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Thermo Scientific™ CryoMed™ Controlled-Rate Freezer w/ OPC UA

OPC UA Communication

ThermoFisher SCIENTIFIC

Contents

Application:

The intent of the Control Rate Freezer OPC UA is to provide a means for the customer to communicate, monitor and have limited control of the Control Rate Freezers. This instruction will illustrate how to test the communication.

Required items and details:

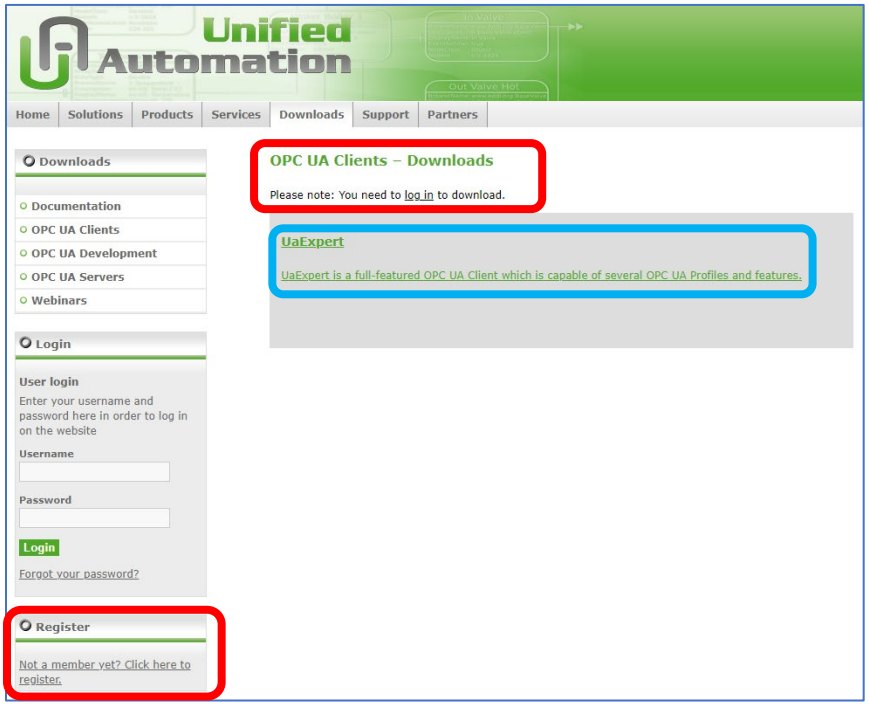
UaExpert Software
Ethernet Cable & Adapter as needed (Tablet Specific)

Software Installation:

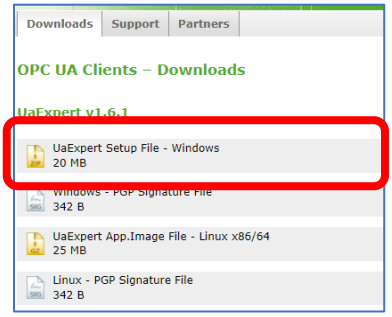
The following will illustrate the basic steps required to install UaExpert.

Downloading UaExpert

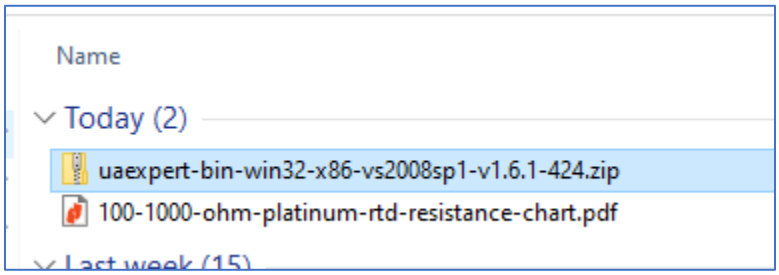
Begin by downloading the UaExpert software from the following link. [UaExpert]



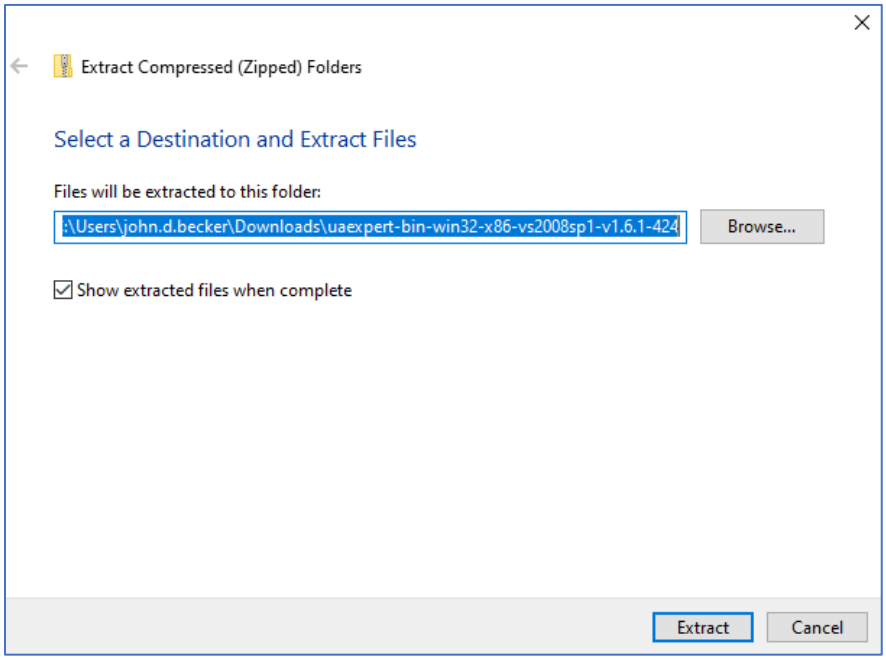
After Registering and/or logging in click on the link boxed in blue above. The screen will change to show the below. Select the file for your operating system, likely to be – Windows.



