Integration Altivar 61/71 on Modbus TCP IP with PES System

Minimum Configuration Procedure

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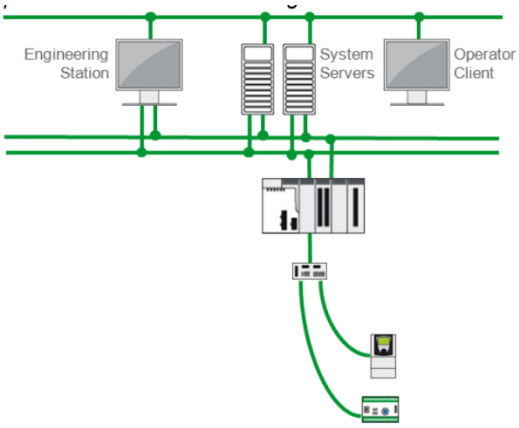
1 INTRODUCTION AND OBJECTIVE

This document to explain the minimum configuration that we should do/ configure in order to have working good integration between Altivar 61/71 on Modbus TCP/ IP with PES.

The PES help document does not help at all to explain this integration so the users who are quite new with the Altivar product and PES will have big difficulties to implement this integration.
At least with this document, it can help the user to do the integration.

The example of system architecture will be something like this



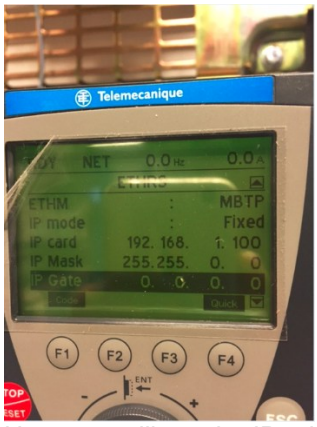
2 ALTIVAR PREPARATION

2.1 Altivar 61/71 -Modbus TCP/ IP card

Altivar 61/71 will come with embedded Modbus serial/ CANOpen. In order to talk with Altivar 61/71, you need to have optional comm card. Some option of part numbers are: VW3A3310D or **VW3A3320.**

We need to make sure that the comm card is for Modbus TCP/IP not for Ethernet IP. They have different part number, so you need to have the correct one.

2.2 Configuration of IP address at Altivar 61/71



Here you will put the IP address, IP mask, and IP gate of the comm card.

If you have ETHM menu: you select MBTP

For IP master: Just leave the IP master with 0.0.0.0. It means we don't apply access control. Any master can connect and request data to this device.

2.3 Configuration Command for Altivar 61/71

You can access this menu from Drive menu-> command.

The most important configuration is:

a. Profile: You need to select the profile that uses DRIVECOM profile.
   Normally the selection will be:
   - Non Separate profile
   - IO Profile

   Important Note: Don't select IO profile. The IO profile is not DRIVECOM profile.
   We must select Non Separate Profile. It uses DRIVECOM profile

b. Ref 1 channel: Comm card
   Once we select Non separate profile, the reference (set point) and cmd (command) will be not separated.
   Because of that you will see in the menu, the configuration name will be Ref1 channel (there is no cmd 1 channel).
   Here for Ref1 channel: you need to select to use Com. Card.
   For the Ref2 channel: you can select HMI or terminal for Local operation (if needed)

