PLC S7
Restoring the Application to the PLC

Content

1 General

This manual has the purpose of explaining the procedure of restoring a backup of a PLC. This is a procedure with potential severe consequences to the process, so it only must be carried out by personnel trained in the area of automation. This procedure is important and it should not be listed as something simple, since it may cause serious problems in the controlled processes.

Requirements

The following elements are required to restore a Backup back into a PLC:

- Ethernet or "PC Adapter" (MPI) network cable, will depend on the type of PLC, usually an Ethernet cable will suffice.
- Computer or PG with the Software "SIEMENS Simatic V5.5" or a newer version (the Simatic TIA Portal **NOT** is supported).
- Automation technician or technician trained in applications of the SIMATIC and who is able to detect problems in a PLC.
- Most current backup of the PLC program.

2 Configure Communication to the PLC

The S7 compatible PLC's mainly support two communication methods to connect to the controller. In general it is preferable to use the Ethernet interface to connect PLC. The MPI interface is normally only used when the Ethernet interface is not available, since it requires an adapter to make the connection. In the following it is described, how to adjust the connection for the two methods. Once connected, the process of performing a backup or restore is exactly the same, independent of the selected interface.

Once communication is set, it is not necessary to change the settings again, because they will remain saved on the computer. However, if the connection to the PLC is not working, it is always recommended to check the settings again.

2.1 Ethernet (TCP/IP)
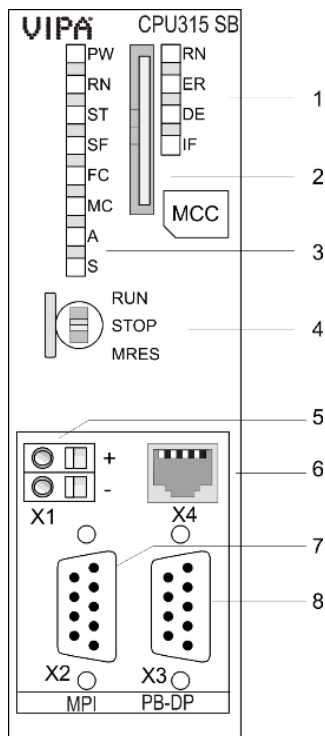
The vast majority of the S7 PLC incorporate an Ethernet interface for communication with the connected equipment. This interface is generally located in the CPU module (item 6). An ordinary Ethernet cable (Patch-Cable) is required for the connection.

Normally a switch is connected to this interface, where you can connect to any available Port.

Some smaller systems do not have a switch installed in the electrical cabinet where you can connect, and the HMI is connected directly to the internal Ethernet interface of the CPU. In this case, the HMI can be unplugged in order to connect directly to the CPU. After the backup is complete, reconnect the HMI which to continue its operation.

WARNING! When you disconnect the HMI, this does not work and may display outdated information on the screen. Actions from the HMI will not be available while the HMI is disconnected..
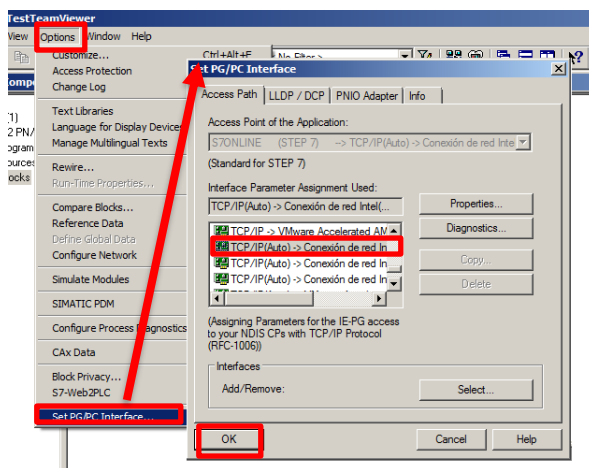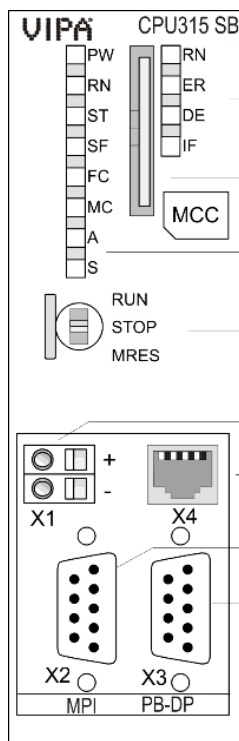
To set the type of communication in the Simatic software, one has to open the dialog in "Options" and select "Set PG/PC interface" and select the type of communication between the PLC and the PC, which normally appears as the name of your Ethernet card installed in the Computer. There is usually an option for every existing adapter on the computer (usually Ethernet and wireless card).