Once the file downloads open the file location. Next right click on the .zip file and select “Extract All…”



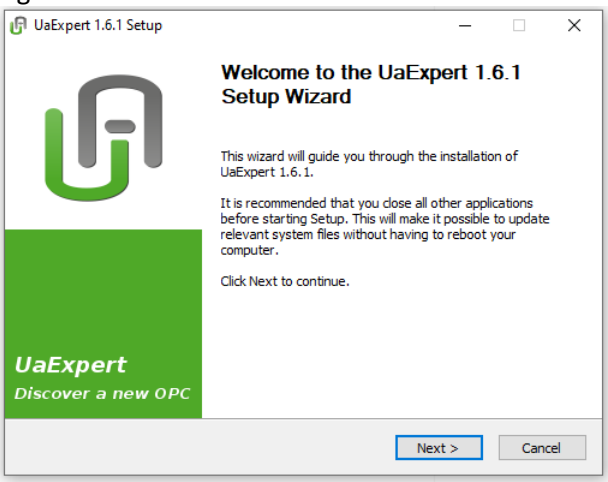
A window will appear asking where you want to extract the files to. Click “Extract”

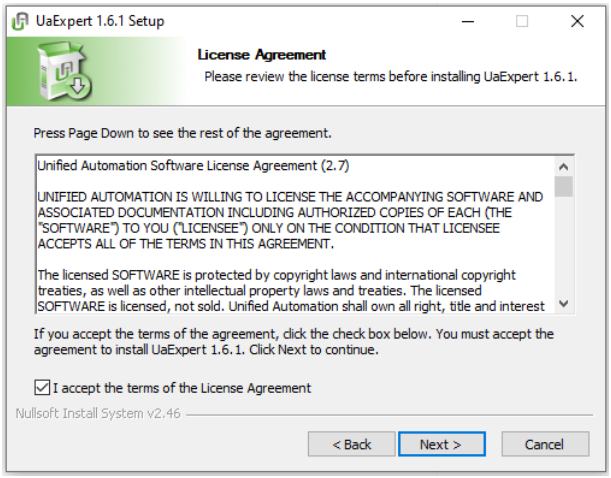


Installing UaExpert

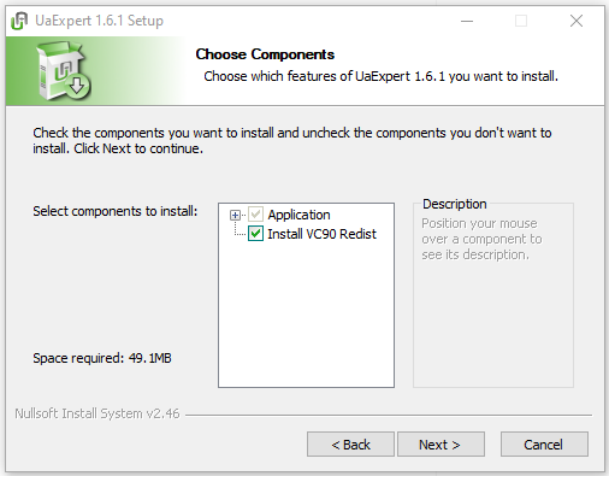
Once the files are extracted double click on the .exe to install. A warning window will pop up, click on “More Info” and then select “Run anyway”. A second warning window will pop up, click on “Yes”.

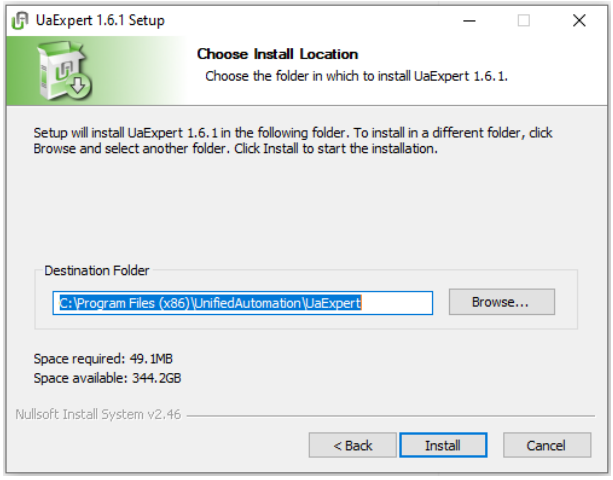
Next a Setup Wizard window will pop up. Select “Next”. IN the next window check the License Agreement box and select “Next”



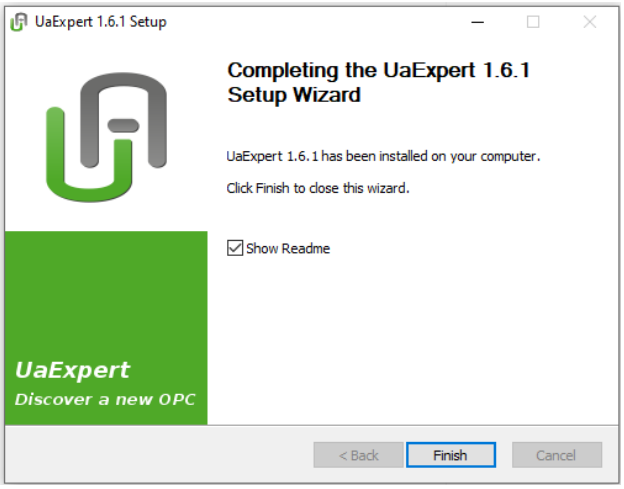


In the Choose Components window leave the boxes checked and select “Next”. In the Choose Install Location window leave the default location or browse to a location on your machine.