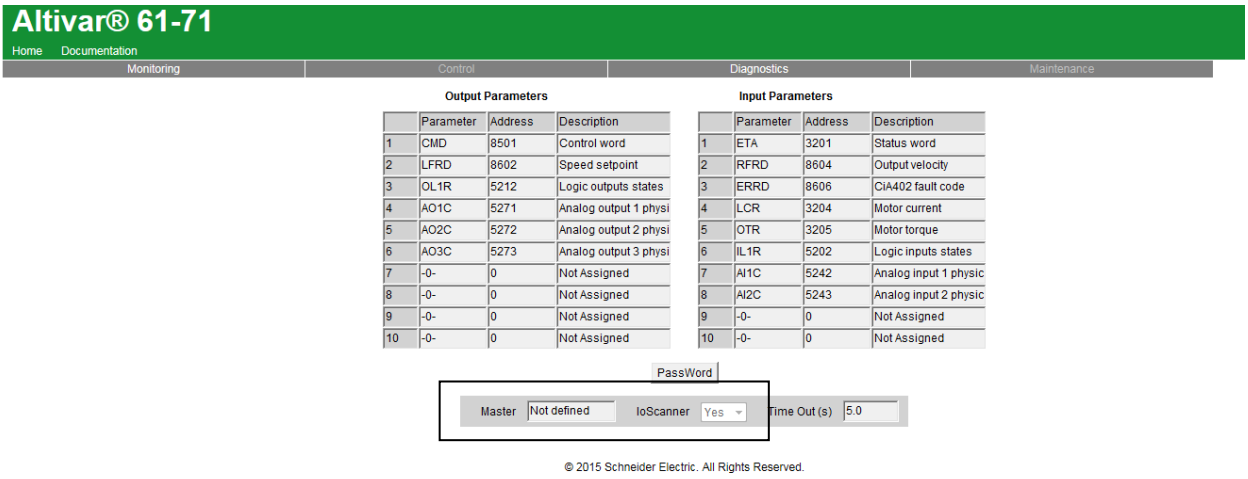
c. If you want this Altivar to do Reverse operation. You need to set up RV Inhibition: NO

Once you finish the configuration using the HMI of Altivar, you need to power recycle the altivar.

2.4 Configuration IO scanner table using Web Client

In order the Altivar object from PES can read and write correct data and show correct diagnostic in Supervision, we need to connect to Web server of Altivar and configure the IO scanner input parameter and output parameter from the Altivar.

Below are the screen snapshot:



	Parameter	Address	Description
1	CMD	8501	Control word
2	LFRD	8602	Speed setpoint
3	OL1R	5212	Logic outputs states
4	AO1C	5271	Analog output 1 physi
5	AO2C	5272	Analog output 2 physi
6	AO3C	5273	Analog output 3 physi
7	-0-	0	Not Assigned
8	-0-	0	Not Assigned
9	-0-	0	Not Assigned
10	-0-	0	Not Assigned

	Parameter	Address	Description
1	ETA	3201	Status word
2	RFRD	8604	Output velocity
3	ERRD	8606	CiA402 fault code
4	LCR	3204	Motor current
5	OTR	3205	Motor torque
6	IL1R	5202	Logic inputs states
7	AI1C	5242	Analog input 1 physic
8	AI2C	5243	Analog input 2 physic
9	-0-	0	Not Assigned
10	-0-	0	Not Assigned

We can put Master: not defined. In order not to apply access control so any master can request those data.

Important note: make sure after the modification of Input/ Output parameters, you need to enable IOScanner (IO scanner: Yes)

3 TESTING WITH MODBUS TESTING TOOL

We can use any Modbus Testing Tool (Modbus scanner) in order to validate first whether we can request the data from the IO scanner table of Altivar or not.

One important point regarding this IO scanner table of Altivar

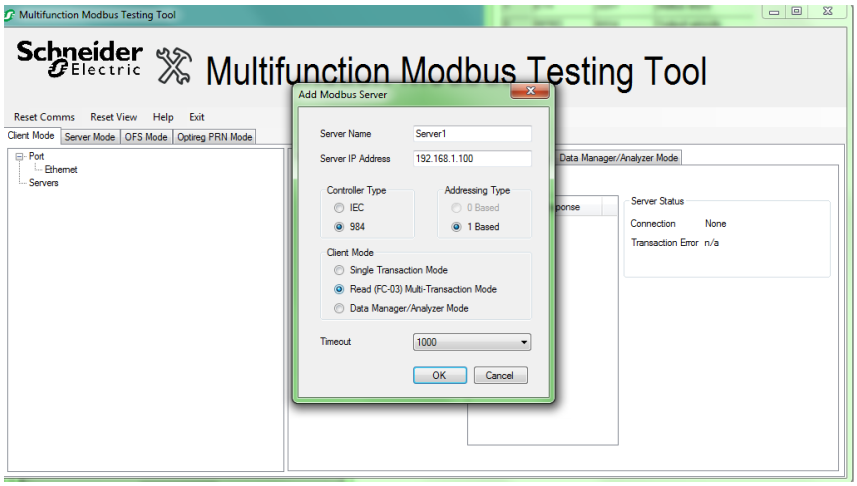
Using the server ID=255 you have access only to the specific area called 'periodic variables' (=>> p.13.2 "Altivar 61/71 Modbus TCP/IP card User manual VW3A3320"), managed by the drive's ethernet card.
For the MB TCP/IP client, this area is limited to 10 input words/10 output words maximum.
That's why, decision was taken to simplify the addressing in the PLC IO scanner - only number of registers is taken into account by ATV.
ATV ignores the starting address you are reading/writing from and makes it fixed, equal 0. "

