Motors

Automation

Energy

Transmission and Distribution

Coatings

CFW900 - AOI

Configuration

Driving efficiency and sustainability

WEG CFW900 AOI Configuration

Prerequisites

Exclusions

This document does not go into detail of setting up a controller in RSLOGIX/STUDIO 5000.

The connection and configuration of the IP network is beyond the scope of this document.

All non-communication specific parameters on the CFW900 are excluded from the configuration requirements of this document.

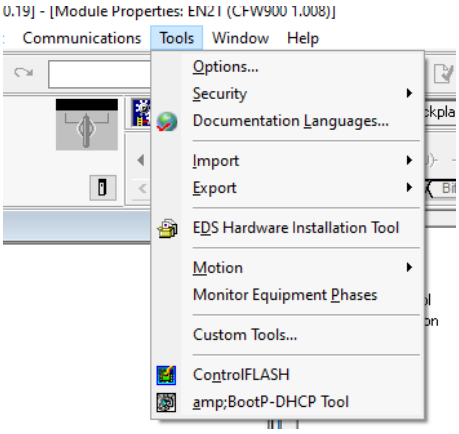
System Components

This document assumes that the following components are available and configured:

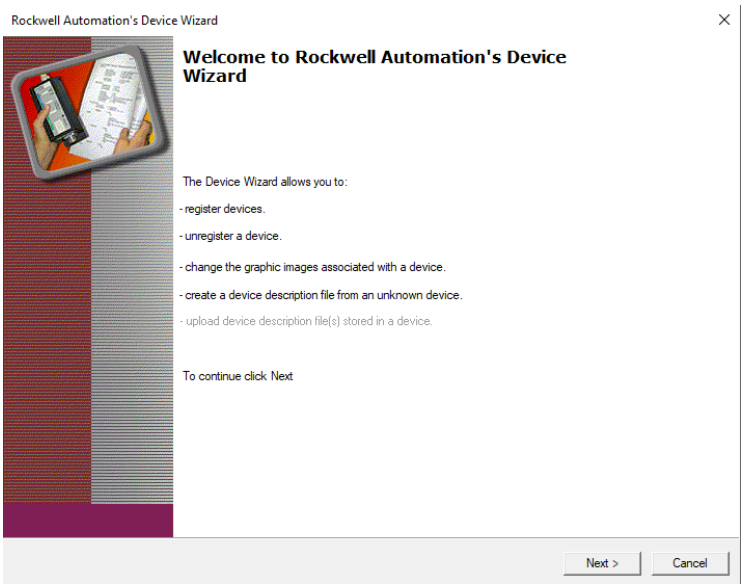
- ControlLogix or CompactLogix PLC controller running version 20 (or higher) firmware
- 10/100 or faster ethernet network with IP connectivity and IP addresses for both the PLC and CFW900

EDS Installation

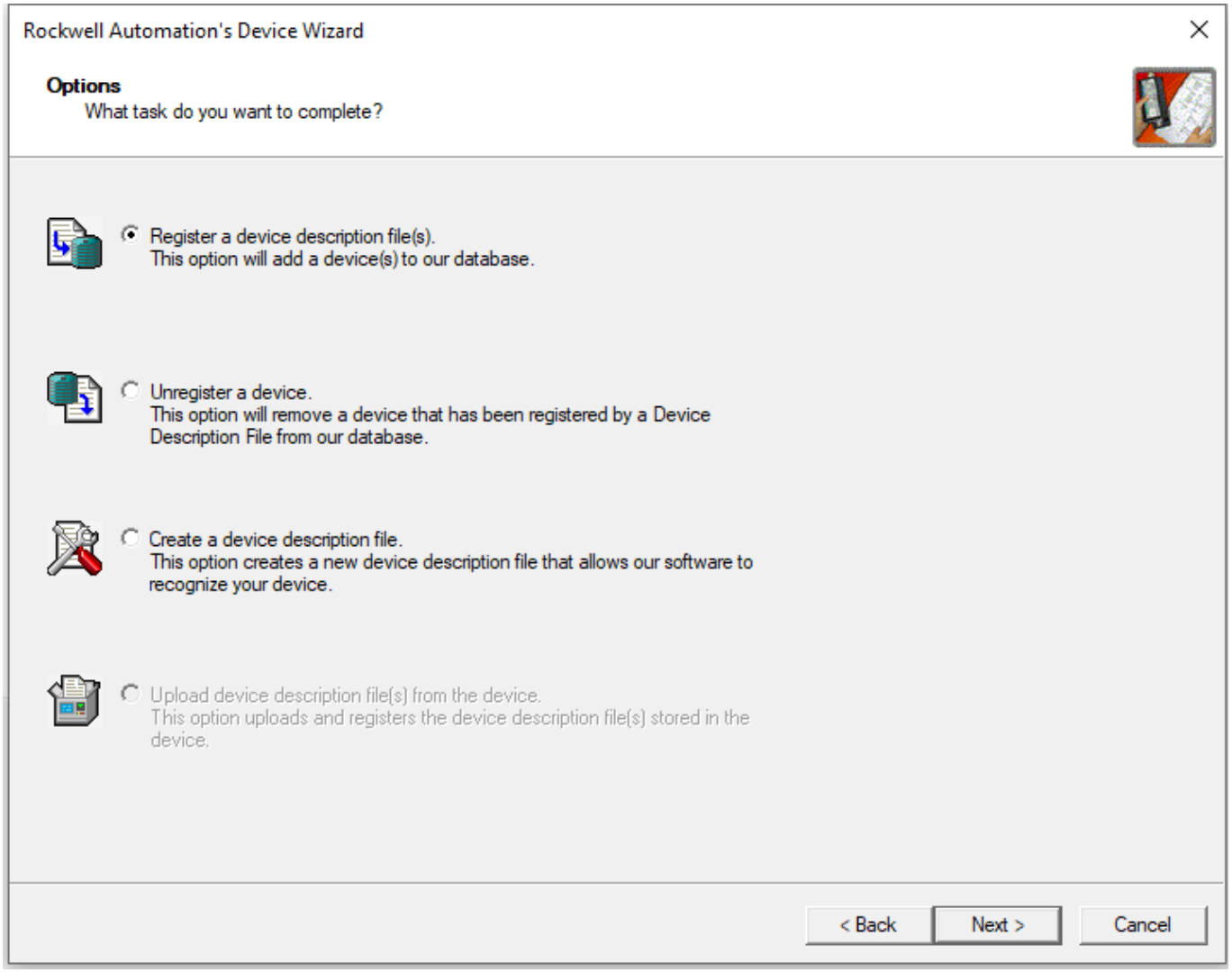
Begin by adding the EDS file for the CFW900 if it is not already in the project.



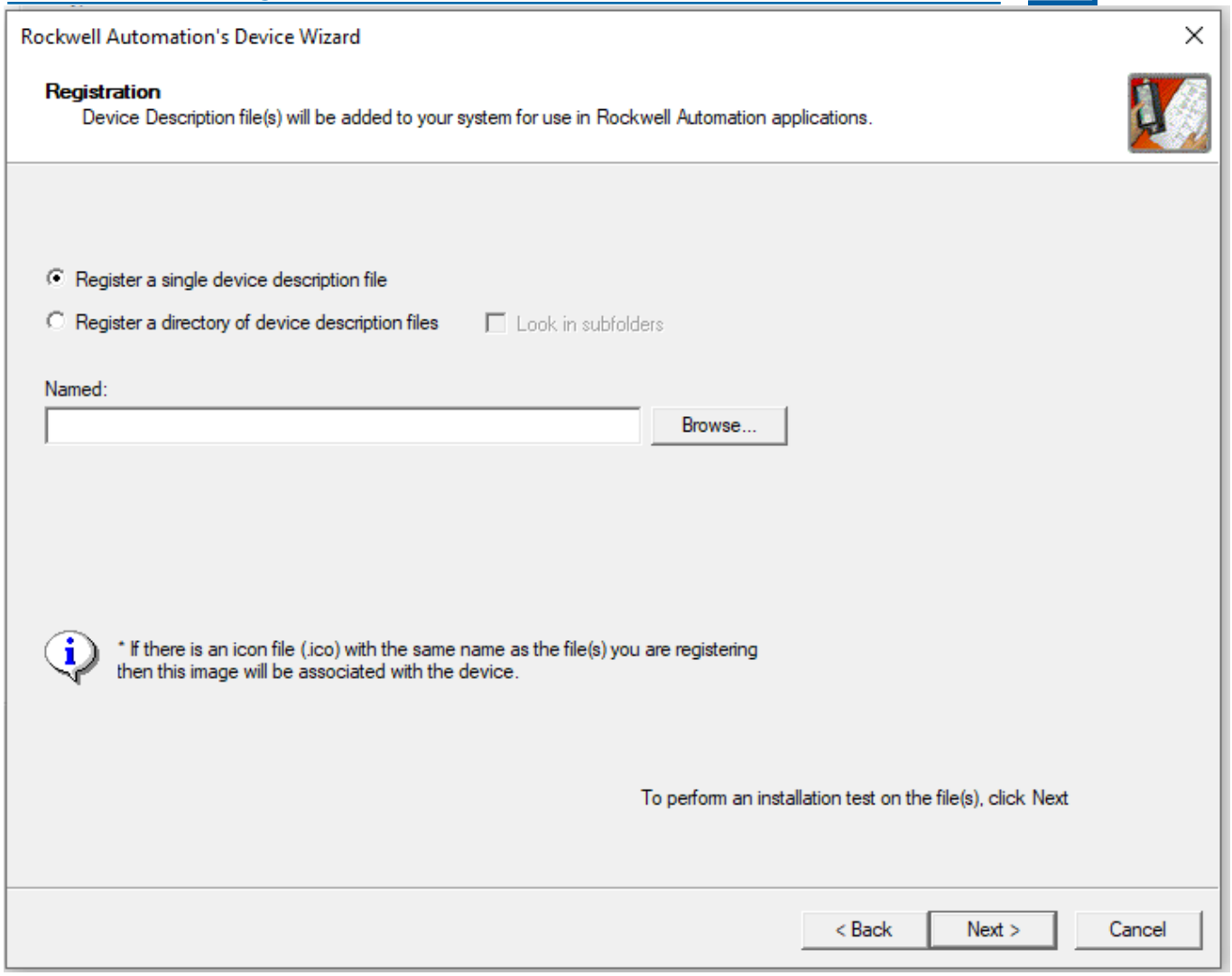
From inside Logix Designer, go to Tools -> EDS Hardware Installation Tool



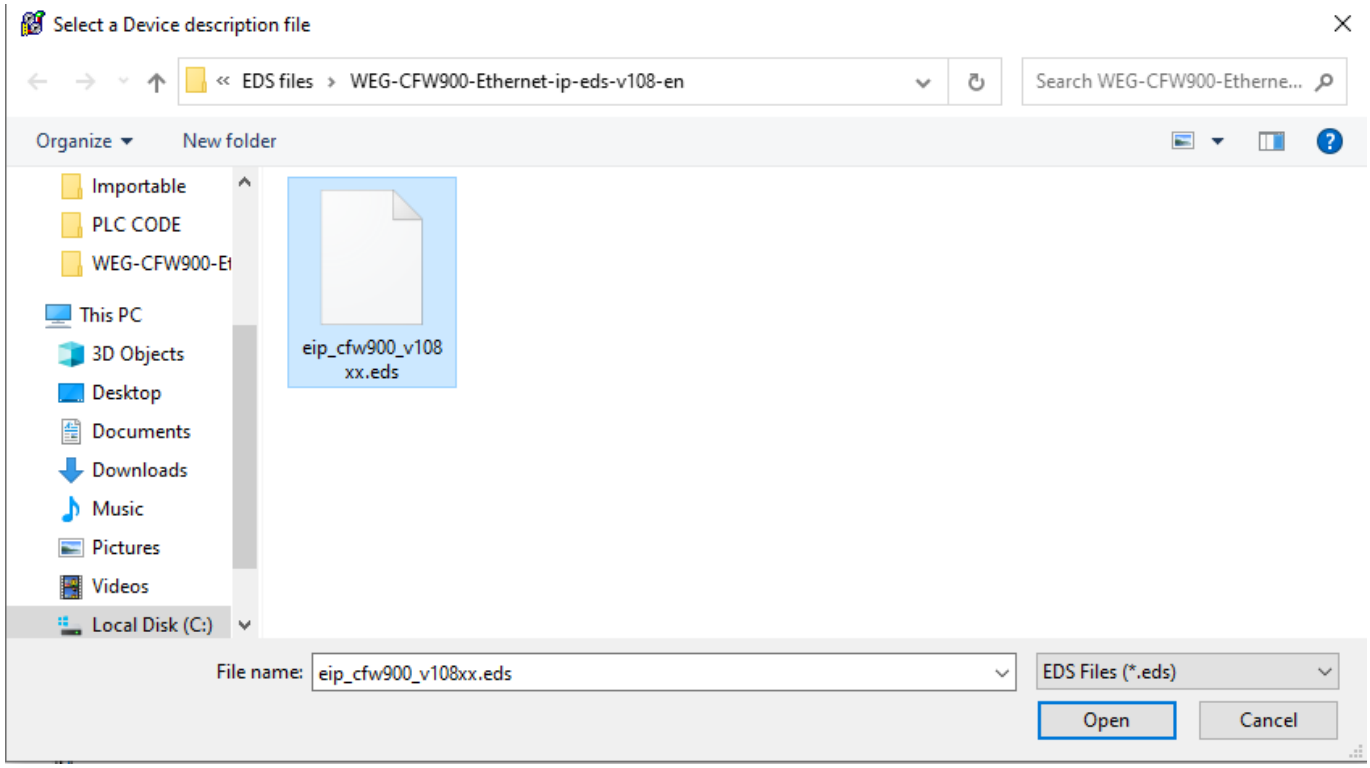
Click Next >



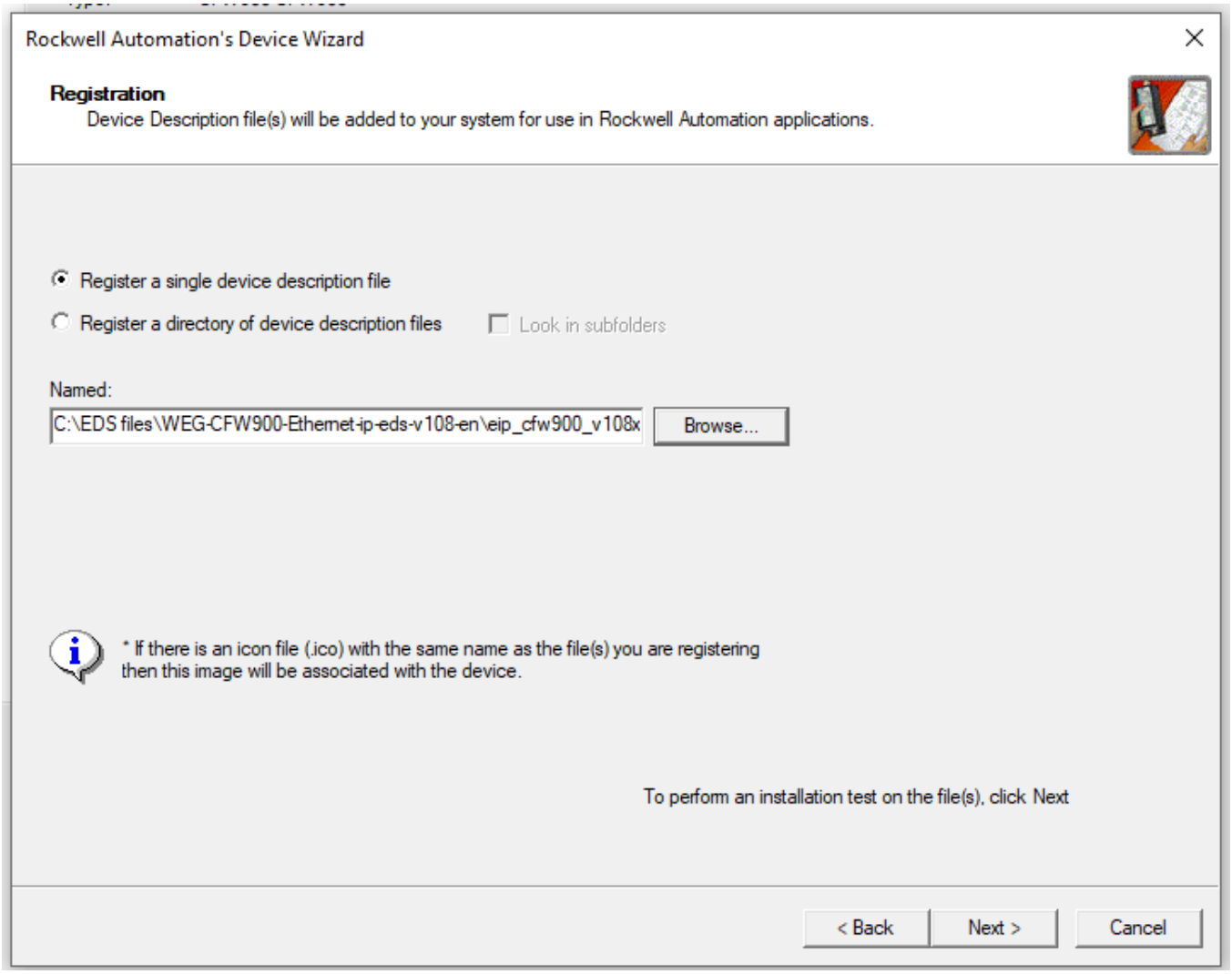
Click Next >



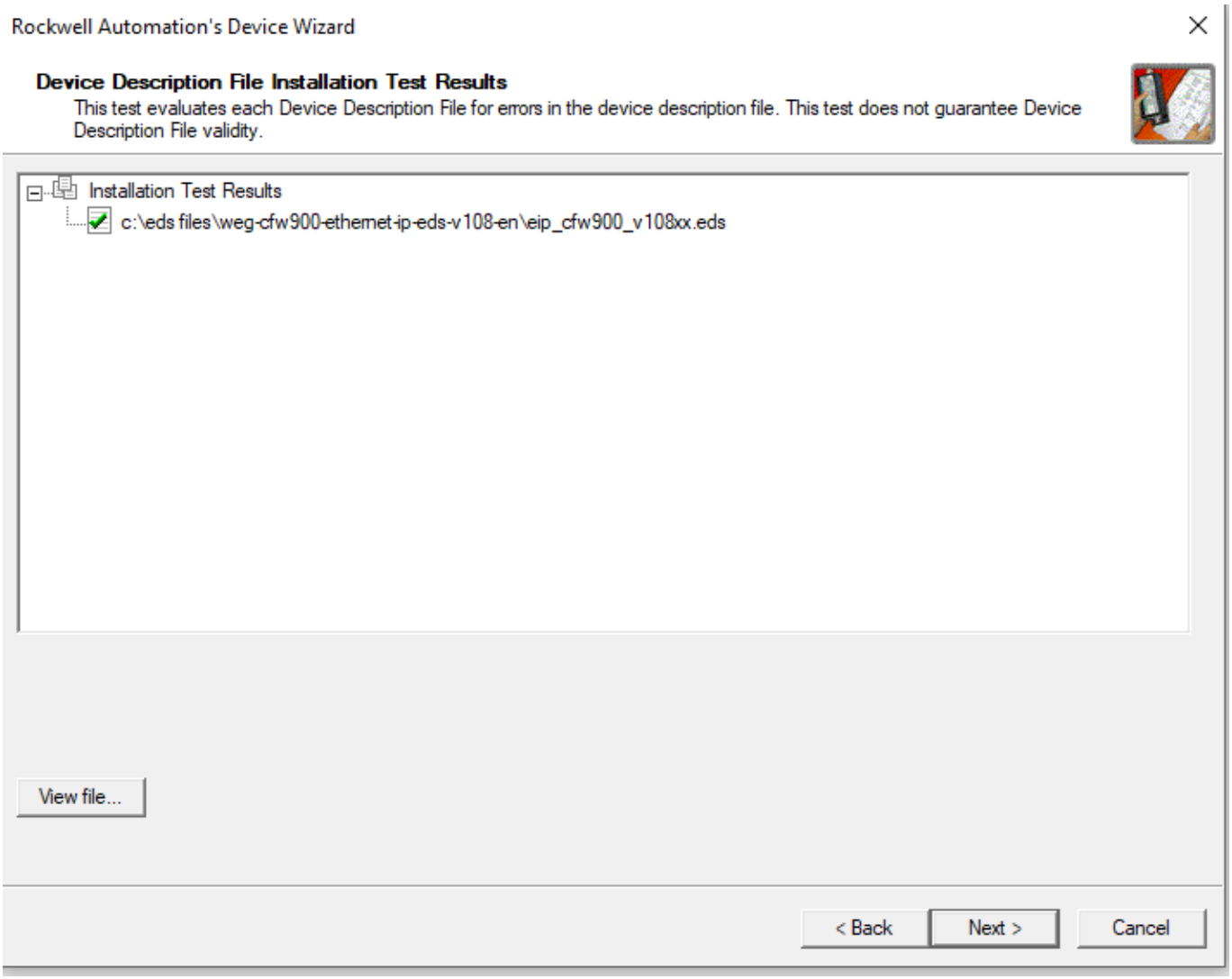
Click Browse …



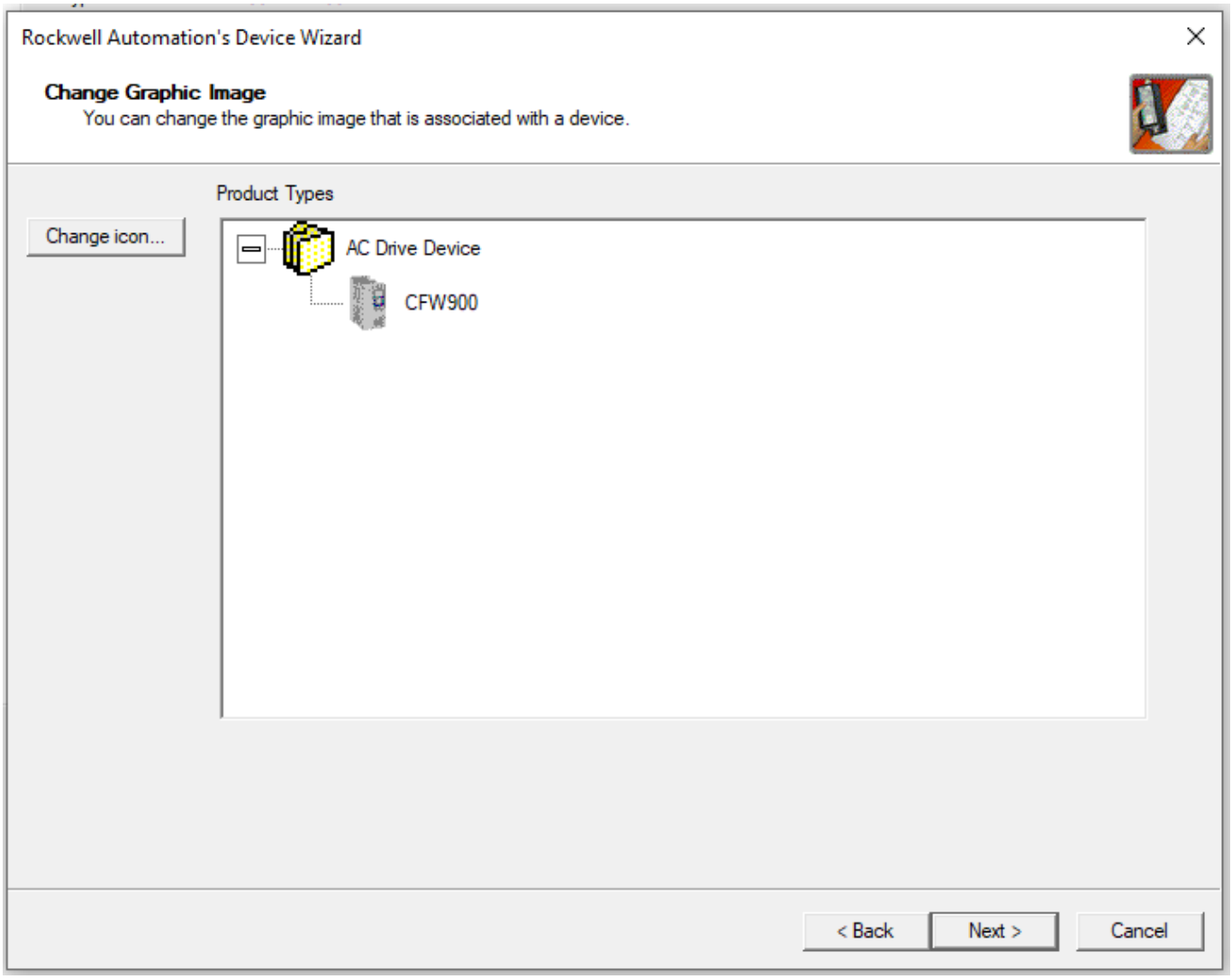
Browse to where the downloaded eds file is located and click Open


Rockwell Automation's Device Wizard
Registration
Device Description file(s) will be added to your system for use in Rockwell Automation applications.
Register a single device description file
Register a directory of device description files
Look in subfolders
Named:
C:\EDS files\WEG-CFW900-Ethernet-ip-eds-v108-en\eip_cfw900_v108x
Browse...
* If there is an icon file (.ico) with the same name as the file(s) you are registering then this image will be associated with the device.
To perform an installation test on the file(s), click Next
< Back
Next >
Cancel

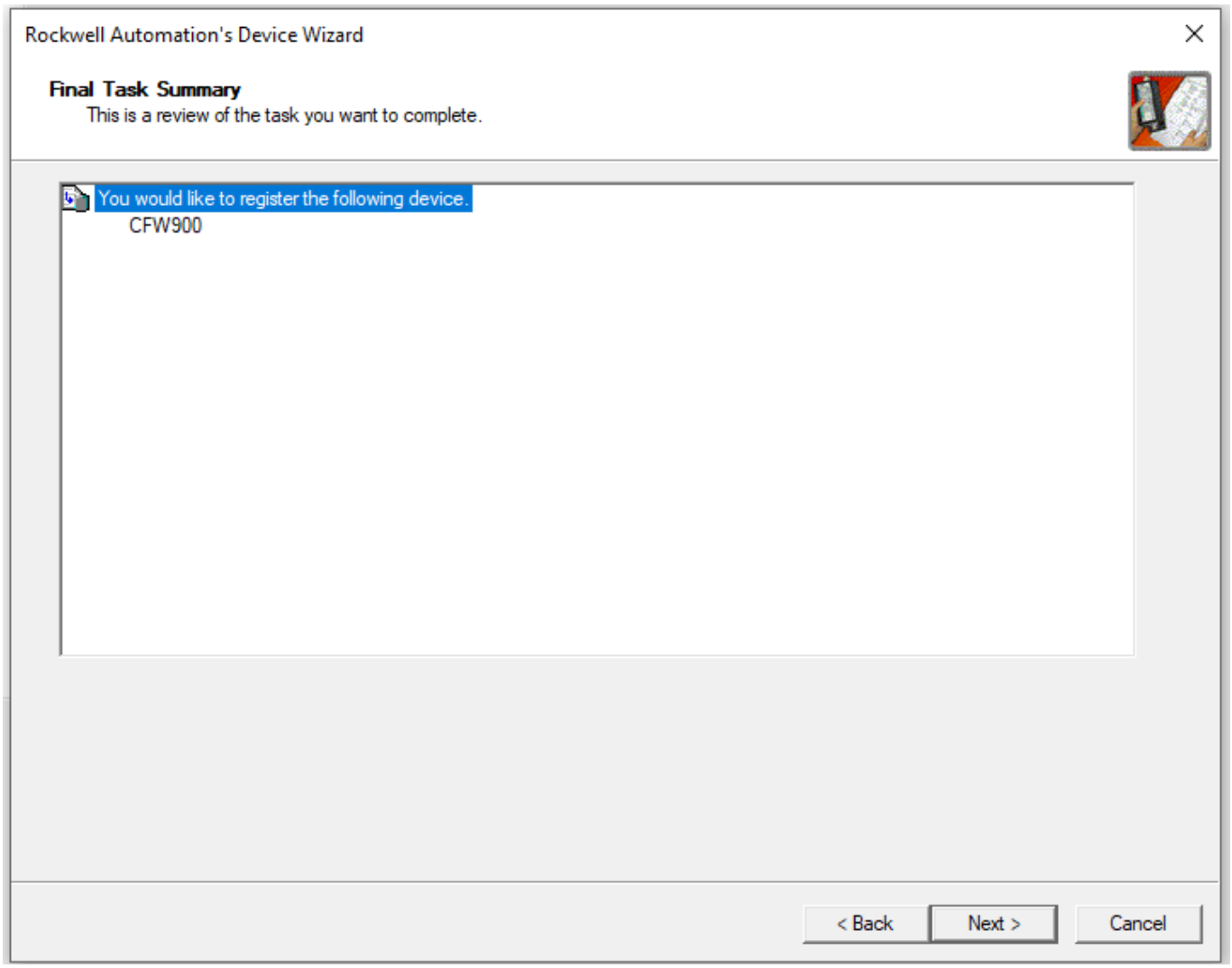
Click Next >



There should be a green checkmark. Click Next >

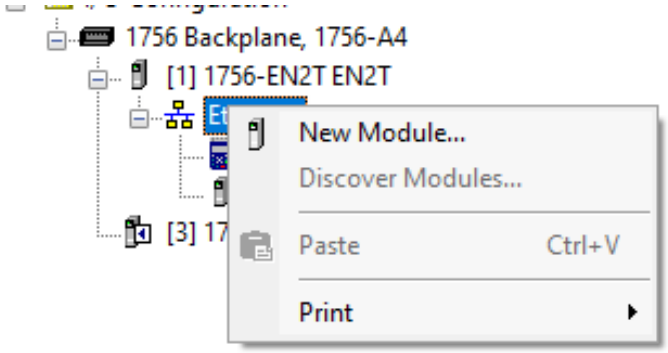


Click Next >

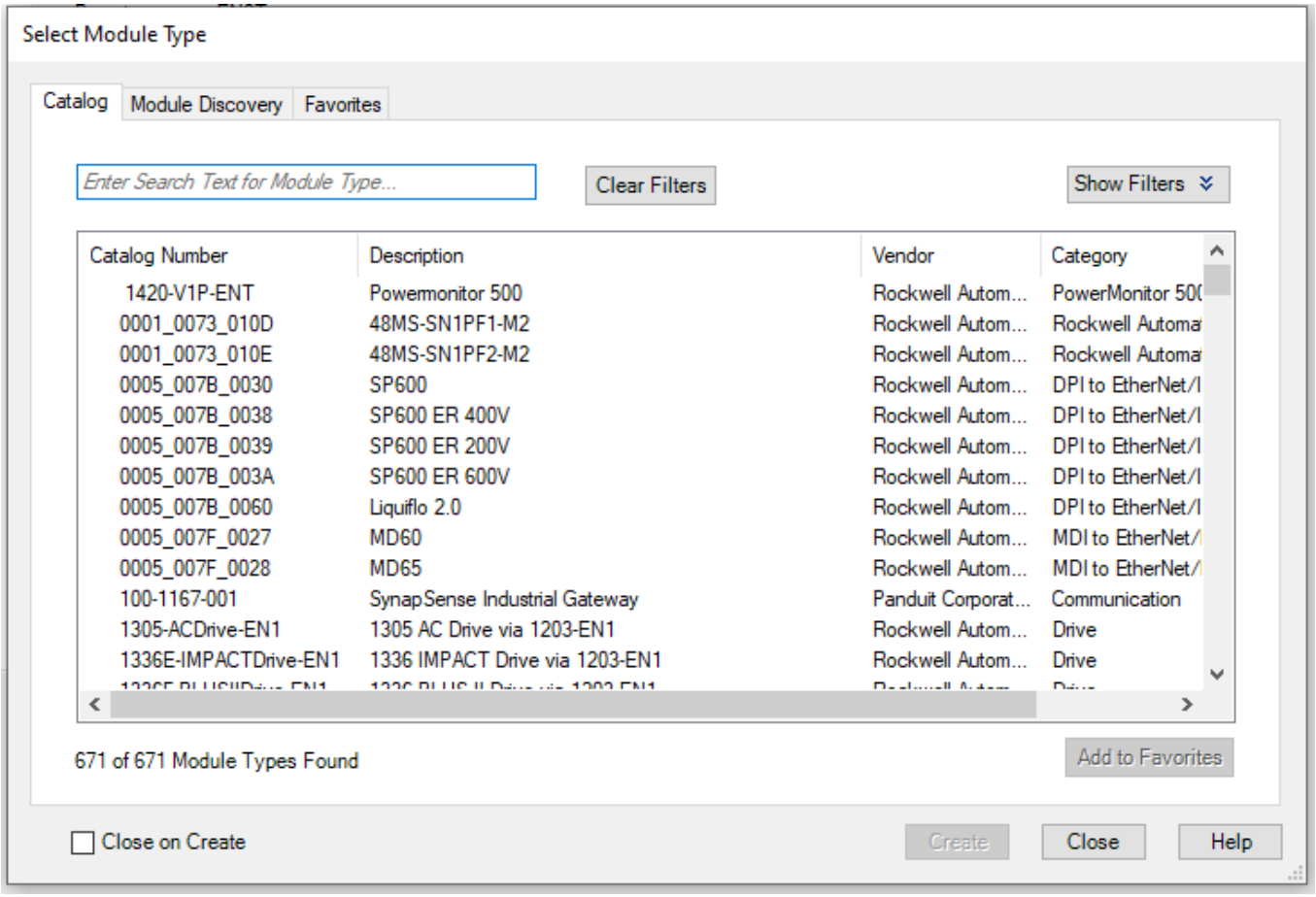

Rockwell Automation's Device Wizard
Final Task Summary
This is a review of the task you want to complete.
You would like to register the following device.
CFW900
< Back
Next >
Cancel

Click Next >

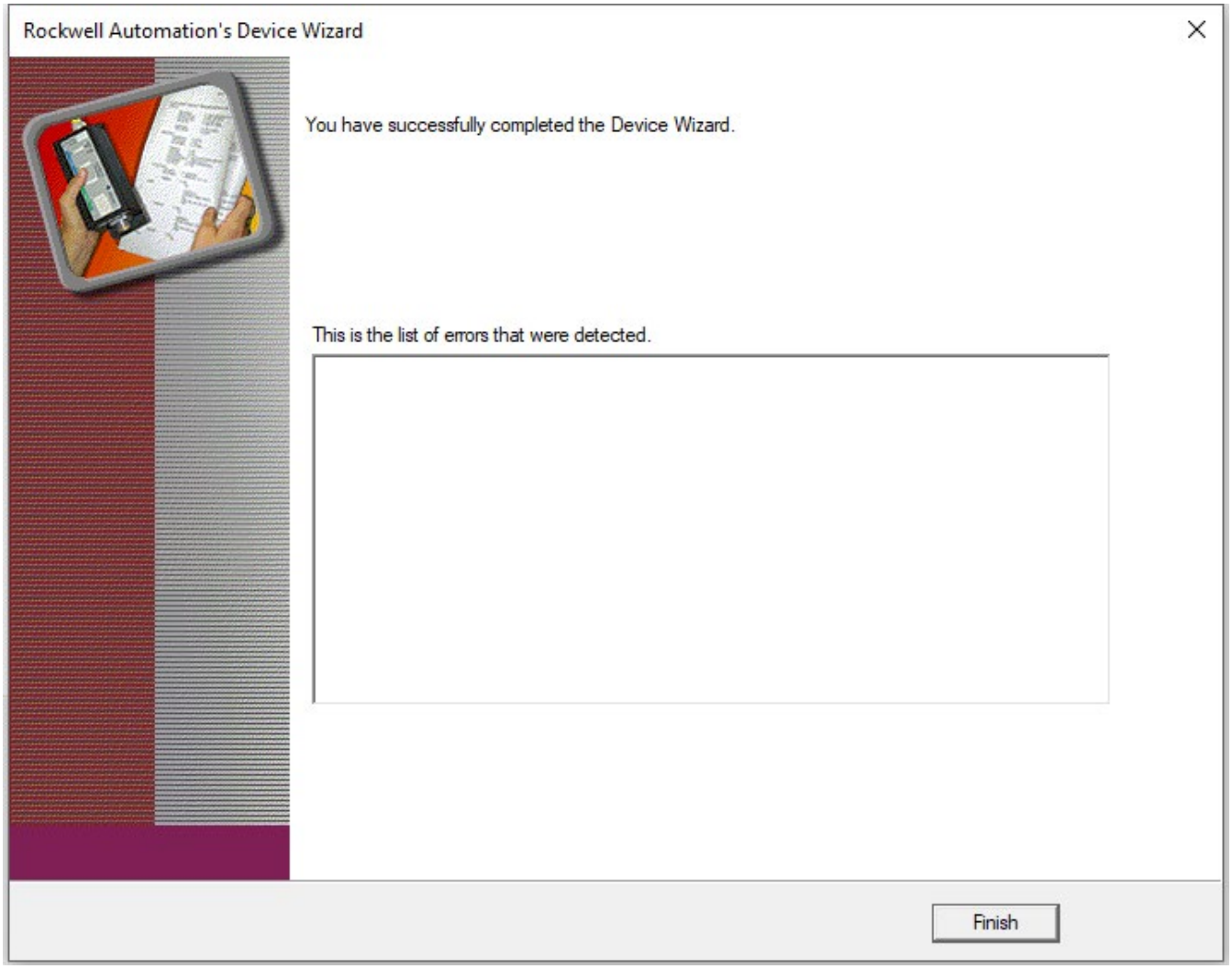
Create the Ethernet/IP Device



In the device tree, right click on the Ethernet bus that will contain the CFW900 and click New Module….



In the Select Module Type dialog box, enter in “CFW900” in the search field



Click Finish

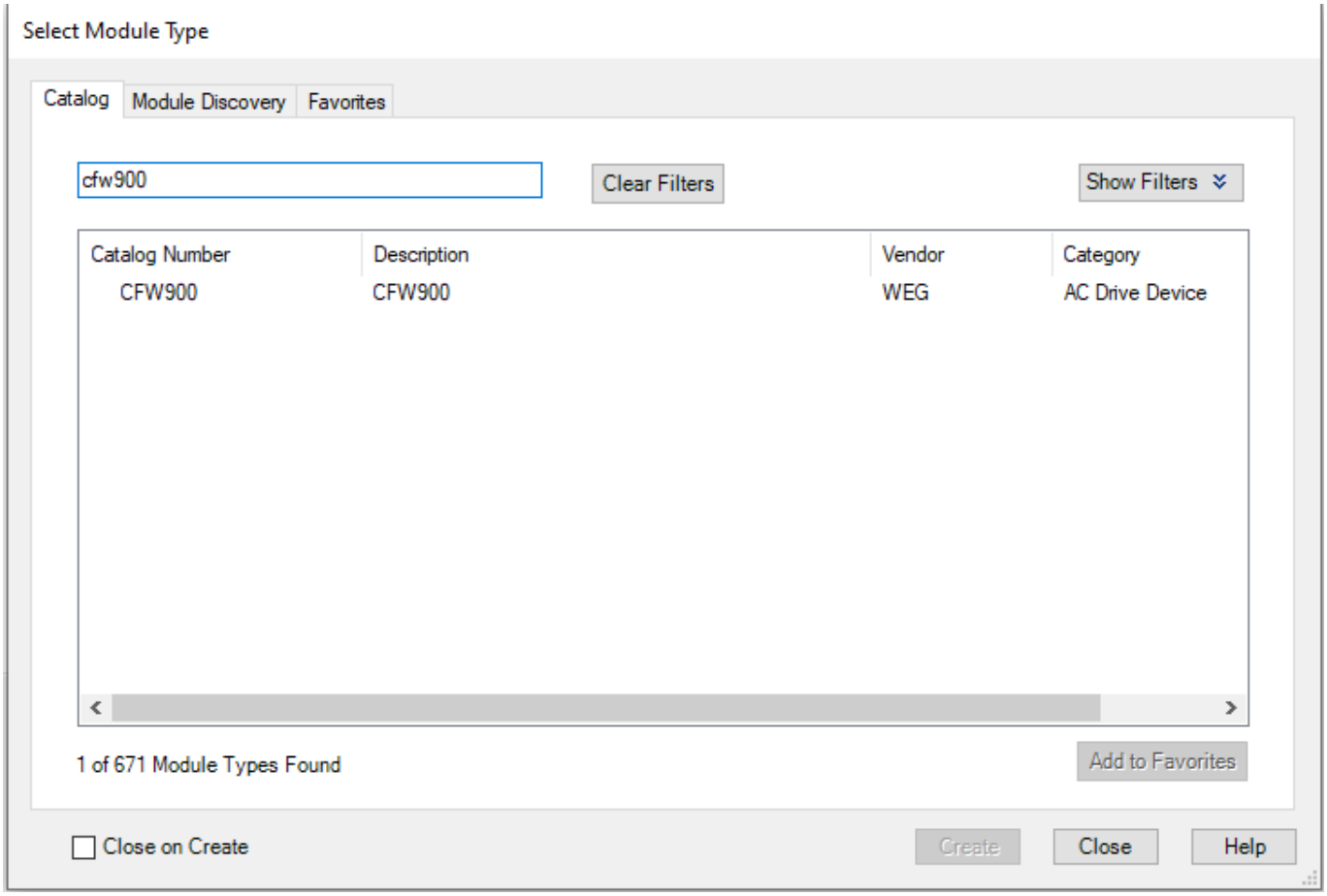
The EDS file is now installed and the CFW900 can be added as an Ethernet/IP device in the device tree.

AOIs

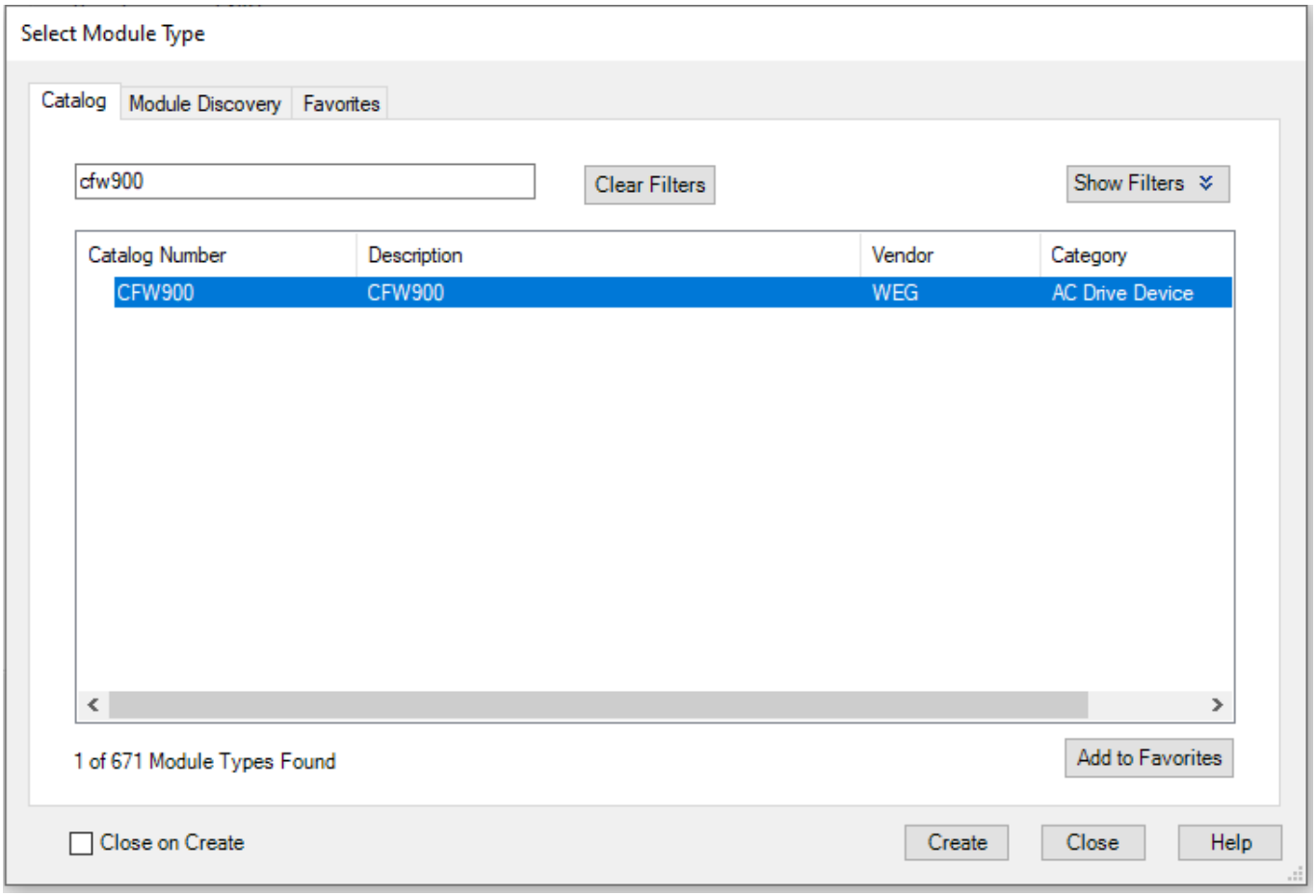
Each AOI is specifically used for a single connection instance type. Select the AOI to be used based on the requirements of the project.