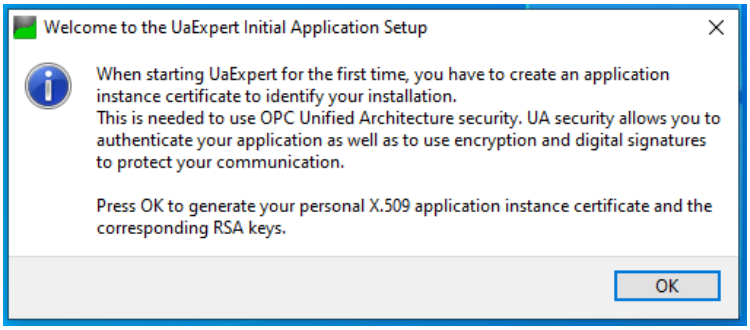




The wizard will go through a loading process. Once complete select “Finish”

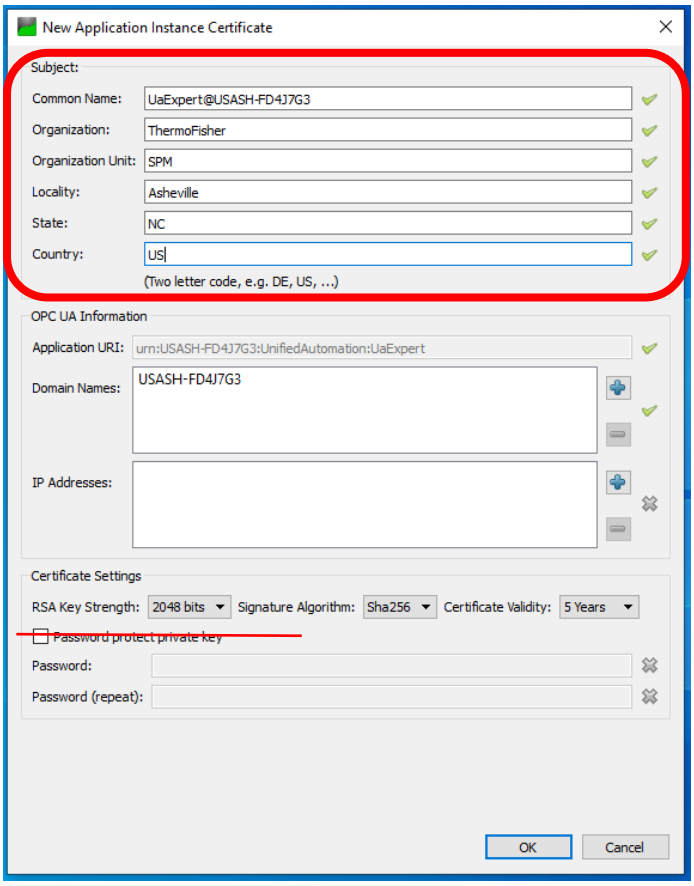


Upon intial openign of the UaExpert select “OK” on the Welcome window.

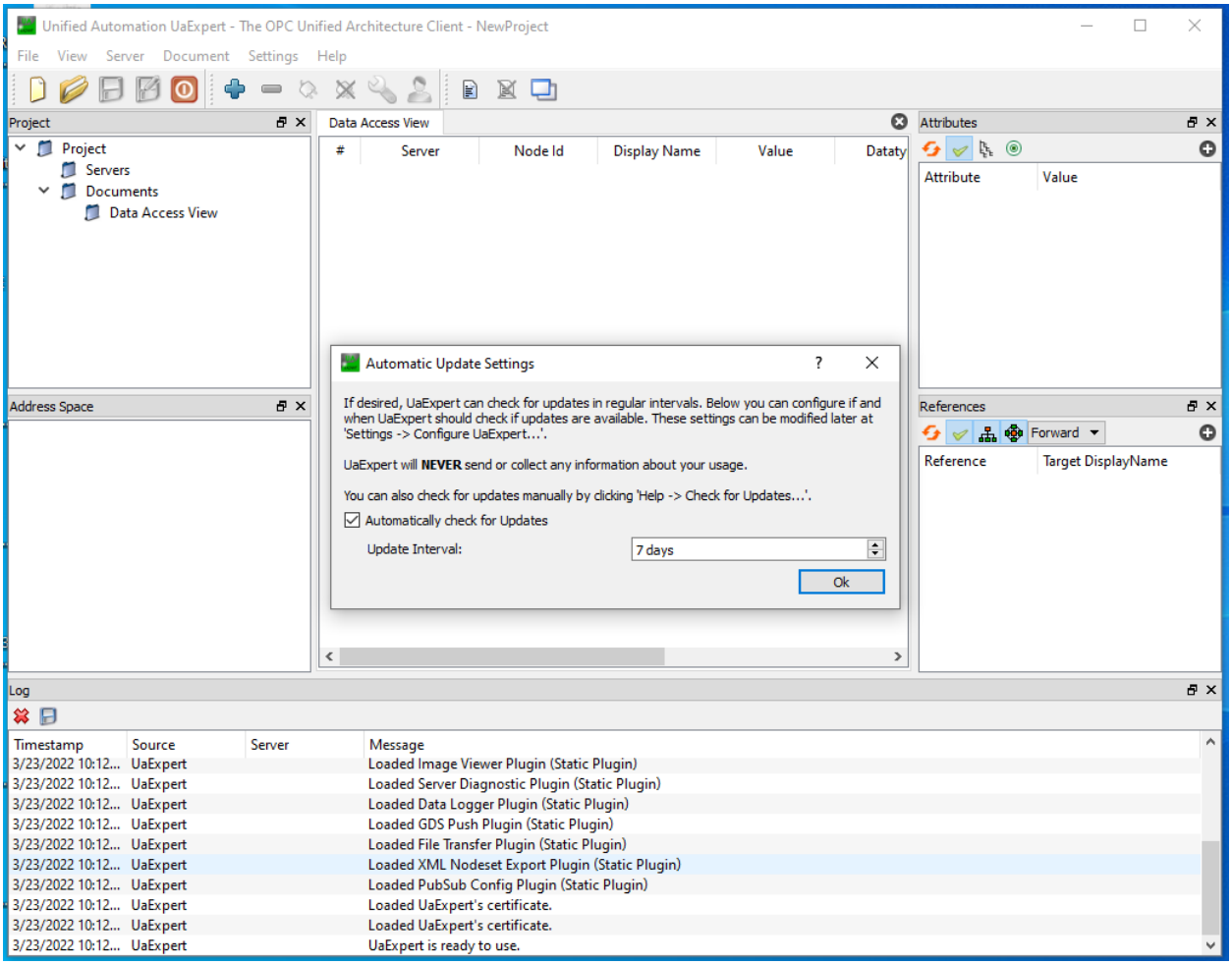


Complete the “Subject” of the New Application Instance Cert and select “OK”.