INFO: In order to connect to the PLC, one should consider setting the IP address of your network adapter of the computer, to an available address within the range accessible by the PLC. In order to adjust the local address, one must know the address of the PLC. The BatchXpert systems typically do not use addresses greater than 200 in their internal networks, so they would be available to adjust the computer.

Example: If the PLC has the address 192.168.0.11 on can use the address 192.168.0.200 to 192.168.0.254. (The first three numbers must remain the same).

For the address of your PLC you can review Project documentation. If you do not know how to set the IP address, see the IT department of your company for assistance.

2.2   MPI

All S7 PLC incorporate a MPI interface for communications with connected equipment. This interface is generally located in the CPU module (item 7). To connect to the PLC, a special MPI adapter is required. These Adapters are available from various Suppliers, such as Siemens (6ES7 972-0CB20-0XA0).

The Programming Devices from Siemens "Field PG" (only Siemens computers, other brands always require an adapter), incorporating an internal MPI adapter, which can be connected directly with a serial cable.

To set the type of communication in the Simatic software, open the dialog located in "Options", select "Set PG / PC interface" and select the "PC Adapter (MPI).
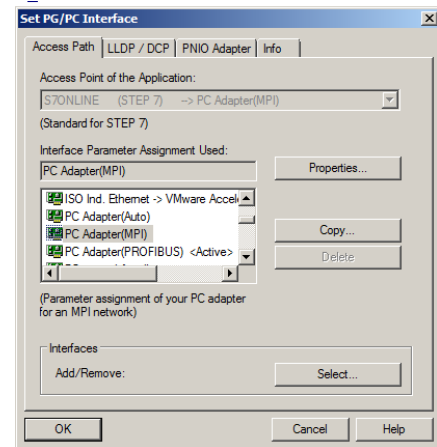
The default MPI address of the PLC is always 2.

3 Considerations

It is important to identify the problem that is happening in the System, since problems that usually occur are not caused by the PLC program itself. A technician who is able to determine the fault, must always be consulted beforehand.

- Before changing any conditions of the PLC, check what the problem of the System. From our experience the problems are almost always caused by external factors and a load of the program does not solve these problems**. Please carefully Read "consider before restoring".**
- **Load an backup of the PLC should be the last option** and any other problem must be discarded beforehand. It must also be checked and verified that the backup that you wish to load is the most actual one running in the PLC, because an out-of-date backup can potentially provoke the PLC to work differently and lead to errors or problems that have already been solved previously. Please carefully read "circumstances in which it will be necessary to upload to PLC".

3.1 Consideration to take into account before Loading:

- *While downloading the Backup into the controller, the PLC will go to stop mode, which causes the entire process controlled by the PLC to be stopped as well. It is also important that depending processes to the PLC are not running to avoid conflicts with other related processes.*

- *Parameters and Settings of all the control Modules (such as: Regulators, Valves, etc.) will be reset to the values that where set at the time that the backup was taken.*

- *While restoring a backup, all PLC data and processes will be reset to the time where the backup was taken. ¡This means that all the sequences and ALL processes lose their status and will be reset, making it impossible to continue with a process that was currently underway!*

- *After restoring the backup the statutes off all processes must established, the appropriate recipes must be initiated and the units must advance their steps into the corresponding steps.*

3.2 *Circumstances in which it might be necessary to upload to PLC:*

- A Memory reset was performed (CPU Switch).
- The CPU was replaced with an new one
- Internal battery discharge (the internal battery of the PLC normally has charge for 3 months +, a battery maintenance is not necessary).
- Various strong power cuts in a short time, without UPS (Uninterruptible Power Supply), which can result in a memory damage. This can only happen in circumstances extremely rare, so it is always recommended consult a trained technician.
- PLC is in Stop and cannot be restarted. In this case the cause of the Stop should be checked by a technician and only as last resource restoring the PLC.

