1. PLC\_CommunicationTo2400S Specifications And Details

This paper describes the actual measurement system created and the recommended method of constructing the system.

* 1. Structure of the created system

Tab Connection Wire Color of KV-XL202



[Equipment List]

・PC

・CPU unit: Keyence KV-8000

・Communication unit: Keyence KV-XL202

・Power unit: Keyence CA-U4

・Source meter: Keithley 2400s

・RS-232c cable (Need to cutting)

・USB cable

・Ethernet cable

・3-terminals power cable

The following Figures of equipment connections (Fig 1) and system structure (Fig 2) are shown below. See Tab 1 for wire color when connecting RS-232c cable to KV-XL202. It is recommended that a continuity check be performed when changing RS-232c cables.

This measurement system consists of a PC, a PLCs CPU unit and Communication unit, and a source meter device. The PC is the user interface, the PLC is the processing unit, and the source meter is controlled by the PLC.

ダイアグラム

AI によって生成されたコンテンツは間違っている可能性があります。

Fig Equipment connection

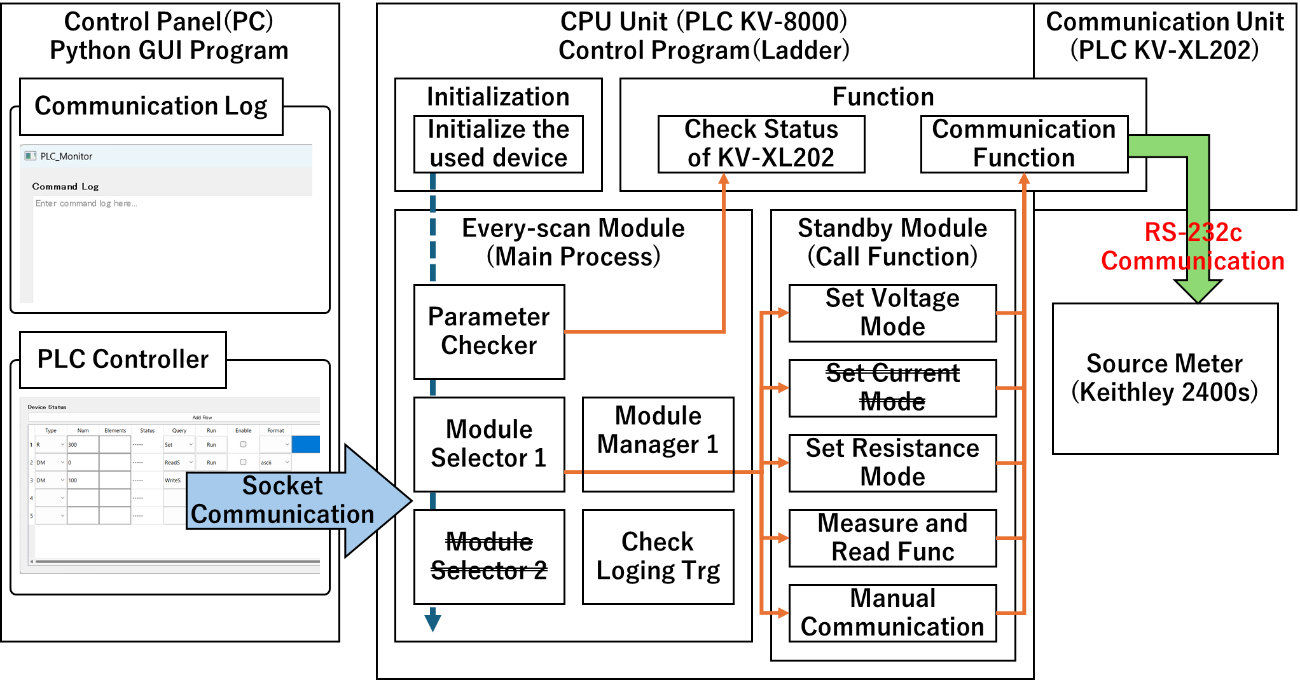


Fig System Structure

[Process Flow]

1. PLC: Initialization. Initialize process flags, Data Memory, and device values of KV-XL202.
2. PLC: Every-scan module is started. And wait for orders from the user. It also monitors device status for error handling.
3. GUI: Send relay rise command to flag the module startup. (\*Socket communication can be used to change device values for most PLCs. In other words, a similar system can be built by controlling the ladder program with a Python Program without transferring it to a PLC. However, that would lose the advantage of PLCs. Therefore, it is necessary to properly restrict the devices to which GUI programs have access. This system assumes access only to the start flag and DM for manual communication.)
4. PLC: When the module start flag is raised, check if the module is executable in Module Manager and call the Standby Module.
5. PLC: Each Standby Module calls a “Communication Function” to send commands to the 2400s for RS-232c communication.
6. PLC: The “Communication Function” handles the sending and receiving of RS-232c communications, and controls the KV-XL202 appropriately. (\*Controls the physical devices of the KV-XL202. Therefore, it must be single-threaded and properly processed.)
7. 2400s: Processing is performed according to the received commands.
8. PLC: Check triggers and perform logging. This system records sending command and receiving command. (\*To use the logging function, PLC settings must be made in addition to ladder program.)

PLCs have a very low logic level compared to C++, Python, etc. Therefore, careful specification is necessary. Also, the execution method is not the sequential execution method of C++, Python, etc., but the every scan method, so it is necessary to create programs that take device state transitions into consideration.

A state transition refers to a change in output values depending on various input conditions. In a ladder program, set modules continue to be scanned. And there is no concept of waiting; it is asynchronous. Therefore, process flags must be used to properly process the program.

* 1. Module execution sequence

The order in which modules are scanned can be set. As the system becomes more complex, this setting becomes more important. The setup method and the Execute sequence of modules of this system (Fig 3) are shown below.

[Setup Method]

1. Click on [Program] -> [Setup module execute sequence].
2. CPU system setting: Select on [Program setting] -> [Execute sequence of modules].
3. CPU system setting: The order of scanning modules can be set.
   1. Definition of PLC variables

Similar to C++ and Python, PLC can define global and local variables. This can be used to properly manage process flags and status. As a point of reference, global variables are defined statically, while local variables have the characteristic of being managed dynamically.

[Setup Method]

1. Click on [View] -> [Variable edit window].
2. Variable edit: Select the Global or Local tab.
3. Variable edit: For Global variables, enter the Variable name, Data type, Assigned device.
4. Variable edit: For Local variables, select the program from the downlist and enter the Local Variable name, Data type, Value (initial value).
   1. Socket Communication by Python script
   2. Logging function
   3. FTP server function
   4. Python script
   5. a