DO NOT select Password protect private key.



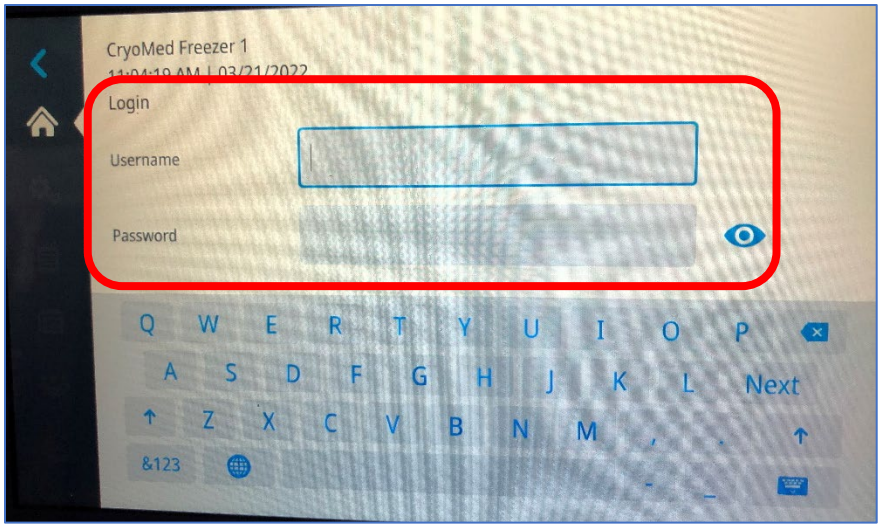
Finally select “OK” on the Automatic Update Settings.



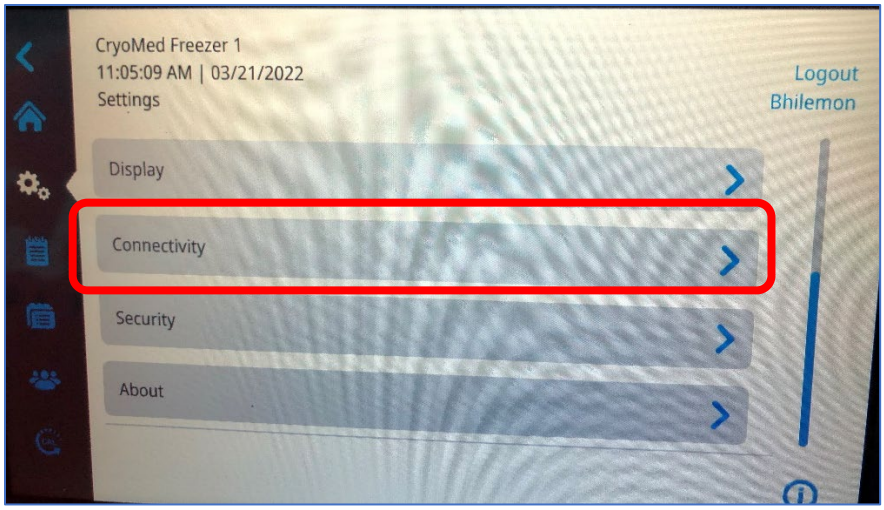
Establishing Communication to CRF:

CRF Details

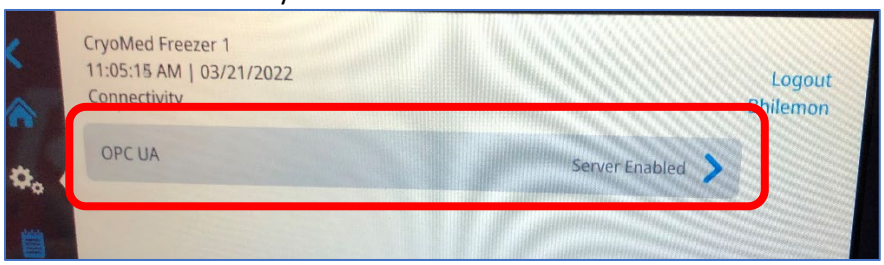
First you will need to access the CRF. Begin by logging in with the Username and Password.



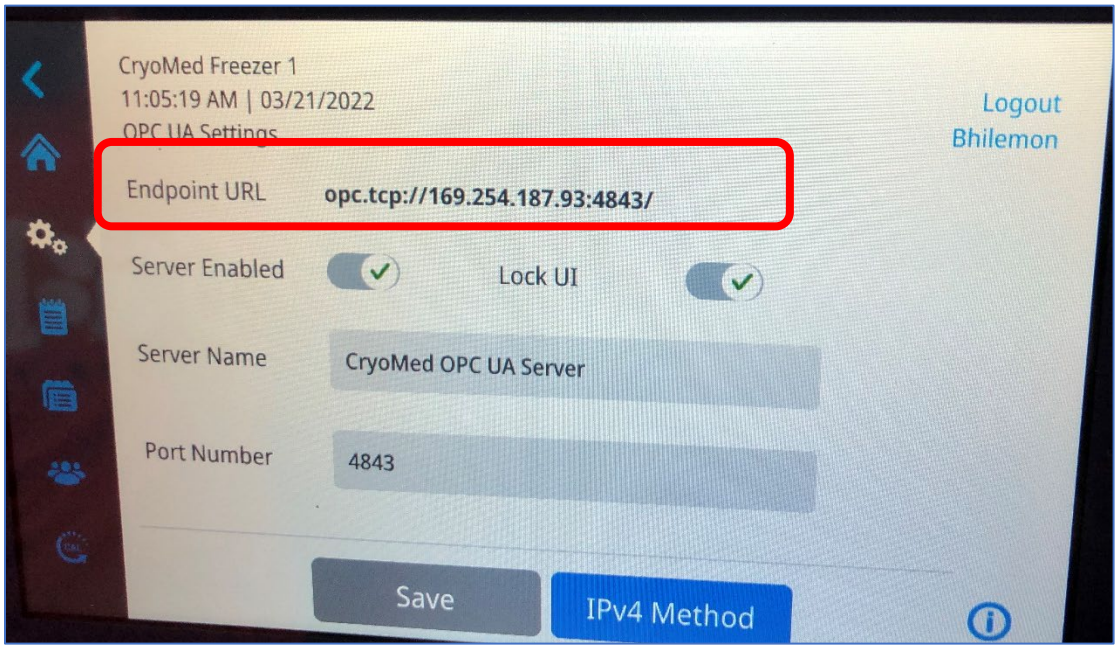
Then select “Settings” by touching the gear icon. Next touch the “Connectivity” button.