CFW900_2070 (CIP Basic Speed)

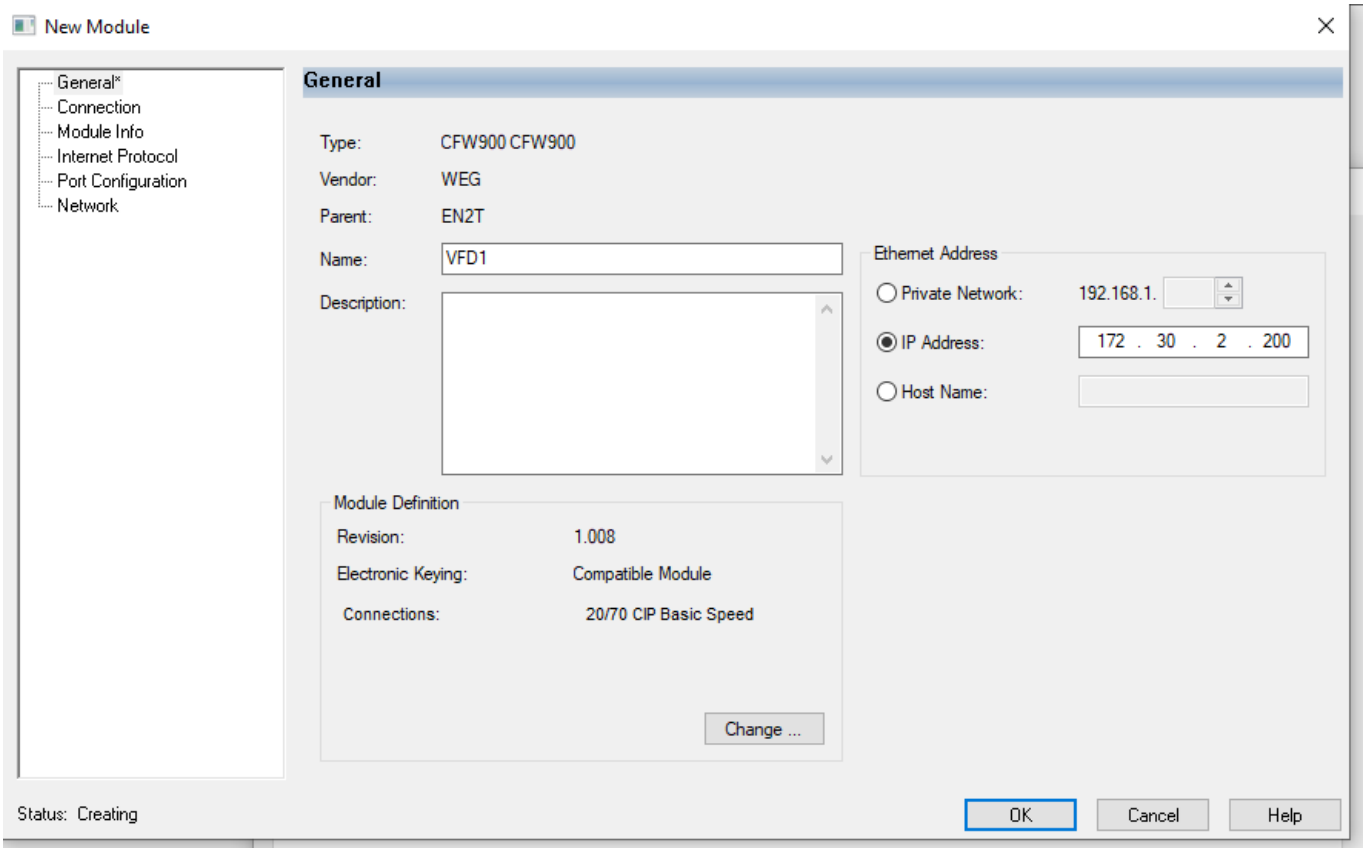
This AOI is used when the 20/70 CIP Basic Speed control mode is desired.



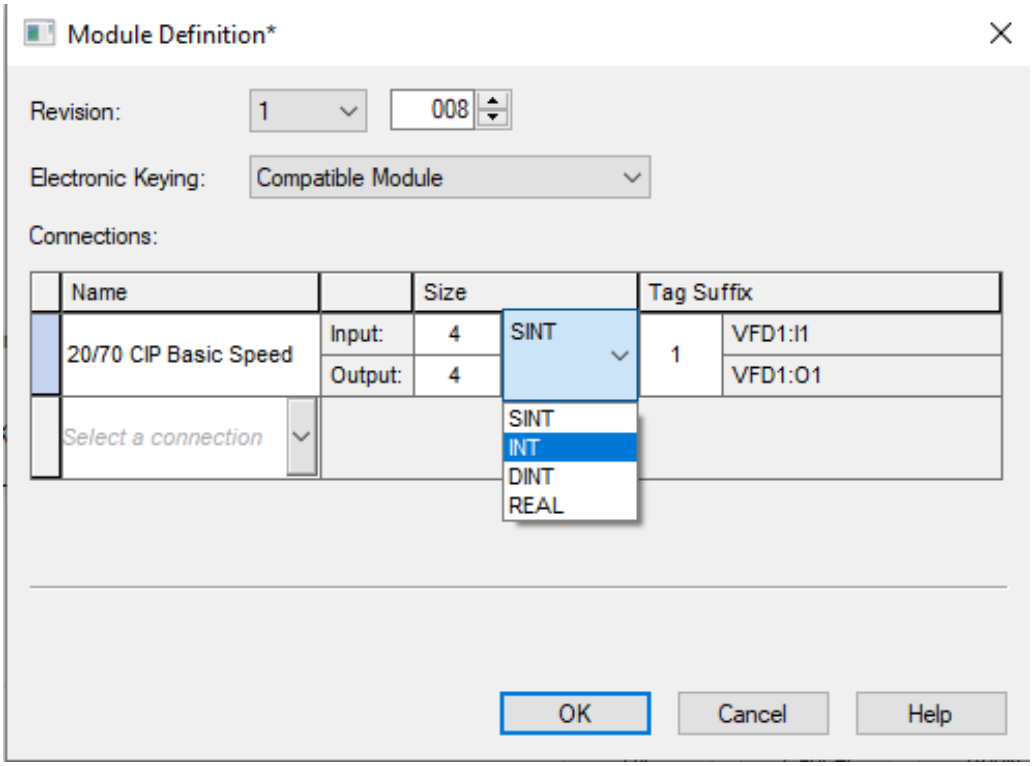
There should be an entry matching the above screenshot.



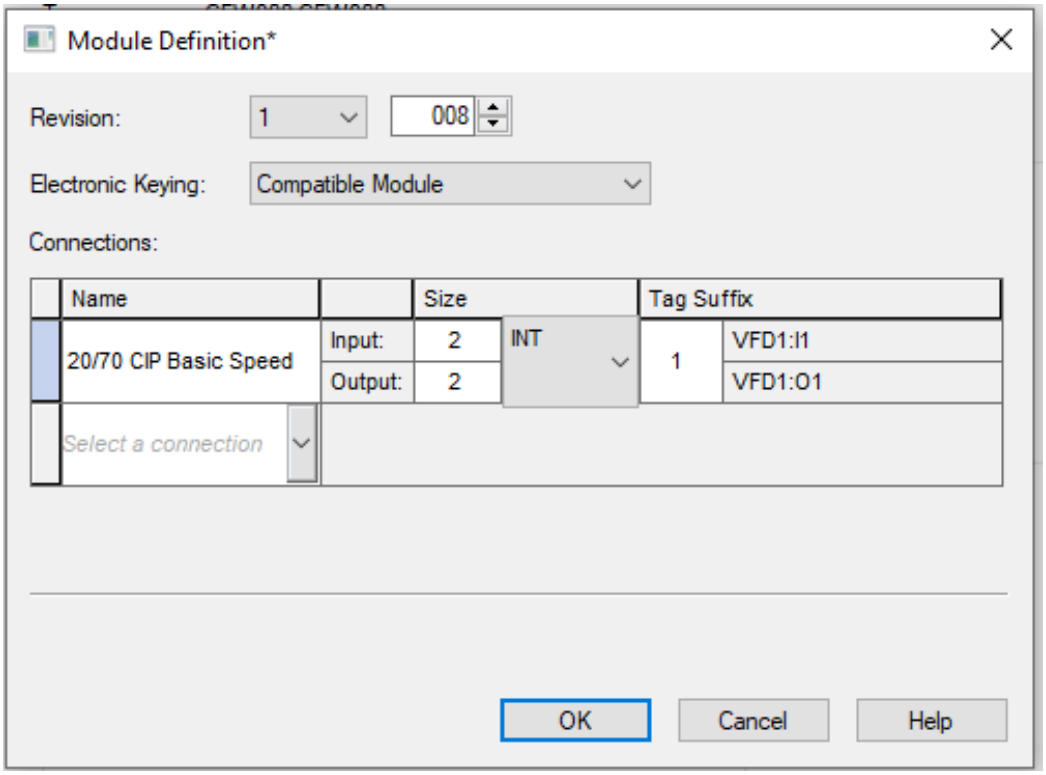
Highlight the CFW900 and click Create



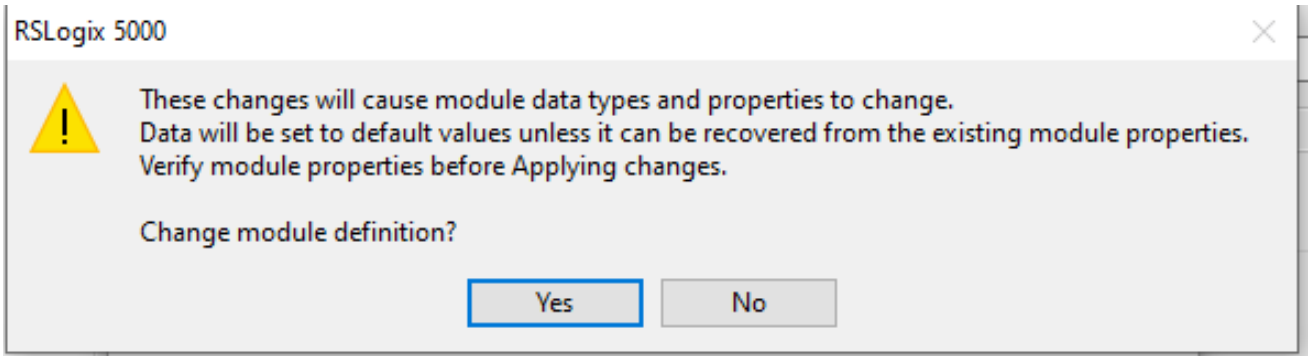
Give the CFW900 a Name and IP address. Before clicking on OK, click on the Change … button in the module definition.



Change the type to INT



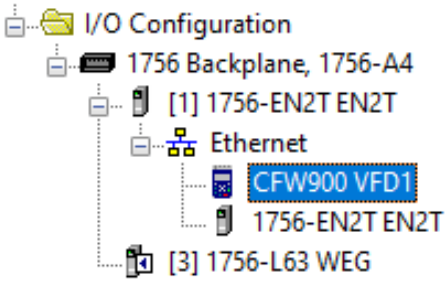
The Input and output size should be set to 2 and 2 respectively. Click OK



Click Yes

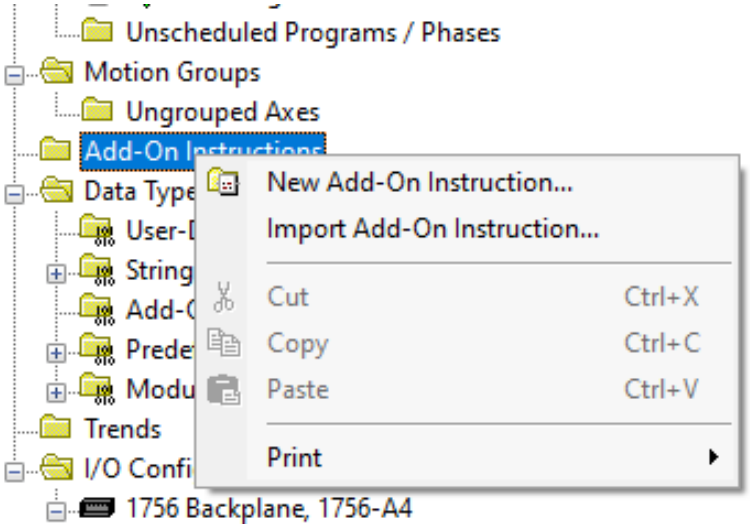
At this point, no other changes are required. However, changing the RPI can be done, if the need arises.

Once satisfied with the settings, Click OK

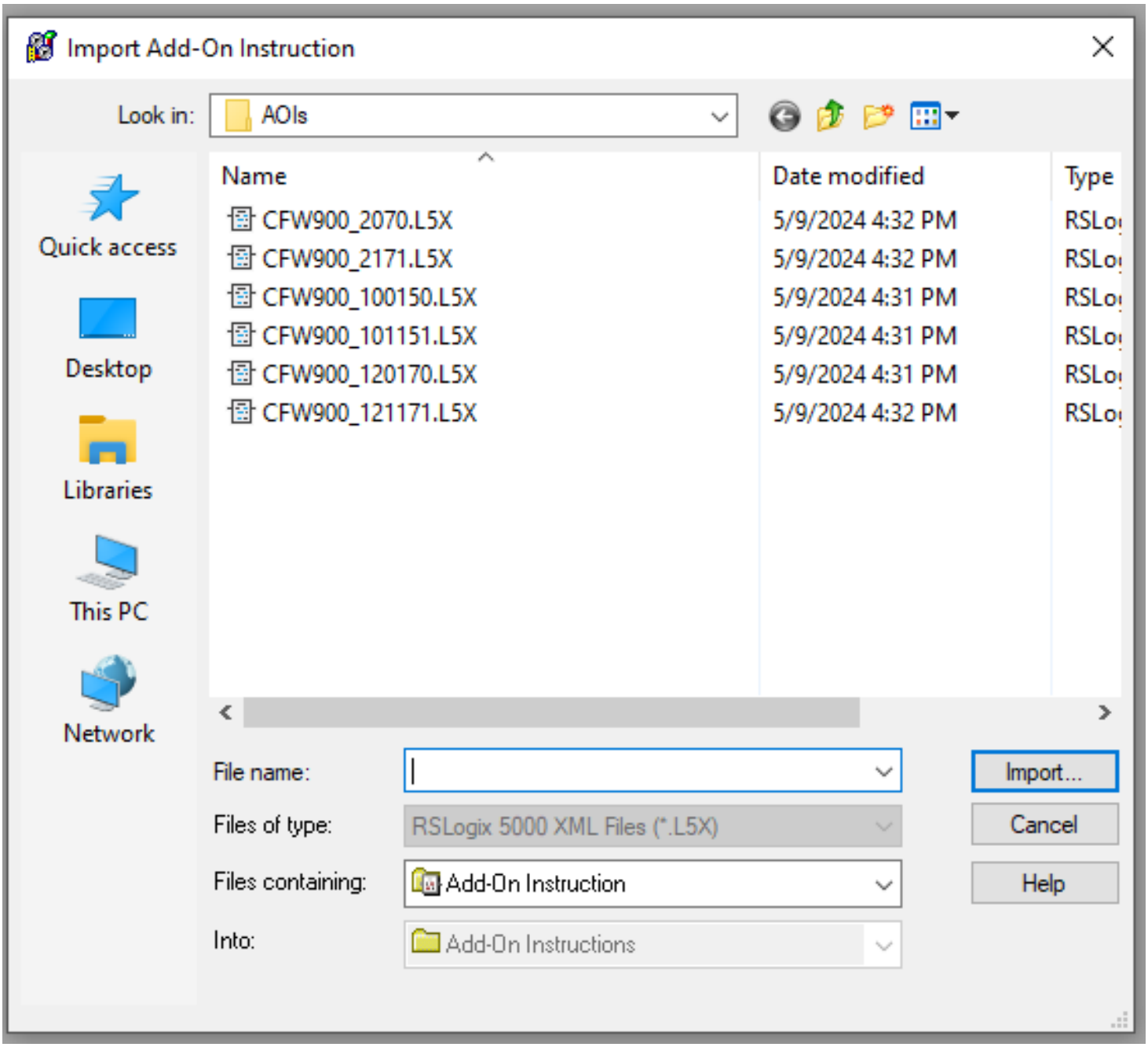


There should now be an instance of the CFW900 in the device tree

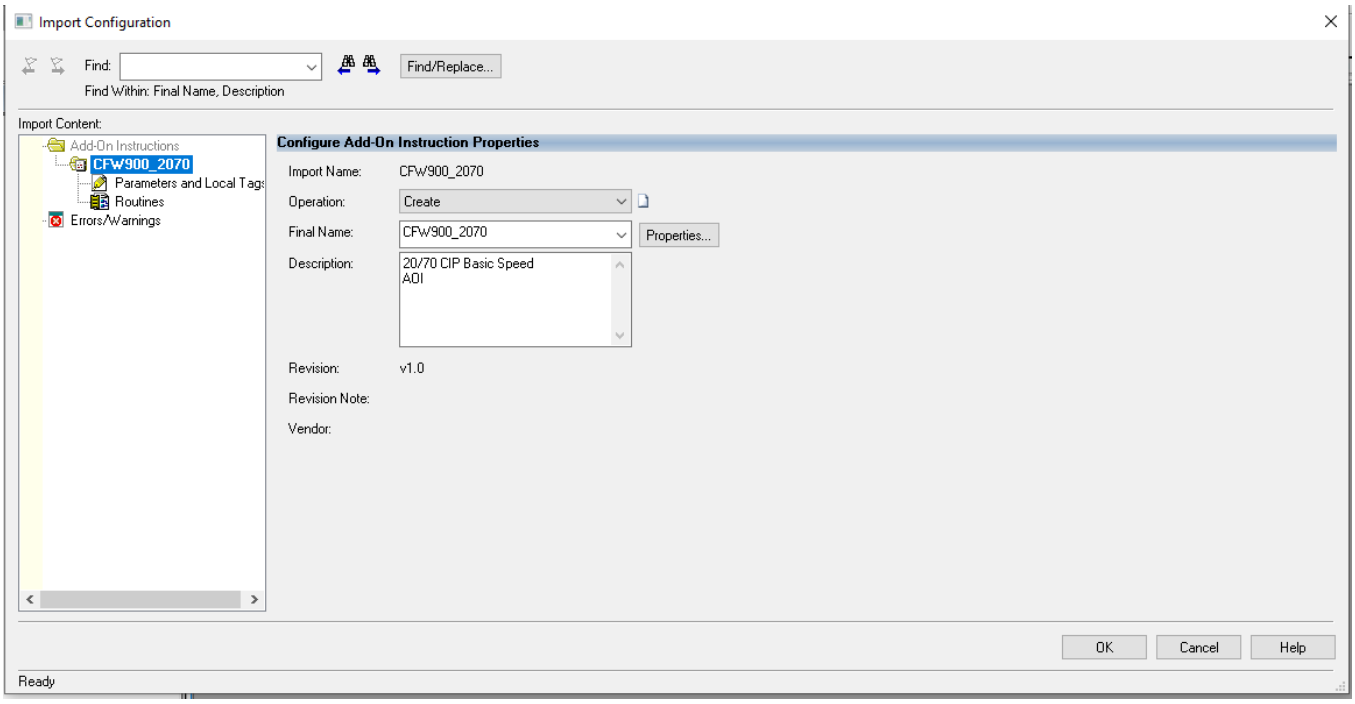
AOI Import



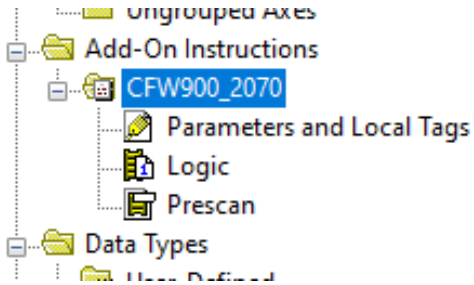
In the device tree, right click on Add-On Instructions and click on Import Add-On Instruction...



Select the appropriate add-on instruction (CFW900_2070.L5X) and click Import….

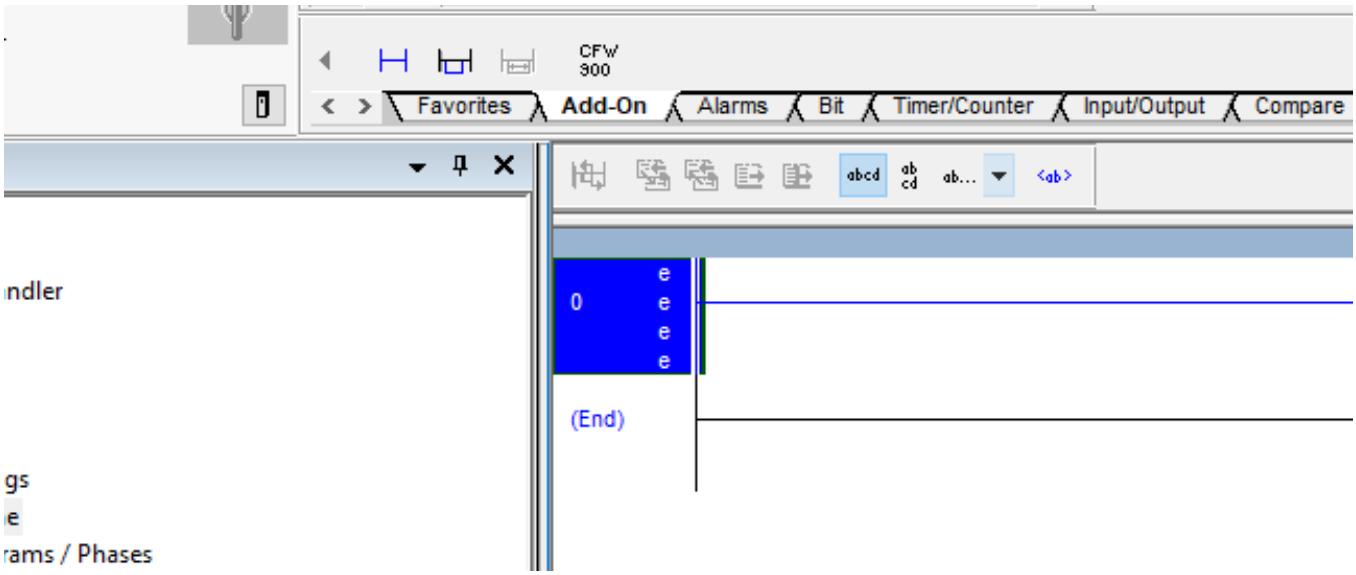


Review the proposed changes and click OK

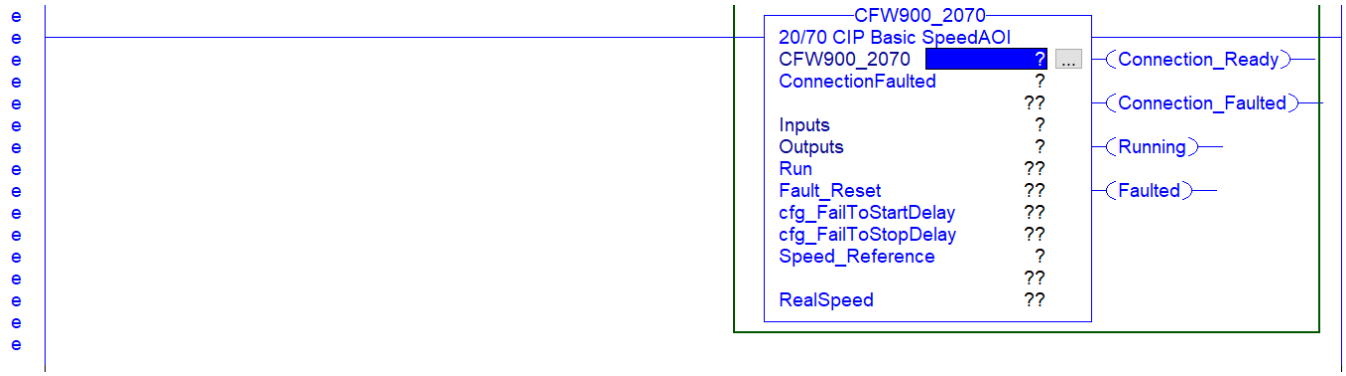


There should now be this add-on instruction in the project.

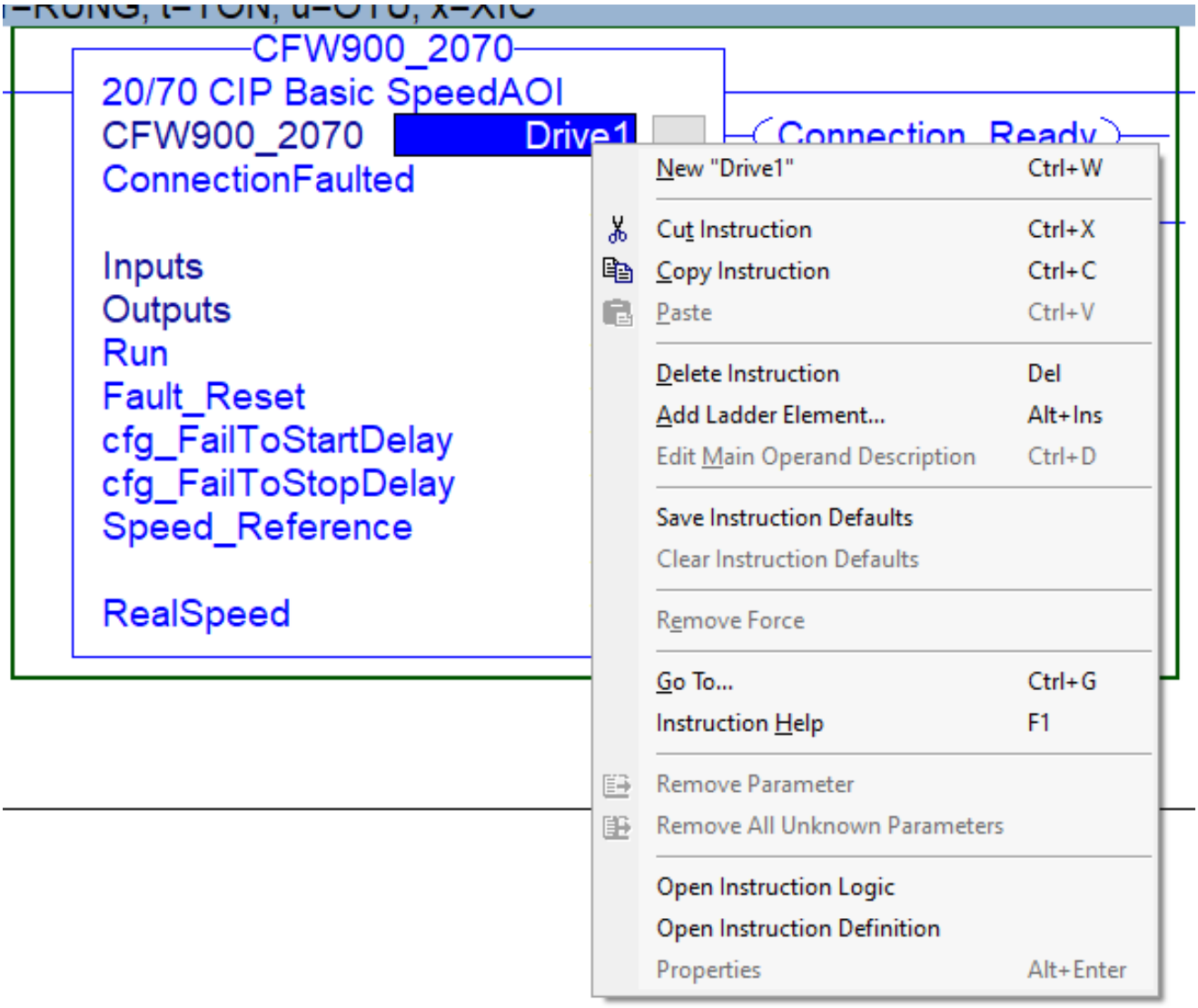
AOI Usage

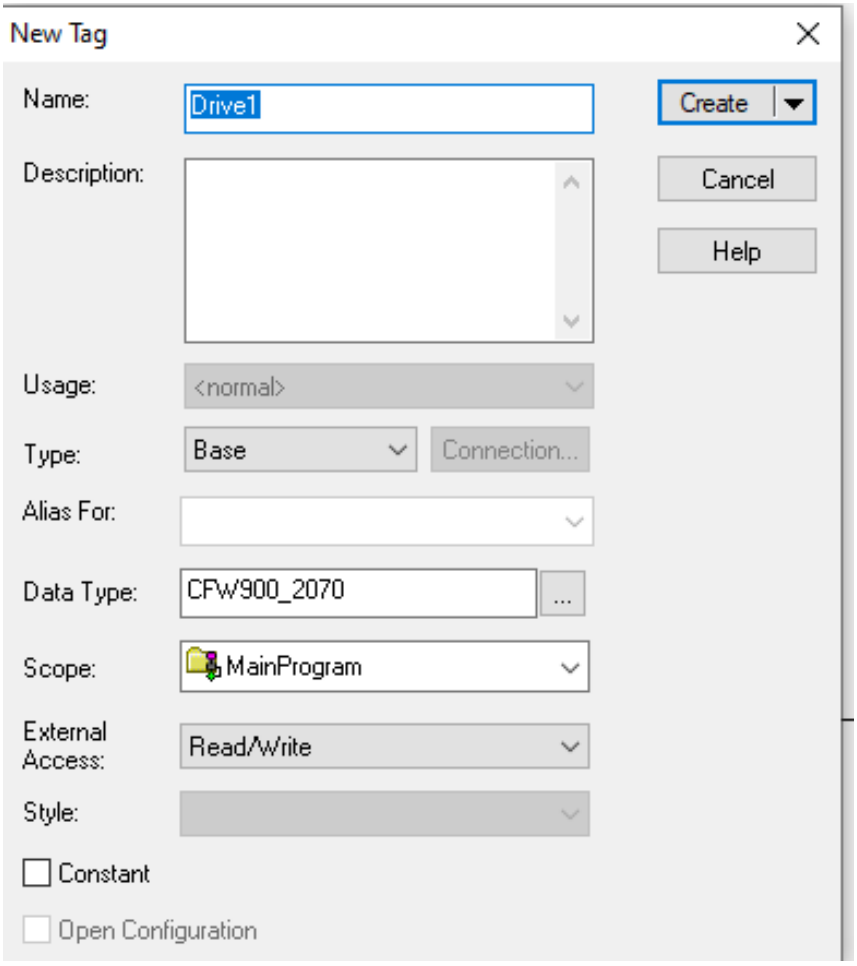


On an empty rung of ladder, add an instance of the newly imported add-on instruction by clicking on the Add-On bar and clicking the CFW900 symbol

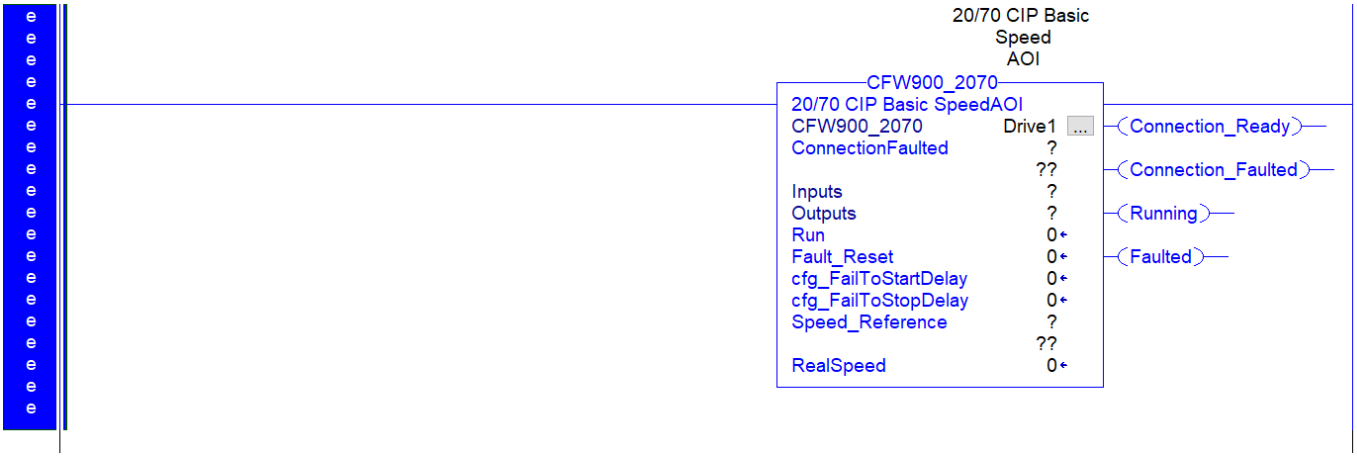


The Add-On requires a tag to be created. Create this tag by typing a name in the CFW900_2070 field and right-clicking and selecting New “Tag”

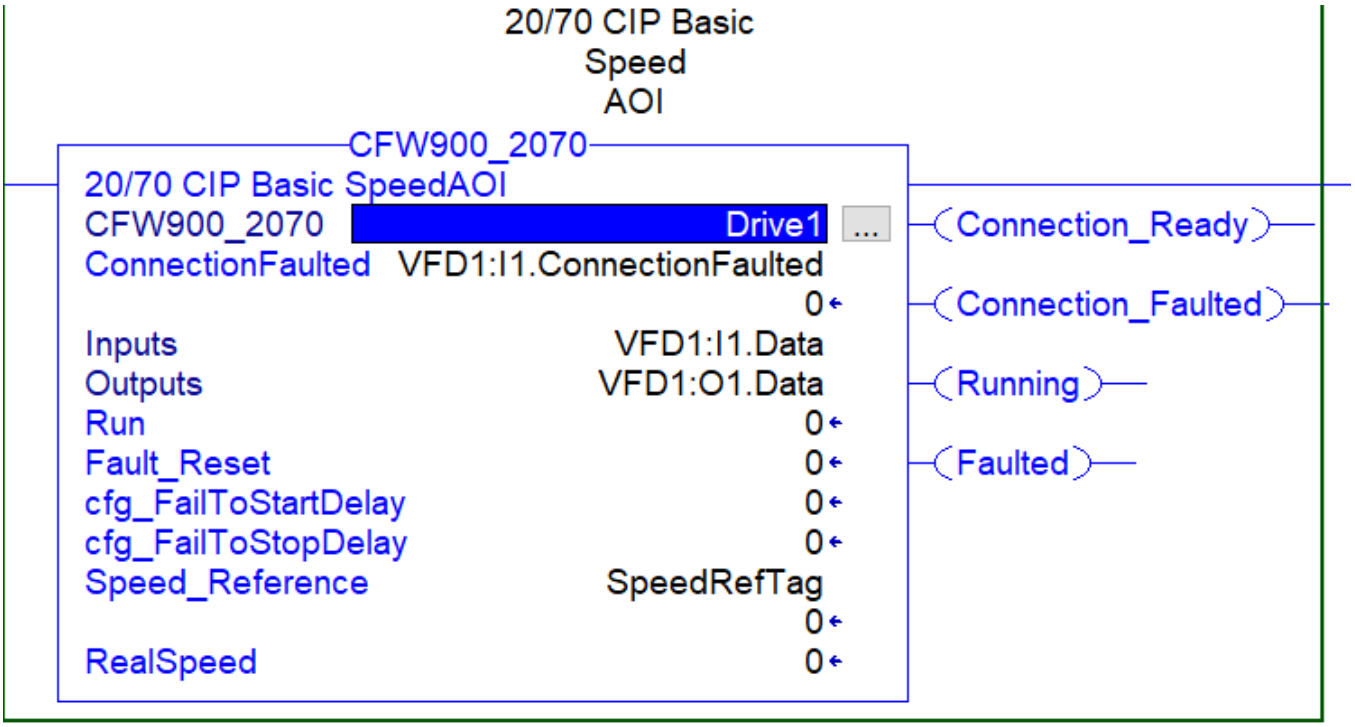




Give any appropriate description and scope (the tag can be either program or controller scoped)



Next the Connection Faulted, Inputs, Outputs, and Speed_Reference need to be populated as follows:



The SpeedRefTag is an INT that is a tag to be created.

AOI Parameter Description

InOut Parameters

Parameter	Type	Description
Inputs	INT[2]	Input Assembly from CFW900
Outputs	INT[2]	Output Assembly to CFW900

Input Parameters

Parameter	Type	Description
Cfg_FailToStartDelay	DINT	Time in seconds before faulting on fail to start if VFD does not start when commanded Set to 0 to disable
Cfg_FailToStopDelay	DINT	Time in seconds before faulting on fail to stop if VFD does not stop when commanded Set to 0 to disable
ConnectionFaulted	BOOL	From CFW900 Ethernet Module. 1 = Connection is faulted 0 = Connection is OK
Fault_Reset	BOOL	1 = Send Reset Fault Signal to VFD 0 = No action
Run	BOOL	1 = Run 0 = Stop

Speed_Reference	INT	Speed Setpoint (RPM) Negative Speed will reverse direction of motor
cfg_AutoFaultResetNum	DINT	Maximum number of tries that AOI will send fault reset command while being maintained

Output Parameters

Parameter	Type	Description
Connection_Faulted	BOOL	Goes high when connections interrupted. If “Run” signal is set, it must be reset before this will clear 1 = Connection has been faulted from VFD to PLC 0 = Connection OK
Connection_Ready	BOOL	1 = Connection from VFD to PLC is established 0 = Connection not established
Faulted	BOOL	1 = VFD Fault, connection fault, or failedToStart/Stop Fault 0 = No faults
RealSpeed	INT	Current Speed (RPM)
Running	BOOL	1 = VFD running 0 = VFD Stopped
AutoFaultResetExceed	BOOL	Indicates when the maximum number of automatic fault clears has been exceeded. Set Fault_Reset to 0 to reset and allow fault clear to resume. 1 = Max number of fault clears reached. Fault Reset Disabled 0 = Under threshold for automatic fault clears. Fault Reset Allowed.

CFW900 Parameter Requirements

The following parameters must be set in the CFW900:

Parameter	**Setting**
C.9.5.1	20/70
C.4.1.1	Remote 2
C.4.2.2.1	Ethernet
C.4.2.2.2	Ethernet

C.4.2.2.3	Ethernet
C.4.2.2.4	Ethernet
C.4.3.1.2.2	Ethernet

CFW900_120170 (CIP Basic Speed + IO)

This AOI is used when the 120/170 CIP Basic Speed control mode + IO is desired.