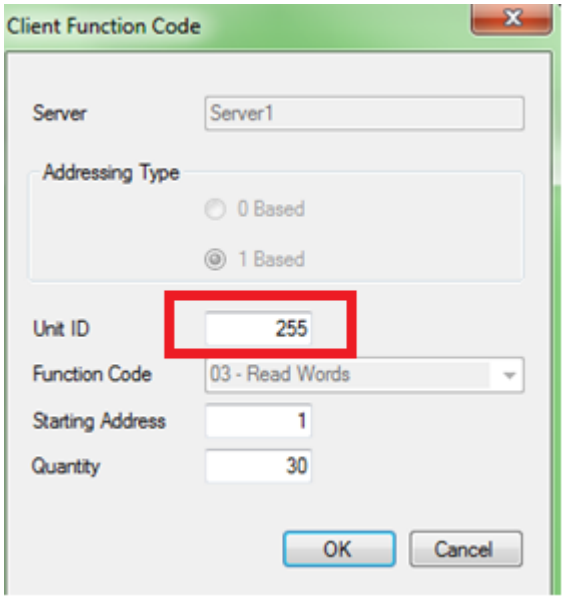
I put some conclusion here below:
1. When we activate the IO scanner (periodic variables) in Altivar web server and we put SERVER ID =255 in IO scanning line of controller/ from modbus testing tool, we will only access to configured to periodic variables that are configured in IO scanning table in web server. No it does not care with starting address of Modbus index to be read or write, as long as we request enough length or word, we will get correct values based on configured periodic variables in altivar web server.

2. If we want to read more data (not only 10 in and 10 out word), we can request the modbus messaging with SERVER ID = Configured modbus serial address in Altivar. For example if i configure modbus serial address for this Altivar become 1, so i can put SERVER ID = 1 and i can access parameters from 3011 to 64318. Even though the connection between PLC and Altivar is using Ethernet (without gateway Modbus serial to Modbus TCP/IP) , it still work to access those parameters.
3. When we dont enable periodic variables (IO scanner) in altivar web server and we put SERVER ID

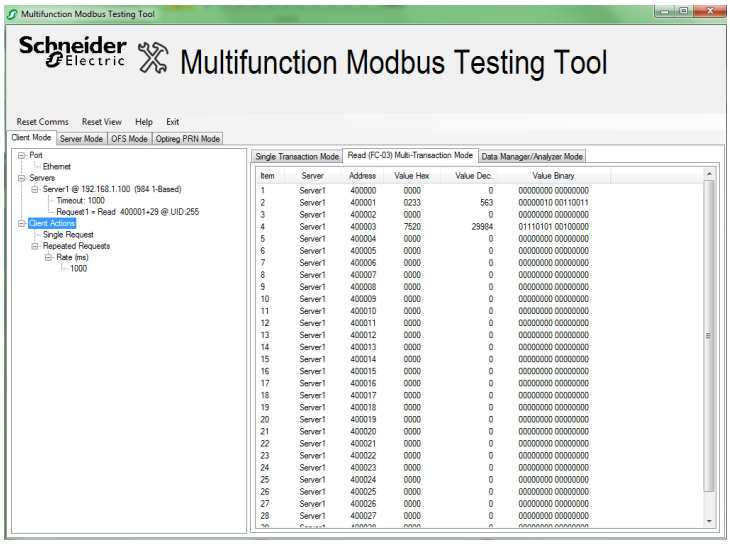
=255, the behavior will be the same like SERVER ID = modbus serial addresss of altivar.. So it will depend on starting index address and length that we request.
4. Beside SERVER ID =255, we can put SERVER ID =251 and enable periodic variables, it will be the same result. But if we dont enable periodic variables, with SERVER ID = 251, it can only access parameter 60000 to 60283.

This is the example of using Multifunction Modbus Testing Tool





You need to put Unit ID =255 in order Altivar will respond by giving the data from IO scanner table. Here you can put any starting address.