Once in the connectivity section select “OPC UA”

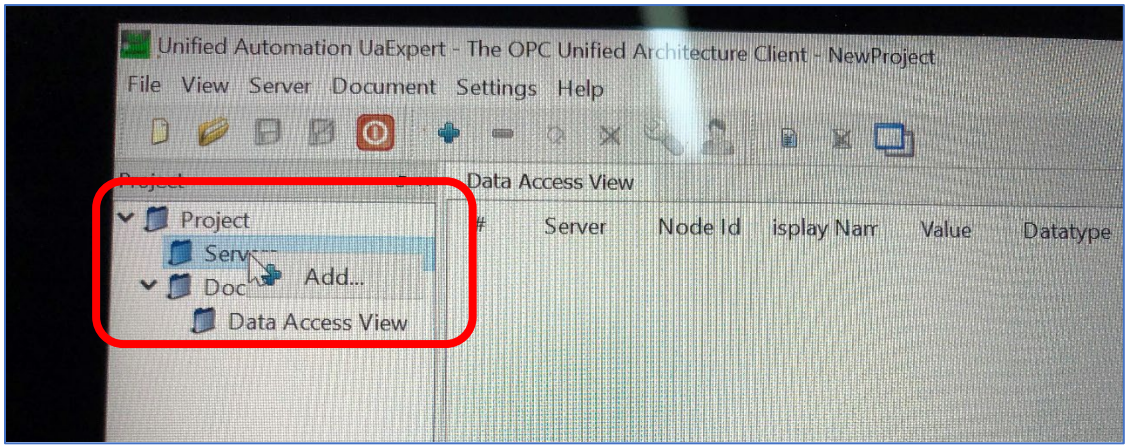


In the OPC UA Settings you will see the “Endpoint URL”, this information will be used in the UaExpert software to connect to the CRF.