This behaves similarly to the 20/70 CIP Basic Speed, but adds the following parameters:

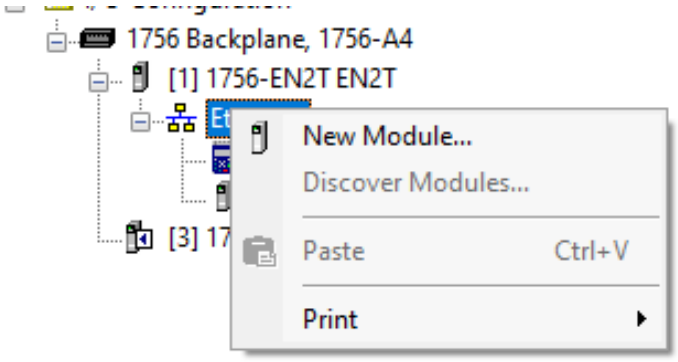
Outputs

- Output Current
- Output Voltage
- Output Frequency
- Last Fault Code

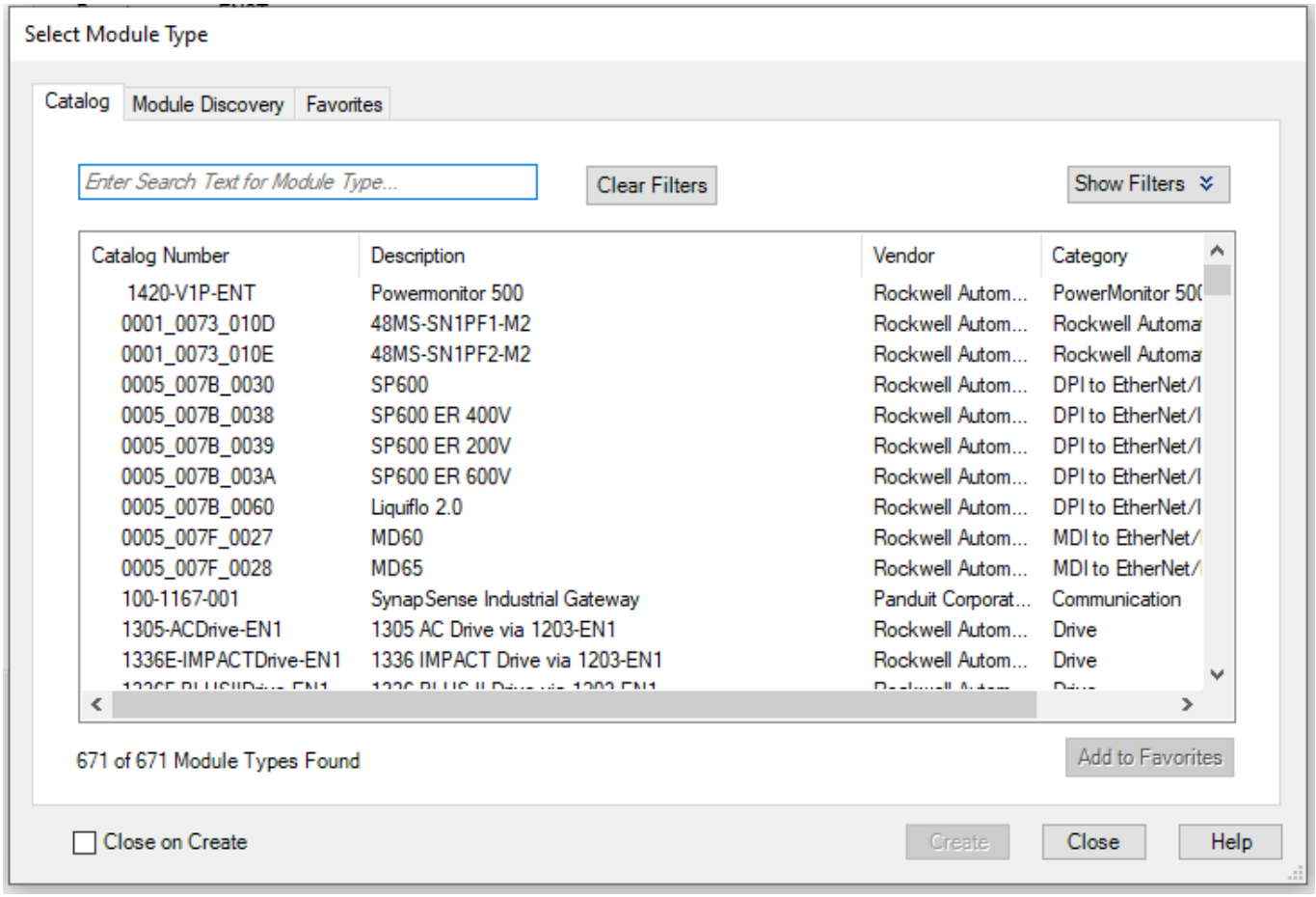
Inputs

- Acceleration Ramp 1
- Deceleration Ramp 1

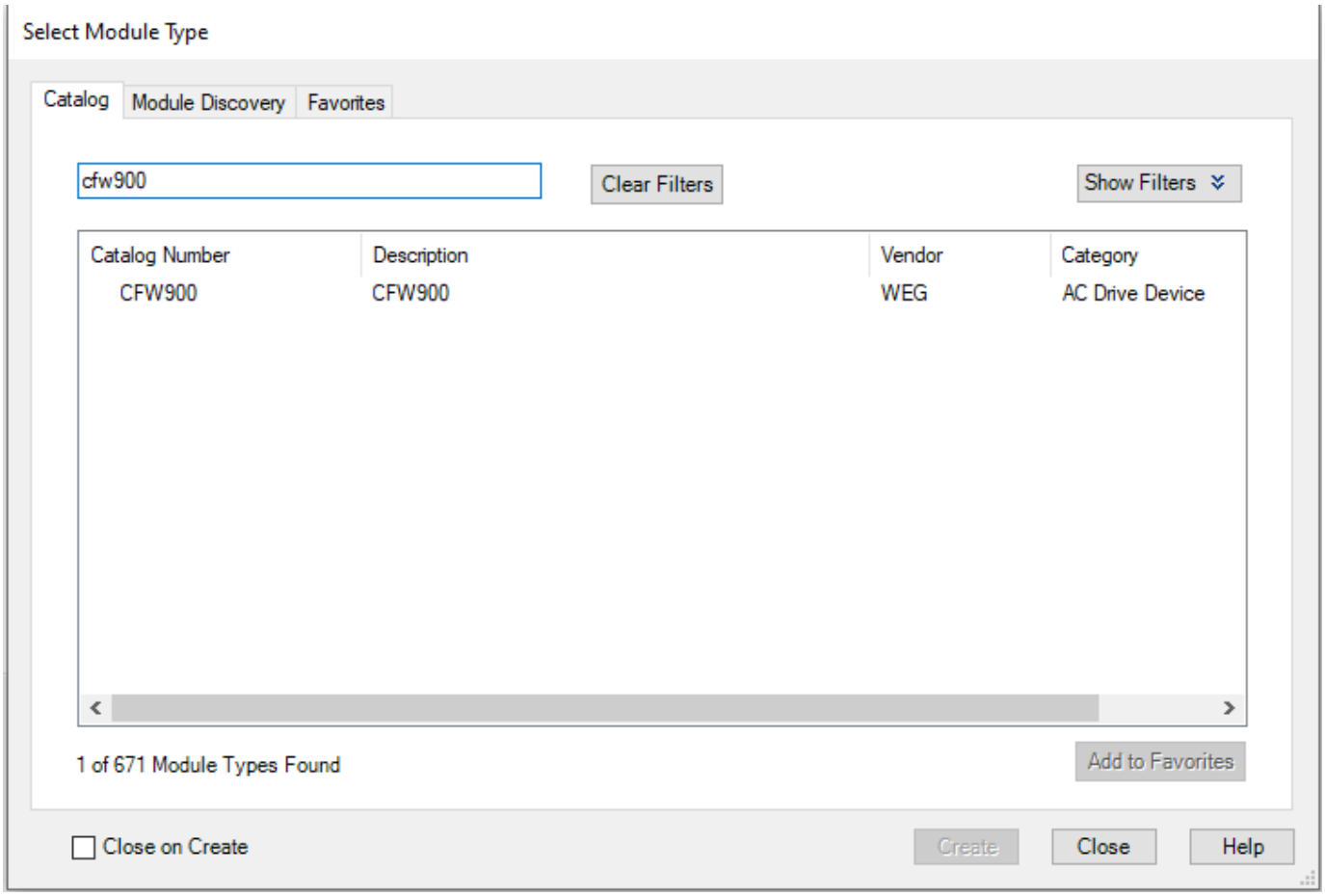
Create the Ethernet/IP Device



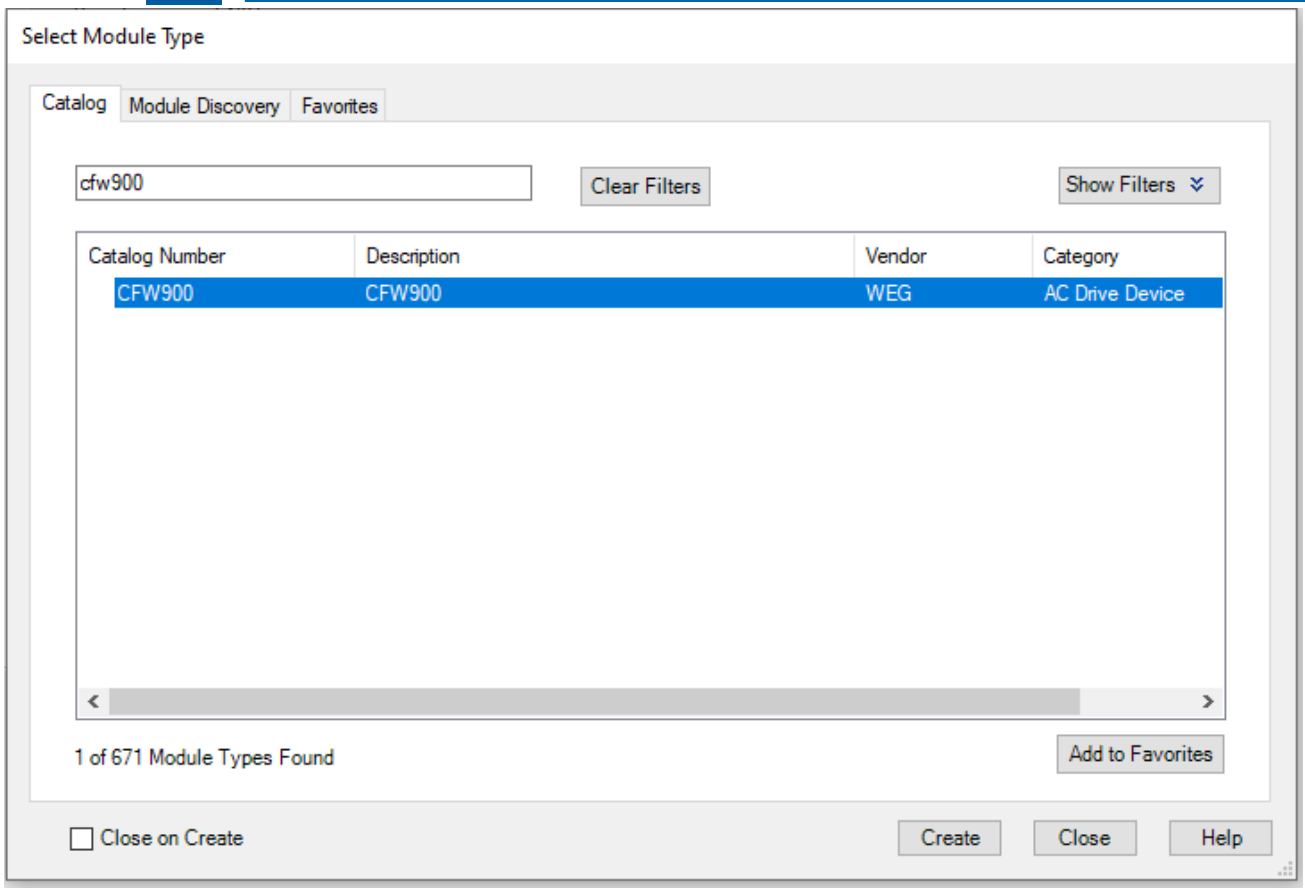
In the device tree, right click on the Ethernet bus that will contain the CFW900 and click New Module….



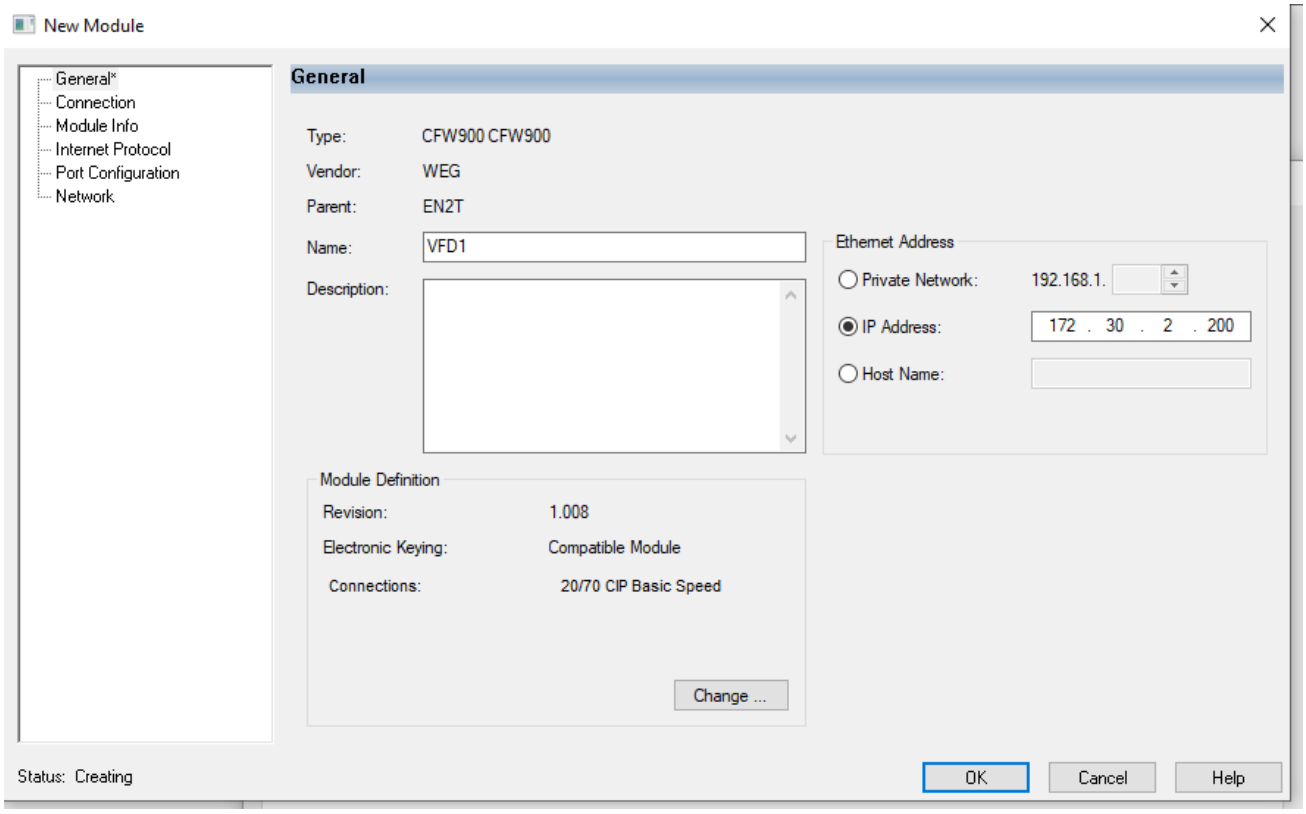
In the Select Module Type dialog box, enter in “CFW900” in the search field



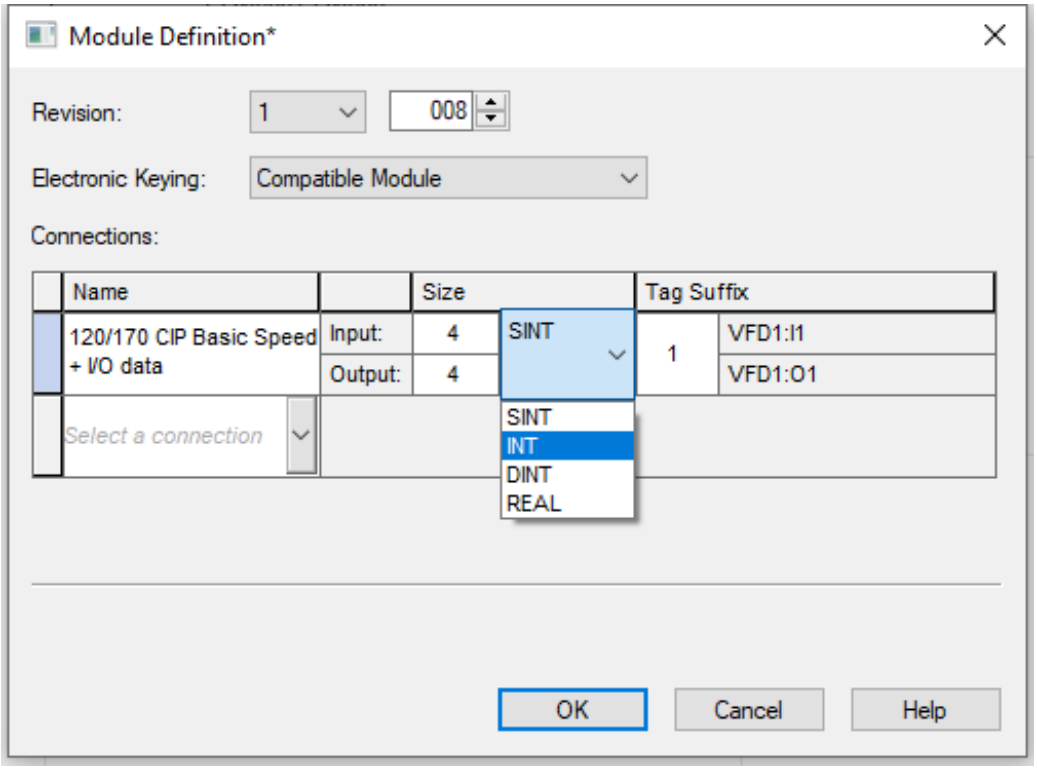
There should be an entry matching the above screenshot.



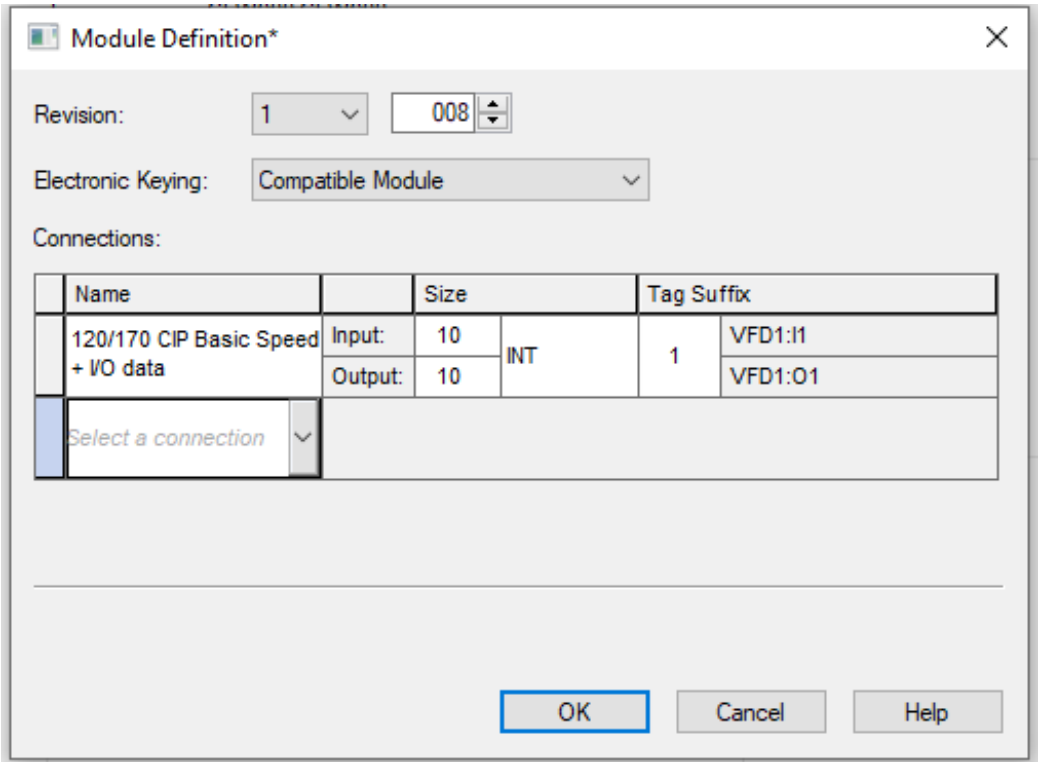
Highlight the CFW900 and click Create



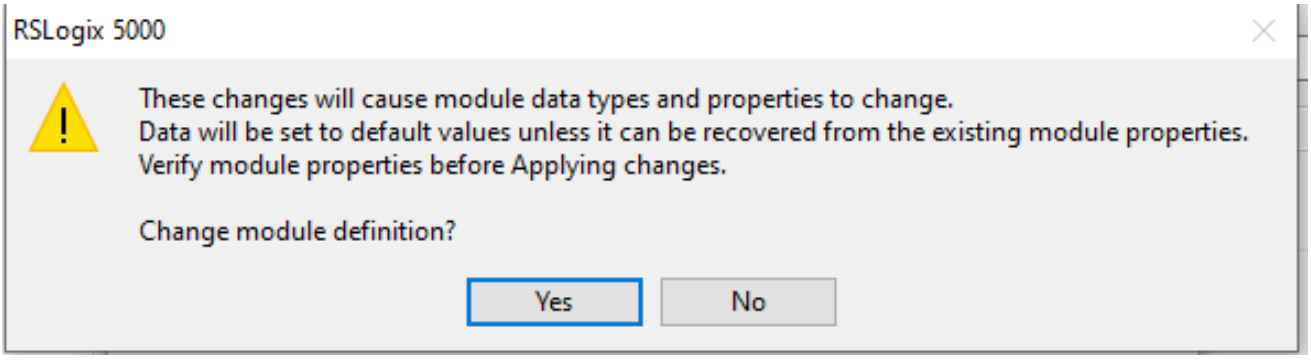
Give the CFW900 a Name and IP address. Before clicking on OK, click on the Change … button in the module definition.



Change the type to INT and the connection name to 120/170 CIP Basic Speed + I/O data



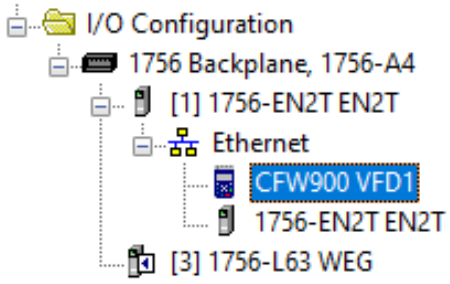
The Input and output size should be set to 10 and 10 respectively. Click OK



Click Yes

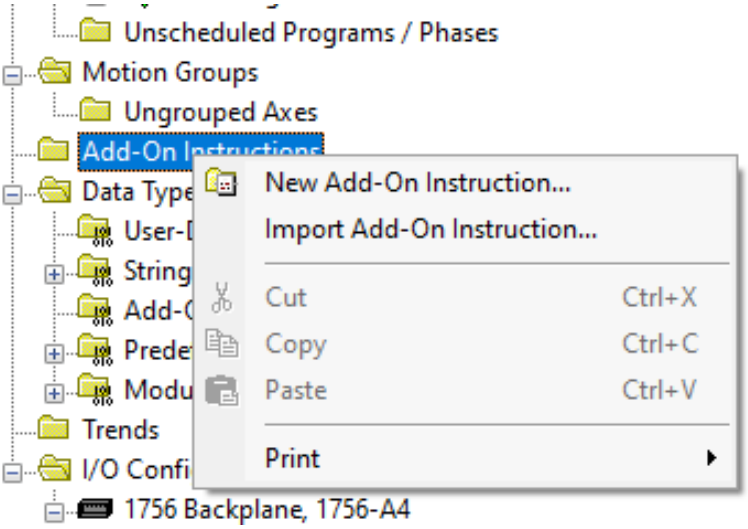
At this point, no other changes are required. However, changing the RPI can be done, if the need arises.

Once satisfied with the settings, Click OK

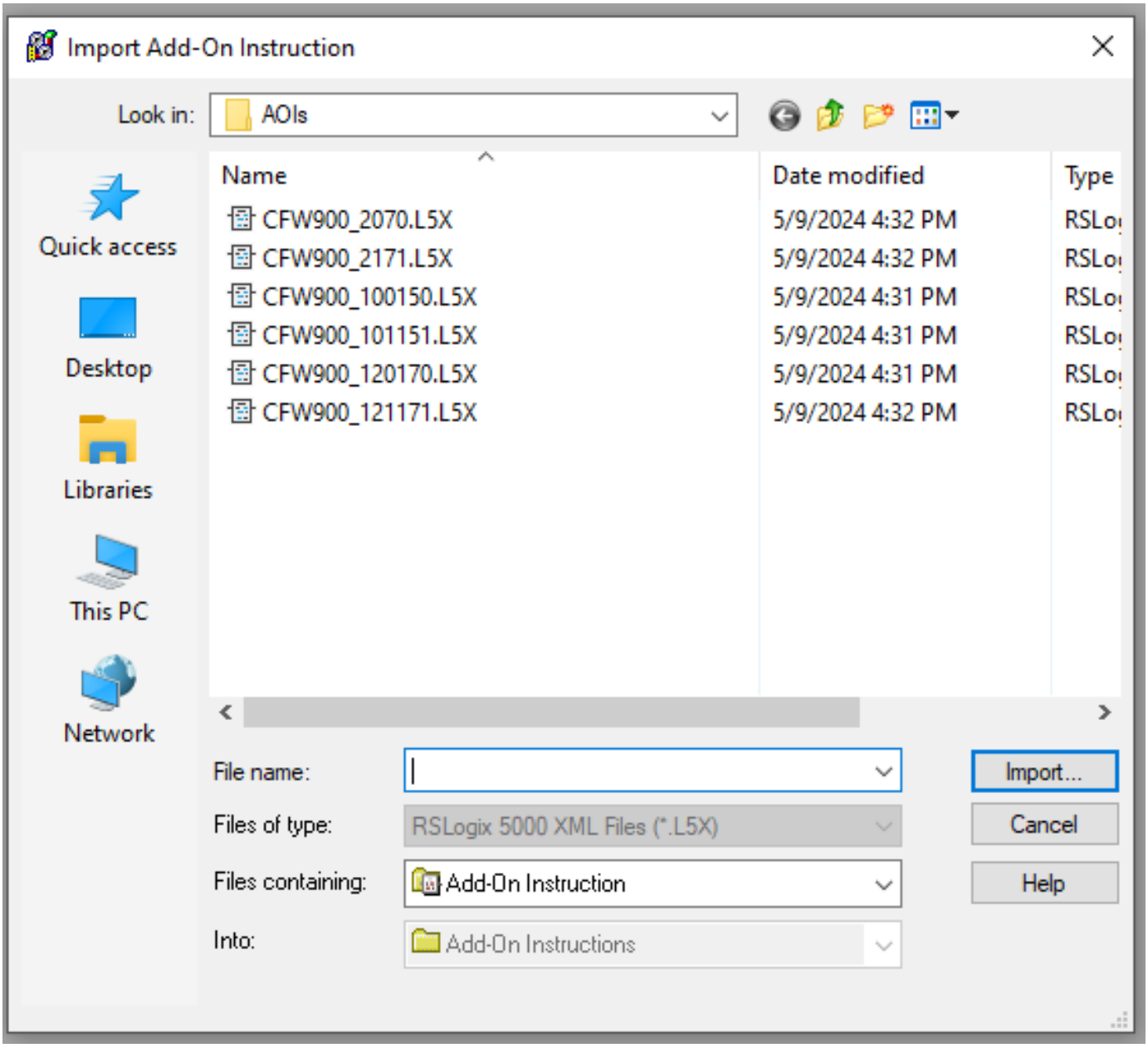


There should now be an instance of the CFW900 in the device tree

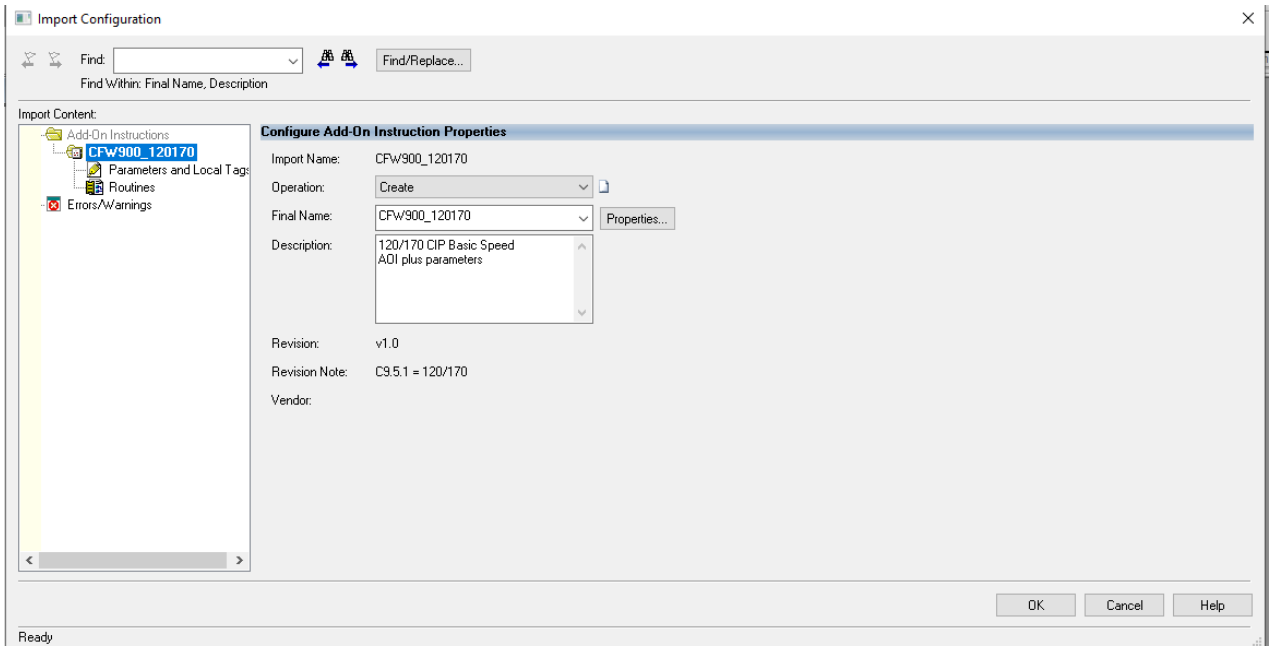
AOI Import



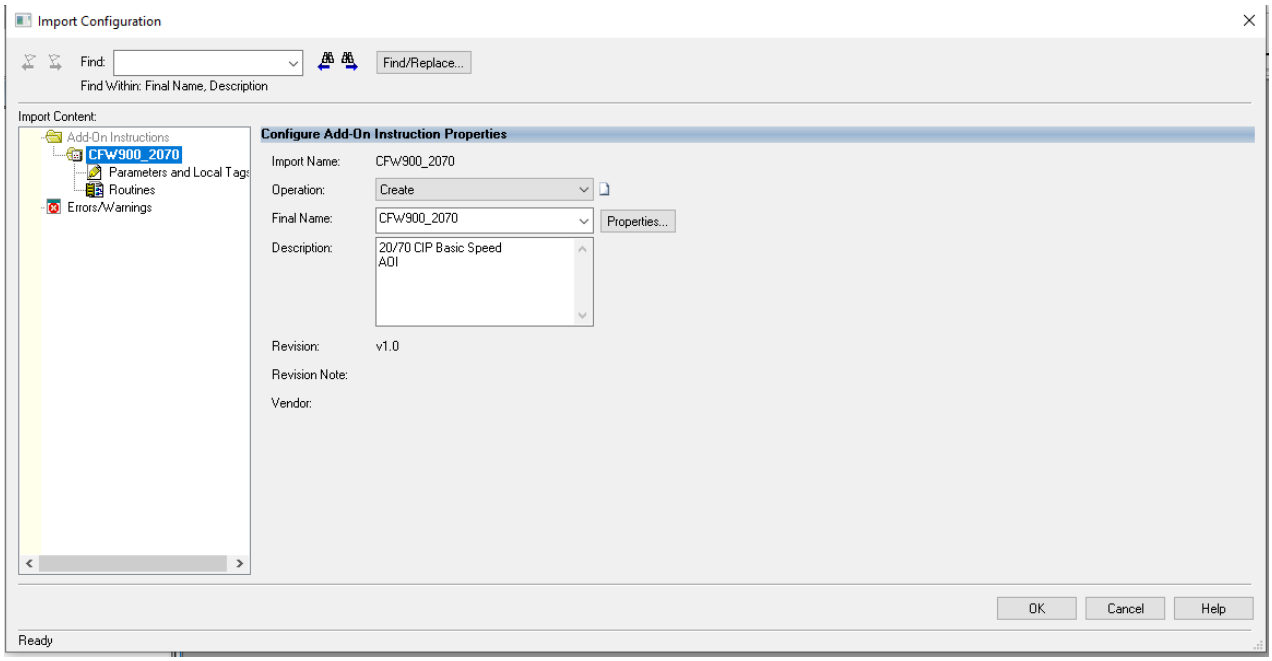
In the device tree, right click on Add-On Instructions and click on Import Add-On Instruction...


Import Add-On Instruction
Look in:
AOIs
Quick access
Desktop
Libraries
This PC
Network
Name
Date modified
Type
CFW900_2070.L5X
5/9/2024 4:32 PM
CFW900_2171.L5X
5/9/2024 4:32 PM
CFW900_100150.L5X
5/9/2024 4:31 PM
CFW900_101151.L5X
5/9/2024 4:31 PM
CFW900_120170.L5X
5/9/2024 4:31 PM
CFW900_121171.L5X
5/9/2024 4:32 PM
File name:
Files of type:
RSLogix 5000 XML Files (*.L5X)
Files containing:
Add-On Instruction
Into:
Add-On Instructions
Import...
Cancel
Help

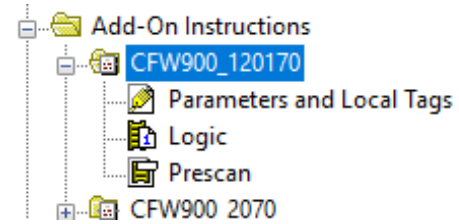
Select the appropriate add-on instruction (CFW900_120170.L5X)



0.L5X) and click Import….

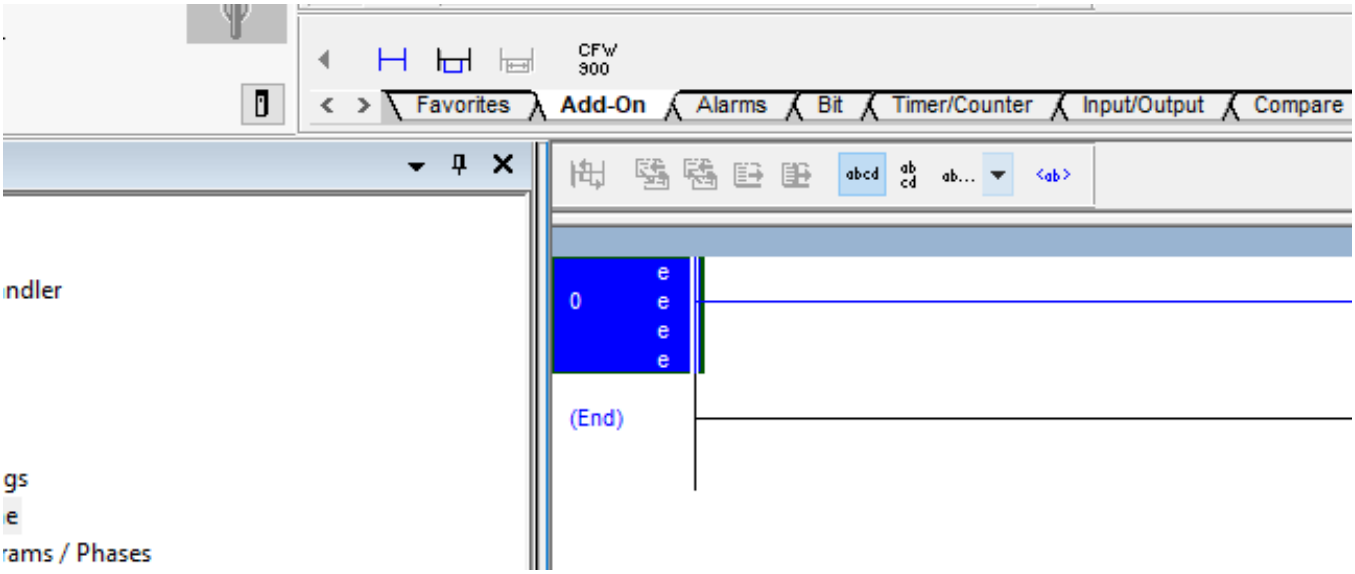


Review the proposed changes and click OK

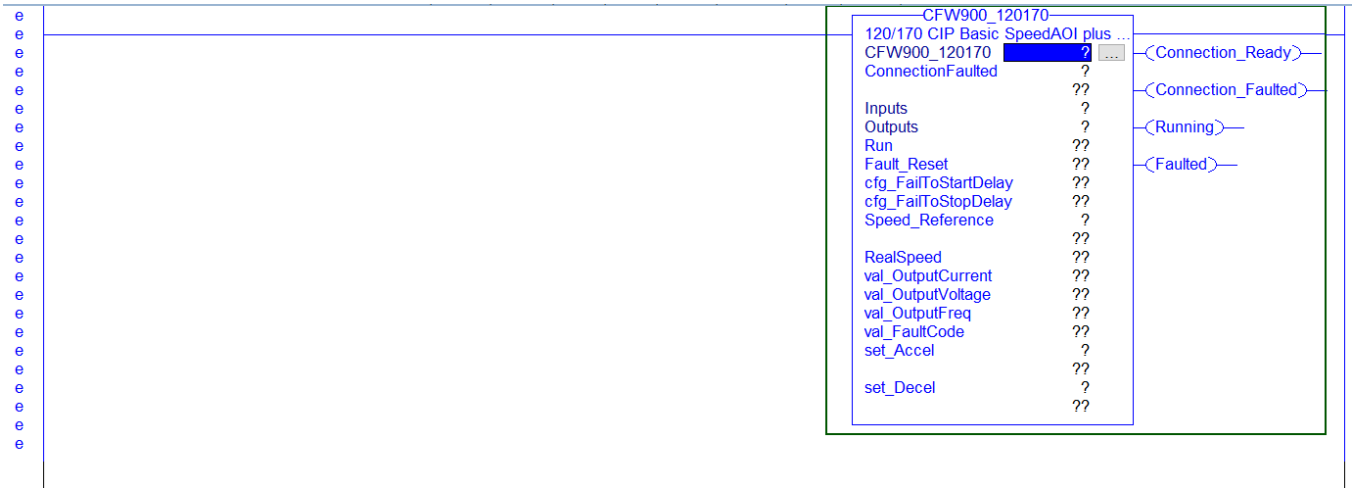


There should now be this add-on instruction in the project.

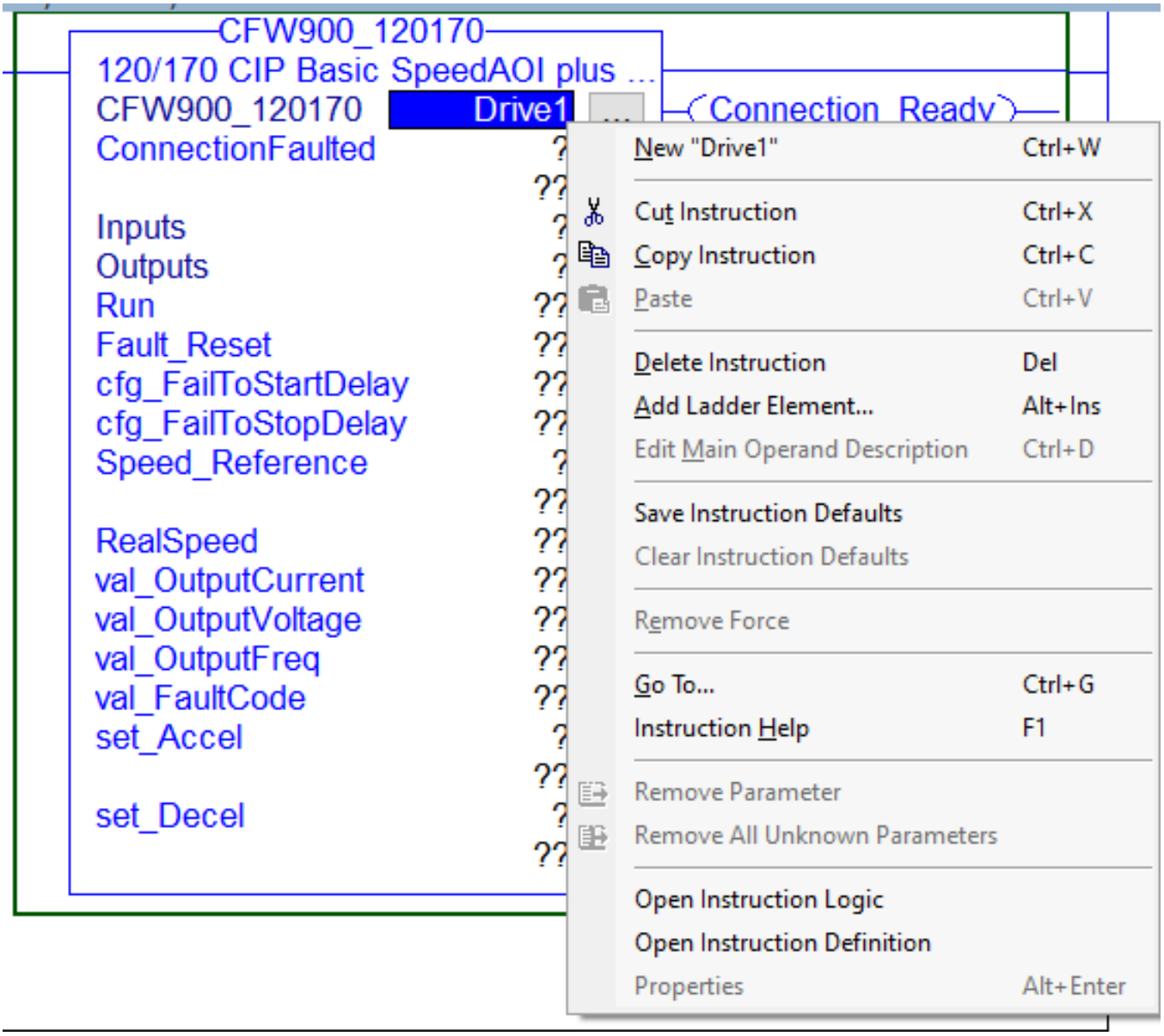
AOI Usage

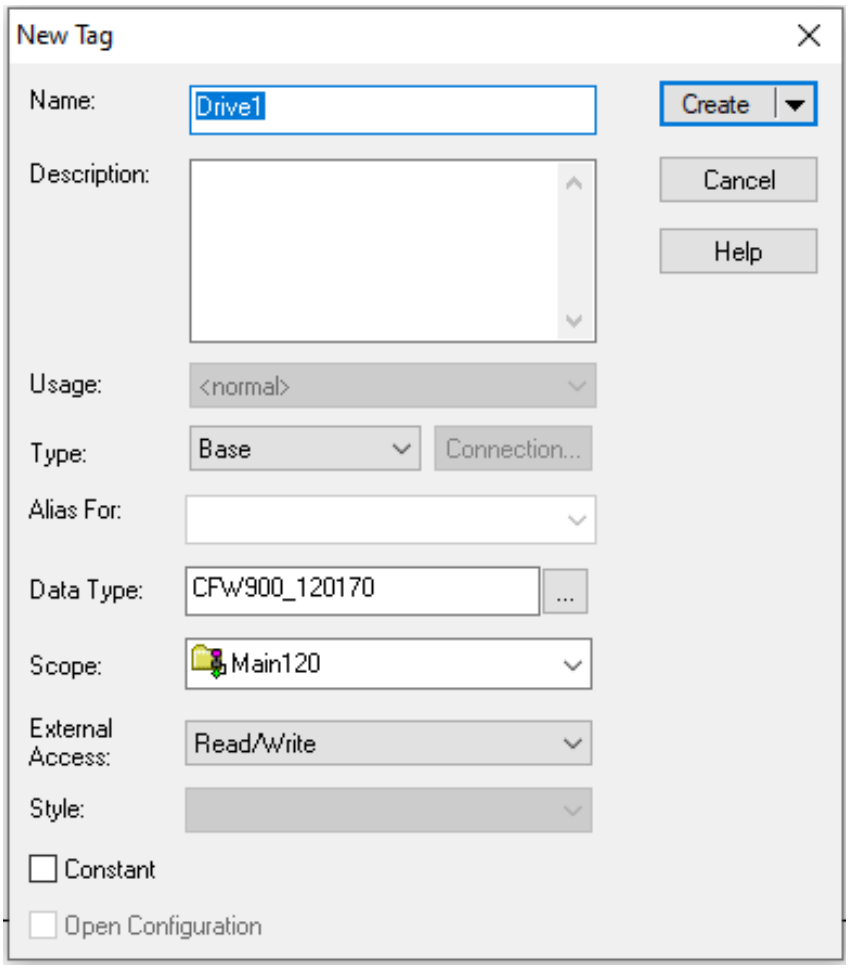


On an empty rung of ladder, add an instance of the newly imported add-on instruction by clicking on the Add-On bar and clicking the CFW900 symbol

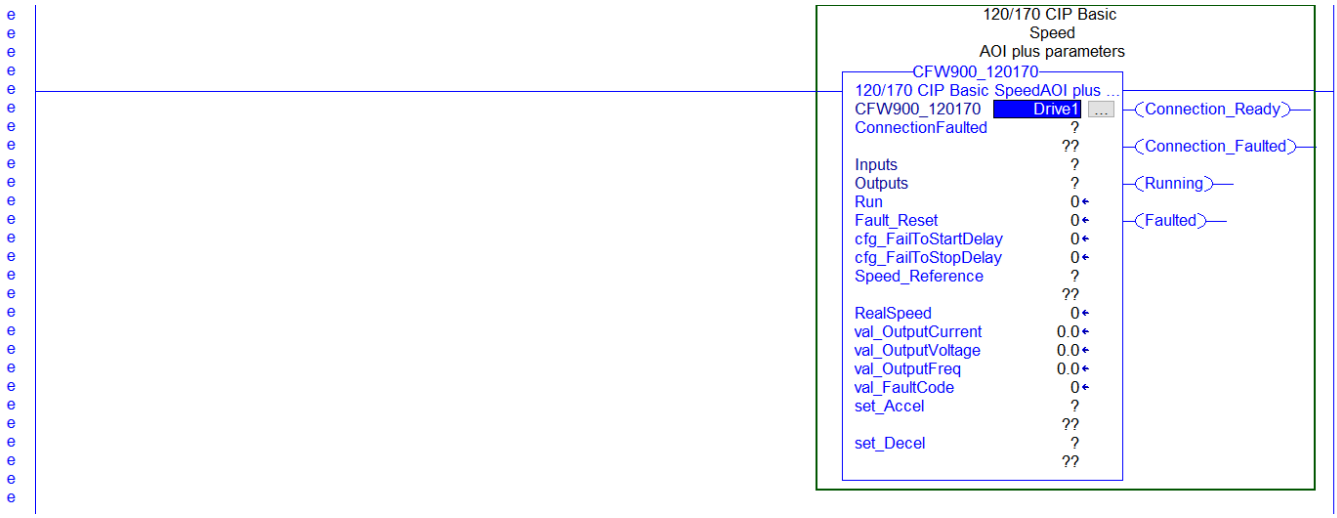


The Add-On requires a tag to be created. Create this tag by typing a name in the CFW900_120170 field and right-clicking and selecting New “Tag”

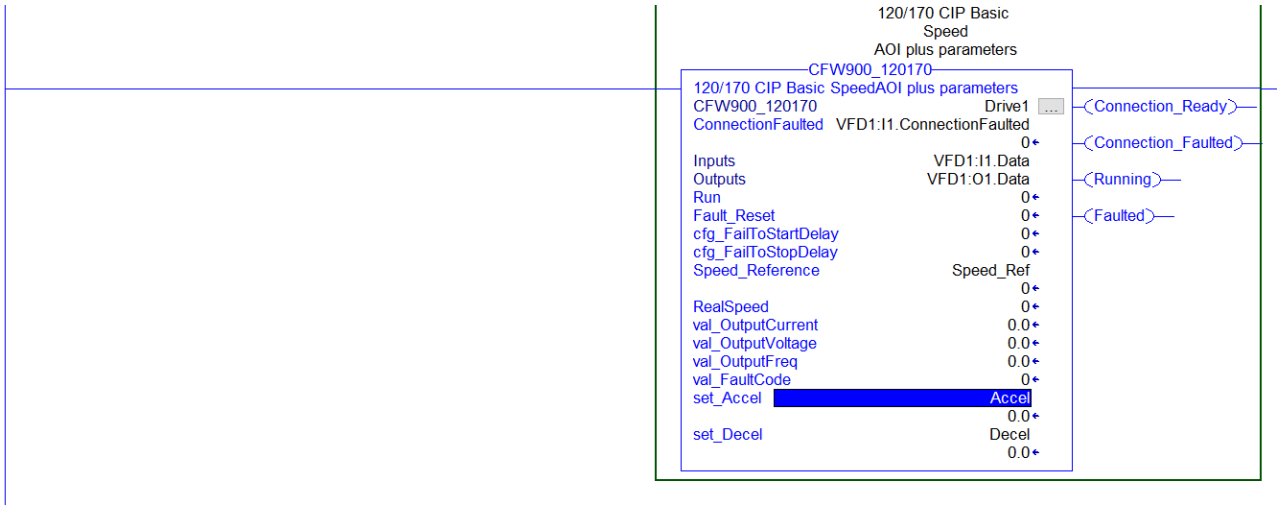

CFW900_120170
120/170 CIP Basic SpeedAOI plus ...
CFW900_120170
Drive1
Connection_Ready
ConnectionFaulted
Inputs
Outputs
Run
Fault_Reset
cfg_FailToStartDelay
cfg_FailToStopDelay
Speed_Reference
RealSpeed
val_OutputCurrent
val_OutputVoltage
val_OutputFreq
val_FaultCode
set_Accel
set_Decel
New "Drive1" Ctrl+W
Cut Instruction Ctrl+X
Copy Instruction Ctrl+C
Paste Ctrl+V
Delete Instruction Del
Add Ladder Element... Alt+Ins
Edit Main Operand Description Ctrl+D
Save Instruction Defaults
Clear Instruction Defaults
Remove Force
Go To... Ctrl+G
Instruction Help F1
Remove Parameter
Remove All Unknown Parameters
Open Instruction Logic
Open Instruction Definition
Properties Alt+Enter



Give any appropriate description and scope (the tag can be either program or controller scoped)



Next the Connection Faulted, Inputs, Outputs, and Speed_Reference need to be populated as follows:



The Speed_Ref is an INT that is a tag to be created.