Once the Modbus testing tool has good result, it means the Altivar already can talk using Modbus TCP IP protocol.

4 PES CONFIGURATION

4.1 Implement the integration of Altivar with Motor with Variables Speed drives in PES

Please follow this document to understand how to implement configuration at PES application manager, topology Manager and project manager to implement this integration.

PES GPL - Modbus TCP-IP IOScannings.

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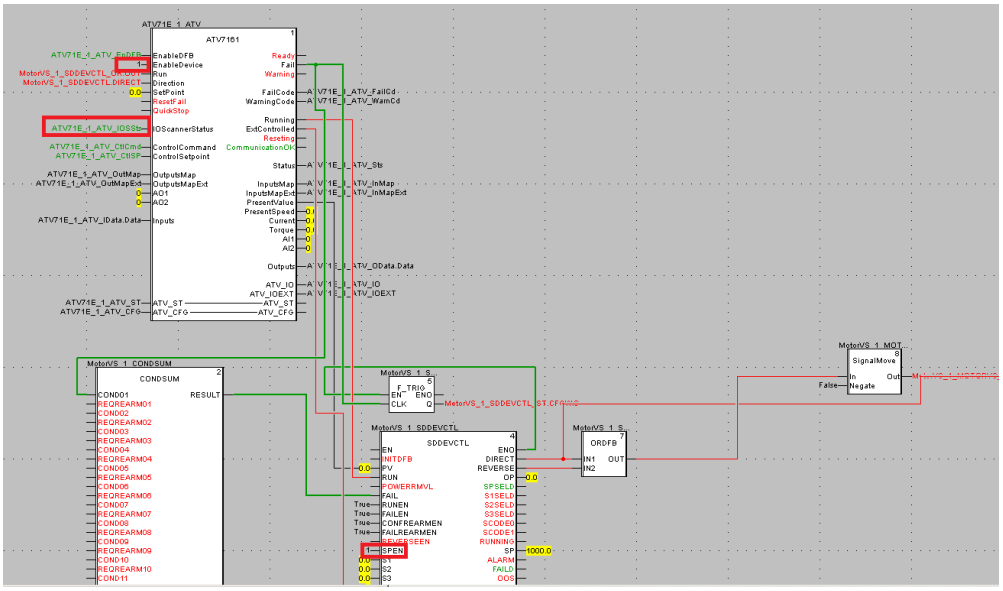
4.2 Minimum Refinement that should be done in Controller project.



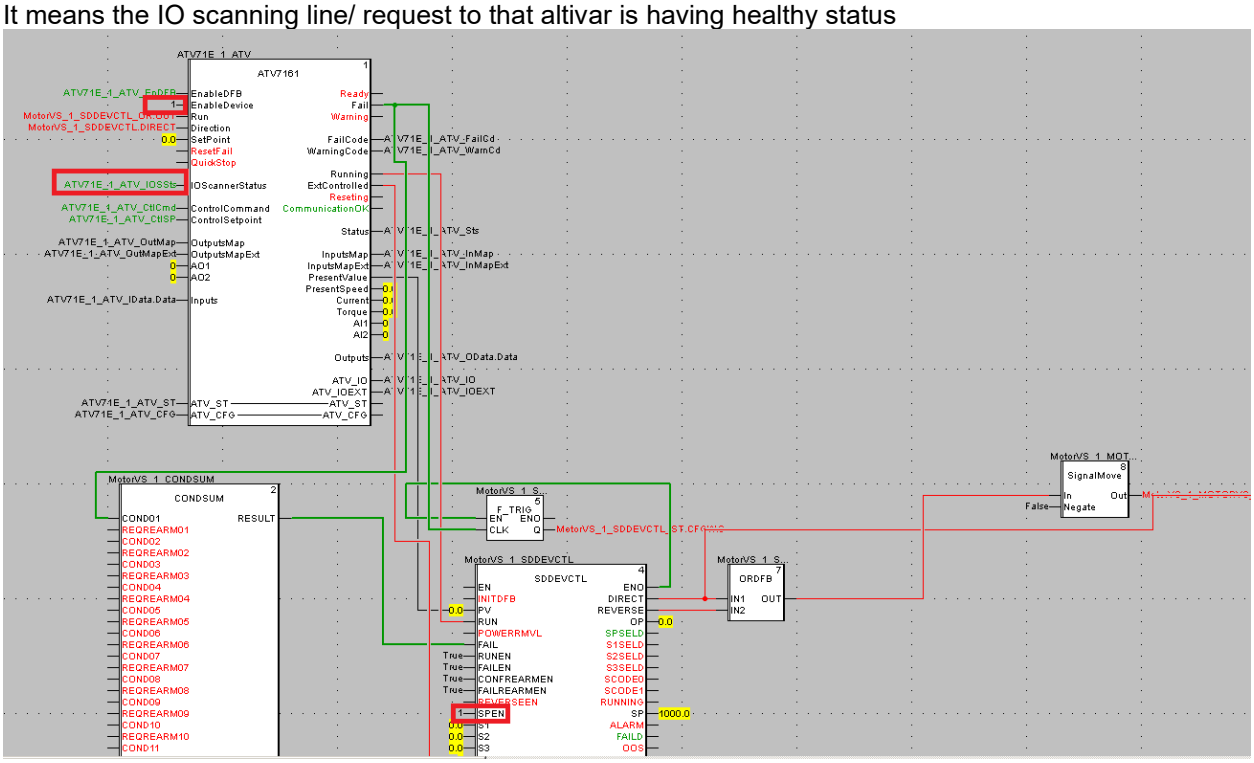
Please make sure:

1. Pin Enable device at ATV object: 1
2. Make sure the pin SPEN pin at motor block is 1, This one in order operator can change the set point
3. Make sure REVERSENE pin at motor block is 1 if we want to give the access to operator to do reverse operation.

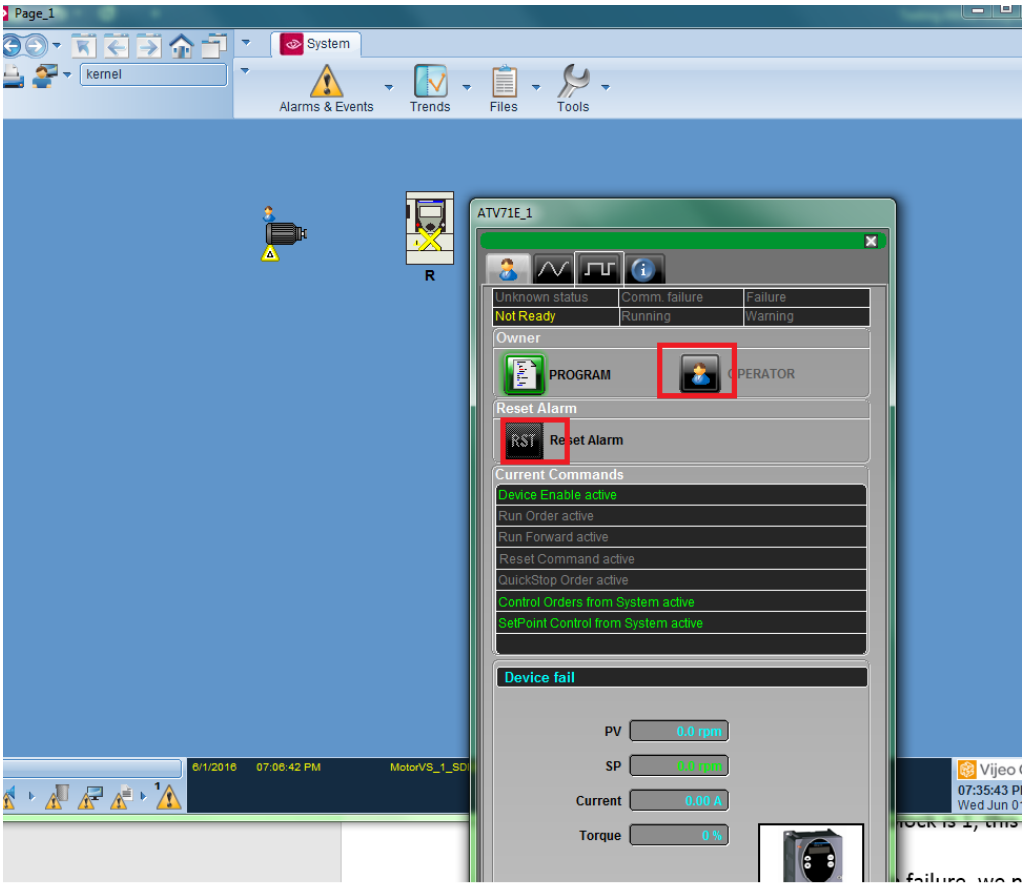
5 TESTING THE APPLICATION

5.1 Make sure the communication is ok or not

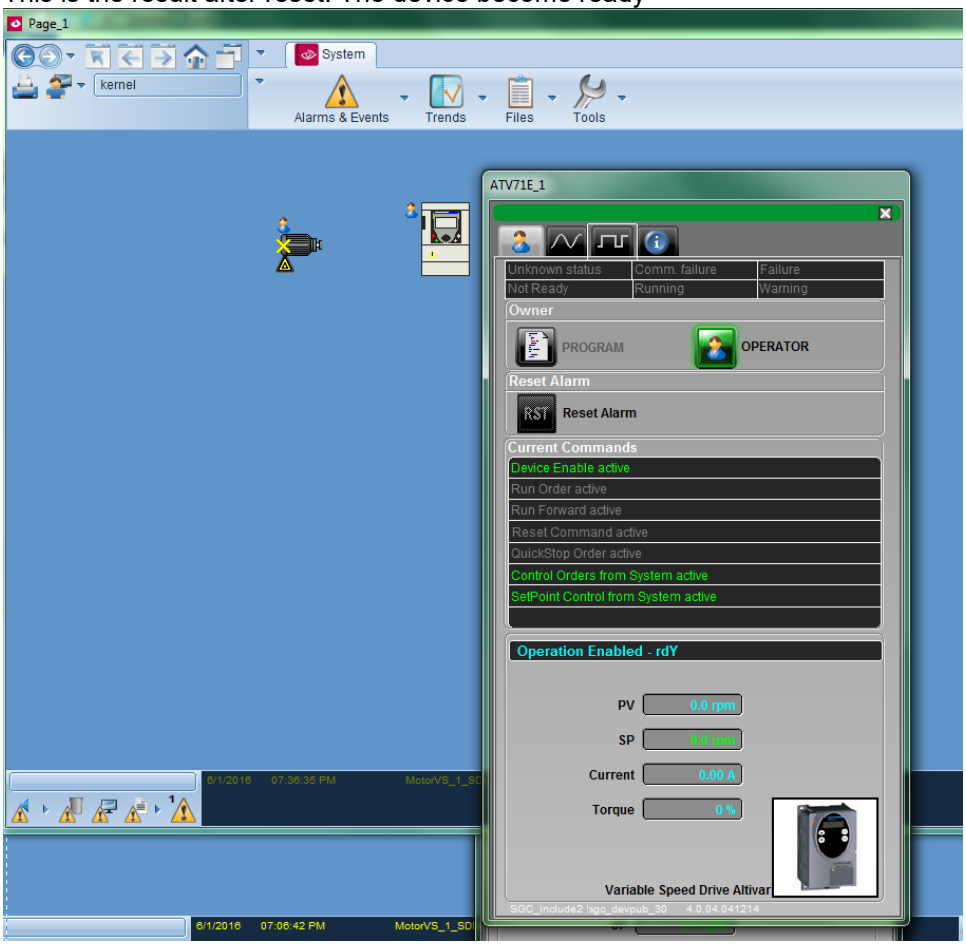
1. In Controller you can access refine online and make the sure the pin IOscannerstatus has value= 1. It means the IO scanning line/ request to that altivar is having healthy status



2. For the first time, the Altivar will have some alarm (and not ready). So we need to go to supervision, and do reset alarm. We can do reset alarm by change the owner of Altivar to Operator