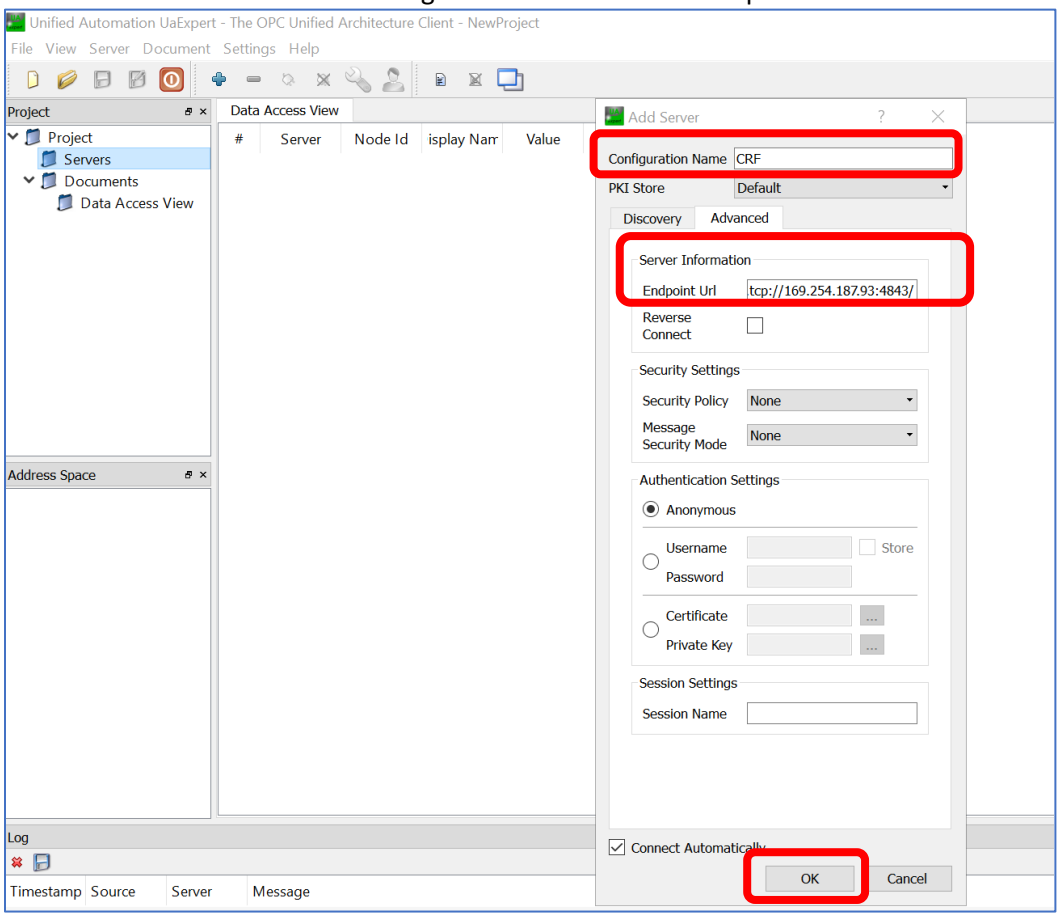


UaExpert

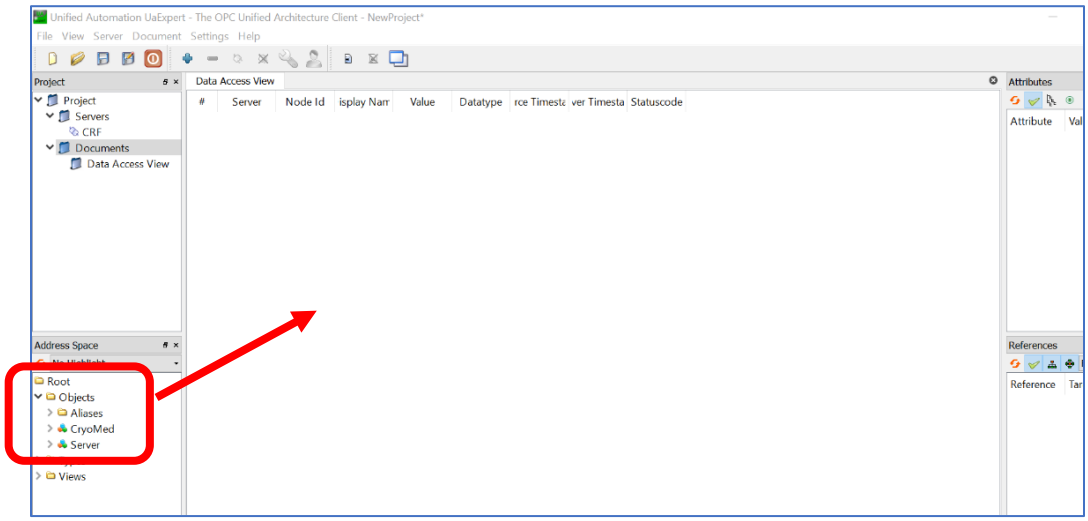
Begin by opening the UaExpert software if it is not already. Once open right click on “Servers” and then select “Add”



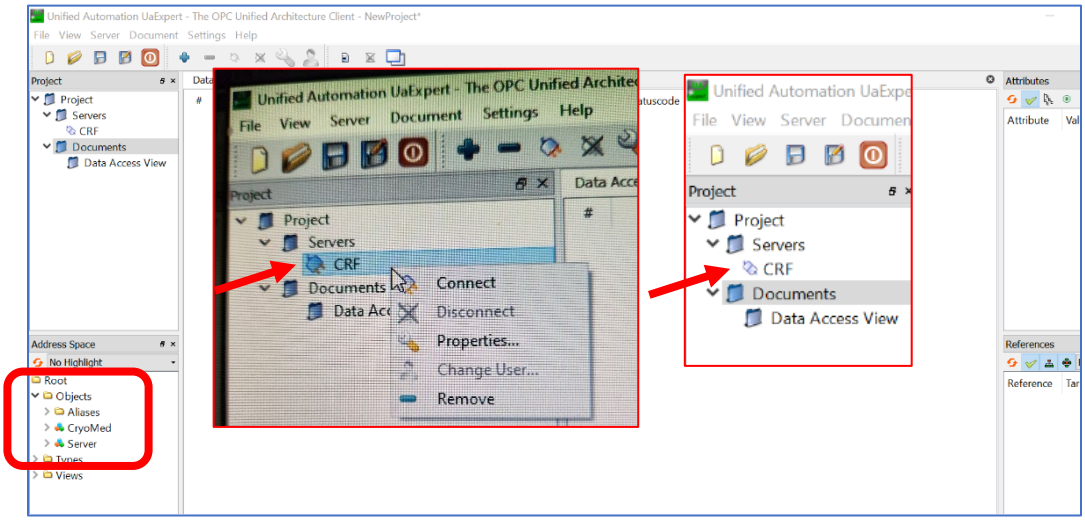
The “Add Server” window will open. Enter the “Endpoint URL” found in the OPC UA Settings of the CRF. You will also need to enter a “Configuration Name”. Once complete select “OK”



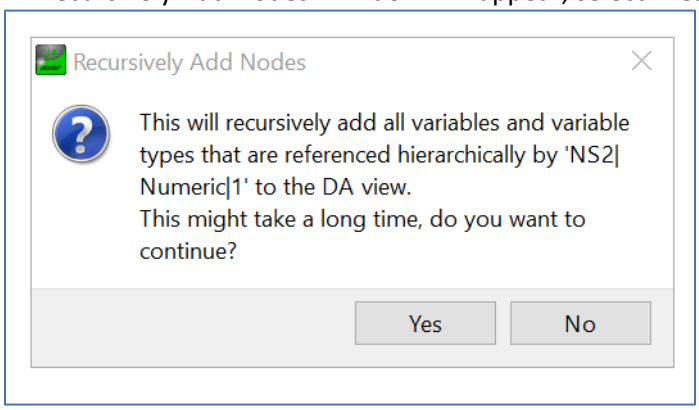
You should now see “CryoMed” listed under “Objects”. Click on “CryMed” and drag into the “Data Access View” window.



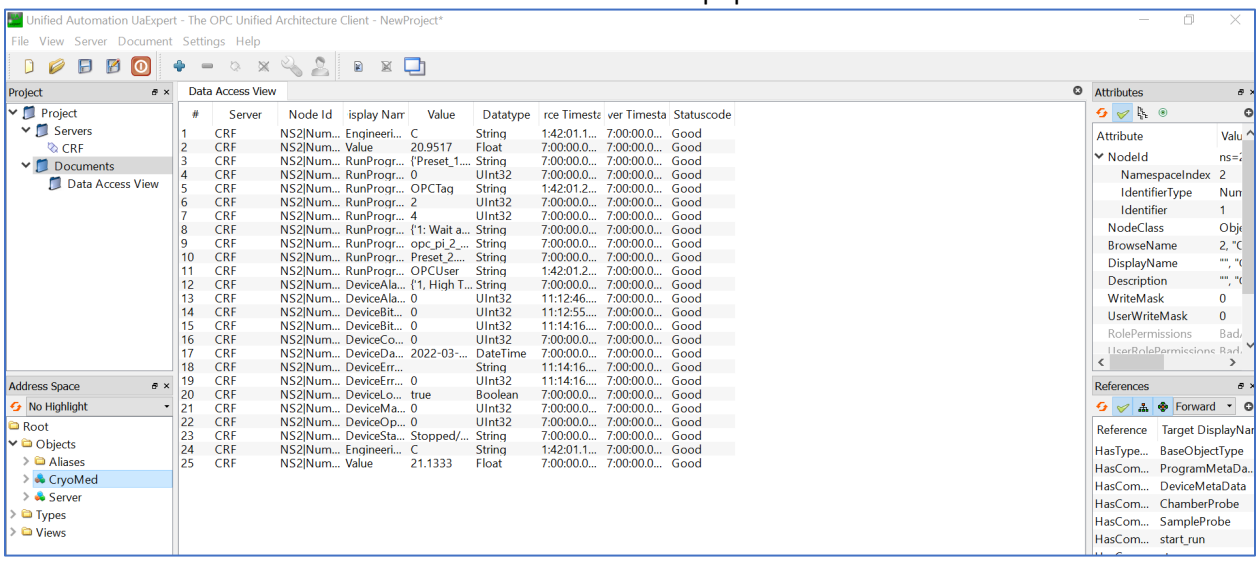
If you do not see the “CryoMed” listed under “Objects” then right click on “CRF” or the configuration name of the server. Next select “Connect”. When connected the plug icon will change as seen below.