Accel and Decel are REAL tags that are to be created.

AOI Parameter Description

InOut Parameters

Parameter	**Type**	**Description**
Inputs	INT[10]	Input Assembly from CFW900
Outputs	INT[10]	Output Assembly to CFW900

Input Parameters

Parameter	Type	Description
Cfg_FailToStartDelay	DINT	Time in seconds before faulting on fail to start if VFD does not start when commanded Set to 0 to disable
Cfg_FailToStopDelay	DINT	Time in seconds before faulting on fail to stop if VFD does not stop when commanded Set to 0 to disable
ConnectionFaulted	BOOL	From CFW900 Ethernet Module. 1 = Connection is faulted 0 = Connection is OK
Fault_Reset	BOOL	1 = Send Reset Fault Signal to VFD 0 = No action
Run	BOOL	1 = Run 0 = Stop
Speed_Reference	INT	Speed Setpoint (RPM) Negative Speed will reverse direction of motor

Set_Accel	REAL	Acceleration Ramp Setpoint (0.1-999.9) in Seconds
Set_Decel	REAL	Deceleration Ramp Setpoint (0.1-999.9) in Seconds
cfg_AutoFaultResetNum	DINT	Maximum number of tries that AOI will send fault reset command while being maintained

Output Parameters

Parameter	Type	Description
Connection_Faulted	BOOL	Goes high when connections interrupted. If “Run” signal is set, it must be reset before this will clear 1 = Connection has been faulted from VFD to PLC 0 = Connection OK
Connection_Ready	BOOL	1 = Connection from VFD to PLC is established 0 = Connection not established
Faulted	BOOL	1 = VFD Fault, connection fault, or failedToStart/Stop Fault 0 = No faults
RealSpeed	INT	Current Speed (RPM)
Running	BOOL	1 = VFD running 0 = VFD Stopped
val_FaultCode	DINT	Last fault code reported from the VFD
val_OutputCurrent	REAL	Output Current in Amps reported from the VFD
val_OutputFreq	REAL	Output Frequency in Hertz reported from the VFD
val_OutputVoltage	REAL	Output Voltage in Volts reported from the VFD
AutoFaultResetExceed	BOOL	Indicates when the maximum number of automatic fault clears has been exceeded. Set Fault_Reset to 0 to reset and allow fault clear to resume. 1 = Max number of fault clears reached. Fault Reset Disabled 0 = Under threshold for automatic fault clears. Fault Reset Allowed.

CFW900 Parameter Requirements

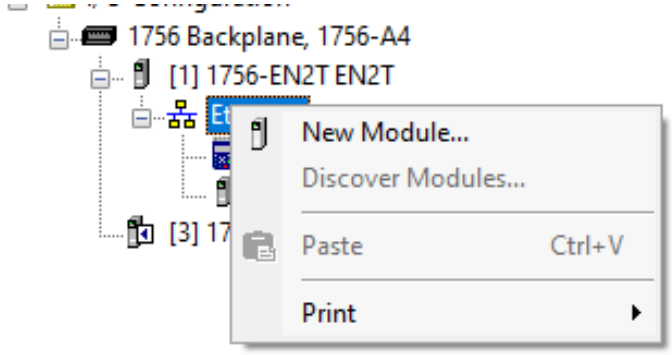
The following parameters must be set in the CFW900:

Parameter	Setting
C.9.5.1	120/170
C.9.5.2	1
C.9.5.3	8
C.9.5.4	1
C.9.5.5	8
C.4.1.1	Remote 2
C.4.2.2.1	Ethernet
C.4.2.2.2	Ethernet
C.4.2.2.3	Ethernet
C.4.2.2.4	Ethernet
C.4.3.1.2.2	Ethernet
C.9.2.1.1	3
C.9.2.1.2	7
C.9.2.1.3	5
C.9.2.1.4	60
C.9.2.1.5	USER DEFINED
C.9.2.1.6	USER DEFINED
C.9.2.1.7	USER DEFINED
C.9.2.1.8	USER DEFINED
C.9.2.2.2	100
C.9.2.2.3	101
C.9.2.2.4	USER DEFINED
C.9.2.2.5	USER DEFINED
C.9.2.2.6	USER DEFINED
C.9.2.2.7	USER DEFINED
C.9.2.2.8	USER DEFINED
C.9.2.2.9	USER DEFINED

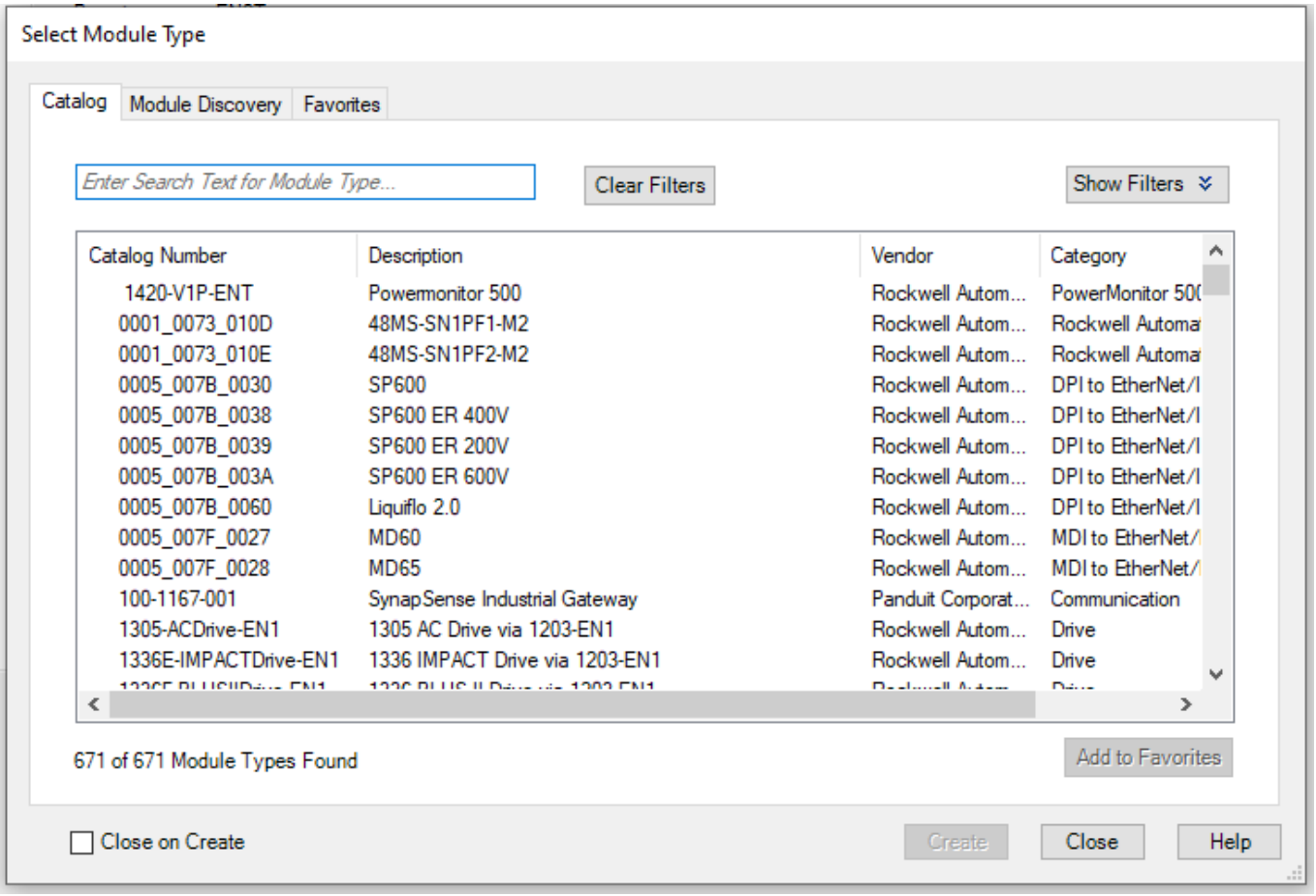
CFW900_2171

This AOI is used when the 21/71 CIP Extended Speed control mode is desired.

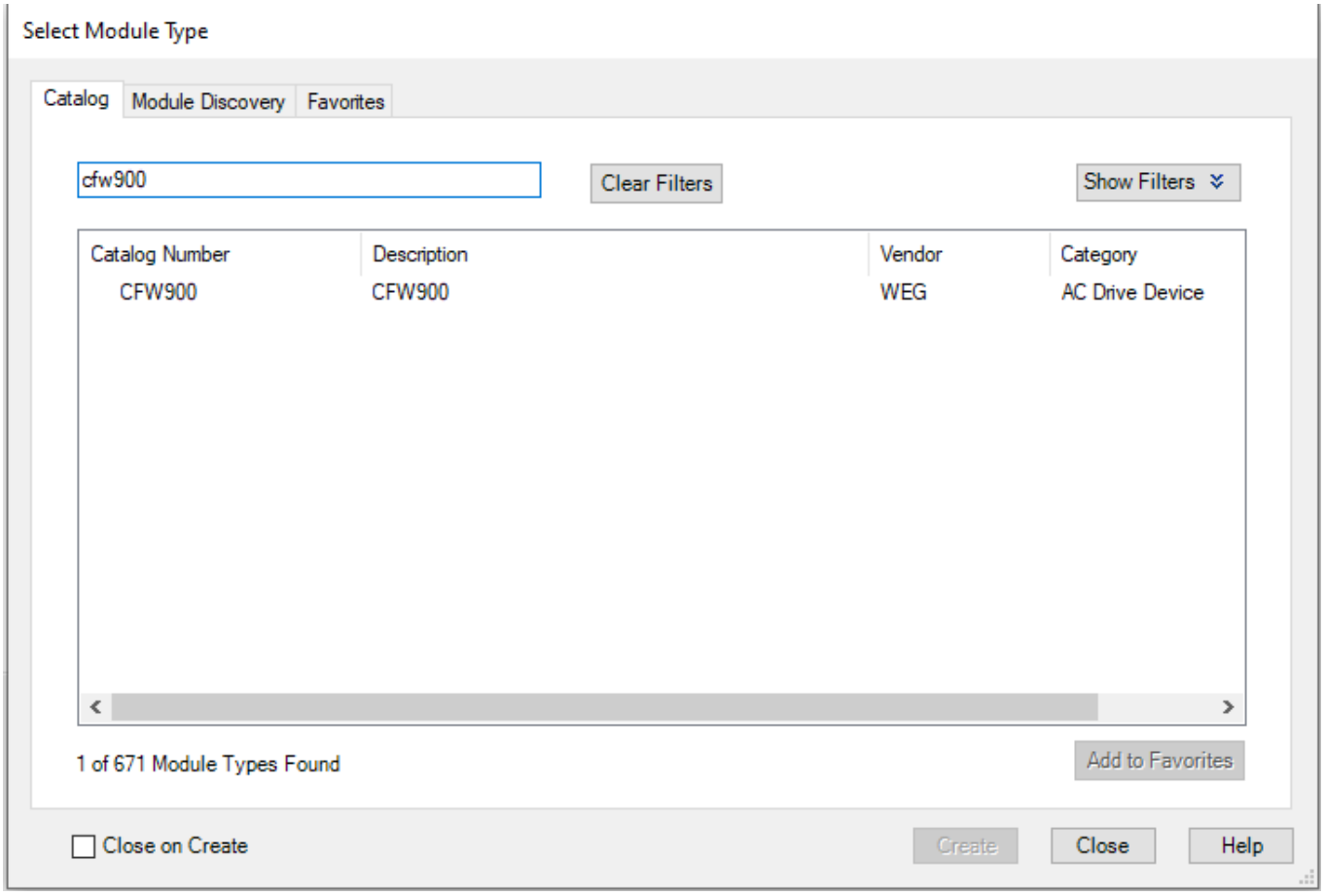
Create the Ethernet/IP Device



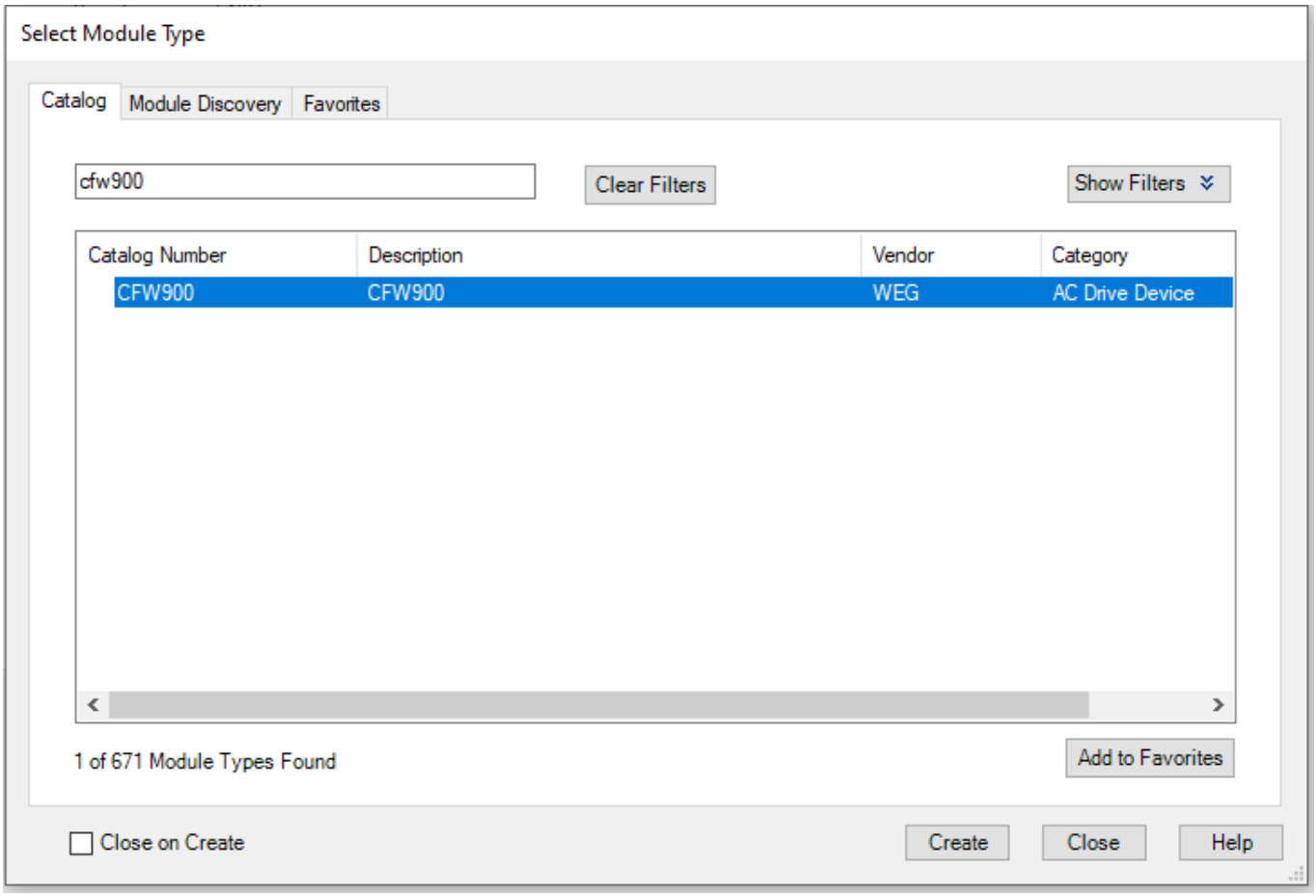
In the device tree, right click on the Ethernet bus that will contain the CFW900 and click New Module….



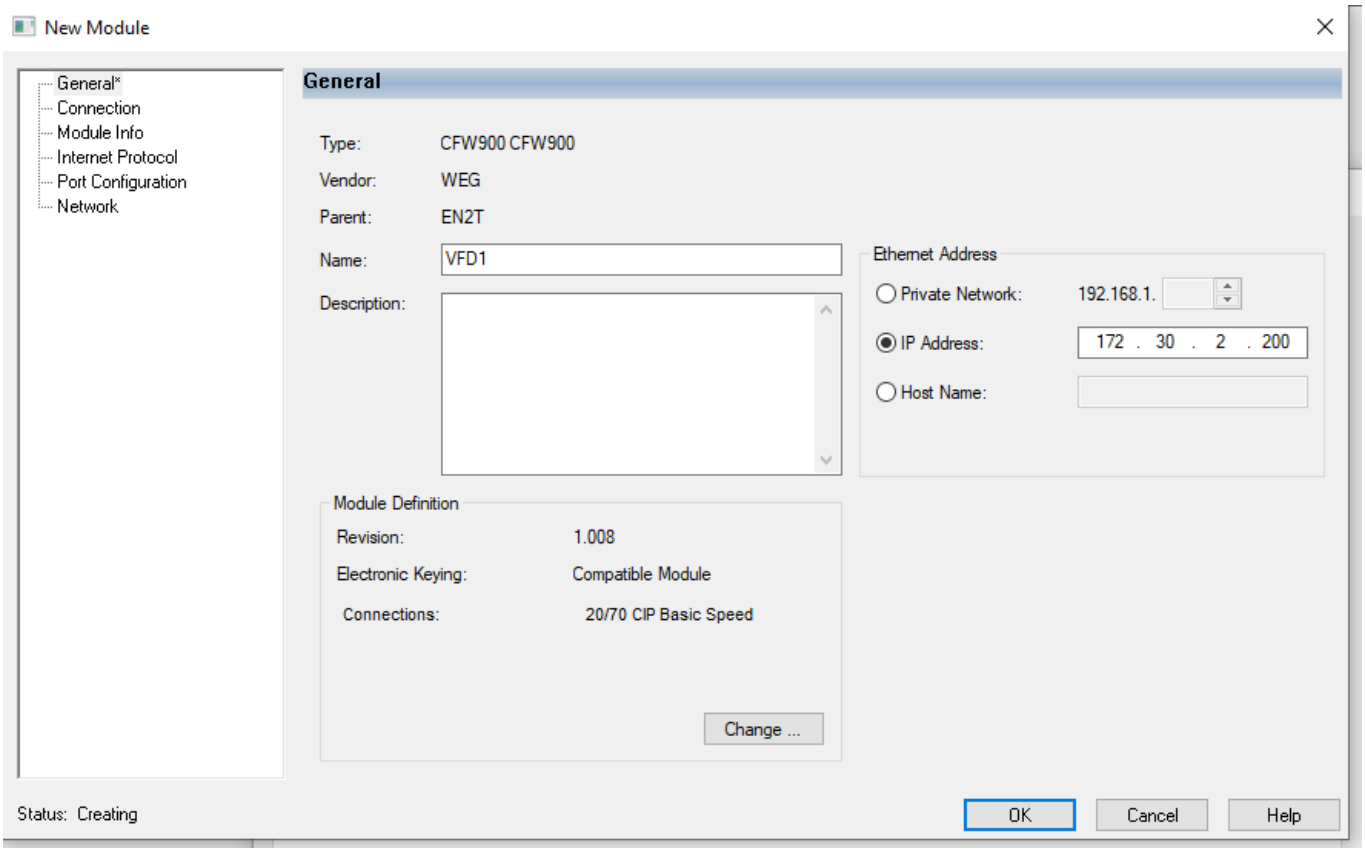
In the Select Module Type dialog box, enter in “CFW900” in the search field



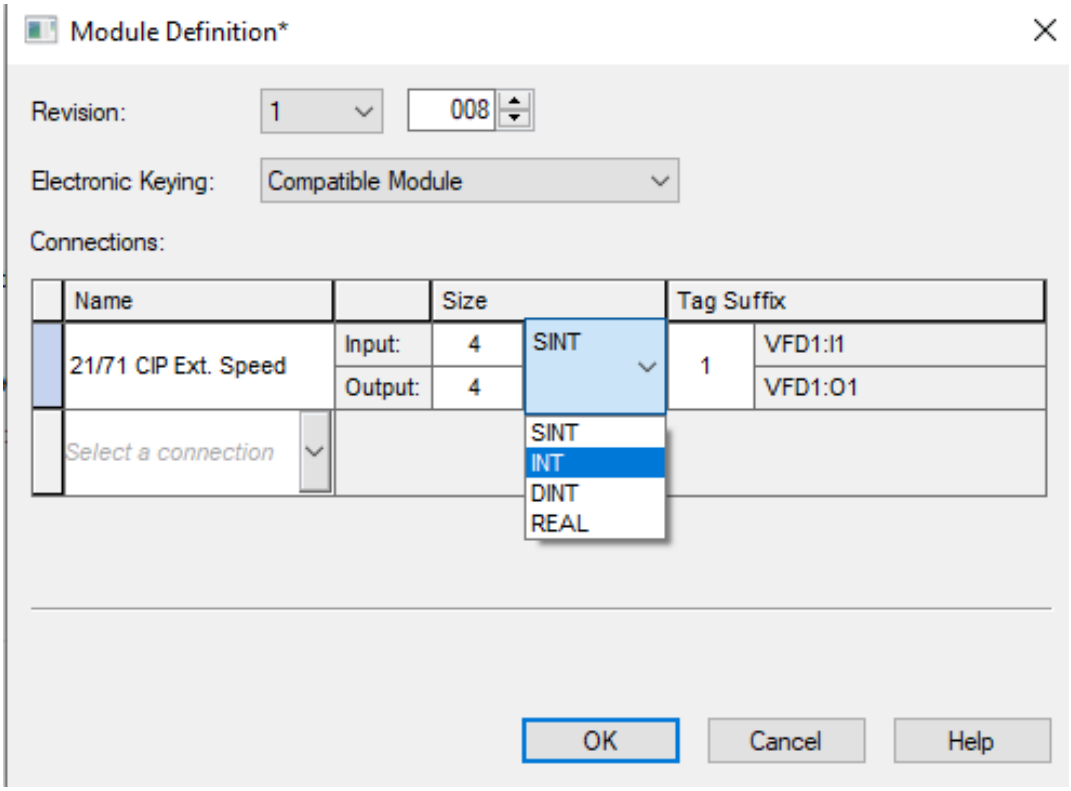
There should be an entry matching the above screenshot.



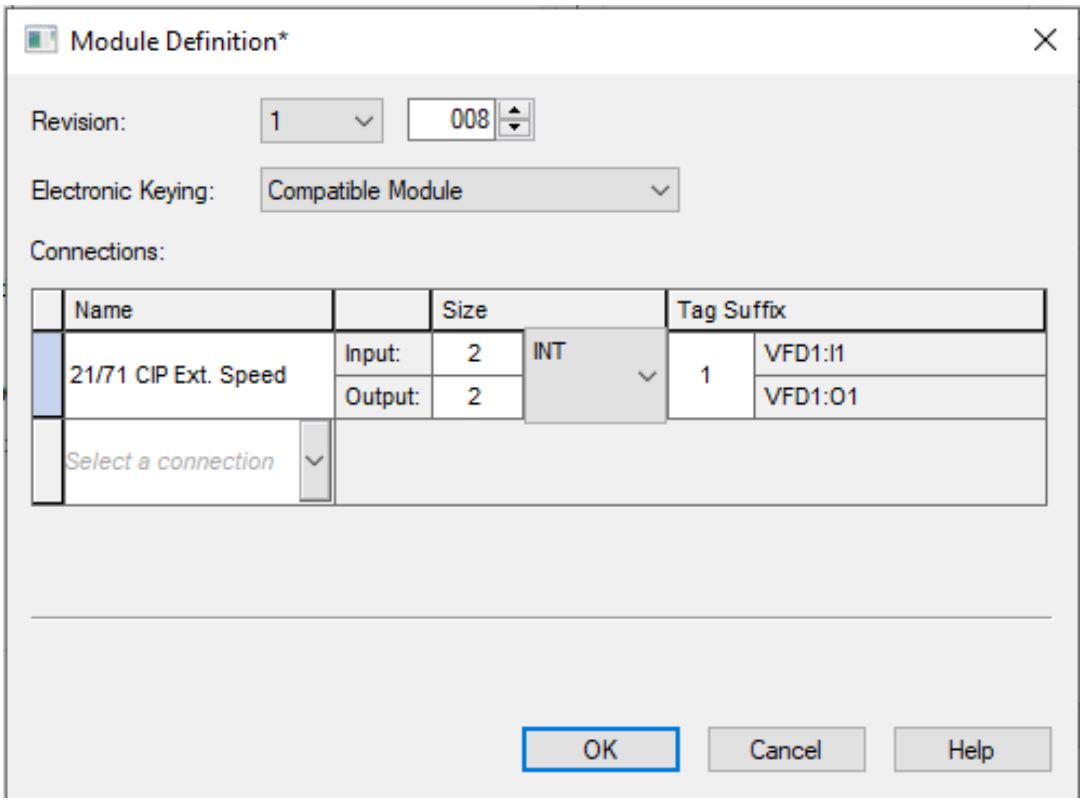
Highlight the CFW900 and click Create



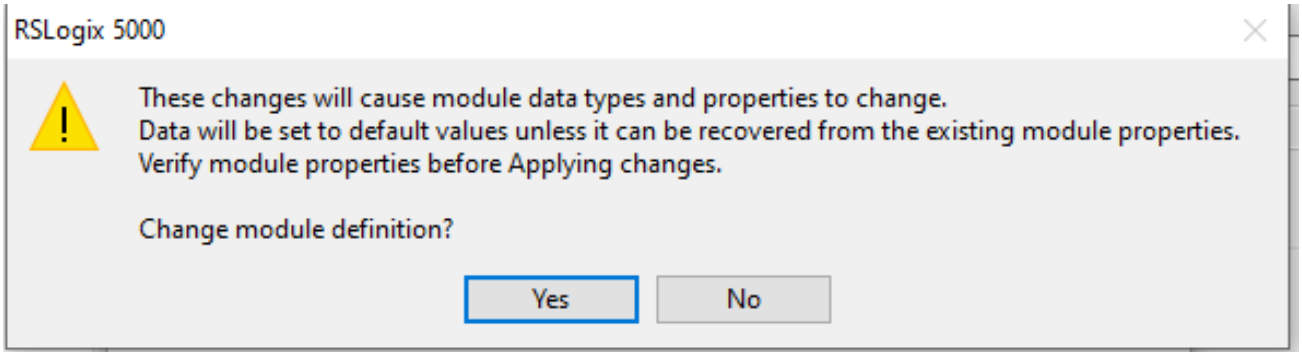
Give the CFW900 a Name and IP address. Before clicking on OK, click on the Change … button in the module definition.



Change the type to INT and the Name to 21/71 CIP Ext. Speed



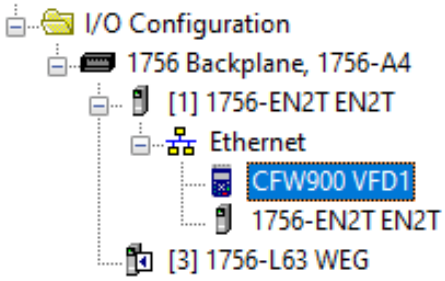
The Input and output size should be set to 2 and 2 respectively. Click OK



Click Yes

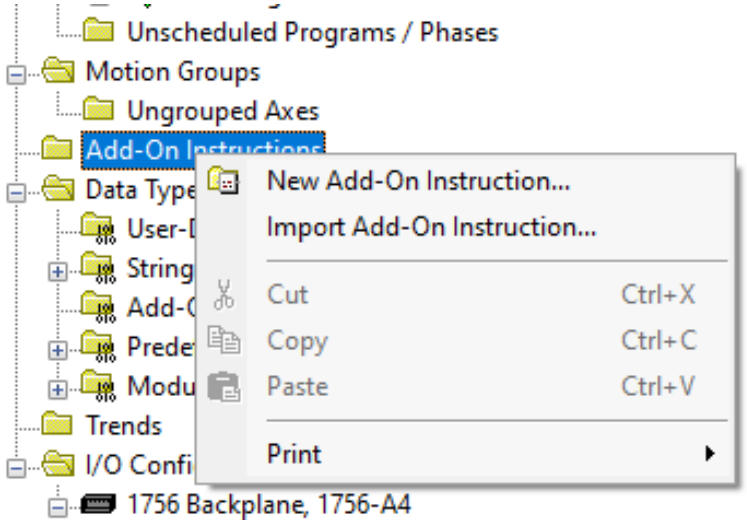
At this point, no other changes are required. However, changing the RPI can be done, if the need arises.

Once satisfied with the settings, Click OK

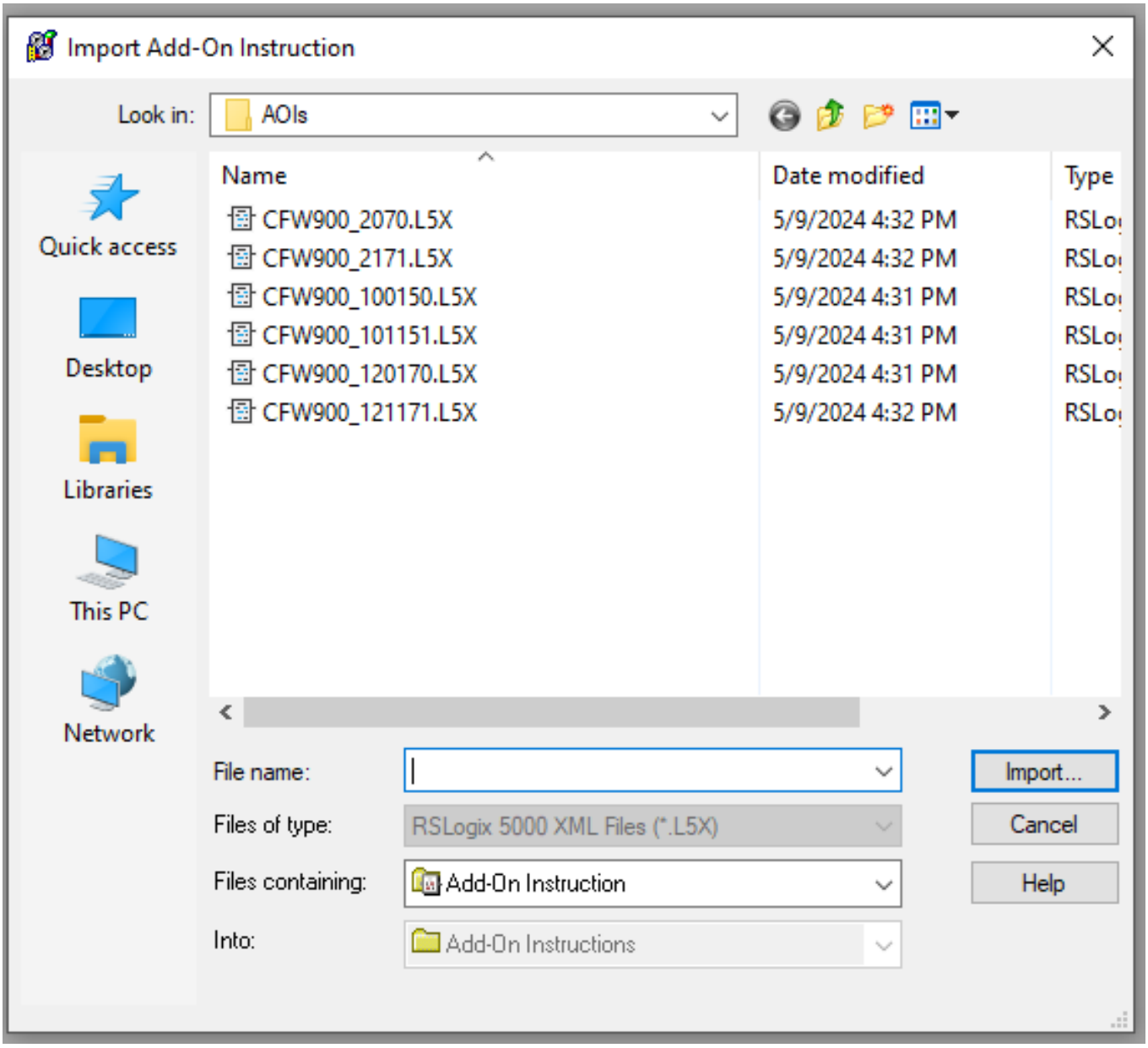


There should now be an instance of the CFW900 in the device tree

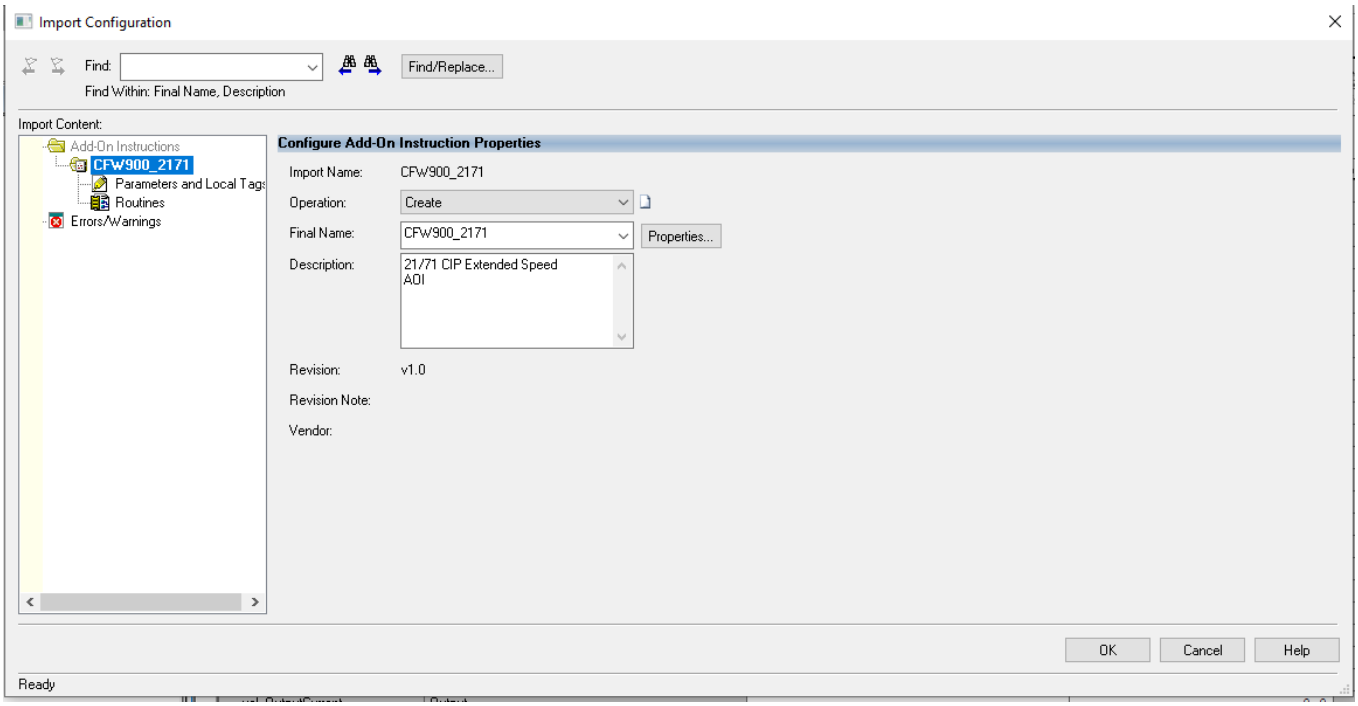
AOI Import



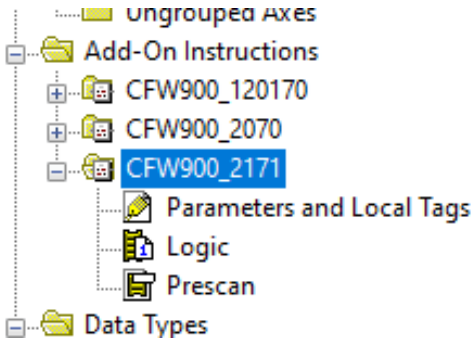
In the device tree, right click on Add-On Instructions and click on Import Add-On Instruction...



Select the appropriate add-on instruction (CFW900_2171.L5X) and click Import….

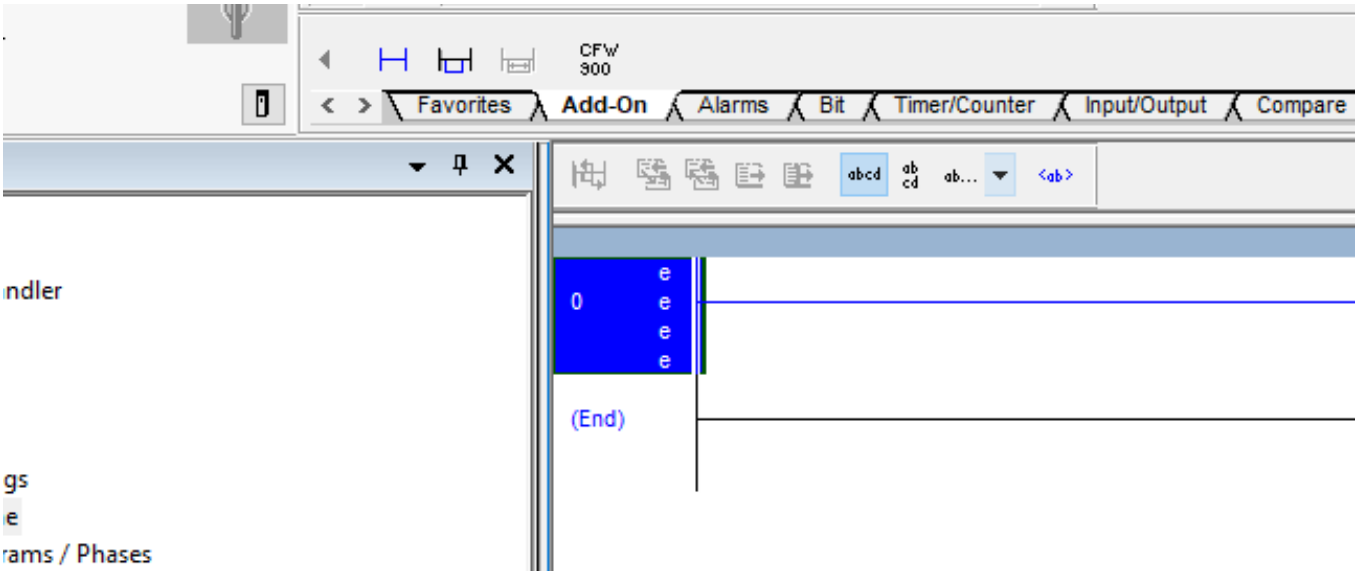


Review the proposed changes and click OK

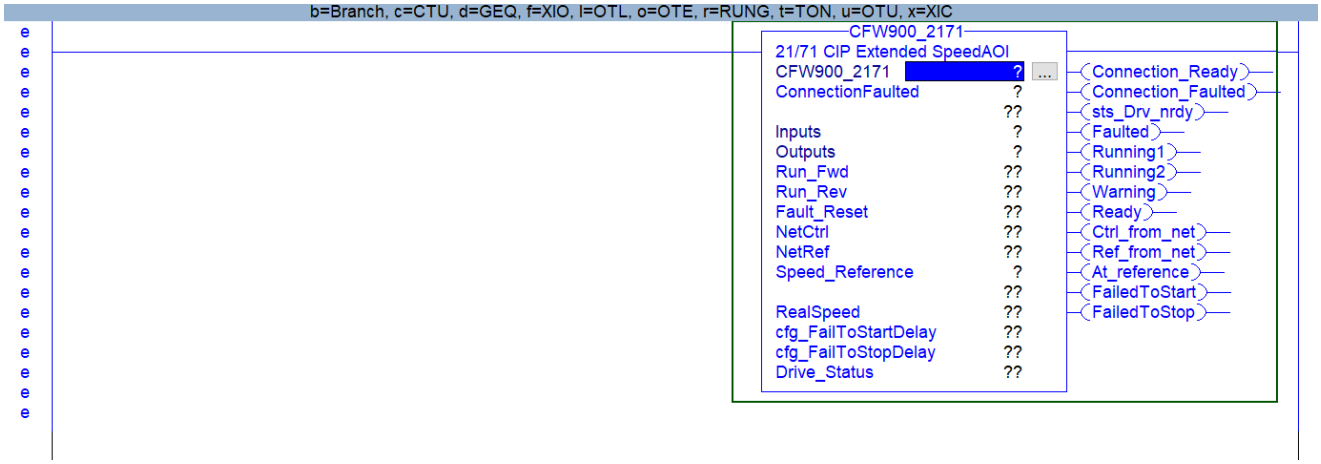


There should now be this add-on instruction in the project.

