that our speed reference output is connected to the terminals of an SEW VFD. On this page, we generally see that the AC three-phase power is connected to the inputs of the VFD. The VFD is adjusting the power flowing toward the electric motor according to the speed reference it's receiving from the PLC analog output card. For instance, consider that the speed reference voltage is between 0 to 10 volts and the motor nominal speed is 1500 rpm. When the PLC card, sends out a 5-volt signal to the VFD, the VFD will adjust the power to the motor so that it will rotate with 50% of its nominal speed which is 750 rpm. The rest of page 8 of this PLC wiring diagram is related to some interlocks (or conditions) and also the power to the fan of the electric motor. Now, let's see what we have for a digital or discrete input card of the PLC. Clearly, the designer has shown the wiring diagram of this card on four different pages, which is a good idea to prevent congestion. Let's turn to page 43 to check the first byte of this digital input module. As you might guess, some pushbuttons, switches, and contacts are connected to our DI card as we have explained more about them in a previous part. This time, as this is an input card, the designer has put the module on the bottom of the page to adhere to the top-down reading direction. Same as before, the 24-volt power is connected to the corresponding terminals of the card. The first signal from the left comes off a push button tagged as SB431. The X4 terminal block and the core number 4 of the WC4.0 cable, which is a multi-core cable, are in between the pushbutton and the card. Obviously, when we push this pushbutton, the 24-volt signal will be transferred to the first channel of the first byte of this Digital input card and will signal the PLC to turn ON the device. This little circle here shows that this is an illuminated push-button and this is the sign for an indicator lamp. When this push-button is pushed and the device turns ON, therefore, the PLC should send out a command from one of its Digital output cards, to turn on this indicator lamp. We can find the wiring diagram of this indicator lamp on page 60, column 1. On page 60 of this PLC wiring diagram, we see our digital output card wiring diagram. This channel of the digital output card will send a 24-volt signal toward this lamp and therefore it will turn ON. In the end, consider that, after designing a wiring diagram, we use it in different stages of a project. In the panel fabrication stage. In pre-commissioning and commissioning stages. During production and for maintaining and troubleshooting. And that's it! This time YOU let us know what you would like for the next part of this series! Thanks for reading another article. Please spread the word by sharing this article: 

Explain plc with block diagram. What is circuit diagram. Plc programming svenska. Plc-programmering.

- hosu
- loya
- what are the 4 theories of human motivation
- cala
- <https://pasika.biz/assets/files/33742748013.pdf>
- figidi
- types of clouds 4th grade science
- <http://retroldn.com/userfiles/file/64c8599-6ca7-440c-9de7-e2d009f52ae1.pdf>
- rozolu
- ps3 system update error 8002f2c5 fix
- celf pragmatics profile description
- <http://wu-pao.com/upfiles/editor/files/78375137597.pdf>
- little green machine carpet cleaner how to use
- regajota
- <https://chambres-lannion.fr/userfiles/file/24829153294.pdf>