A “Recursively Add Nodes” window will appear, select “Yes”



After a short moment the “Data Access View” window will populate with the “Nodes” seen below.



Verifying Two-way Communication:

Once the connection to the CRF is established you will ensure that the UaExpert is receiving data and can send commands.

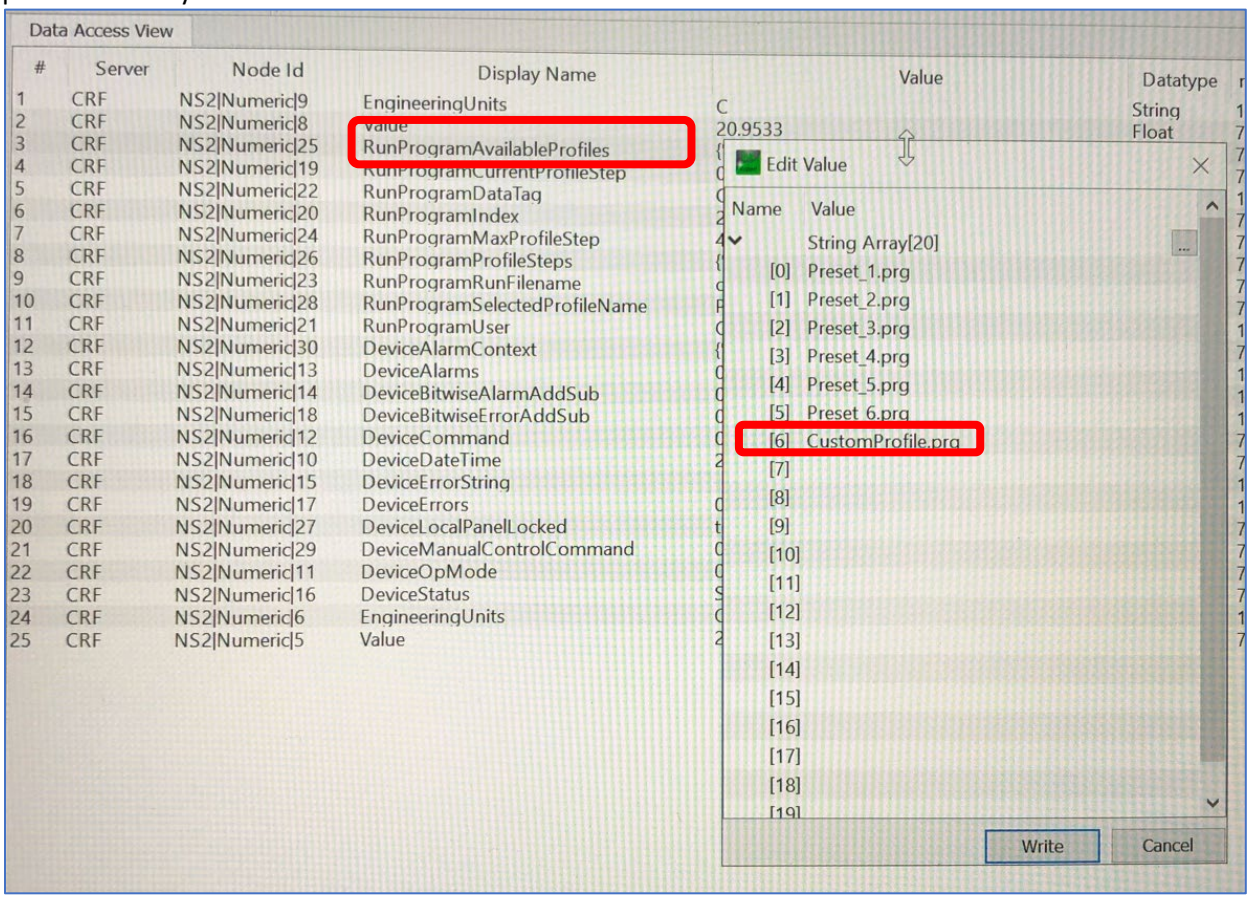
Confirm Reading Data

The first Node to check is “Values” which will report the readings from temperature sensors 1 and 2. These values should match the values displayed on the CRF. Next you want to verify the Date and Time also match. Then check that the Device Status is correct for the current operating condition.