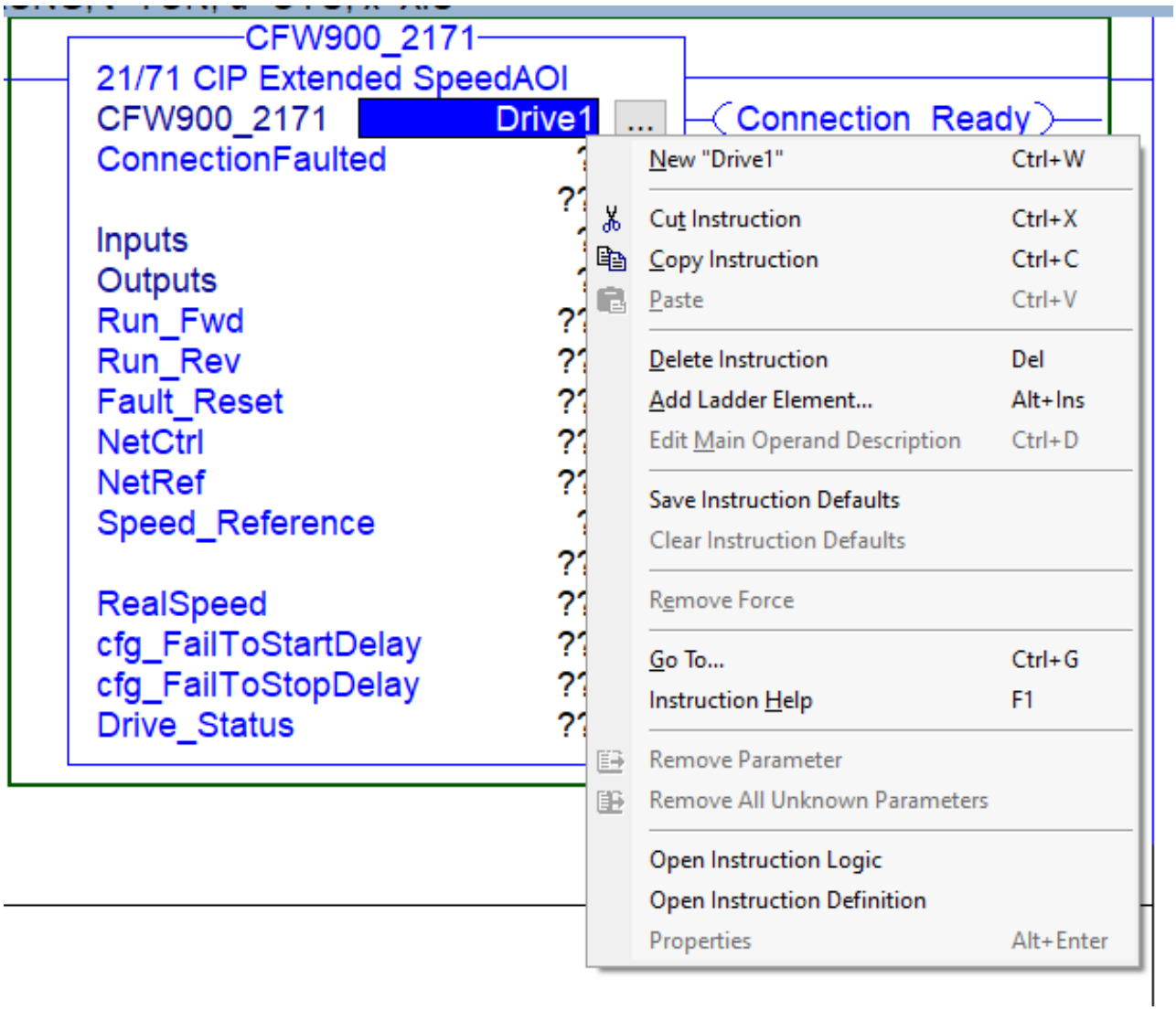
AOI Usage

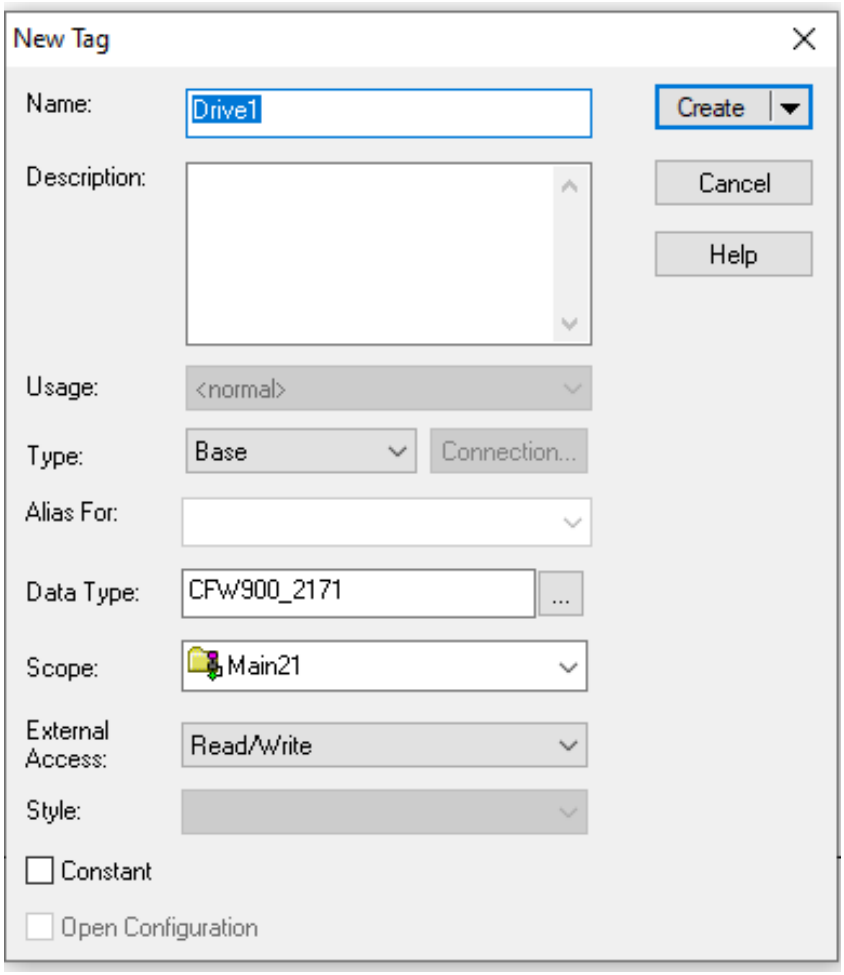


On an empty rung of ladder, add an instance of the newly imported add-on instruction by clicking on the Add-On bar and clicking the CFW900 symbol

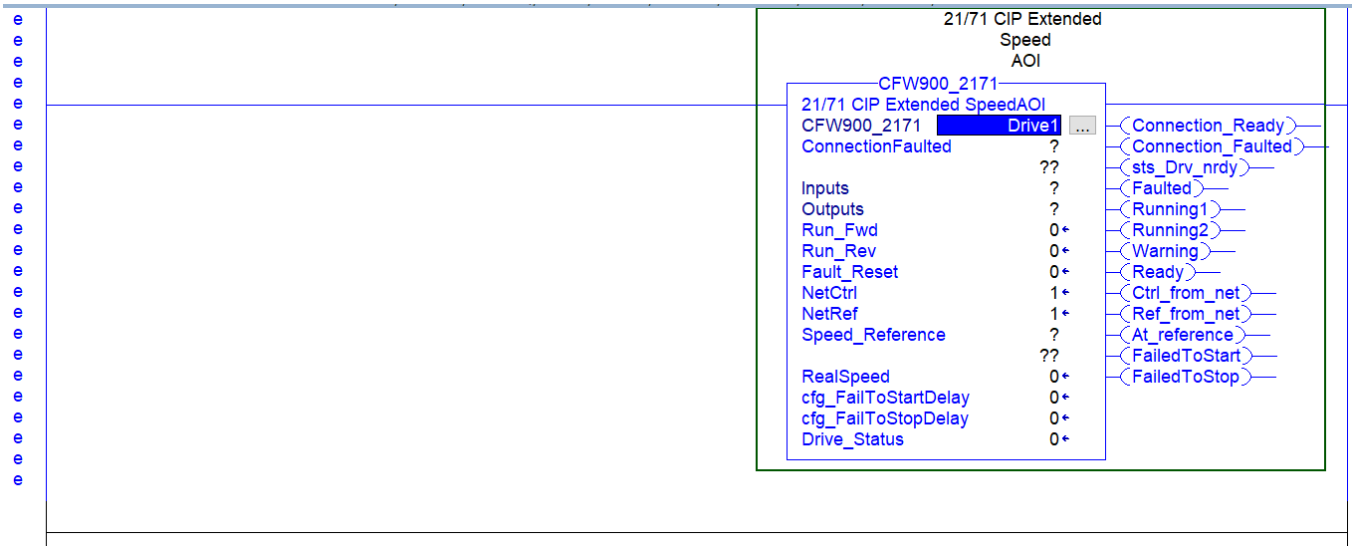


The Add-On requires a tag to be created. Create this tag by typing a name in the CFW900_2171 field and right-clicking and selecting New “Tag”

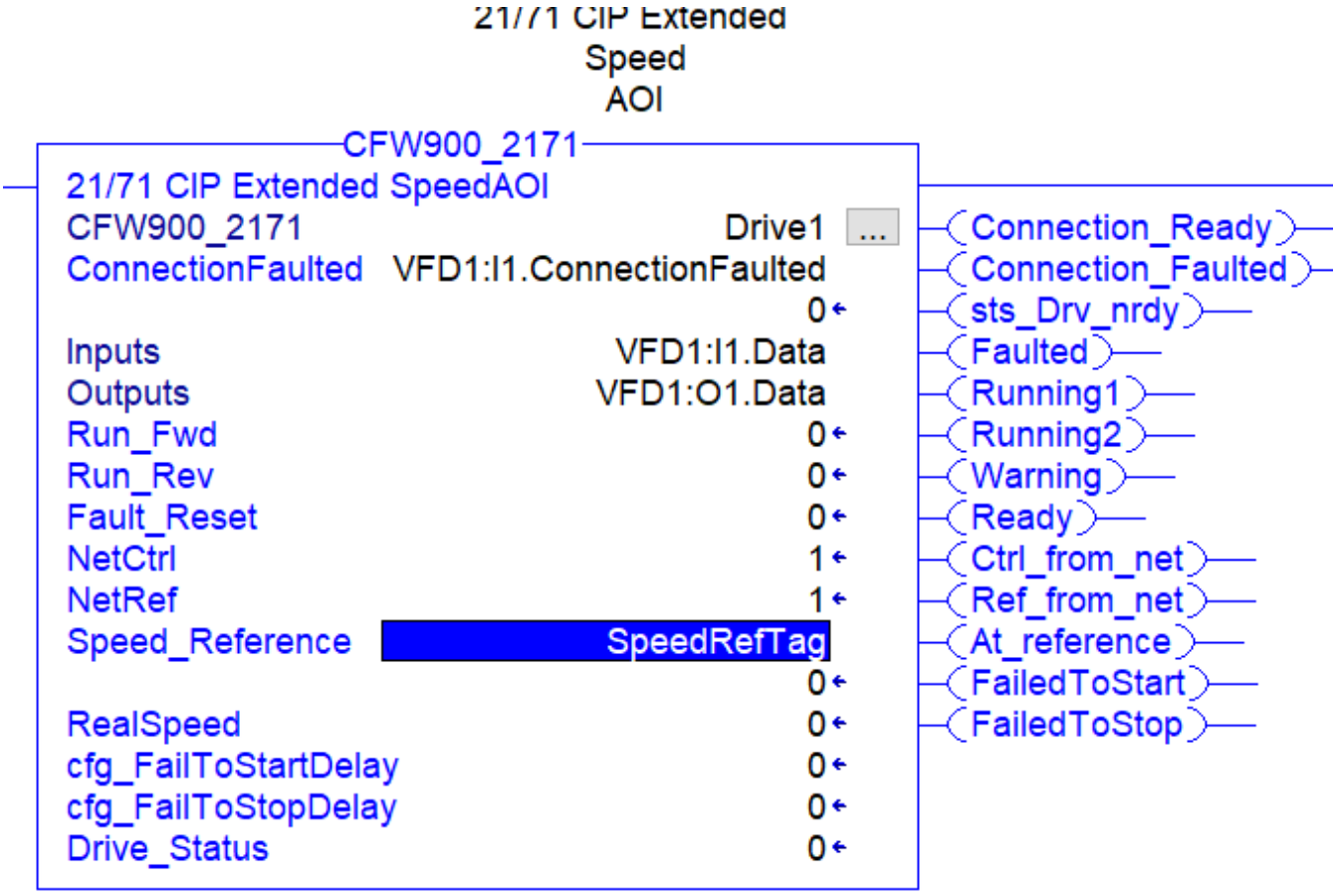




Give any appropriate description and scope (the tag can be either program or controller scoped)



Next the Connection Faulted, Inputs, Outputs, and Speed_Reference need to be populated as follows:



The SpeedRefTag is an INT that is a tag to be created.

AOI Parameter Description

InOut Parameters

Parameter	Type	Description
Inputs	INT[2]	Input Assembly from CFW900
Outputs	INT[2]	Output Assembly to CFW900

Input Parameters

Parameter	Type	Description
Cfg_FailToStartDelay	DINT	Time in seconds before faulting on fail to start if VFD does not start when commanded Set to 0 to disable
Cfg_FailToStopDelay	DINT	Time in seconds before faulting on fail to stop if VFD does not stop when commanded Set to 0 to disable
ConnectionFaulted	BOOL	From CFW900 Ethernet Module. 1 = Connection is faulted 0 = Connection is OK

Fault_Reset	BOOL	1 = Send Reset Fault Signal to VFD 0 = No action
Run_Fwd	BOOL	1 = Run Forward 0 = Stop
Run_Rev	BOOL	1 = Run Reverse 0 = Stop
Speed_Reference	INT	Speed Setpoint (RPM) Negative Speed will reverse direction of motor
NetCtrl	BOOL	1 = R2 Control (Ethernet) 0 = R1 Control (other)
NetRef	BOOL	1 = R2 Reference (Ethernet) 0 = R1 Reference (other)
cfg_AutoFaultResetNum	DINT	Maximum number of tries that AOI will send fault reset command while being maintained

Output Parameters

Parameter	Type	Description
Connection_Faulted	BOOL	Goes high when connections interrupted. If “Run” signal is set, it must be reset before this will clear 1 = Connection has been faulted from VFD to PLC 0 = Connection OK
Connection_Ready	BOOL	1 = Connection from VFD to PLC is established 0 = Connection not established
Faulted	BOOL	1 = VFD Fault, connection fault, or failedToStart/Stop Fault 0 = No faults
RealSpeed	INT	Current Speed (RPM)
Running_Fwd	BOOL	1 = VFD running forward 0 = VFD not running forward
Running_Rev	BOOL	1 = VFD running in reverse 0 = VFD not running in reverse
At_reference	BOOL	1 = VFD has reached programmed speed
Ctrl_from_net	BOOL	1 = VFD Controlled remotely (PLC) 0 = VFD Controlled Locally
Drive_Status	INT	0 = Non-existent 1 = Startup

		2 = Not Ready 3 = Ready 4 = Enabled 5 = Stopping 6 = Fault Stop 7 = Faulted
FailedToStart	BOOL	1 = VFD failed to start in time allotted 0 = Normal
FailedToStop	BOOL	1 = VFD failed to stop in time allotted 0 = Normal
Ref_from_net	BOOL	1 = using speed reference from remote source 0 = using speed reference from local source
Sts_Drv_nrdy	BOOL	1 = indicates AOI detected a not ready state and run_fwd/run_rev must be set to 0 to clear 0 = Normal
Warning	BOOL	1 = VFD is in alarm condition 0 = VFD is not in alarm condition
AutoFaultResetExceed	BOOL	Indicates when the maximum number of automatic fault clears has been exceeded. Set Fault_Reset to 0 to reset and allow fault clear to resume. 1 = Max number of fault clears reached. Fault Reset Disabled 0 = Under threshold for automatic fault clears. Fault Reset Allowed.

CFW900 Parameter Requirements

The following parameters must be set in the CFW900:

Parameter	**Setting**
C.9.5.1	21/71
C.4.1.1	Ethernet
C.4.2.2.1	Ethernet
C.4.2.2.2	Ethernet
C.4.2.2.3	Ethernet
C.4.2.2.4	Ethernet
C.4.3.1.2.2	Ethernet

CFW900_121171

This AOI is used when the 121/171 CIP Extended Speed control mode + IO is desired.

This behaves similarly to the 21/71 CIP Extended Speed, but adds the following parameters:

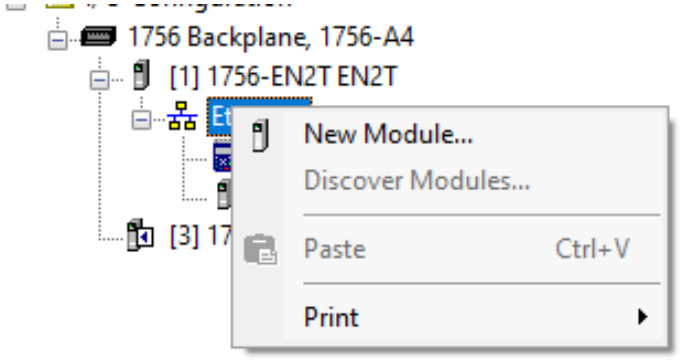
Outputs

- Output Current
- Output Voltage
- Output Frequency
- Last Fault Code

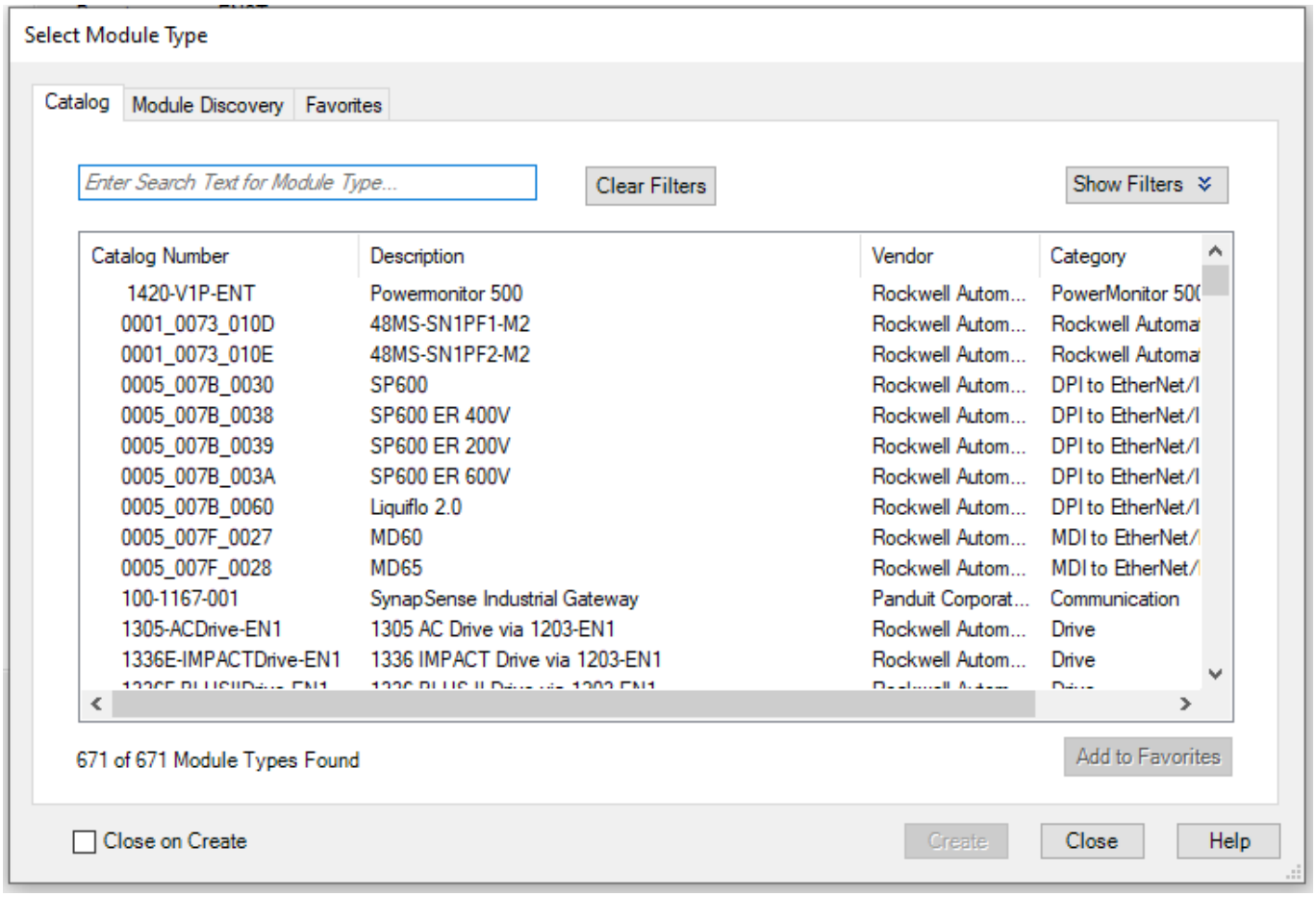
Inputs

- Acceleration Ramp 1
- Deceleration Ramp 1

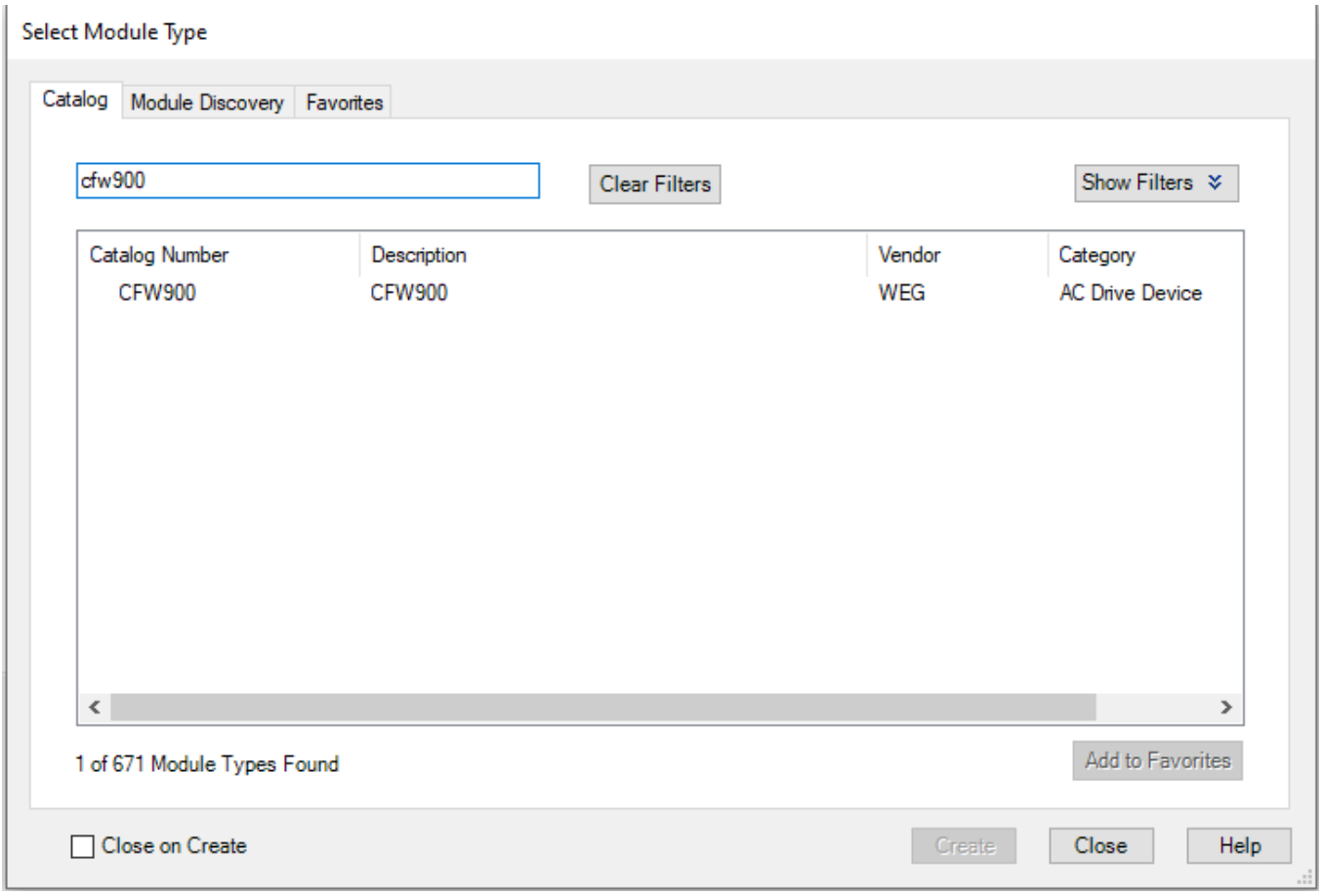
Create the Ethernet/IP Device



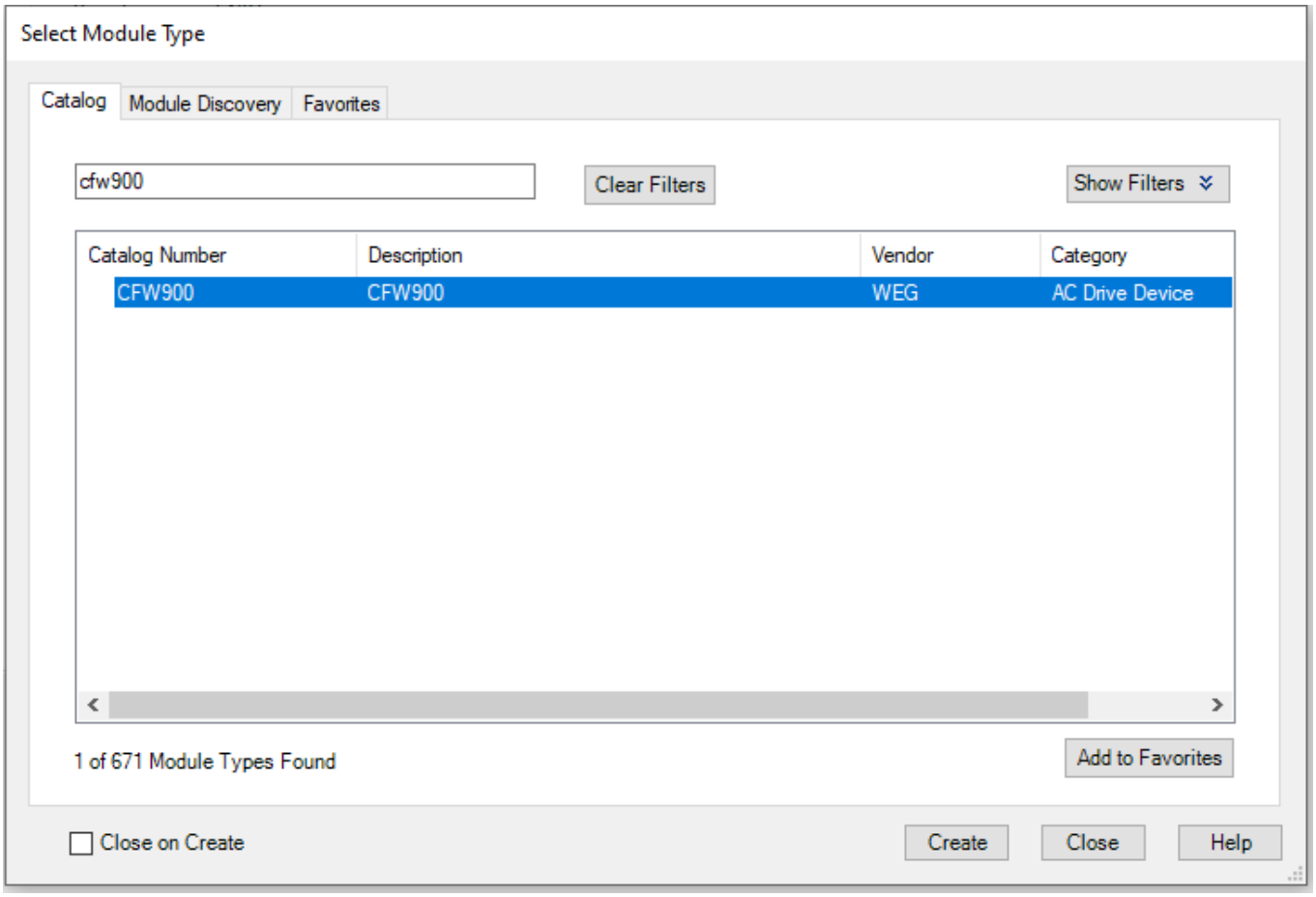
In the device tree, right click on the Ethernet bus that will contain the CFW900 and click New Module….



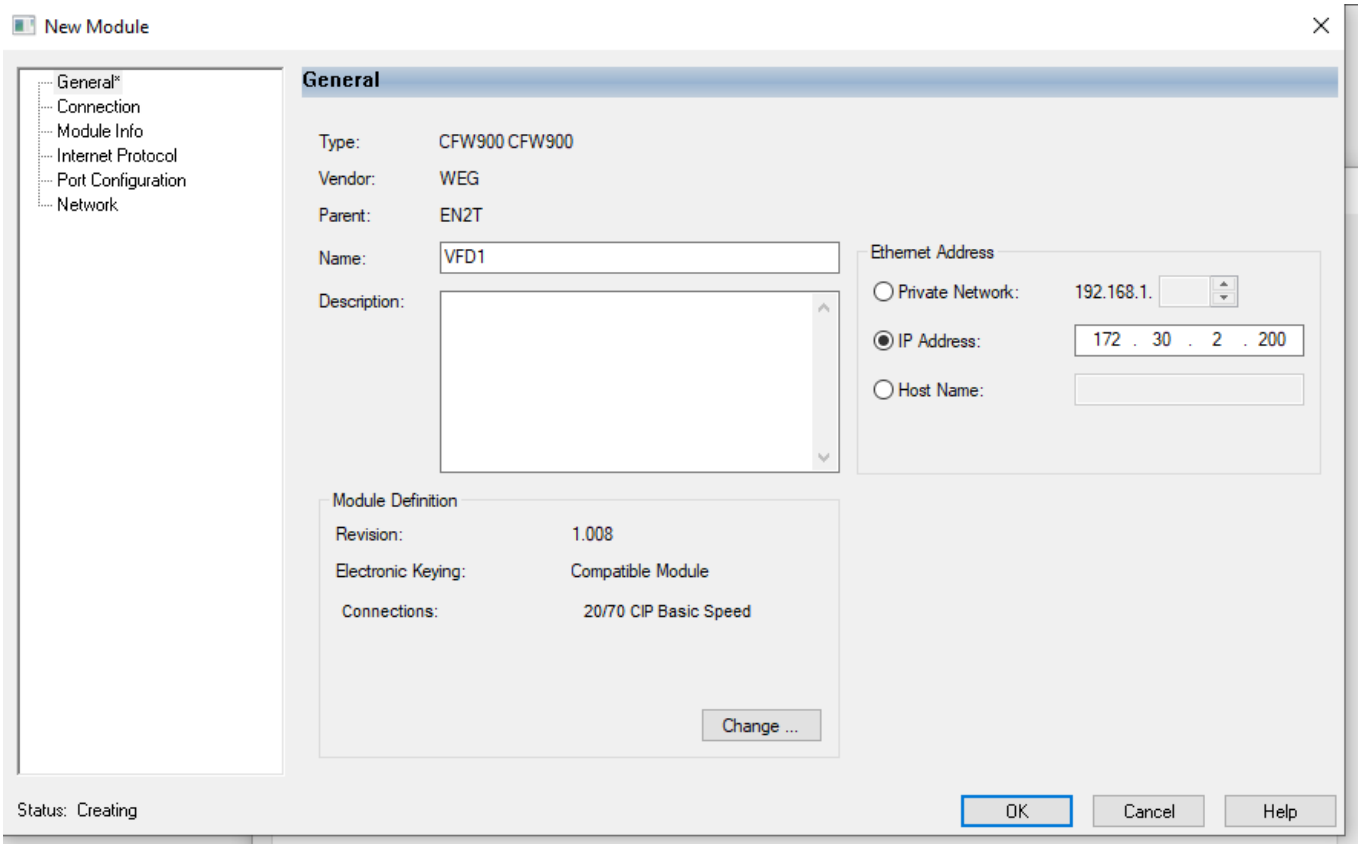
In the Select Module Type dialog box, enter in “CFW900” in the search field



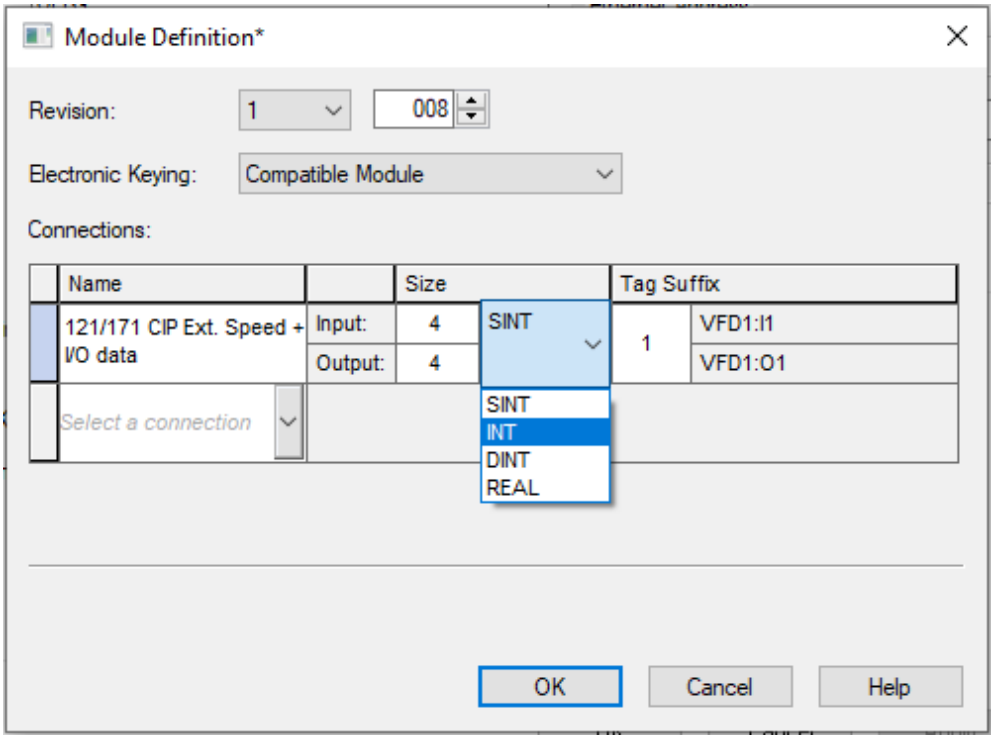
There should be an entry matching the above screenshot.



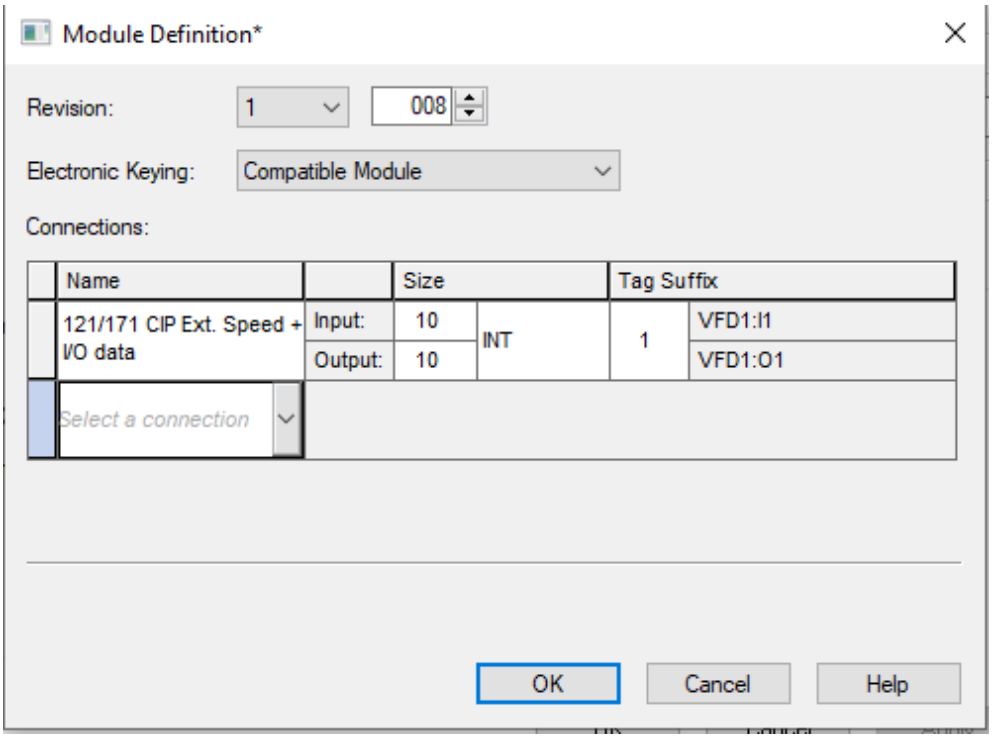
Highlight the CFW900 and click Create



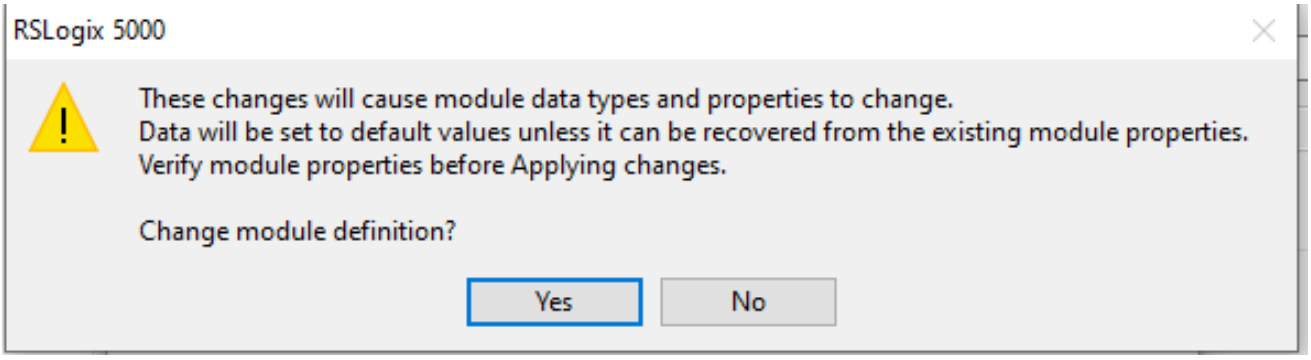
Give the CFW900 a Name and IP address. Before clicking on OK, click on the Change … button in the module definition.



Change the type to INT and the Name to 121/171 CIP Ext. Speed + I/O data



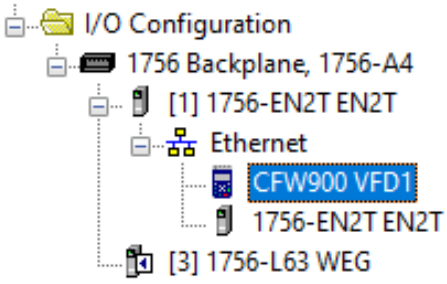
The Input and output size should be set to 10 and 10 respectively. Click OK



Click Yes

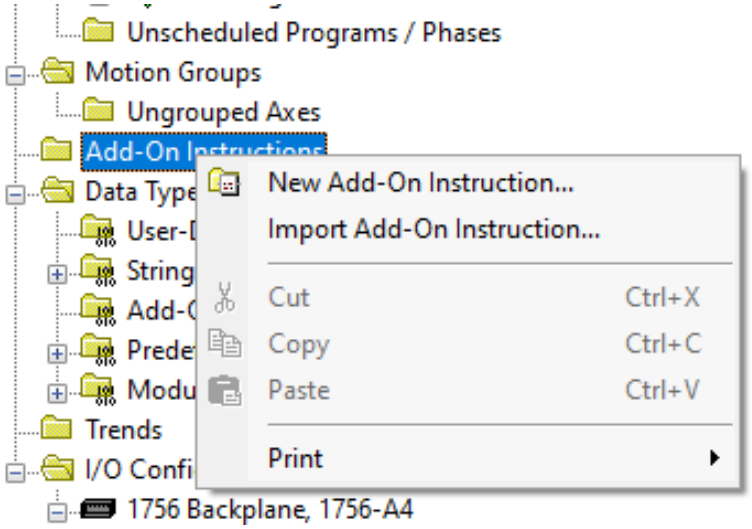
At this point, no other changes are required. However, changing the RPI can be done, if the need arises.

Once satisfied with the settings, Click OK

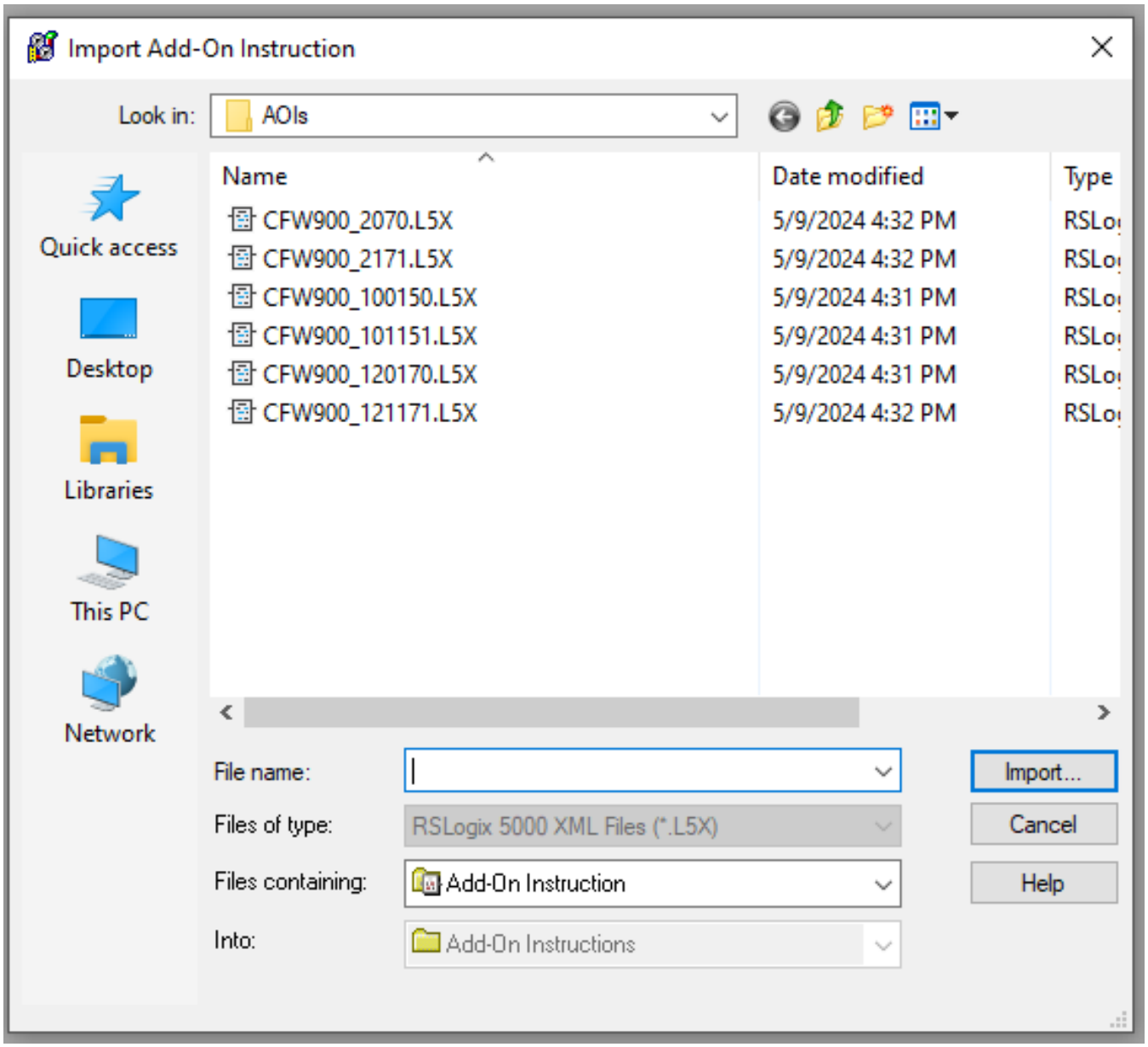


There should now be an instance of the CFW900 in the device tree

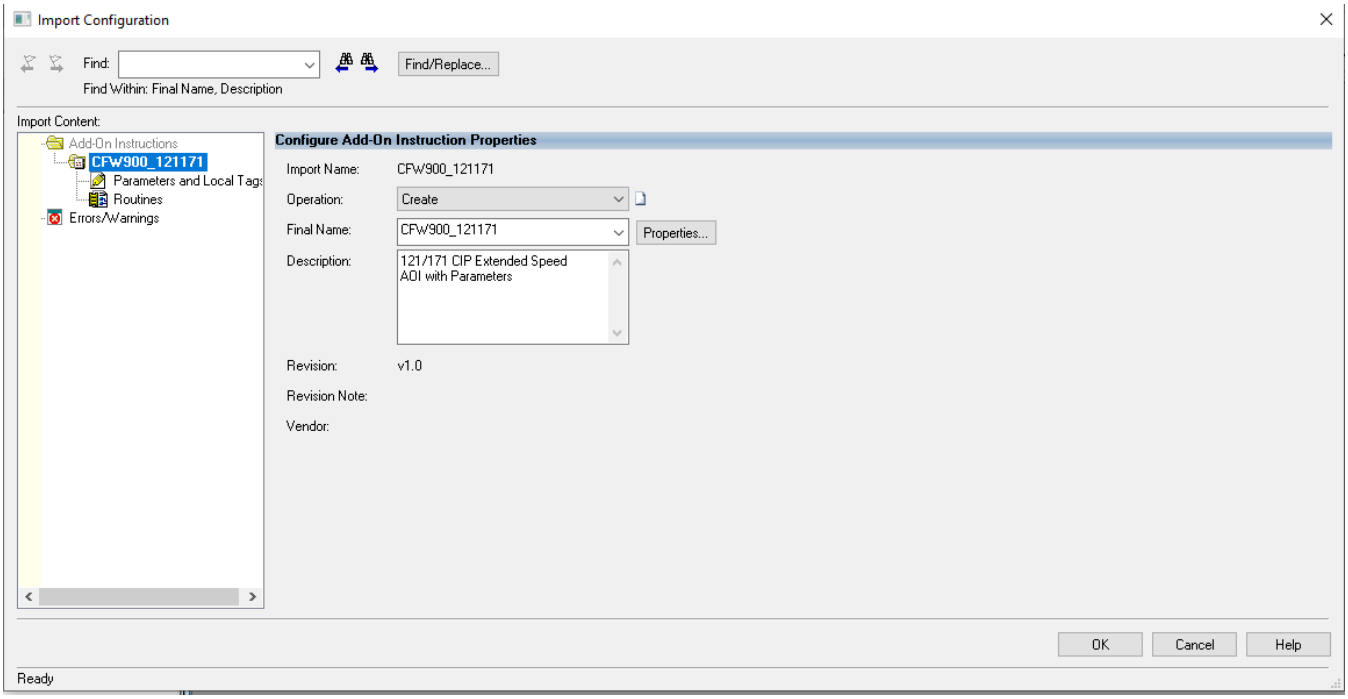
AOI Import



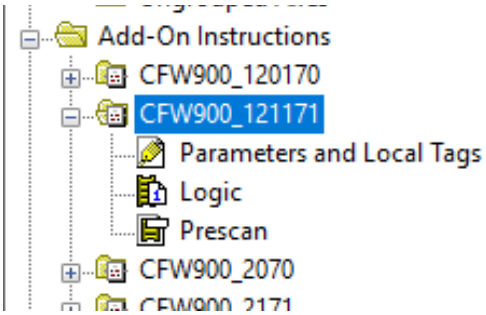
In the device tree, right click on Add-On Instructions and click on Import Add-On Instruction...