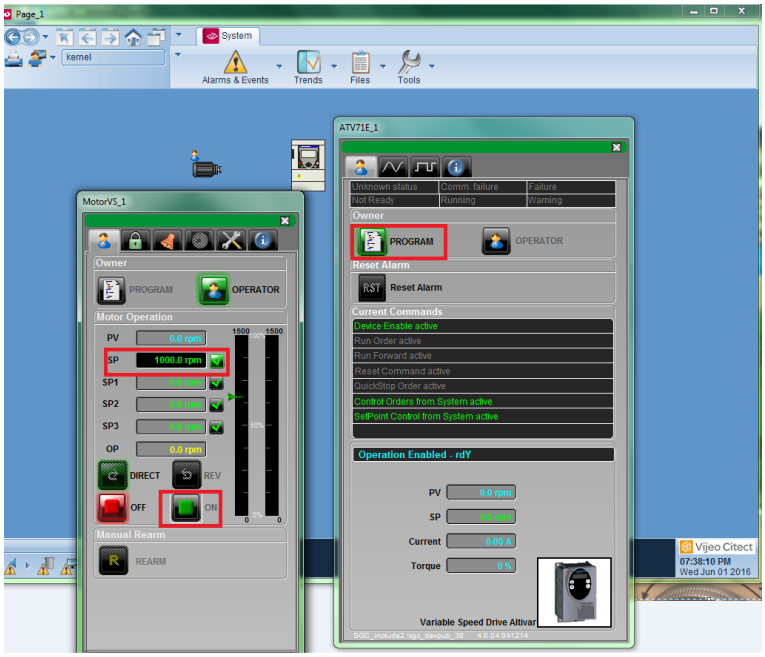


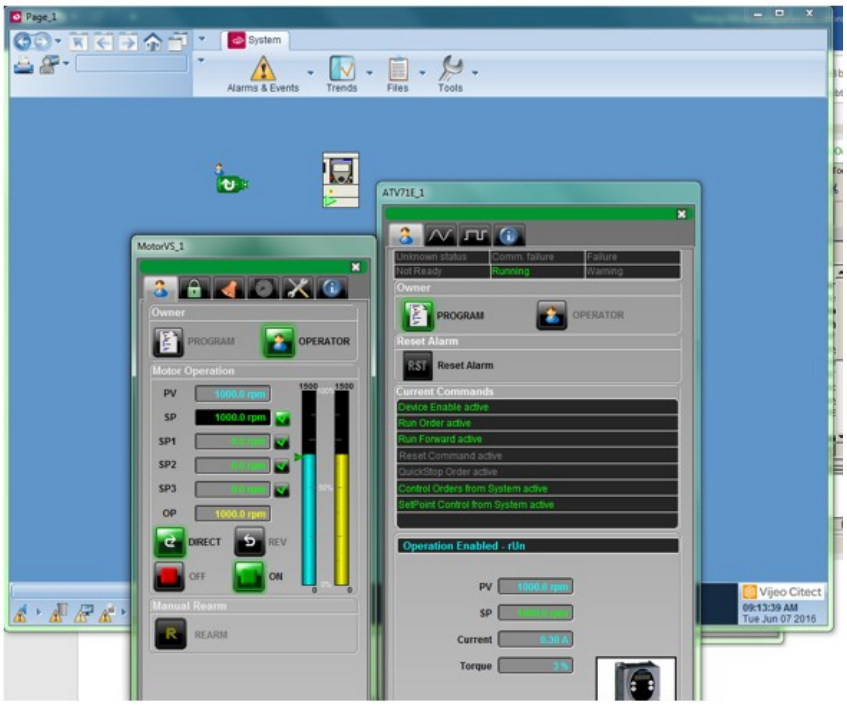
This is the result after reset. The device become ready



5.2 Testing the Run and stop operation

Once the device become ready, you need to change the owner of the Altivar to Program. So we can command the Altivar using Motor object that linked to this Altivar





If we set the speed point (SP) lower than The LOW SPEED (Configuration in the Altivar), the altivar will run at the LOW speed configuration. For example, the LOW speed configuration is 10 Hz (for example 300 rpm) then when put SP= 200 rpm, the motor will run at 300 rpm (not 200 rpm)

When we click the stop command, the motor will be stopped perfectly


MotorVS_1
Owner
PROGRAM
OPERATOR
Motor Operation
PV
0.0 rpm
SP
1000.0 rpm
SP1
SP2
SP3
OP
0.0 rpm
DIRECT
REV
OFF
ON
Manual Rearm
REARM
ATV71E_1
Unknown status
Comm. failure
Failure
Not Ready
Running
Warning
Owner
PROGRAM
OPERATOR
Reset Alarm
RST
Reset Alarm
Current Commands
Device Enable active
Run Order active
Run Forward active
Reset Command active
QuickStop Order active
Control Orders from System active
SetPoint Control from System active
Operation Enabled - rdY
PV
0.0 rpm
SP
Current
0.00 A
Torque
0 %
Variable Speed Drive Altivar