Data Access View

#	Server	Node Id	isplay Nam	Value	Datatype	rce Timesta	ver Timesta	Statuscode
1	CRF	NS2|Num...	Engineeri...	C	String	1:42:01.1...	7:00:00.0...	Good
2	CRF	NS2|Num...	Value	20.9517	Float	7:00:00.0...	7:00:00.0...	Good
3	CRF	NS2|Num...	RunProgr...	{'Preset_1....	String	7:00:00.0...	7:00:00.0...	Good
4	CRF	NS2|Num...	RunProgr...	0	UInt32	7:00:00.0...	7:00:00.0...	Good
5	CRF	NS2|Num...	RunProgr...	OPCTag	String	1:42:01.2...	7:00:00.0...	Good
6	CRF	NS2|Num...	RunProgr...	2	UInt32	7:00:00.0...	7:00:00.0...	Good
7	CRF	NS2|Num...	RunProgr...	4	UInt32	7:00:00.0...	7:00:00.0...	Good
8	CRF	NS2|Num...	RunProgr...	{'1: Wait a...	String	7:00:00.0...	7:00:00.0...	Good
9	CRF	NS2|Num...	RunProgr...	opc_pi_2_...	String	7:00:00.0...	7:00:00.0...	Good
10	CRF	NS2|Num...	RunProgr...	Preset_2....	String	7:00:00.0...	7:00:00.0...	Good
11	CRF	NS2|Num...	RunProgr...	OPCUser	String	1:42:01.2...	7:00:00.0...	Good
12	CRF	NS2|Num...	DeviceAla...	{'1, High T...	String	7:00:00.0...	7:00:00.0...	Good
13	CRF	NS2|Num...	DeviceAla...	0	UInt32	11:12:46....	7:00:00.0...	Good
14	CRF	NS2|Num...	DeviceBit...	0	UInt32	11:12:55....	7:00:00.0...	Good
15	CRF	NS2|Num...	DeviceBit...	0	UInt32	11:14:16....	7:00:00.0...	Good
16	CRF	NS2|Num...	DeviceCo...	0	UInt32	7:00:00.0...	7:00:00.0...	Good
17	CRF	NS2|Num...	DeviceDa...	2022-03-...	DateTime	7:00:00.0...	7:00:00.0...	Good
18	CRF	NS2|Num...	DeviceErr...		String	11:14:16....	7:00:00.0...	Good
19	CRF	NS2|Num...	DeviceErr...	0	UInt32	11:14:16....	7:00:00.0...	Good
20	CRF	NS2|Num...	DeviceLo...	true	Boolean	7:00:00.0...	7:00:00.0...	Good
21	CRF	NS2|Num...	DeviceMa...	0	UInt32	7:00:00.0...	7:00:00.0...	Good
22	CRF	NS2|Num...	DeviceOp...	0	UInt32	7:00:00.0...	7:00:00.0...	Good
23	CRF	NS2|Num...	DeviceSta...	Stopped/...	String	7:00:00.0...	7:00:00.0...	Good
24	CRF	NS2|Num...	Engineeri...	C	String	1:42:01.1...	7:00:00.0...	Good
25	CRF	NS2|Num...	Value	21.1333	Float	7:00:00.0...	7:00:00.0...	Good

Finally, you can confirm the Programs match the CRF by Available Profiles. You will see the 6 preset profiles and any that the customer has added. Note the “CustomProfile” seen below



Confirm Writing Data

Once you have confirmed the UaExpert software is reading data we will write a command to ensure we have two-way communication. To do so you will click on the “Value” column of “Device Commands” and type a command (1,2, or3) from the list below the press enter. You should see the “DeviceStatus” change and the CRF should begin a run, stop a run, or advance a profile to match the command you have entered.

Device Commands -16 (only 3 commands available)

1. Start
2. Stop
3. Advance

Data Access View

#	Server	Node Id	isplay Nam	Value	Datatype	rce Timesta	ver Timesta	Statuscode
1	CRF	NS2|Num...	Engineeri...	C	String	1:42:01.1...	7:00:00.0...	Good
2	CRF	NS2|Num...	Value	20.9517	Float	7:00:00.0...	7:00:00.0...	Good
3	CRF	NS2|Num...	RunProgr...	{'Preset_1....	String	7:00:00.0...	7:00:00.0...	Good
4	CRF	NS2|Num...	RunProgr...	0	UInt32	7:00:00.0...	7:00:00.0...	Good
5	CRF	NS2|Num...	RunProgr...	OPCTag	String	1:42:01.2...	7:00:00.0...	Good
6	CRF	NS2|Num...	RunProgr...	2	UInt32	7:00:00.0...	7:00:00.0...	Good
7	CRF	NS2|Num...	RunProgr...	4	UInt32	7:00:00.0...	7:00:00.0...	Good
8	CRF	NS2|Num...	RunProgr...	{'1: Wait a...	String	7:00:00.0...	7:00:00.0...	Good
9	CRF	NS2|Num...	RunProgr...	opc_pi_2_...	String	7:00:00.0...	7:00:00.0...	Good
10	CRF	NS2|Num...	RunProgr...	Preset_2....	String	7:00:00.0...	7:00:00.0...	Good
11	CRF	NS2|Num...	RunProgr...	OPCUser	String	1:42:01.2...	7:00:00.0...	Good
12	CRF	NS2|Num...	DeviceAla...	{'1, High T...	String	7:00:00.0...	7:00:00.0...	Good
13	CRF	NS2|Num...	DeviceAla...	0	UInt32	11:12:46....	7:00:00.0...	Good
14	CRF	NS2|Num...	DeviceBit...	0	UInt32	11:12:55....	7:00:00.0...	Good
15	CRF	NS2|Num...	DeviceBit...	0	UInt32	11:14:16....	7:00:00.0...	Good
16	CRF	NS2|Num...	DeviceCo...	0	UInt32	7:00:00.0...	7:00:00.0...	Good
17	CRF	NS2|Num...	DeviceDa...	2022-03-...	DateTime	7:00:00.0...	7:00:00.0...	Good
18	CRF	NS2|Num...	DeviceErr...		String	11:14:16....	7:00:00.0...	Good
19	CRF	NS2|Num...	DeviceErr...	0	UInt32	11:14:16....	7:00:00.0...	Good
20	CRF	NS2|Num...	DeviceLo...	true	Boolean	7:00:00.0...	7:00:00.0...	Good
21	CRF	NS2|Num...	DeviceMa...	0	UInt32	7:00:00.0...	7:00:00.0...	Good
22	CRF	NS2|Num...	DeviceOp...	0	UInt32	7:00:00.0...	7:00:00.0...	Good
23	CRF	NS2|Num...	DeviceSta...	Stopped/...	String	7:00:00.0...	7:00:00.0...	Good
24	CRF	NS2|Num...	Engineeri...	C	String	1:42:01.1...	7:00:00.0...	Good
25	CRF	NS2|Num...	Value	21.1333	Float	7:00:00.0...	7:00:00.0...	Good