Select the appropriate add-on instruction (CFW900_121171.L5X) and click Import….

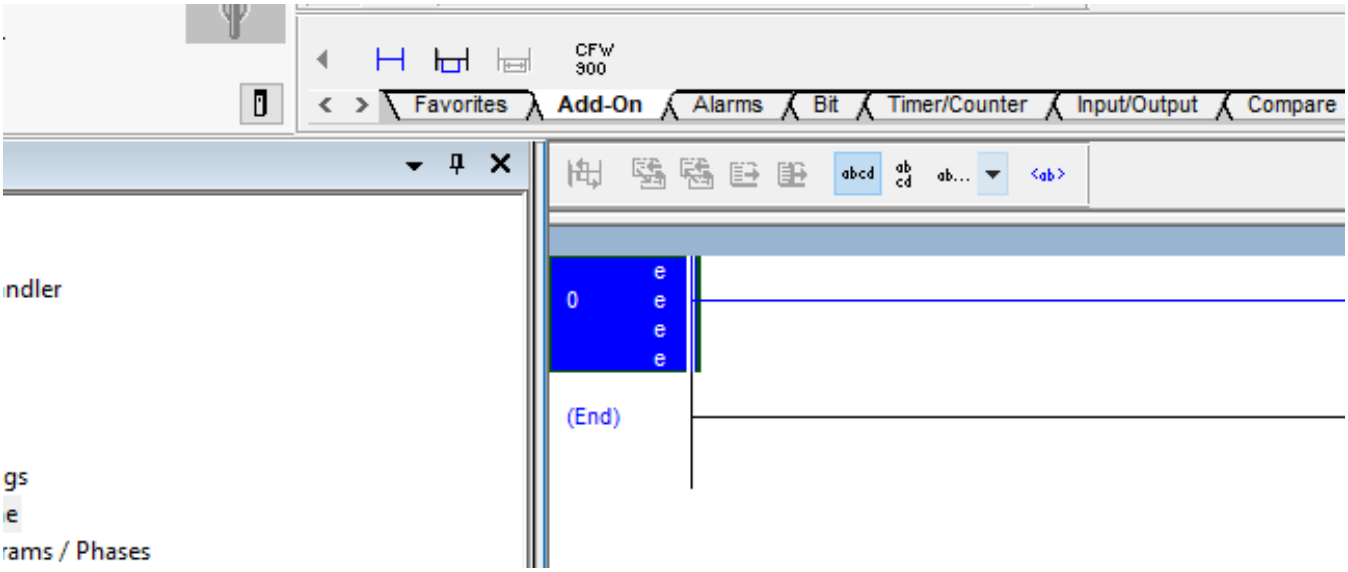


Review the proposed changes and click OK

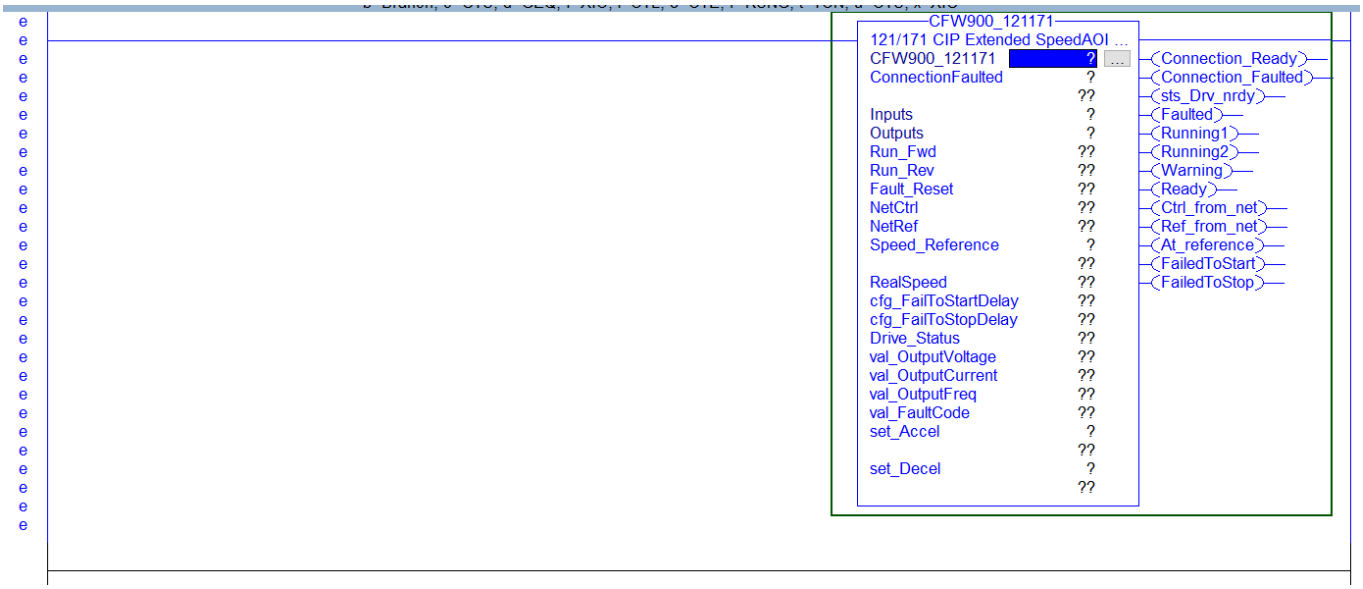


There should now be this add-on instruction in the project.

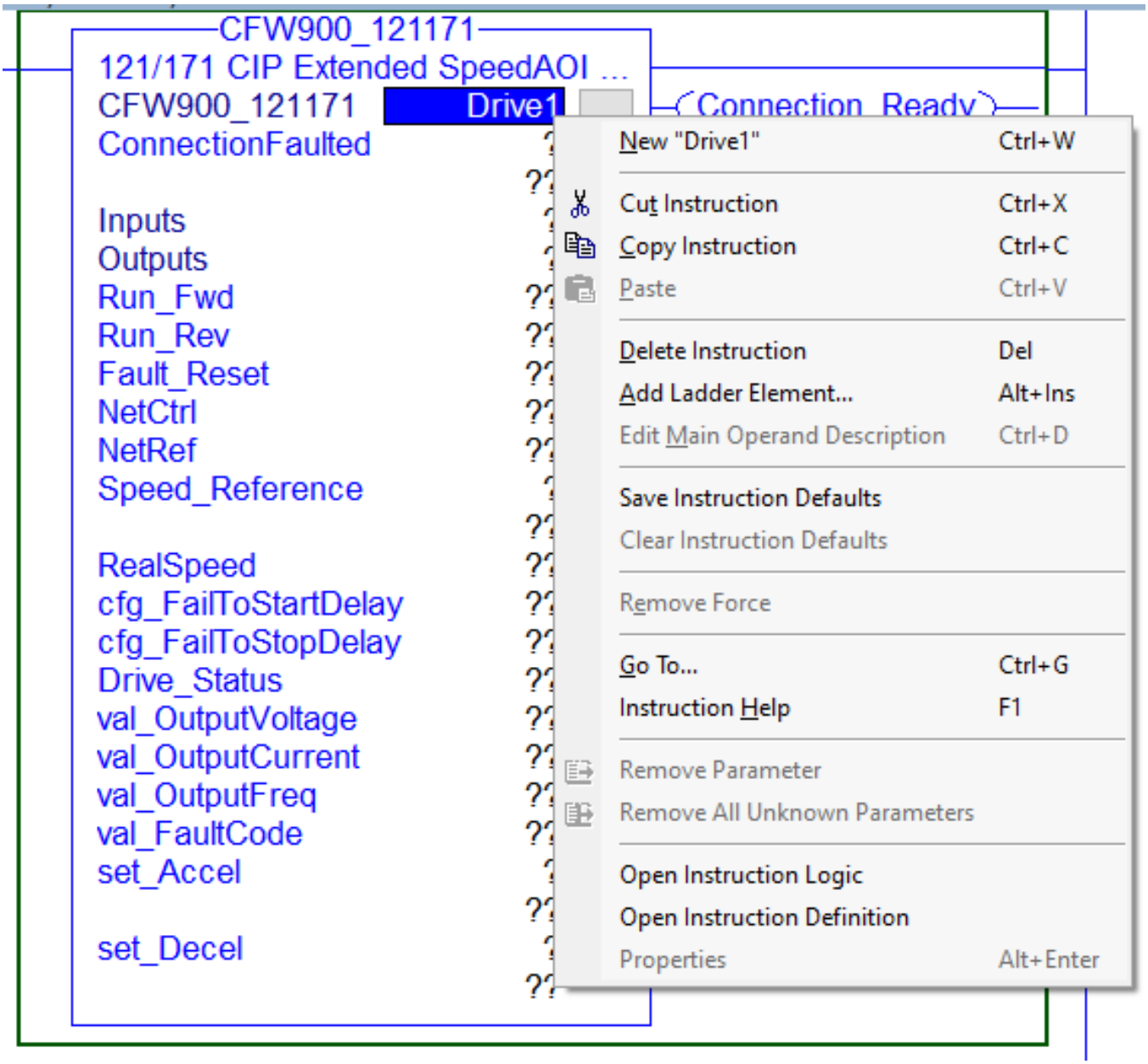
AOI Usage

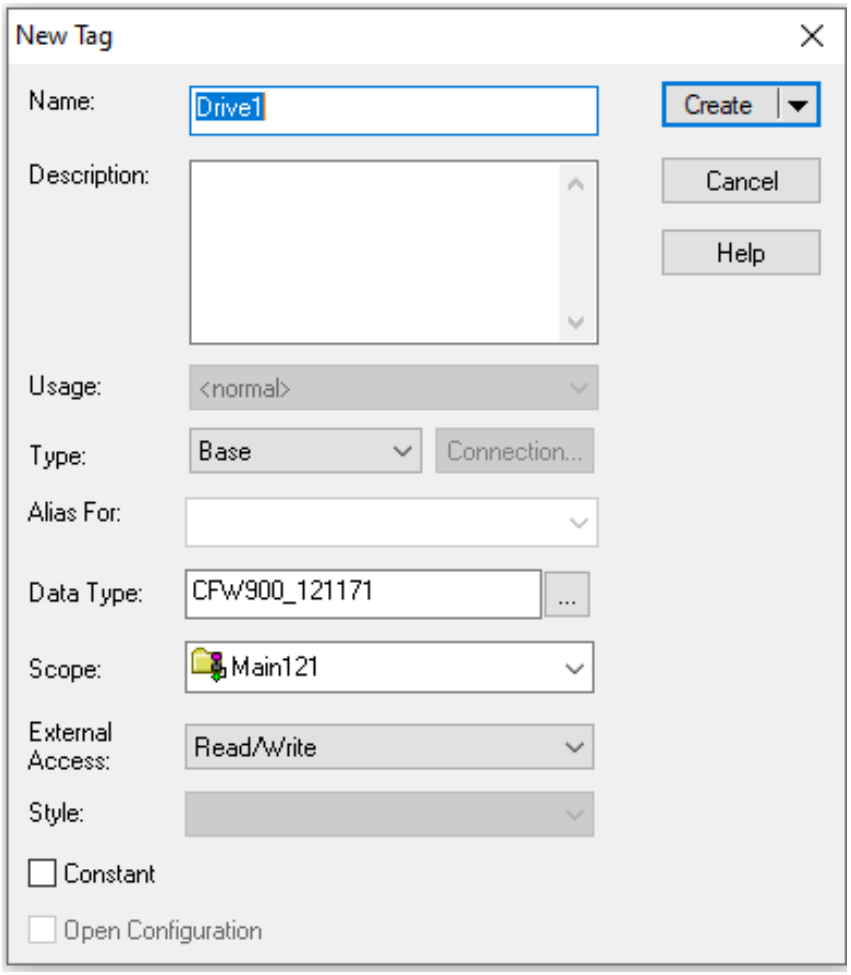


On an empty rung of ladder, add an instance of the newly imported add-on instruction by clicking on the Add-On bar and clicking the CFW900 symbol

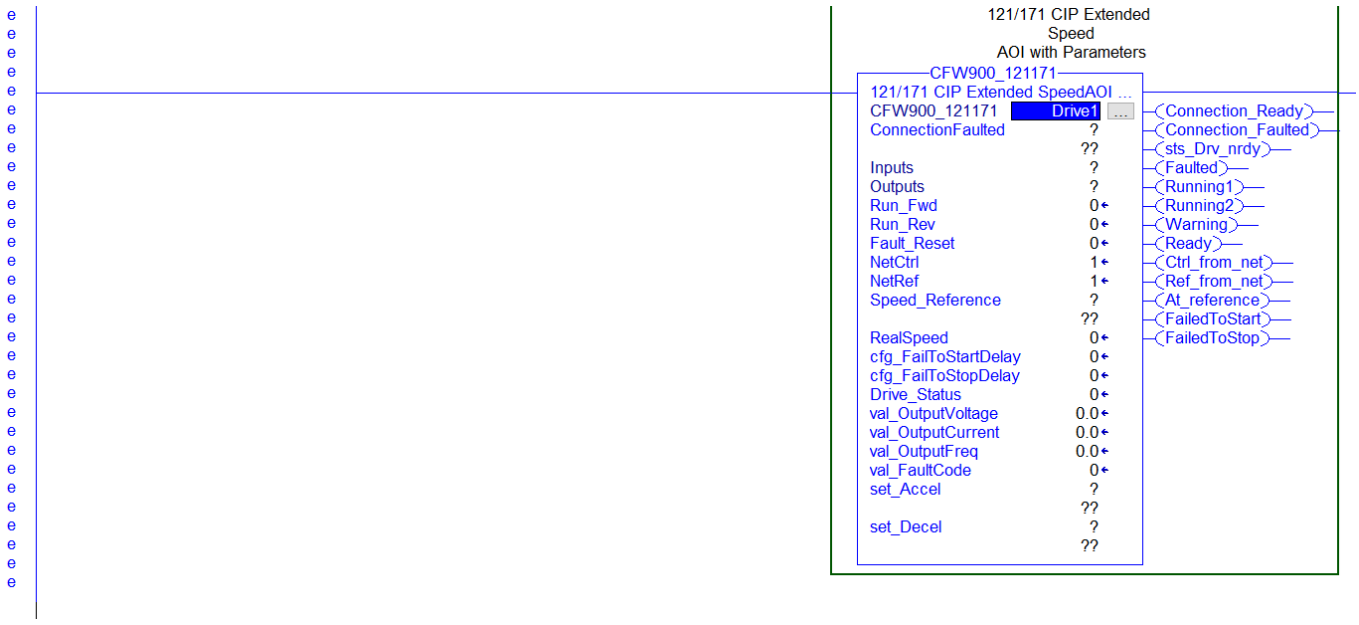


The Add-On requires a tag to be created. Create this tag by typing a name in the CFW900_121171 field and right-clicking and selecting New “Tag”

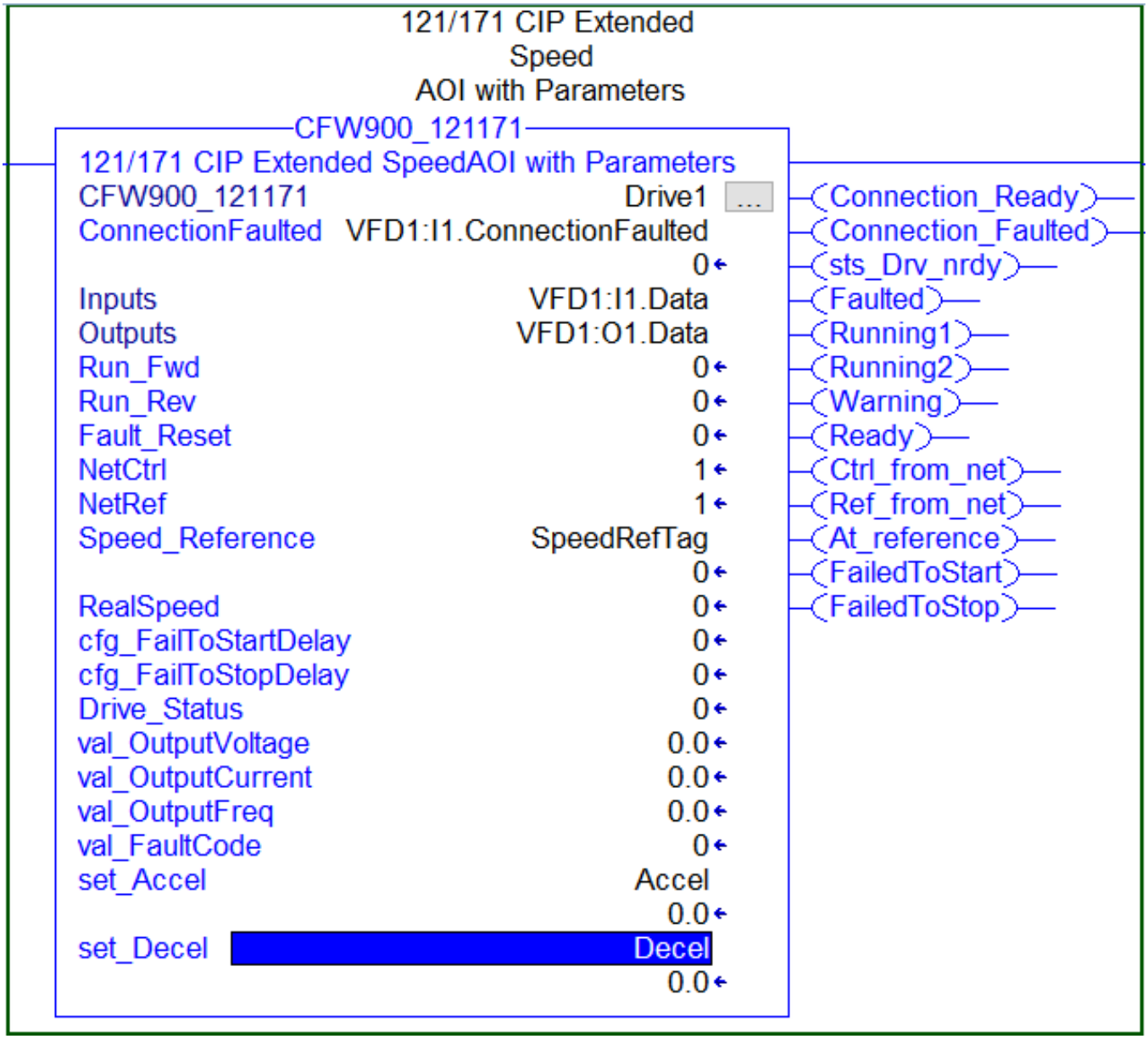

CFW900_121171
121/171 CIP Extended SpeedAOI ...
CFW900_121171
Drive1
ConnectionFaulted
Inputs
Outputs
Run_Fwd
Run_Rev
Fault_Reset
NetCtrl
NetRef
Speed_Reference
RealSpeed
cfg_FailToStartDelay
cfg_FailToStopDelay
Drive_Status
val_OutputVoltage
val_OutputCurrent
val_OutputFreq
val_FaultCode
set_Accel
set_Decel
Connection_Ready
New "Drive1" Ctrl+W
Cut Instruction Ctrl+X
Copy Instruction Ctrl+C
Paste Ctrl+V
Delete Instruction Del
Add Ladder Element... Alt+Ins
Edit Main Operand Description Ctrl+D
Save Instruction Defaults
Clear Instruction Defaults
Remove Force
Go To... Ctrl+G
Instruction Help F1
Remove Parameter
Remove All Unknown Parameters
Open Instruction Logic
Open Instruction Definition
Properties Alt+Enter



Give any appropriate description and scope (the tag can be either program or controller scoped)



Next the Connection Faulted, Inputs, Outputs, Speed_Reference, set_Accel, and set_Decel need to be populated as follows:



The SpeedRefTag is an INT that is a tag to be created.

set_Accel and set_Decel are REAL tags to be created.

AOI Parameter Description

InOut Parameters

Parameter	Type	Description
Inputs	INT[10]	Input Assembly from CFW900
Outputs	INT[10]	Output Assembly to CFW900

Input Parameters

Parameter	Type	Description

Cfg_FailToStartDelay	DINT	Time in seconds before faulting on fail to start if VFD does not start when commanded Set to 0 to disable
Cfg_FailToStopDelay	DINT	Time in seconds before faulting on fail to stop if VFD does not stop when commanded Set to 0 to disable
ConnectionFaulted	BOOL	From CFW900 Ethernet Module. 1 = Connection is faulted 0 = Connection is OK
Fault_Reset	BOOL	1 = Send Reset Fault Signal to VFD 0 = No action
Run_Fwd	BOOL	1 = Run Forward 0 = Stop
Run_Rev	BOOL	1 = Run Reverse 0 = Stop
Speed_Reference	INT	Speed Setpoint (RPM) Negative Speed will reverse direction of motor
NetCtrl	BOOL	1 = R2 Control (Ethernet) 0 = R1 Control (other)
NetRef	BOOL	1 = R2 Reference (Ethernet) 0 = R1 Reference (other)
Set_Accel	REAL	Acceleration Ramp Setpoint (0.1-999.9) in Seconds
Set_Decel	REAL	Deceleration Ramp Setpoint (0.1-999.9) in Seconds
cfg_AutoFaultResetNum	DINT	Maximum number of tries that AOI will send fault reset command while being maintained

Output Parameters

Parameter	Type	Description
connection_Faulted	BOOL	Goes high when connections interrupted. If “Run” signal is set, it must be reset before this will clear 1 = Connection has been faulted from VFD to PLC 0 = Connection OK
connection_Ready	BOOL	1 = Connection from VFD to PLC is established 0 = Connection not established

faulted	BOOL	1 = VFD Fault, connection fault, or failedToStart/Stop Fault 0 = No faults
realSpeed	INT	Current Speed (RPM)
running_Fwd	BOOL	1 = VFD running forward 0 = VFD not running forward
running_Rev	BOOL	1 = VFD running in reverse 0 = VFD not running in reverse
at_reference	BOOL	1 = VFD has reached programmed speed
ctrl_from_net	BOOL	1 = VFD Controlled remotely (PLC) 0 = VFD Controlled Locally
drive_Status	INT	0 = Non-existent 1 = Startup 2 = Not Ready 3 = Ready 4 = Enabled 5 = Stopping 6 = Fault Stop 7 = Faulted
failedToStart	BOOL	1 = VFD failed to start in time allotted 0 = Normal
failedToStop	BOOL	1 = VFD failed to stop in time allotted 0 = Normal
ref_from_net	BOOL	1 = using speed reference from remote source 0 = using speed reference from local source
sts_Drv_nrdy	BOOL	1 = indicates AOI detected a not ready state and run_fwd/run_rev must be set to 0 to clear 0 = Normal
warning	BOOL	1 = VFD is in alarm condition 0 = VFD is not in alarm condition
val_FaultCode	DINT	Fault code from VFD
val_OutputCurrent	REAL	Output current in Amps from VFD
val_OutputFreq	REAL	Output frequency in Hertz from VFD
val_OutputVoltage	REAL	Output voltage in Volts from VFD

AutoFaultResetExceed	BOOL	Indicates when the maximum number of automatic fault clears has been exceeded. Set Fault_Reset to 0 to reset and allow fault clear to resume. 1 = Max number of fault clears reached. Fault Reset Disabled 0 = Under threshold for automatic fault clears. Fault Reset Allowed.

CFW900 Parameter Requirements

The following parameters must be set in the CFW900:

Parameter	**Setting**
C.9.5.1	121/171
C.9.5.2	1
C.9.5.3	8
C.9.5.4	1
C.9.5.5	8
C.4.1.1	Ethernet
C.4.2.2.1	Ethernet
C.4.2.2.2	Ethernet
C.4.2.2.3	Ethernet
C.4.2.2.4	Ethernet
C.4.3.1.2.2	Ethernet
C.9.2.1.1	3
C.9.2.1.2	7
C.9.2.1.3	5
C.9.2.1.4	60
C.9.2.1.5	USER DEFINED
C.9.2.1.6	USER DEFINED
C.9.2.1.7	USER DEFINED
C.9.2.1.8	USER DEFINED
C.9.2.2.2	100
C.9.2.2.3	101
C.9.2.2.4	USER DEFINED
C.9.2.2.5	USER DEFINED
C.9.2.2.6	USER DEFINED
C.9.2.2.7	USER DEFINED
C.9.2.2.8	USER DEFINED
C.9.2.2.9	USER DEFINED

CFW900_100150

This AOI is used when the 100/150 Manufacture Speed + IO is desired.

This uses the WEG status word and is controlled slightly differently from the CIP style controls.

Additionally, the AOI handles the following additional parameters:

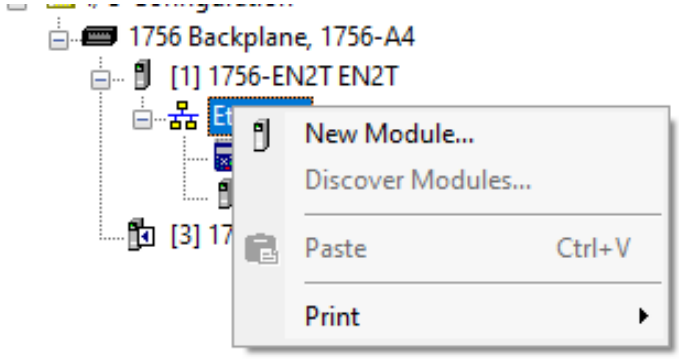
Outputs

- Output Current
- Output Voltage
- Output Frequency
- Last Fault Code

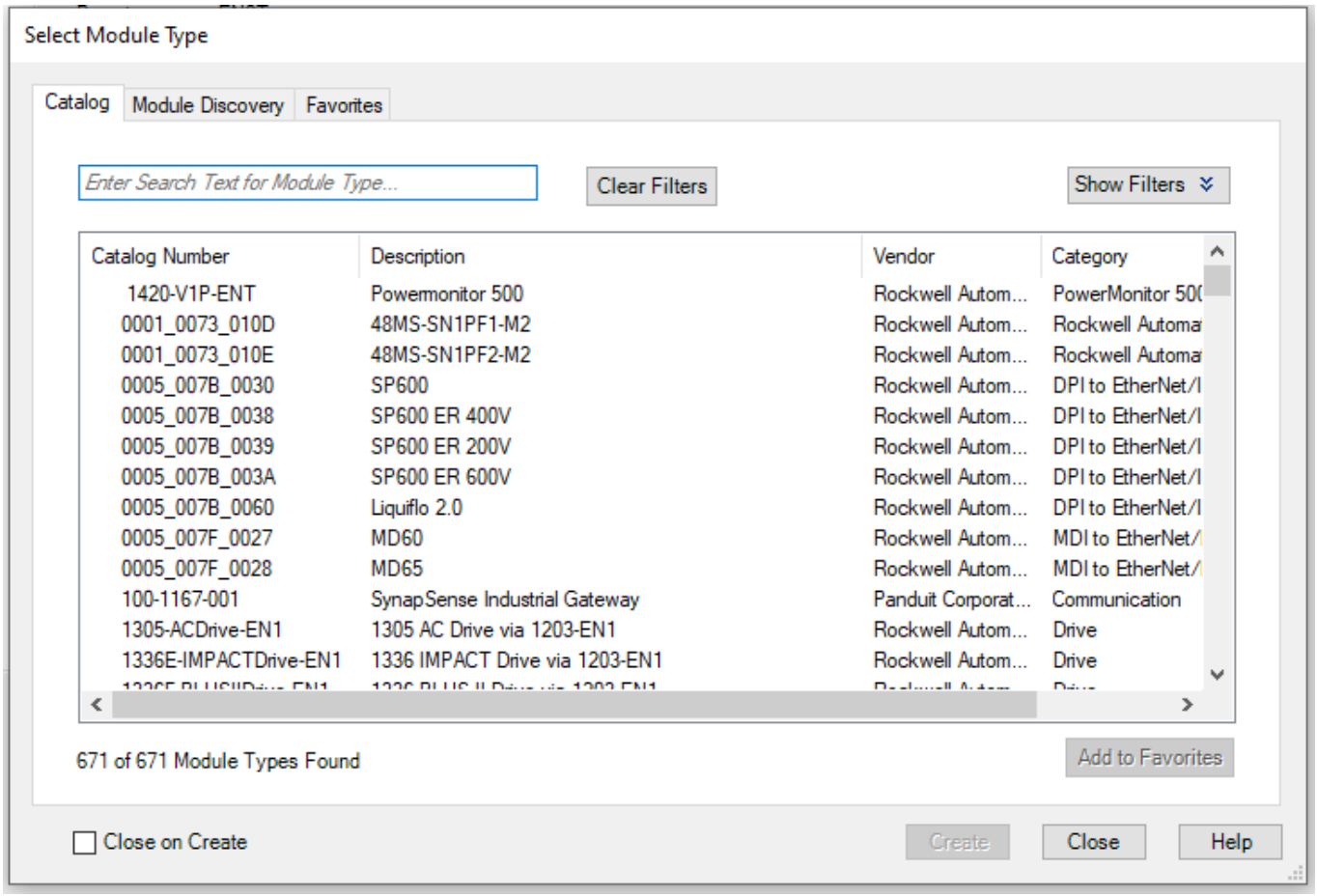
Inputs

- Acceleration Ramp 1
- Deceleration Ramp 1

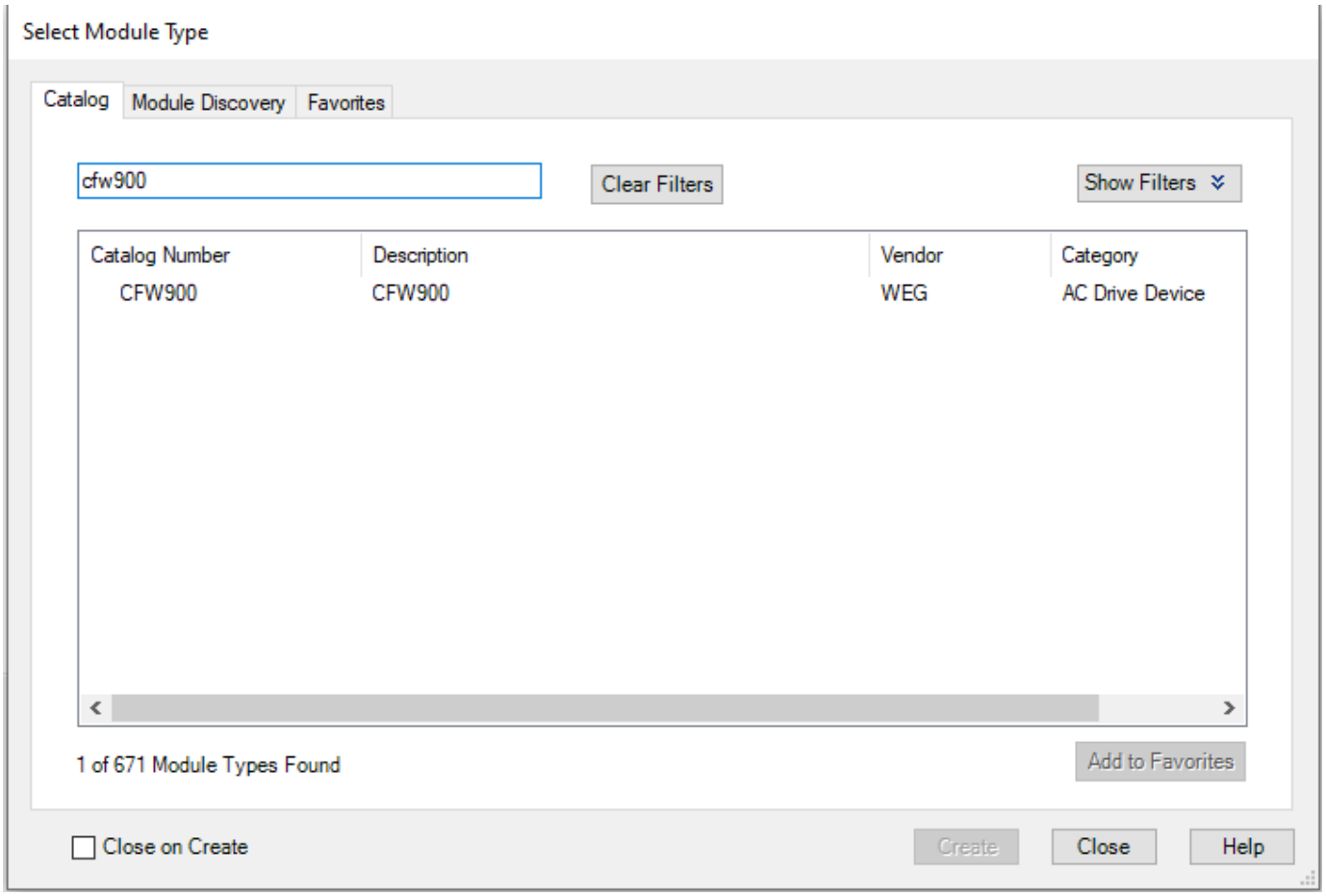
Create the Ethernet/IP Device



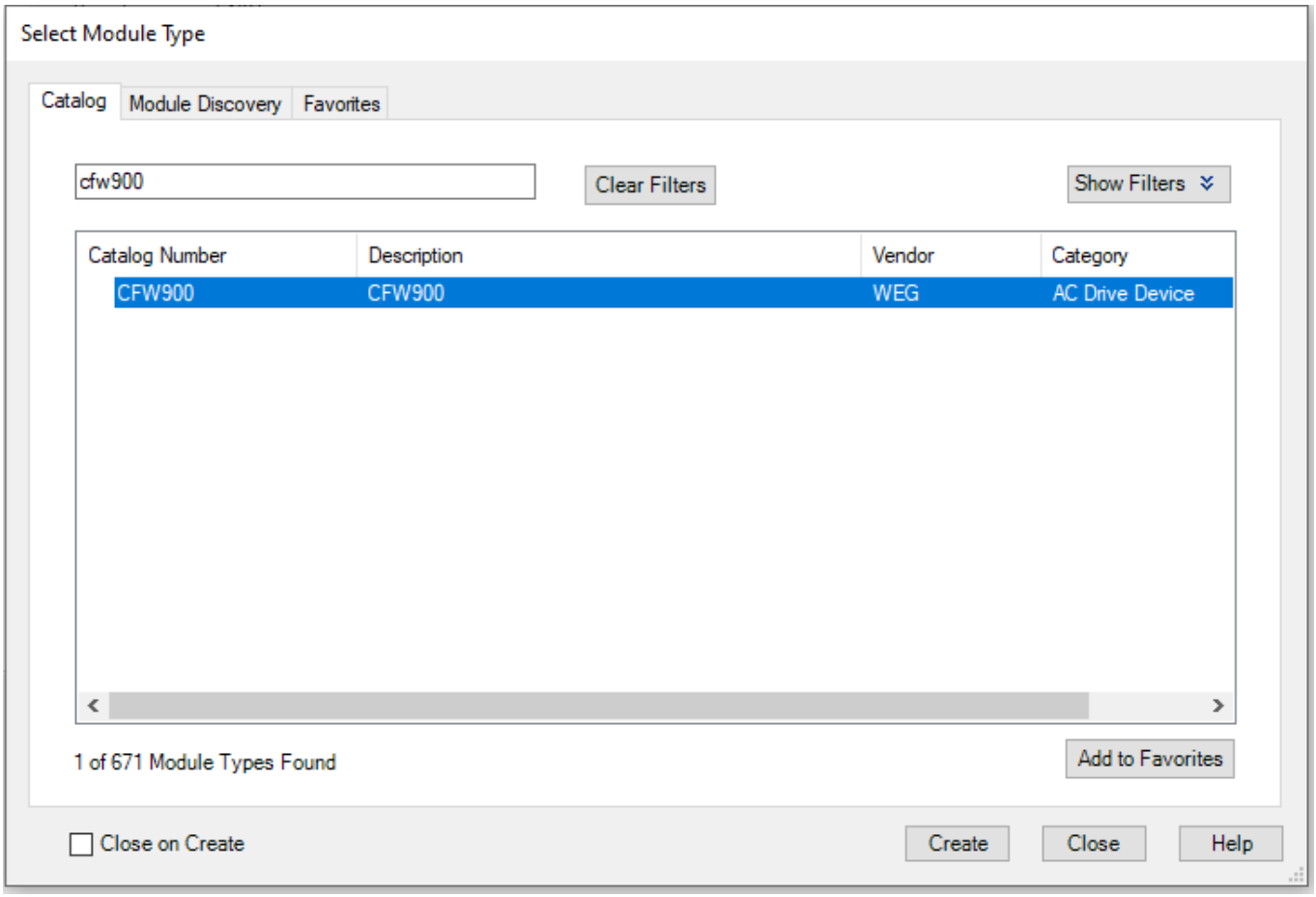
In the device tree, right click on the Ethernet bus that will contain the CFW900 and click New Module….



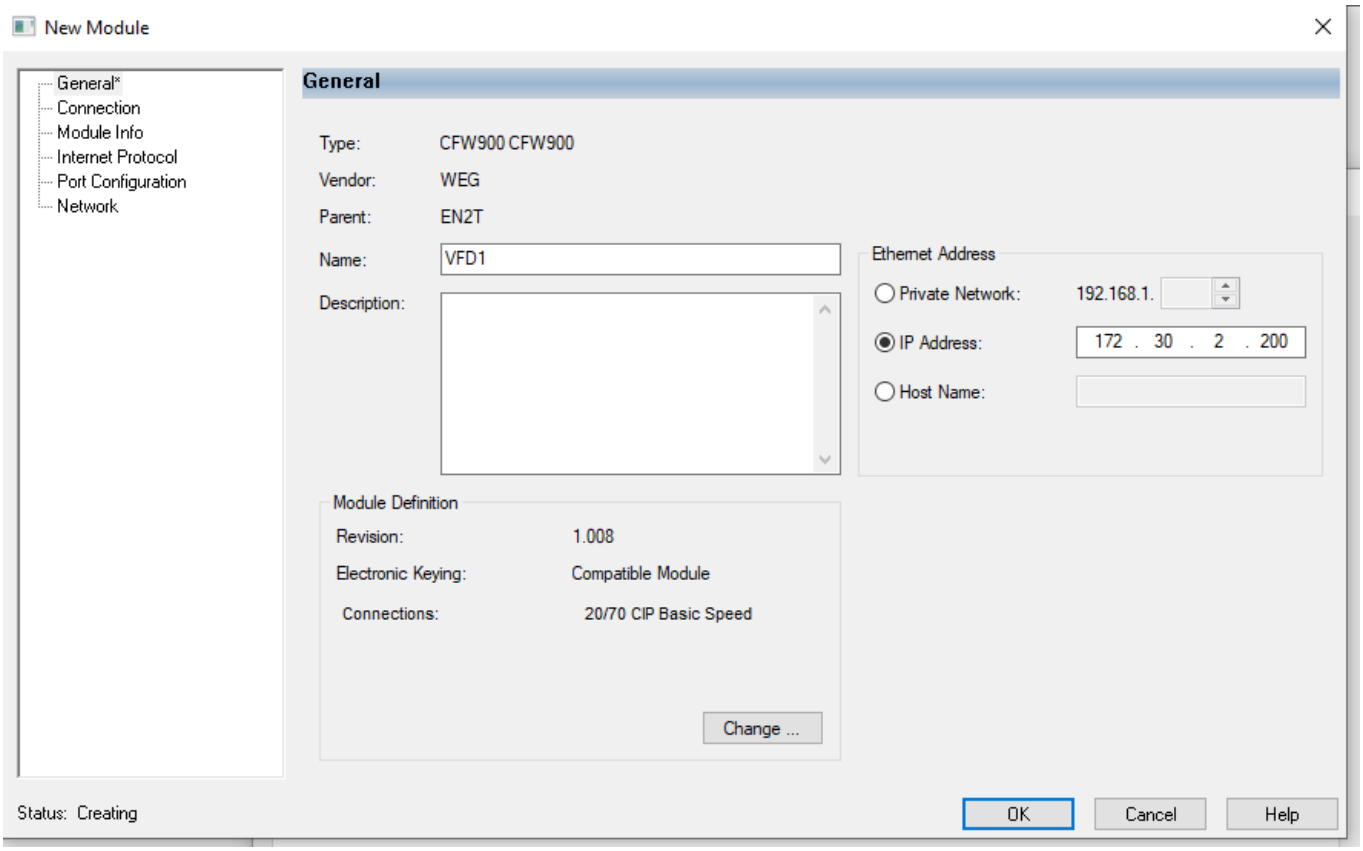
In the Select Module Type dialog box, enter in “CFW900” in the search field



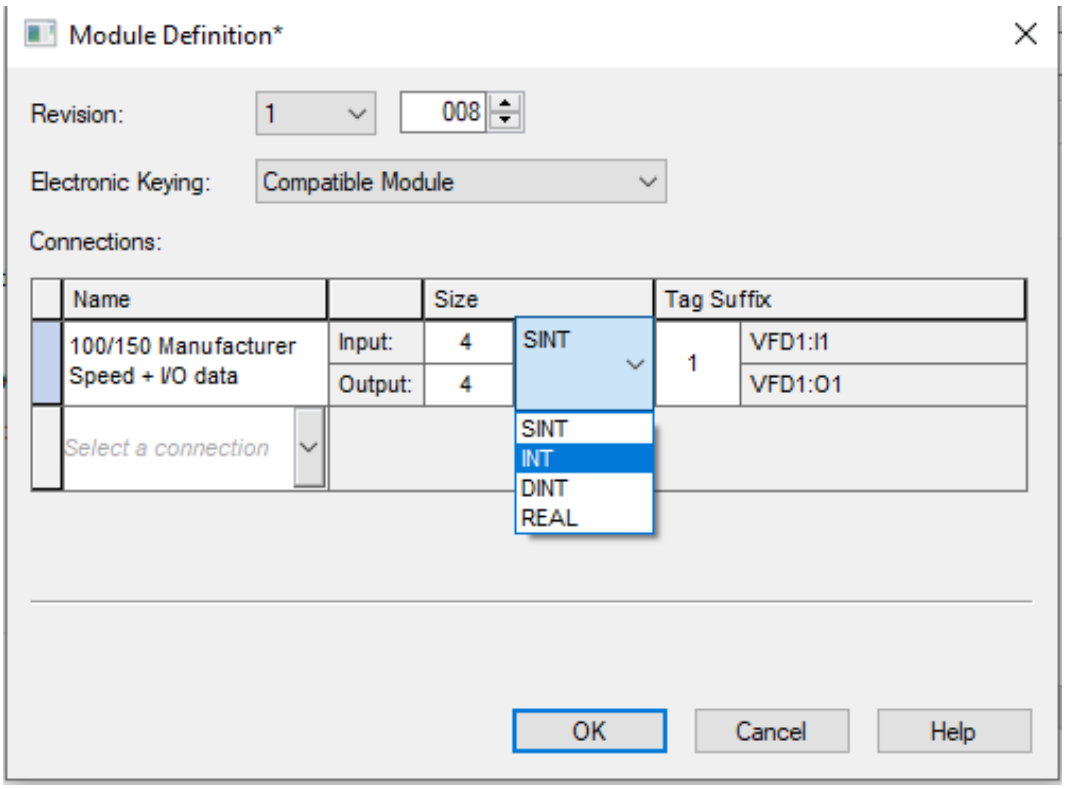
There should be an entry matching the above screenshot.