3.3 *Circumstances in which it is <u>NOT</u> be necessary to upload to PLC:*

A restore of the PLC Program will **<u>NOT</u>** solve the following type's problem, so it should not be performed in these cases.

- Some sensor does not function as it should. This is an isolated problem that probably is related to a malfunction of the sensor or a PLC IO card.
- A process does not start or is stuck on a step. This is most likely also a problem of any Field instrument.
- Any system function does not work as always
- The HMI is not connected to the PLC. This kind of problem usually has to do with bad Ethernet configuration or a faulty cables.
- The PLC is in Stop. In this case you should check the cause of the Stop by a technician and only as a last resort to load the PLC.

4 Restore an Backup to the PLC

The following procedure is intended for people who know how to use the program "SIEMENS Simatic", it is assumed that a technician performing the restore operation has experience with this kind of program and procedures.

Once the PLC connected to the Computer, open the "Simatic" software.

Set the IP address of the computer or PG. The IP address of the PLC can be seen it in the hardware configuration of the PLC backup, or in the documentation of the project, in the file "Project Information". Usually the computer programmer has an IP-address 192.168.0.100 or greater than 100.

Open the backup file with the Simatic Software:
- A right click on the PLC (example: "PLC01").
- Select "Target System".
- Click on "Download" to send to PLC details of hardware and the program blocks
- Confirm the message with 'yes' or 'OK'
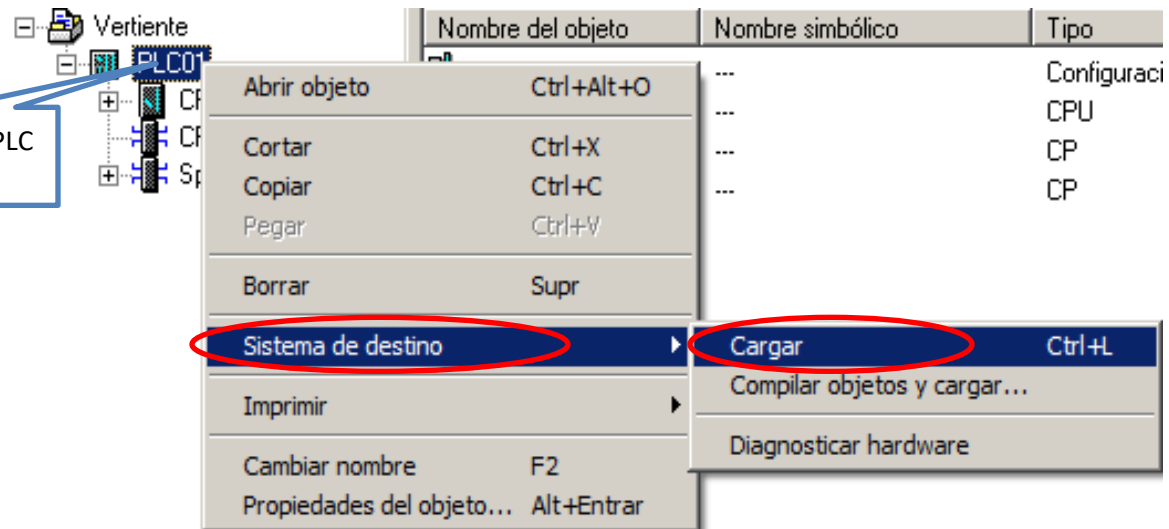
After loading the program, the PLC can be restarted. Right now all the PLC is reset at the time the backup was performed. Then you should adjust the sequences and processes units of the corresponding steps to further use