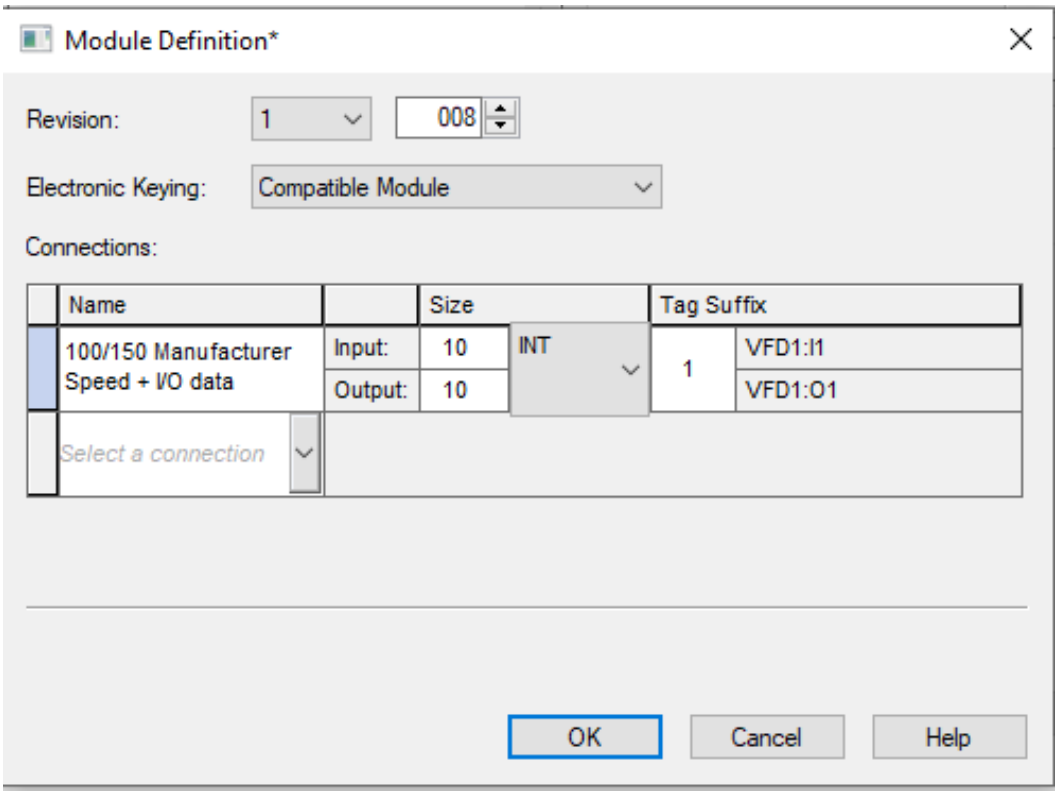
Highlight the CFW900 and click Create



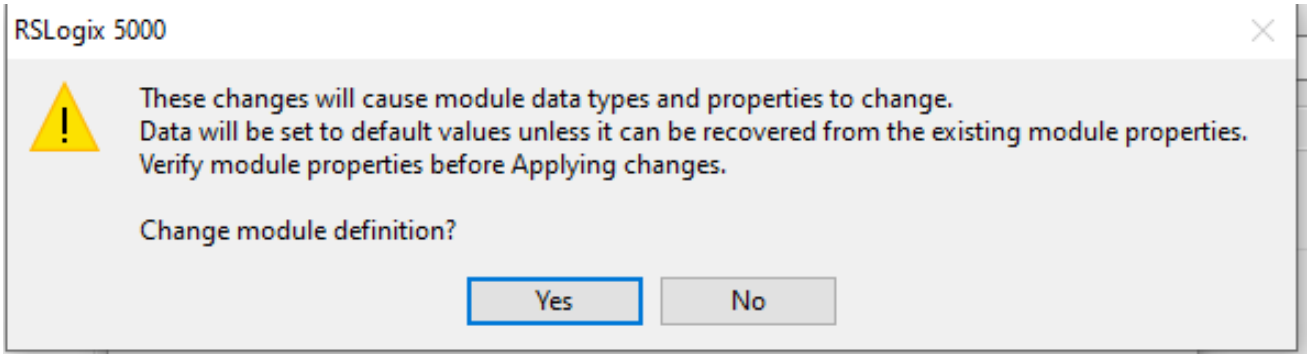
Give the CFW900 a Name and IP address. Before clicking on OK, click on the Change … button in the module definition.



Change the type to INT and the Name to 100/150 Manufacturer Speed + I/O data



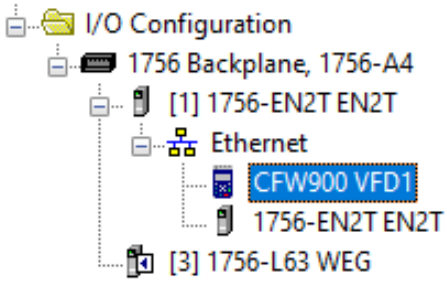
The Input and output size should be set to 10 and 10 respectively. Click OK



Click Yes

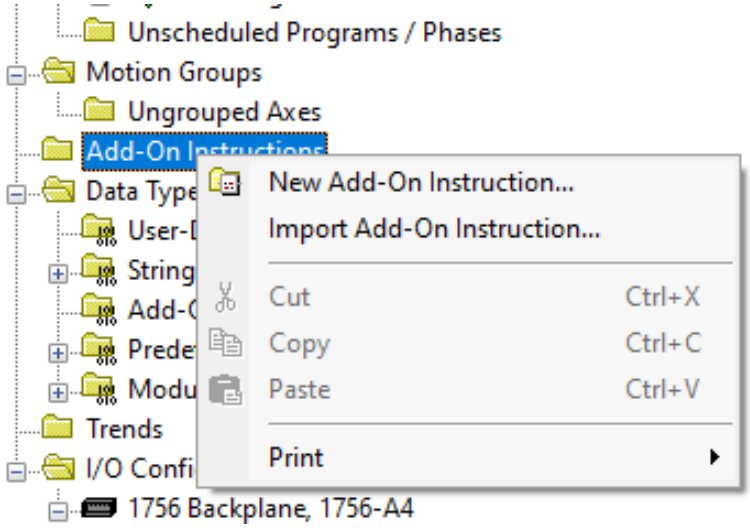
At this point, no other changes are required. However, changing the RPI can be done, if the need arises.

Once satisfied with the settings, Click OK

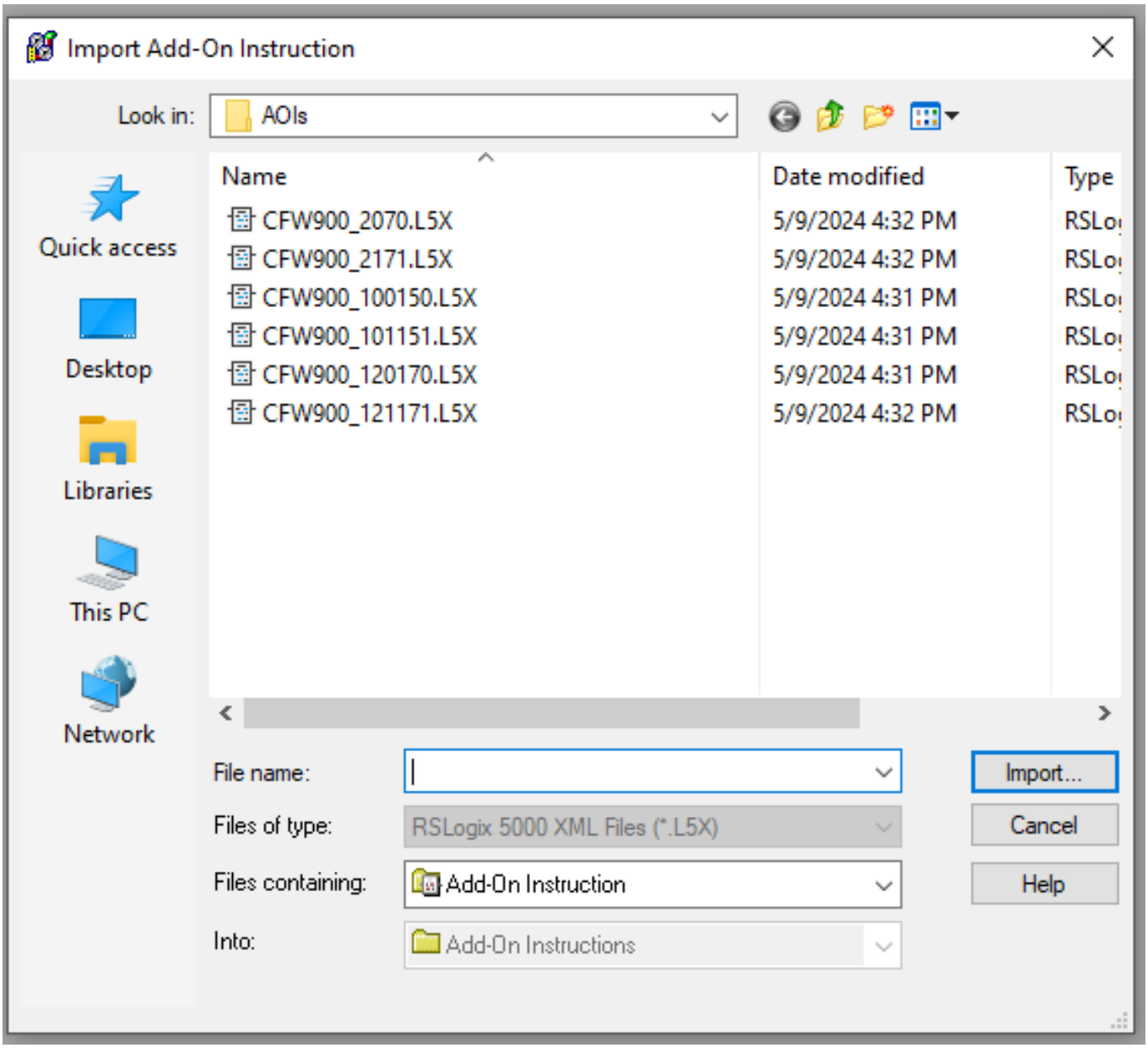


There should now be an instance of the CFW900 in the device tree

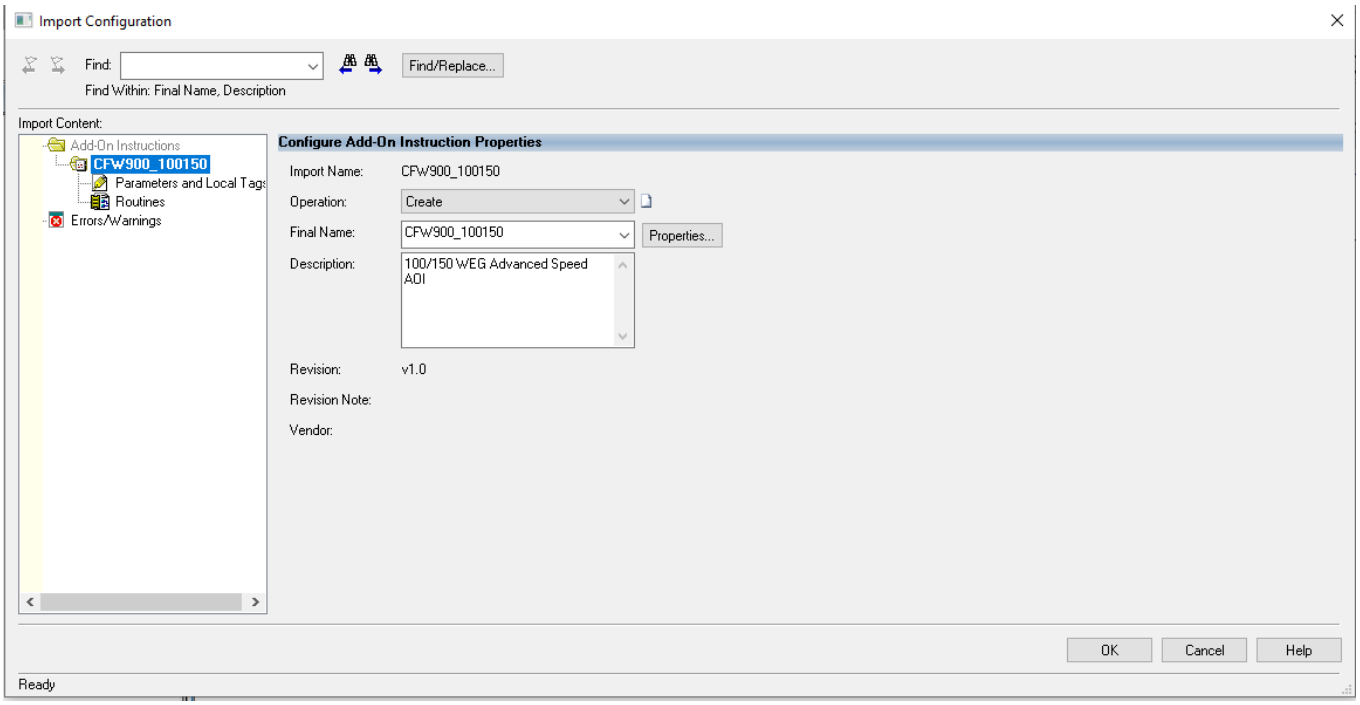
AOI Import



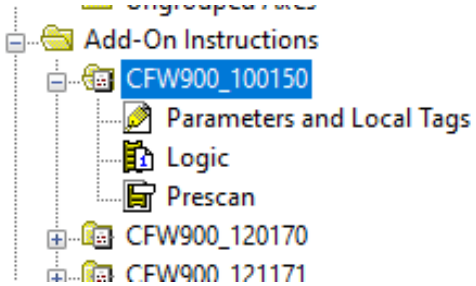
In the device tree, right click on Add-On Instructions and click on Import Add-On Instruction...



Select the appropriate add-on instruction (CFW900_100150.L5X) and click Import….

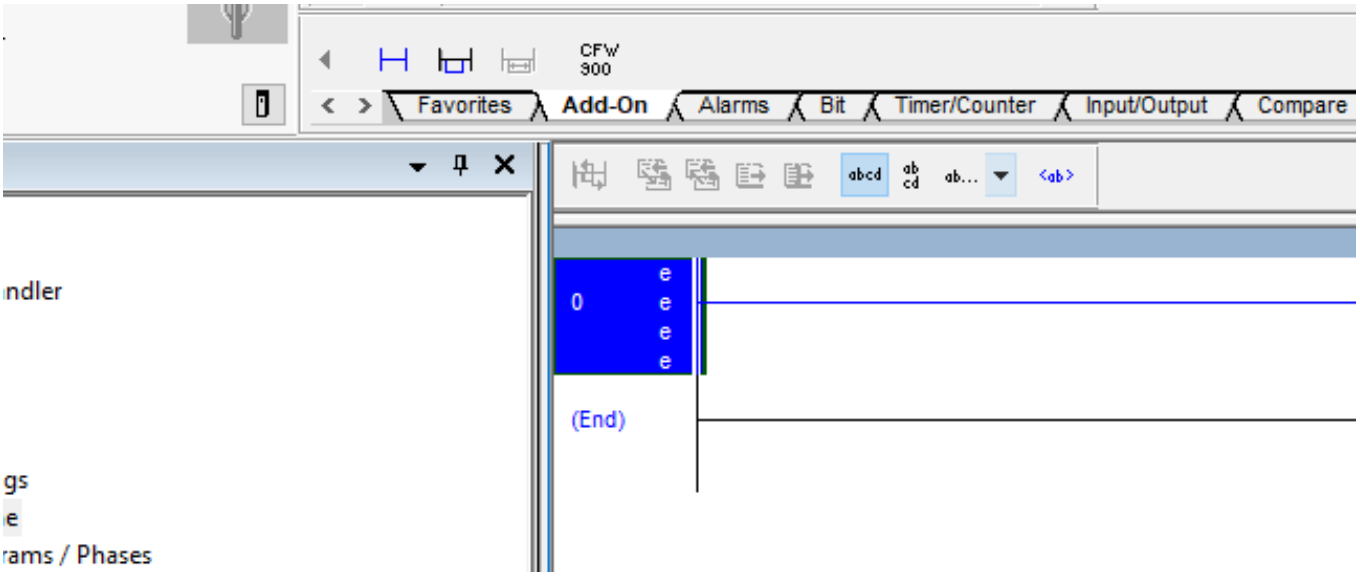


Review the proposed changes and click OK

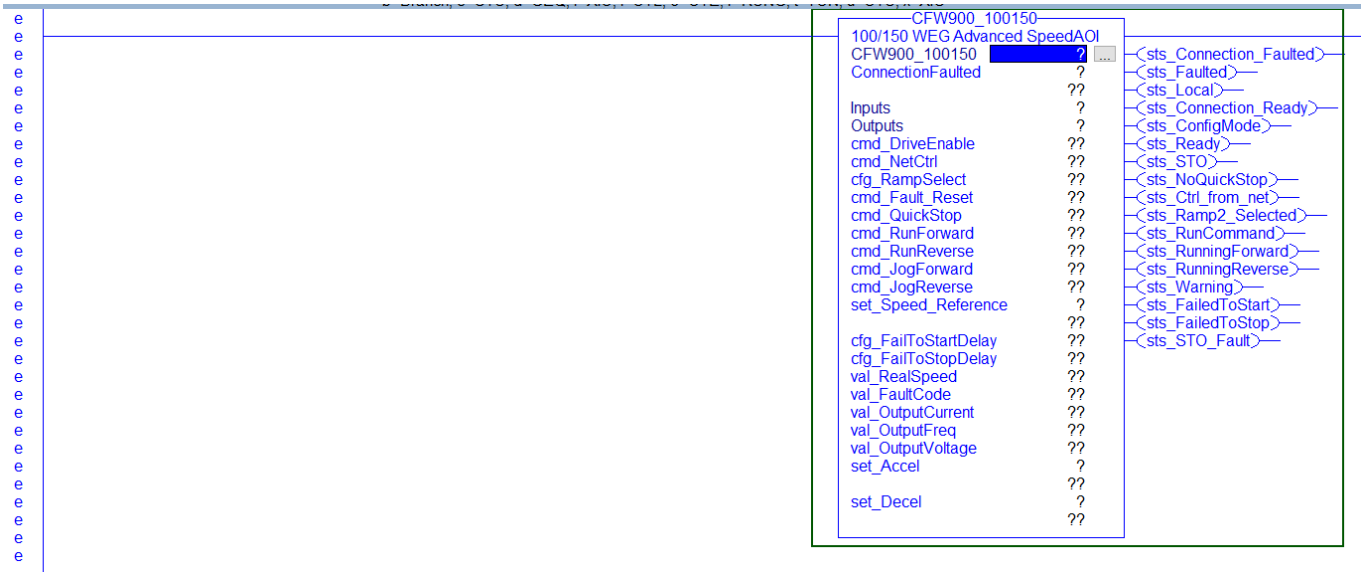


There should now be this add-on instruction in the project.

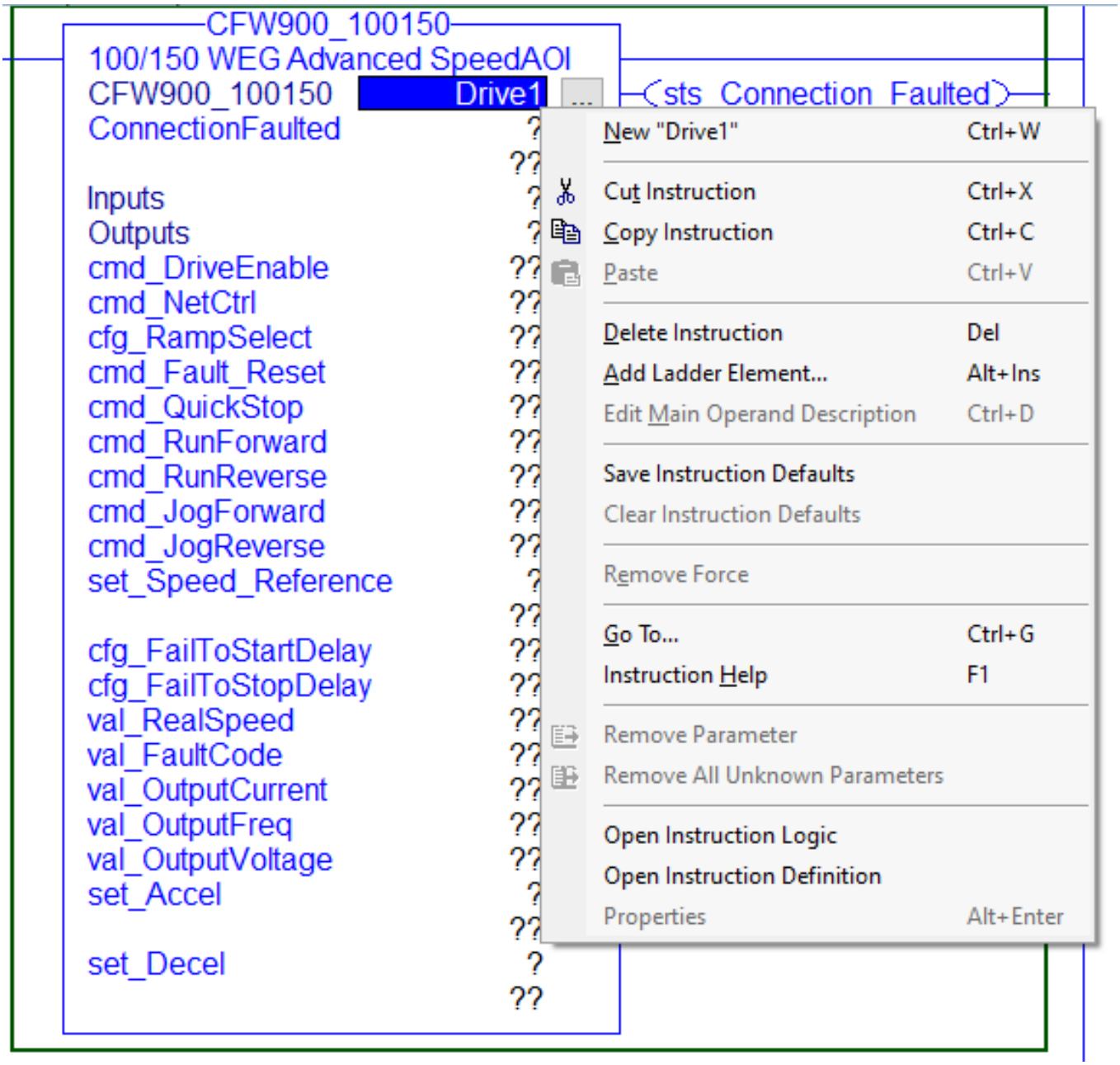
AOI Usage

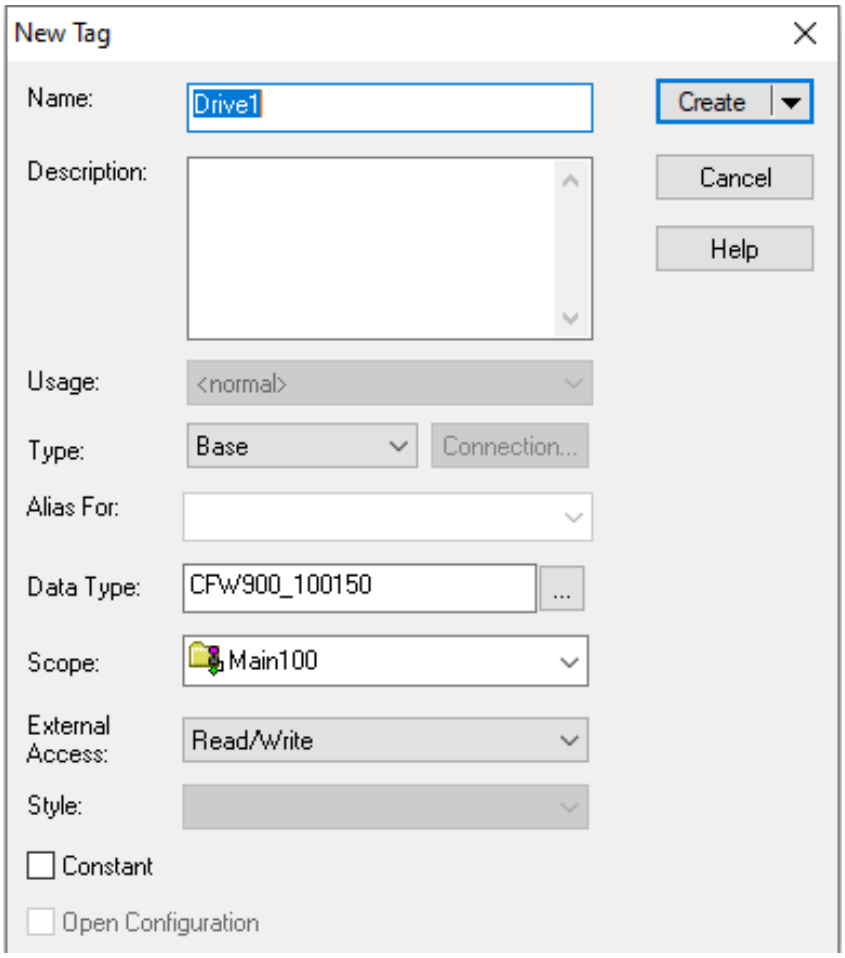


On an empty rung of ladder, add an instance of the newly imported add-on instruction by clicking on the Add-On bar and clicking the CFW900 symbol

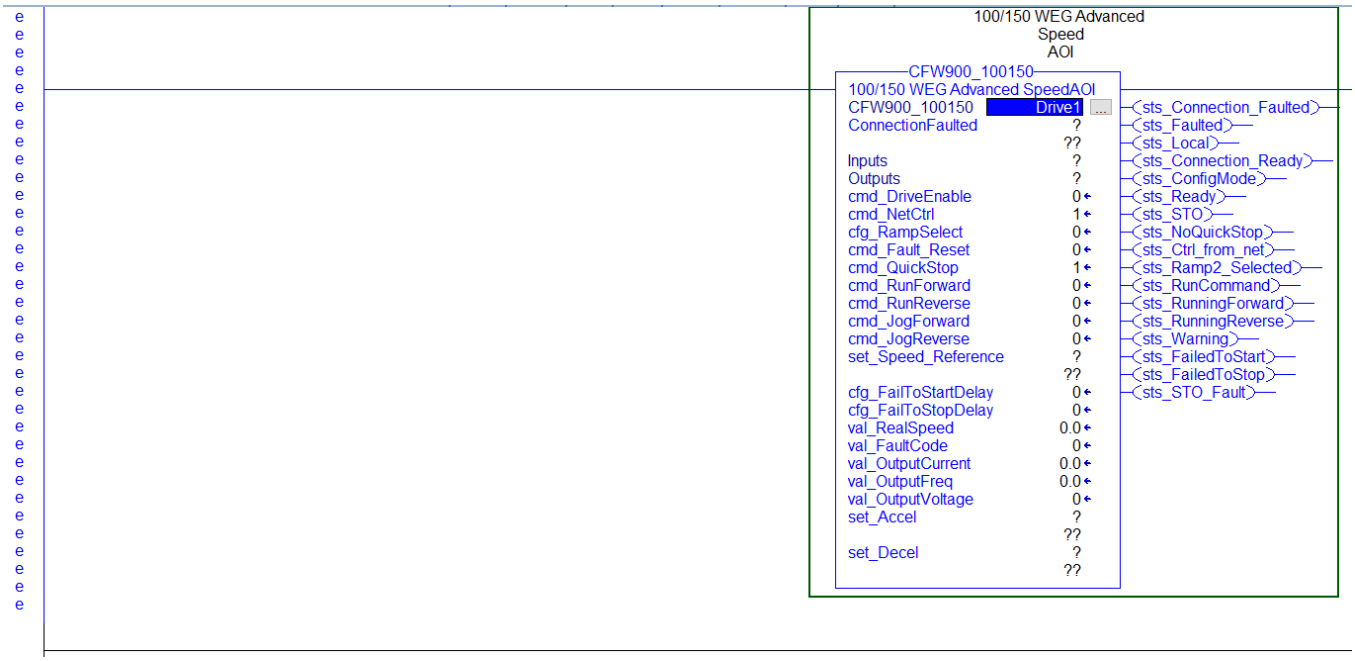


The Add-On requires a tag to be created. Create this tag by typing a name in the CFW900_100150 field and right-clicking and selecting New “Tag”

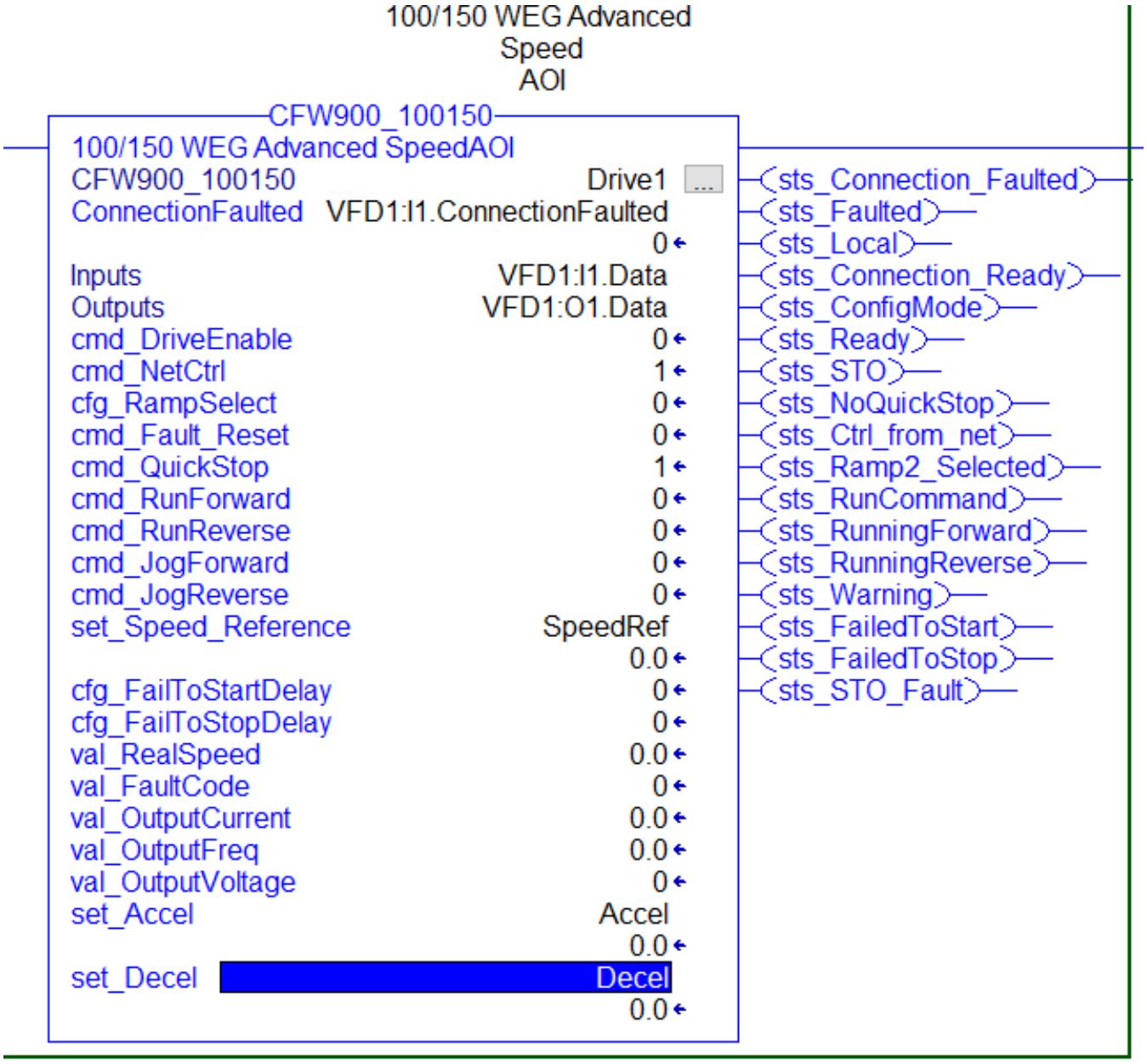

CFW900_100150
100/150 WEG Advanced SpeedAOI
CFW900_100150
Drive1
...
sts_Connection_Faulted
ConnectionFaulted
Inputs
Outputs
cmd_DriveEnable
cmd_NetCtrl
cfg_RampSelect
cmd_Fault_Reset
cmd_QuickStop
cmd_RunForward
cmd_RunReverse
cmd_JogForward
cmd_JogReverse
set_Speed_Reference
cfg_FailToStartDelay
cfg_FailToStopDelay
val_RealSpeed
val_FaultCode
val_OutputCurrent
val_OutputFreq
val_OutputVoltage
set_Accel
set_Decel
New "Drive1" Ctrl+W
Cut Instruction Ctrl+X
Copy Instruction Ctrl+C
Paste Ctrl+V
Delete Instruction Del
Add Ladder Element... Alt+Ins
Edit Main Operand Description Ctrl+D
Save Instruction Defaults
Clear Instruction Defaults
Remove Force
Go To... Ctrl+G
Instruction Help F1
Remove Parameter
Remove All Unknown Parameters
Open Instruction Logic
Open Instruction Definition
Properties Alt+Enter



Give any appropriate description and scope (the tag can be either program or controller scoped)



Next the Connection Faulted, Inputs, Outputs, Speed_Reference, set_Accel, and set_Decel need to be populated as follows:



SpeedRef, Accel, and Decel are REAL tags to be created.

AOI Parameter Description

InOut Parameters

Parameter	Type	Description
Inputs	INT[10]	Input Assembly from CFW900
Outputs	INT[10]	Output Assembly to CFW900

Input Parameters

Parameter	Type	Description
Cfg_FailToStartDelay	DINT	Time in seconds before faulting on fail to start if VFD does not start when commanded

		Set to 0 to disable
Cfg_FailToStopDelay	DINT	Time in seconds before faulting on fail to stop if VFD does not stop when commanded Set to 0 to disable
ConnectionFaulted	BOOL	From CFW900 Ethernet Module. 1 = Connection is faulted 0 = Connection is OK
cfg_RampSelect	BOOL	1 = Ramp 2 (C.6.1.4/C.6.1.5) 0 = Ramp 1 (C.6.1.1/C.6.1.2)
cmd_DriveEnable	BOOL	1 = Enable operation of VFD 0 = Disable operation of VFD
cmd_Fault_Reset	BOOL	1 = Send Reset Fault Signal to VFD 0 = No action
cmd_JogForward	BOOL	1 = Jog Forward 0 = No Action / Stop
cmd_JogReverse	BOOL	1 = Jog Reverse 0 = No Action / Stop
cmd_NetCtrl	BOOL	1 = R2 (Ethernet) control 0 = R1 (Other) control
cmd_QuickStop	BOOL	1 = No Quick stop (must be 1 to run) 0 = Quick Stop
cmd_RunForward	BOOL	1 = Run Forward 0 = Stop
cmd_RunReverse	BOOL	1 = Run Reverse 0 = Stop
set_Speed_Reference	REAL	Speed Setpoint (0-100%)
set_Accel	REAL	Acceleration Ramp Setpoint (0.1-999.9) in Seconds
set_Decel	REAL	Deceleration Ramp Setpoint (0.1-999.9) in Seconds
cfg_AutoFaultResetNum	DINT	Maximum number of tries that AOI will send fault reset command while being maintained

Output Parameters

Parameter	Type	Description
sts_ConfigMode	BOOL	1 = VFD in Config Mode 0 = VFD in Operation Mode
sts_Connection_Faulted	BOOL	Goes high when connections interrupted. If “Run” signal is set, it must be reset before this will clear

		1 = Connection has been faulted from VFD to PLC 0 = Connection OK
sts_Connection_Ready	BOOL	1 = Connection from VFD to PLC is established 0 = Connection not established
sts_Ctrl_from_net	BOOL	1 = VFD controlled remotely (PLC) 0 = VFD controlled locally
sts_Faulted	BOOL	1 = VFD Fault, connection fault, or failedToStart/Stop Fault 0 = No faults
sts_FailedToStart	BOOL	1 = VFD failed to start in time allotted 0 = Normal
sts_FailedToStop	BOOL	1 = VFD failed to stop in time allotted 0 = Normal
sts_Local	BOOL	1 = Local 0 = Remote
sts_NoQuickStop	BOOL	1 = No quick stop commanded 0 = Quick stop commanded
sts_Ramp2_Selected	BOOL	1 = Ramp 2 rates selected 0 = Ramp 1 rates selected
sts_Ready	BOOL	1 = VFD is ready to operate (states Ready, Enabled, or Stopping) 0 = VFD is not ready to operate
sts_RunCommand	BOOL	1 = Commanded to run 0 = Not commanded to run
sts_RunningForward	BOOL	1 = Running forward 0 = Not running forward
sts_RunningReverse	BOOL	1 = Running reverse 0 = Not running reverse
sts_STO	BOOL	1 = Safe Torque Off is active 0 = Safe Torque Off is not active
sts_STO_Fault	BOOL	1 = AOI is preventing running due to STO trip until cmd_RunForward/Reverse shows a rising edge 0 = Normal Operation
val_FaultCode	DINT	Fault code 1 from VFD
val_OutputCurrent	REAL	Output current in Amps from VFD
val_OutputFreq	REAL	Output frequency in Hertz from VFD

val_OutputVoltage	REAL	Output voltage in Volts from VFD
AutoFaultResetExceed	BOOL	Indicates when the maximum number of automatic fault clears has been exceeded. Set cmd_Fault_Reset to 0 to reset and allow fault clear to resume. 1 = Max number of fault clears reached. Fault Reset Disabled 0 = Under threshold for automatic fault clears. Fault Reset Allowed.

CFW900 Parameter Requirements

The following parameters must be set in the CFW900:

Parameter	**Setting**
C.9.5.1	100/150
C.9.5.2	1
C.9.5.3	8
C.9.5.4	1
C.9.5.5	8
C.4.1.1	Ethernet
C.4.2.2.1	Ethernet
C.4.2.2.2	Ethernet
C.4.2.2.3	Ethernet
C.4.2.2.4	Ethernet
C.4.3.1.2.2	Ethernet
C.9.2.1.1	3
C.9.2.1.2	7
C.9.2.1.3	5
C.9.2.1.4	60
C.9.2.1.5	USER DEFINED
C.9.2.1.6	USER DEFINED
C.9.2.1.7	USER DEFINED
C.9.2.1.8	USER DEFINED
C.9.2.2.2	100
C.9.2.2.3	101
C.9.2.2.4	USER DEFINED
C.9.2.2.5	USER DEFINED
C.9.2.2.6	USER DEFINED
C.9.2.2.7	USER DEFINED
C.9.2.2.8	USER DEFINED
C.9.2.2.9	USER DEFINED

CFW900_101151

This AOI is used when the 101/151 Manufacture Speed + IO is desired.

This uses the WEG status word and is controlled slightly differently from the CIP style controls.

This mode is suited for torque control

Additionally, the AOI handles the following additional parameters:

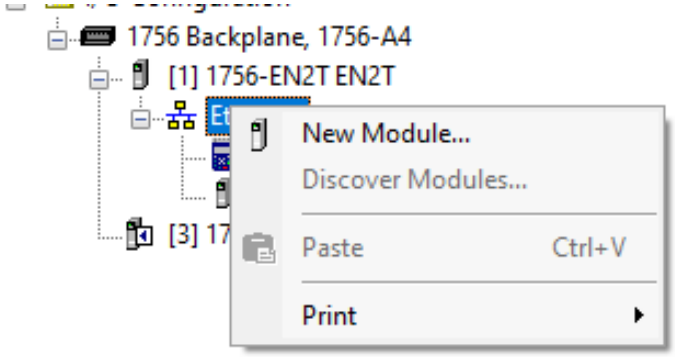
Outputs

- Torque Reference
- Output Current
- Output Voltage
- Output Frequency
- Last Fault Code

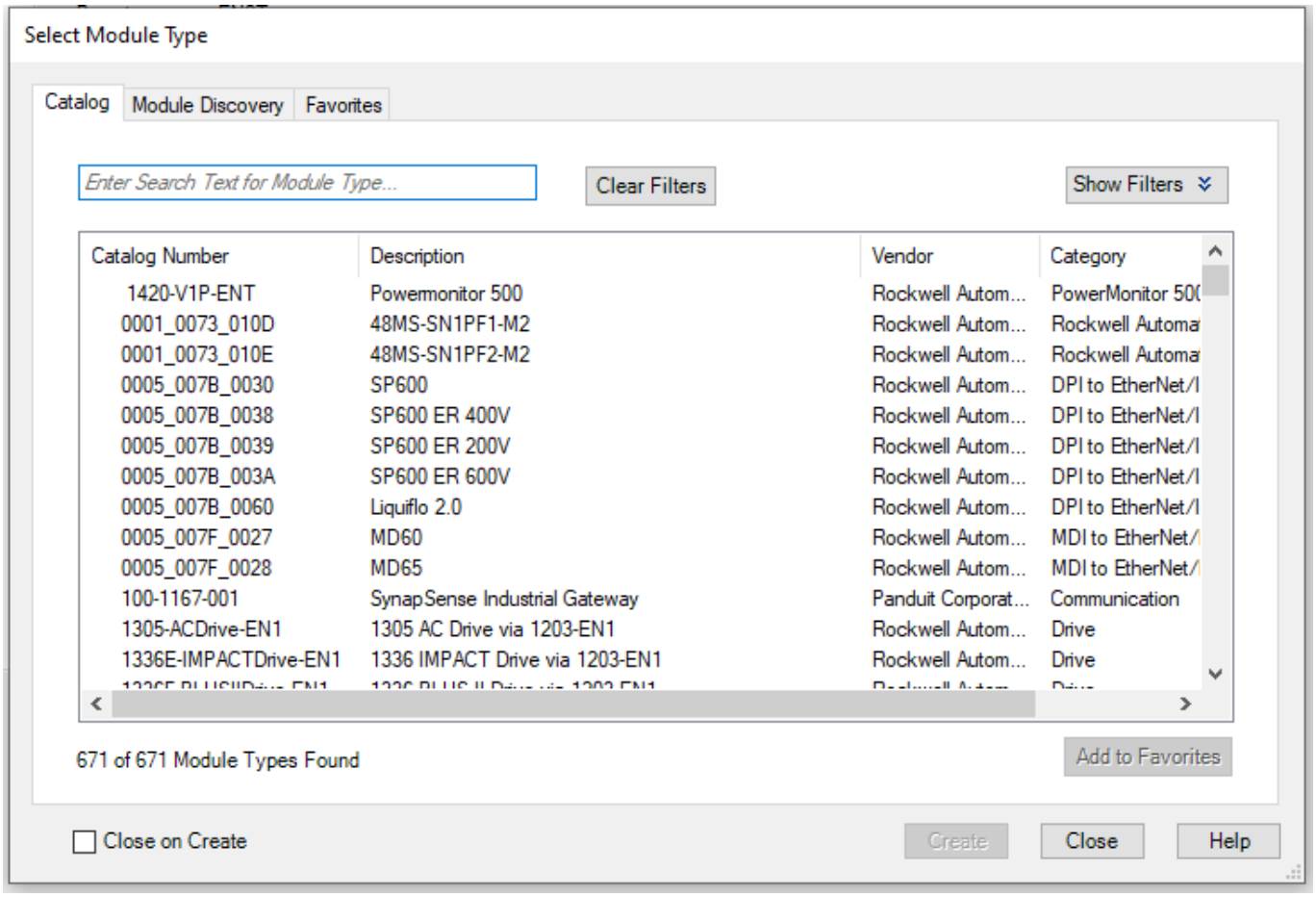
Inputs

- Acceleration Ramp 1
- Deceleration Ramp 1
- Torque IncRamp
- Torque DecRamp

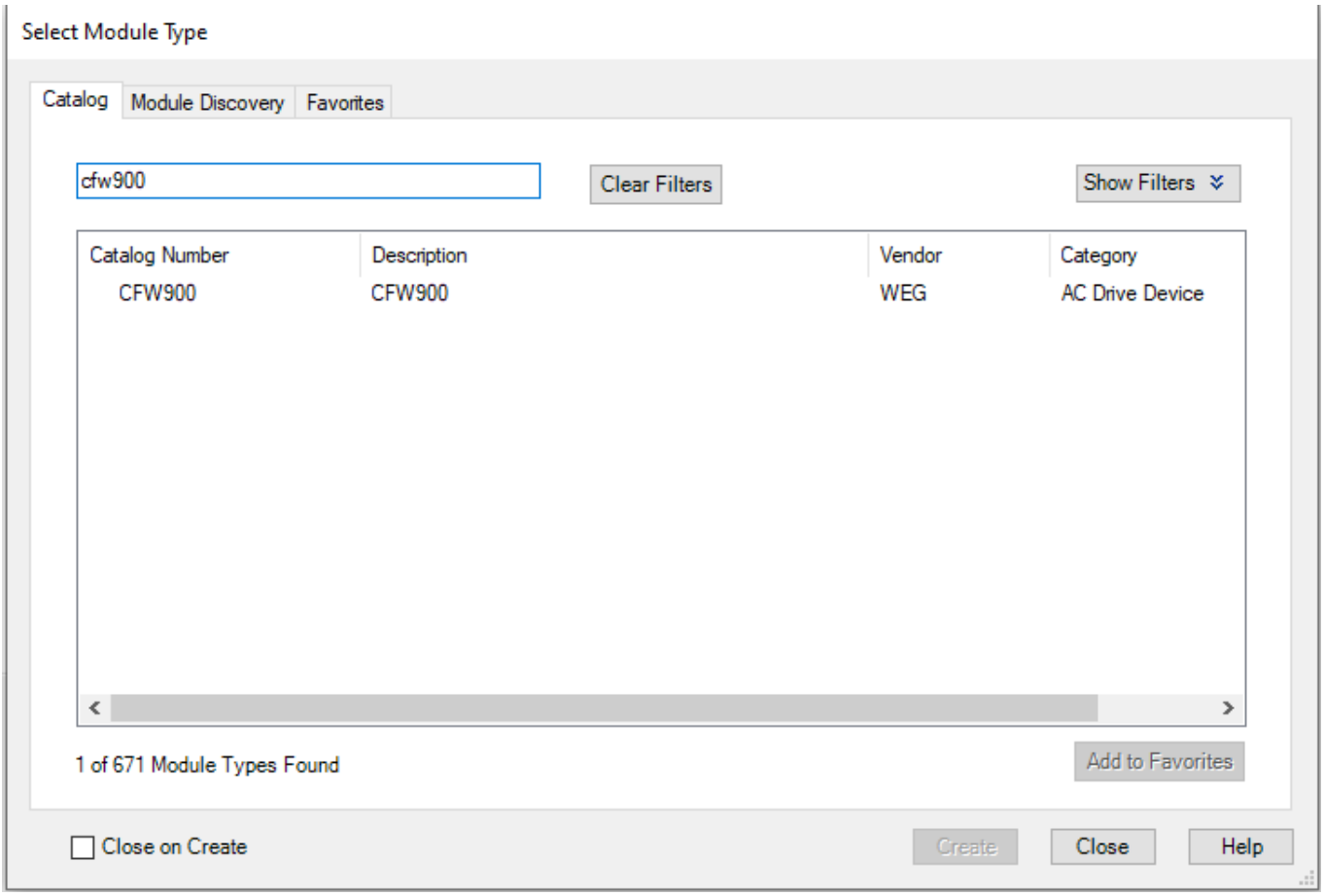
Create the Ethernet/IP Device



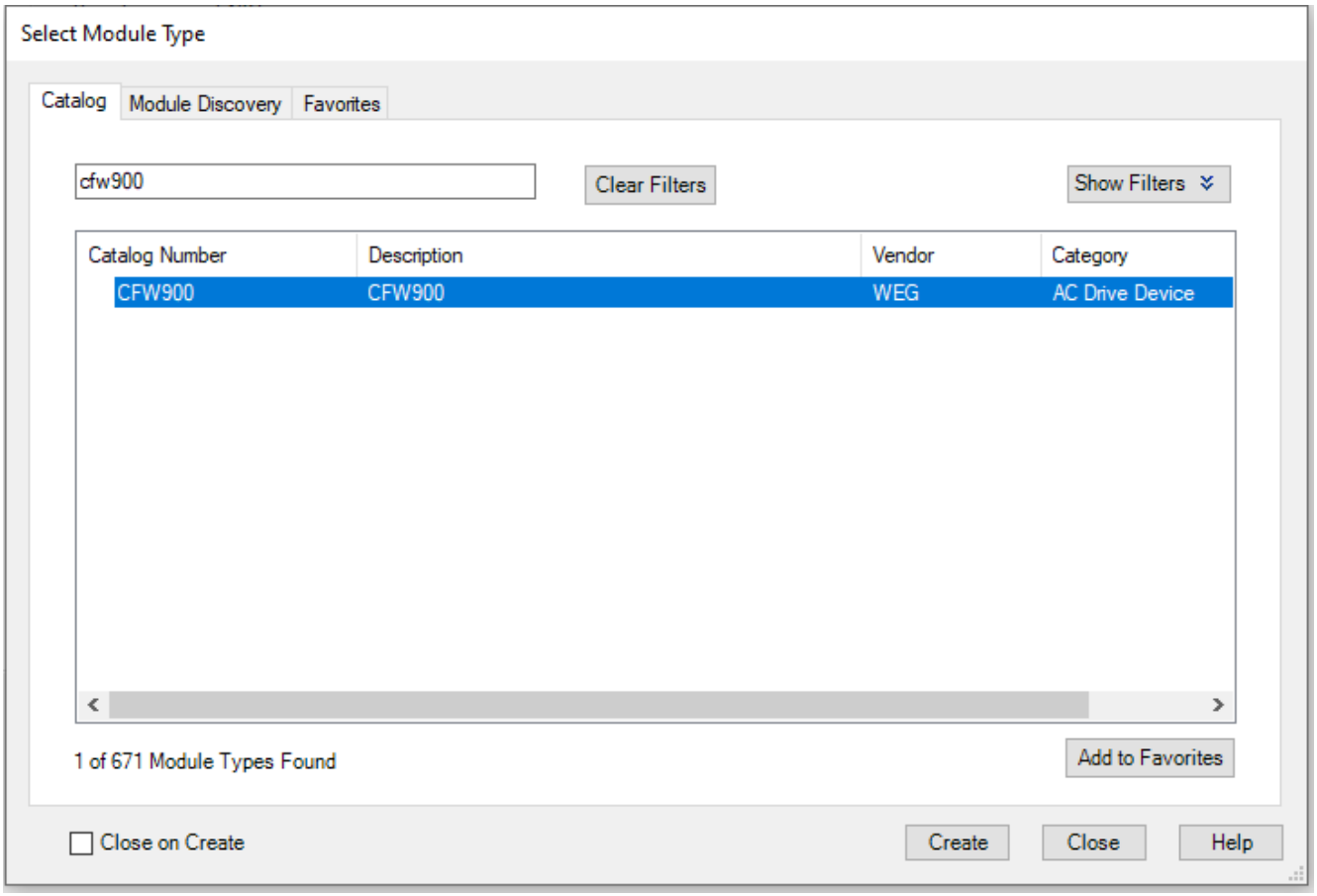
In the device tree, right click on the Ethernet bus that will contain the CFW900 and click New Module….



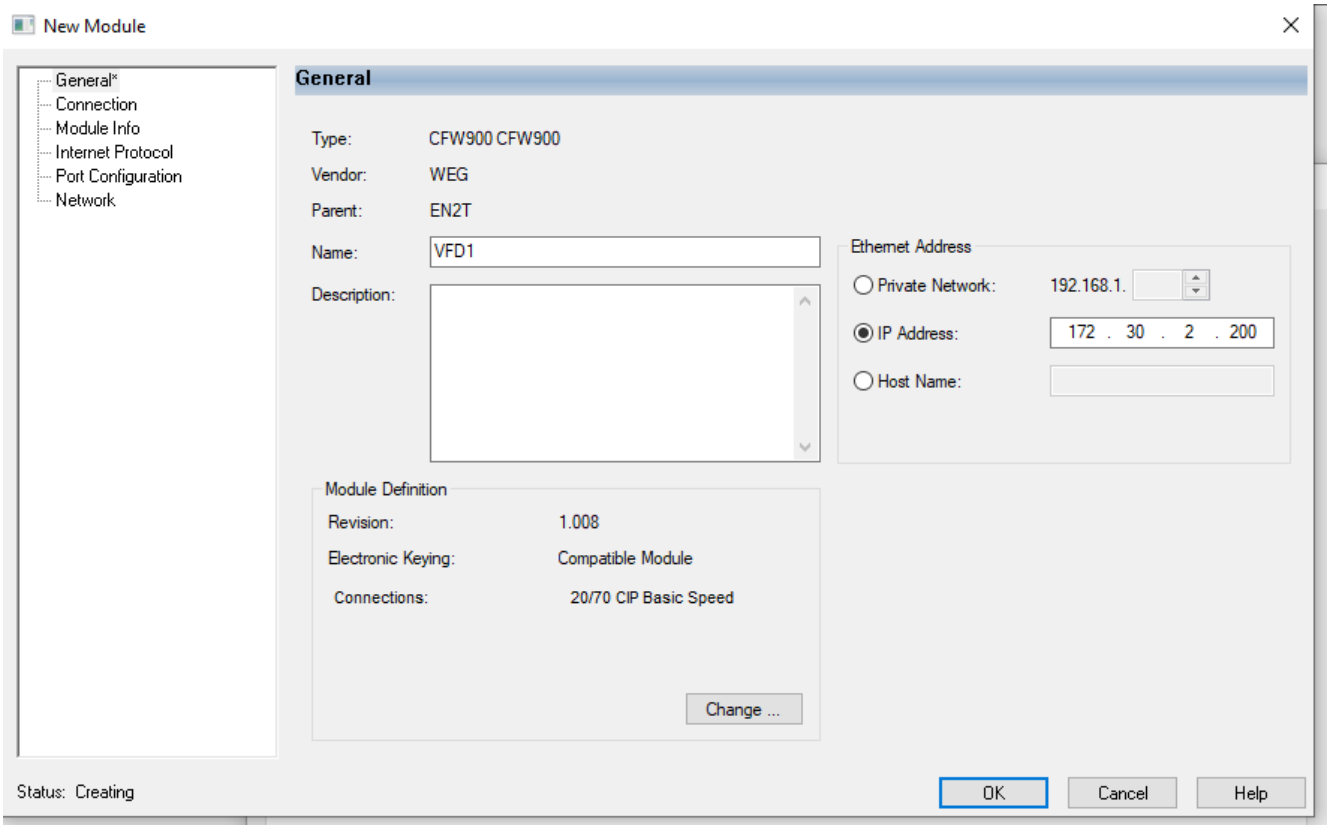
In the Select Module Type dialog box, enter in “CFW900” in the search field



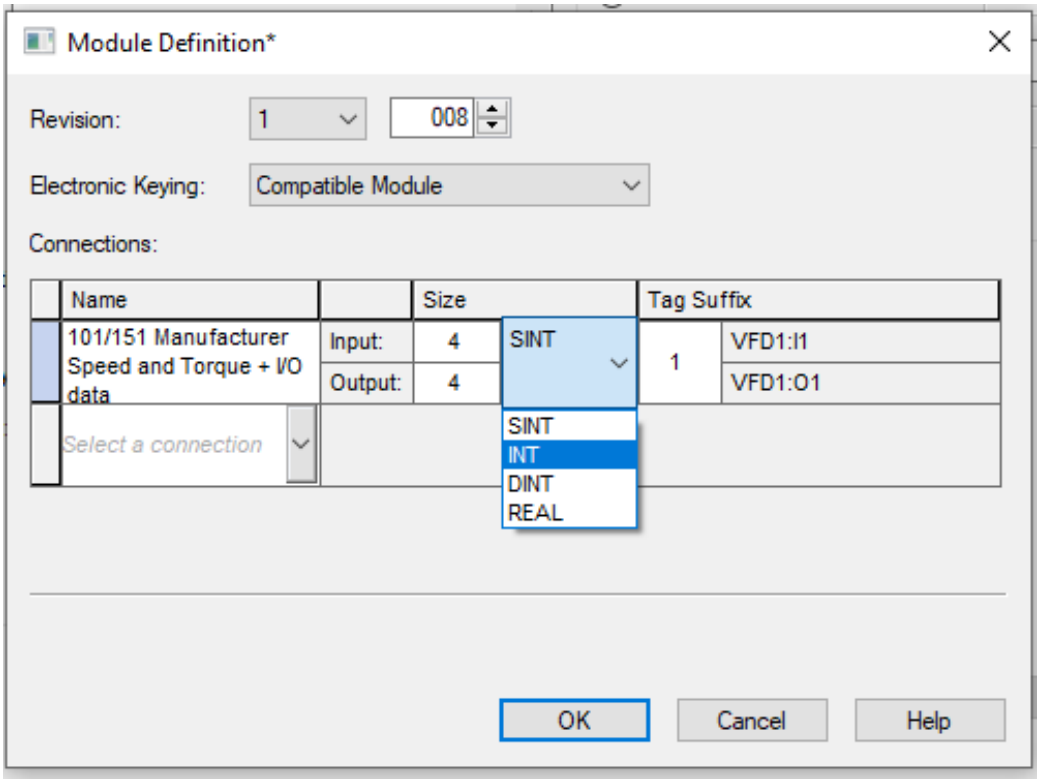
There should be an entry matching the above screenshot.



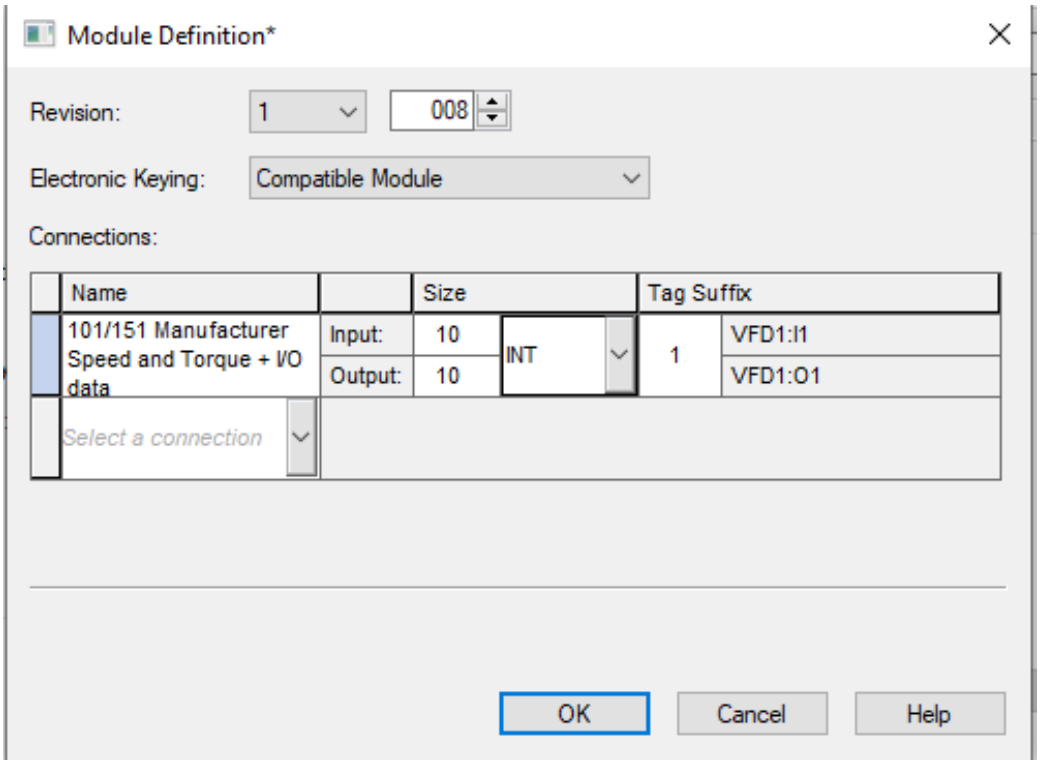
Highlight the CFW900 and click Create



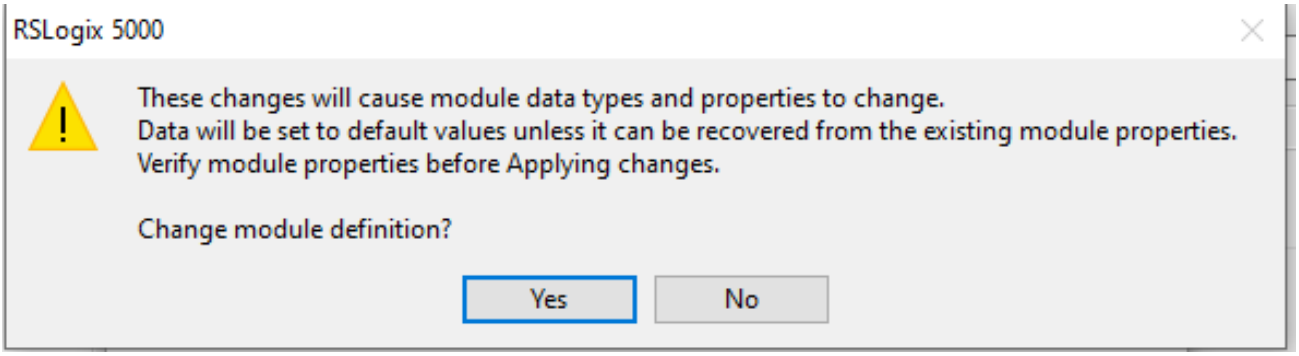
Give the CFW900 a Name and IP address. Before clicking on OK, click on the Change … button in the module definition.



Change the type to INT and the Name to 101/151 Manufacturer Speed and Torque + I/O data



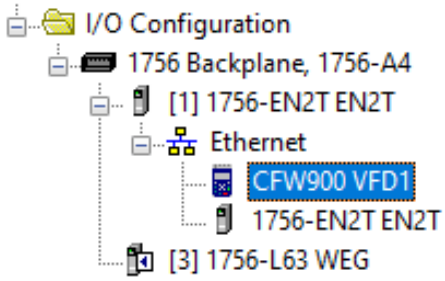
The Input and output size should be set to 10 and 10 respectively. Click OK



Click Yes

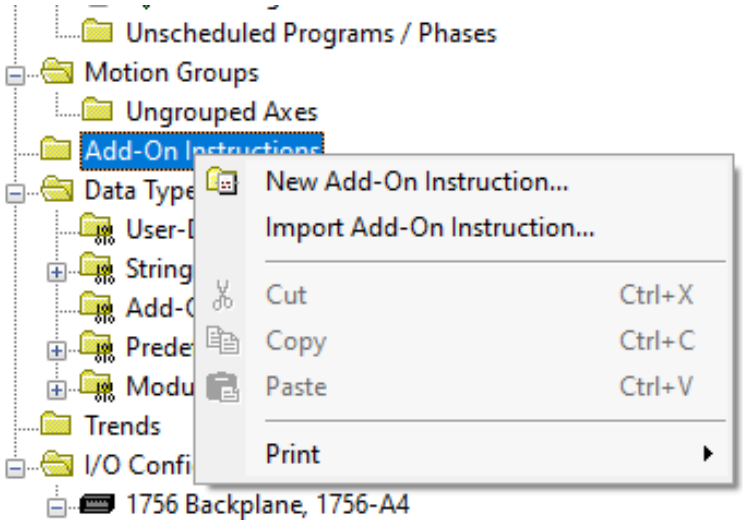
At this point, no other changes are required. However, changing the RPI can be done, if the need arises.

Once satisfied with the settings, Click OK

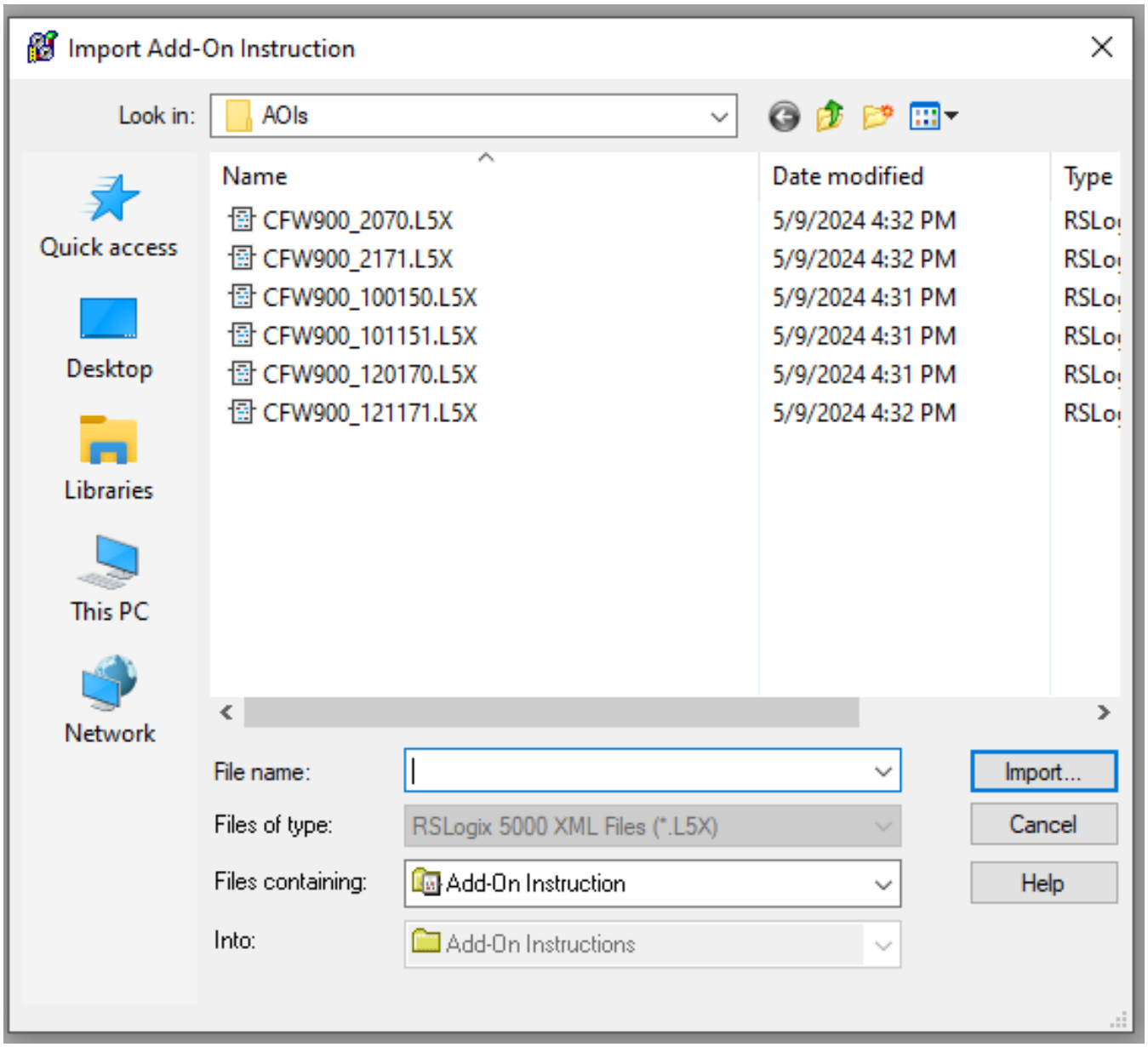


There should now be an instance of the CFW900 in the device tree

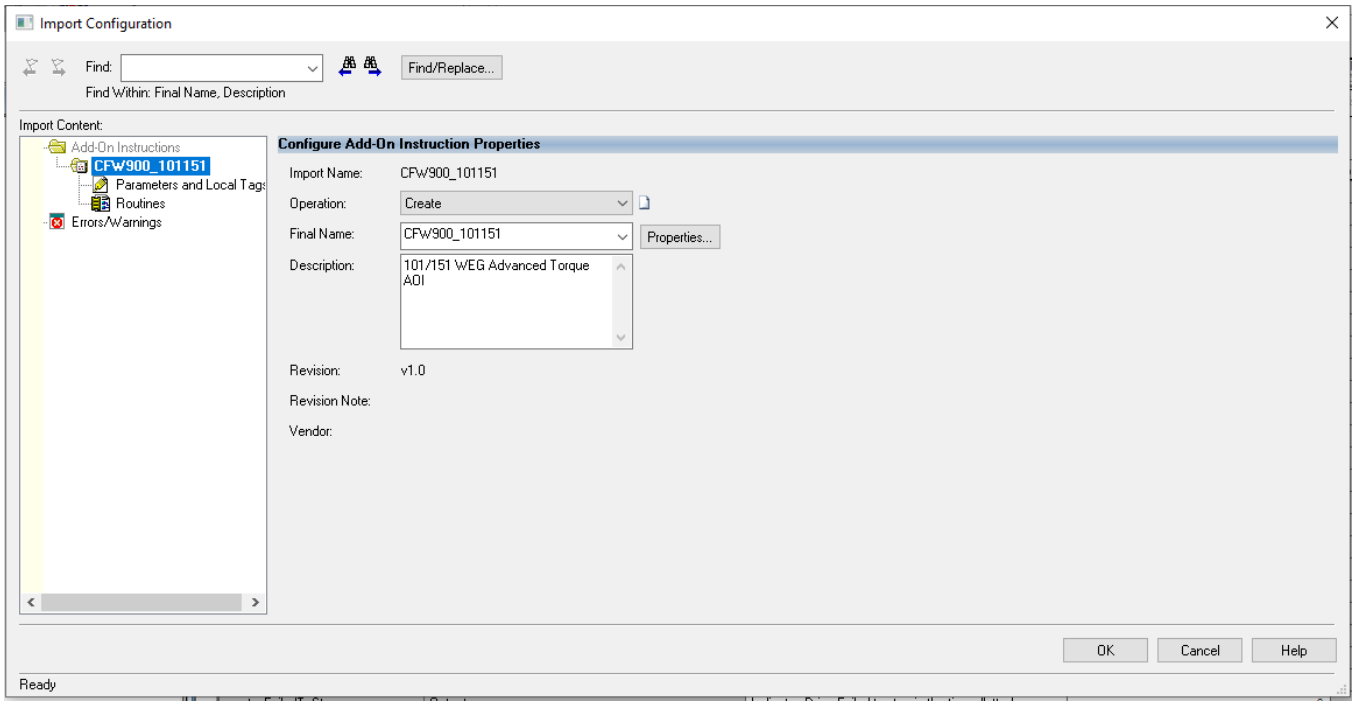
AOI Import



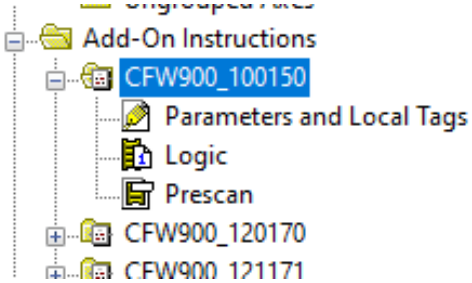
In the device tree, right click on Add-On Instructions and click on Import Add-On Instruction...



Select the appropriate add-on instruction (CFW900_101151.L5X) and click Import….

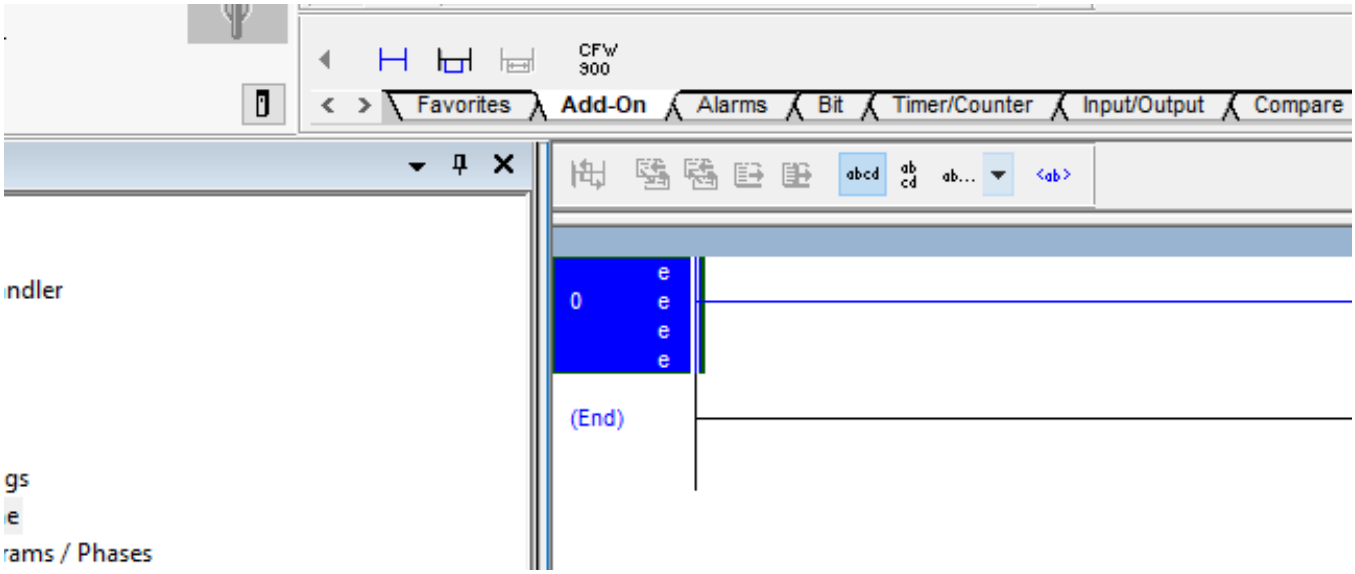


Review the proposed changes and click OK

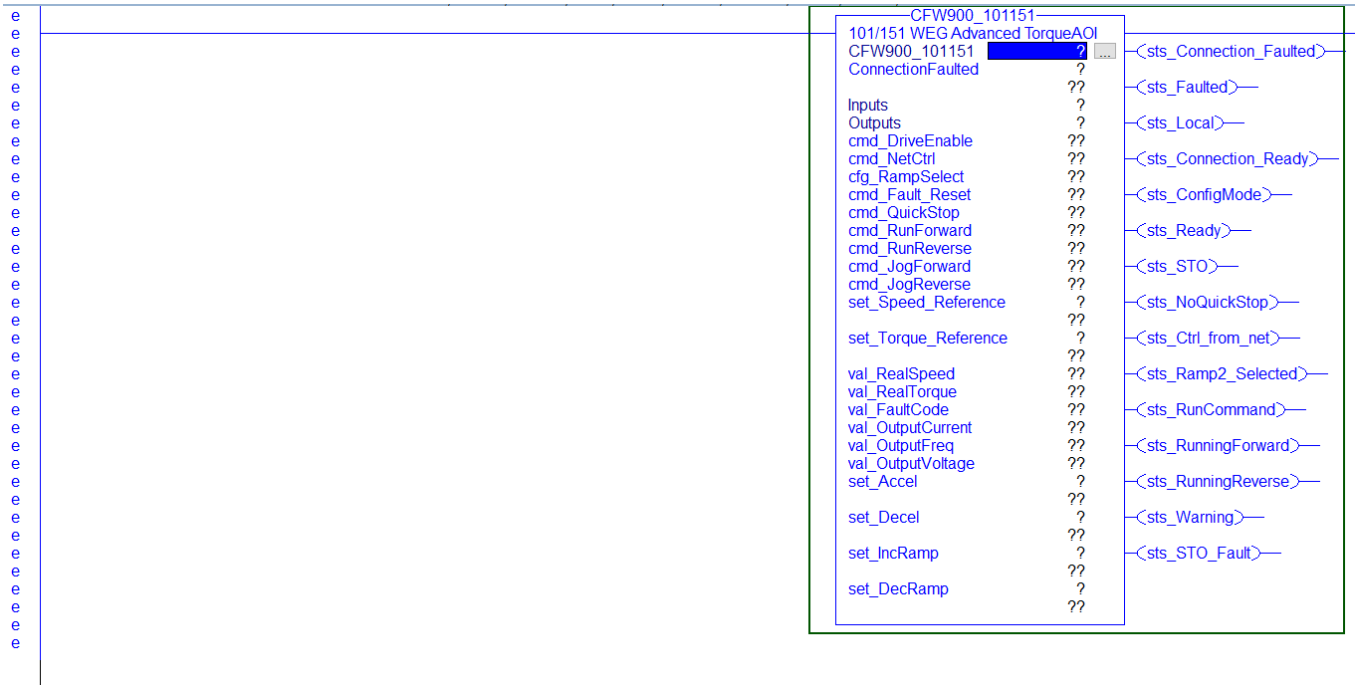


There should now be this add-on instruction in the project.

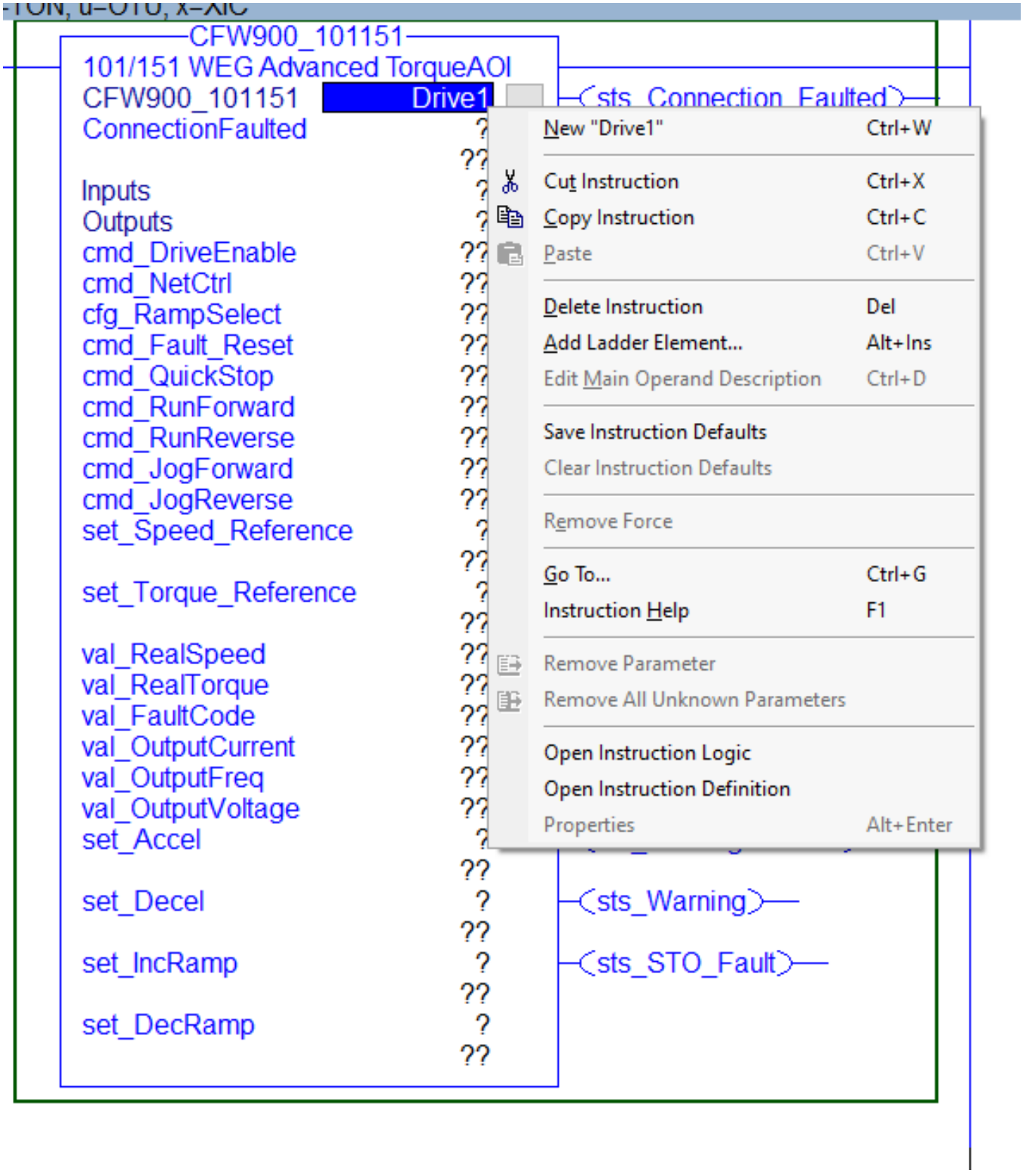
AOI Usage

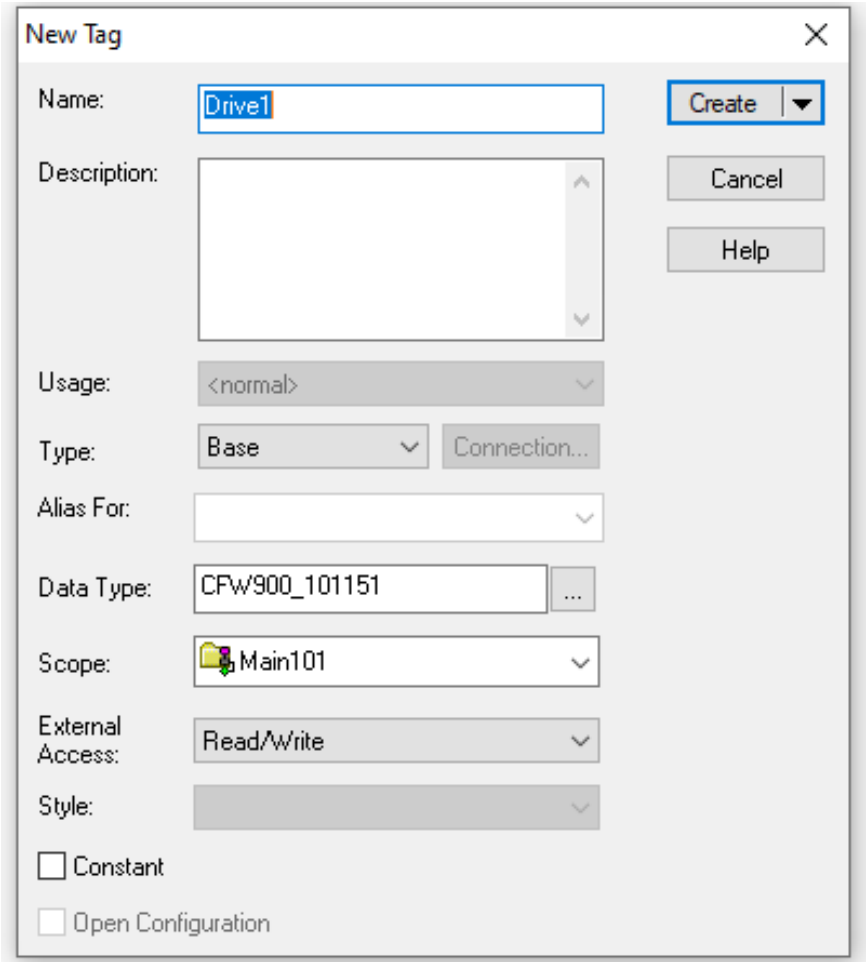


On an empty rung of ladder, add an instance of the newly imported add-on instruction by clicking on the Add-On bar and clicking the CFW900 symbol

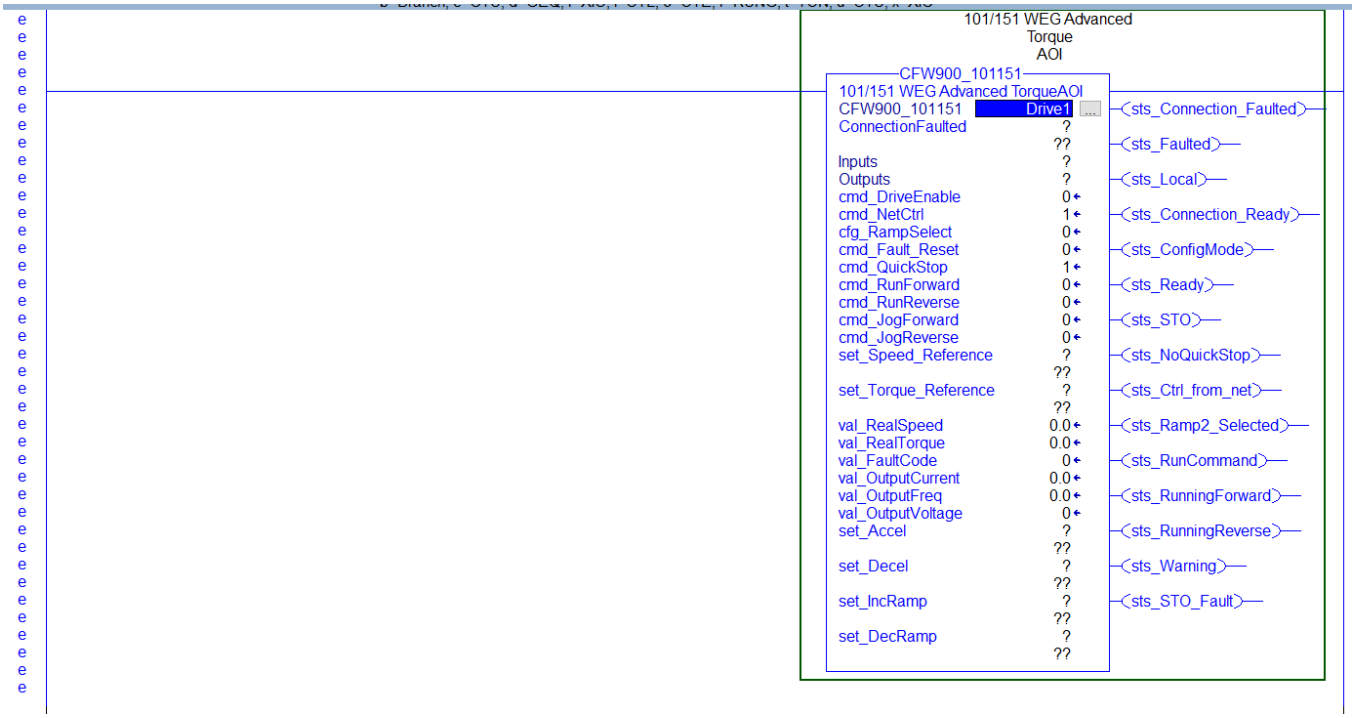


The Add-On requires a tag to be created. Create this tag by typing a name in the CFW900_101151 field and right-clicking and selecting New “Tag”

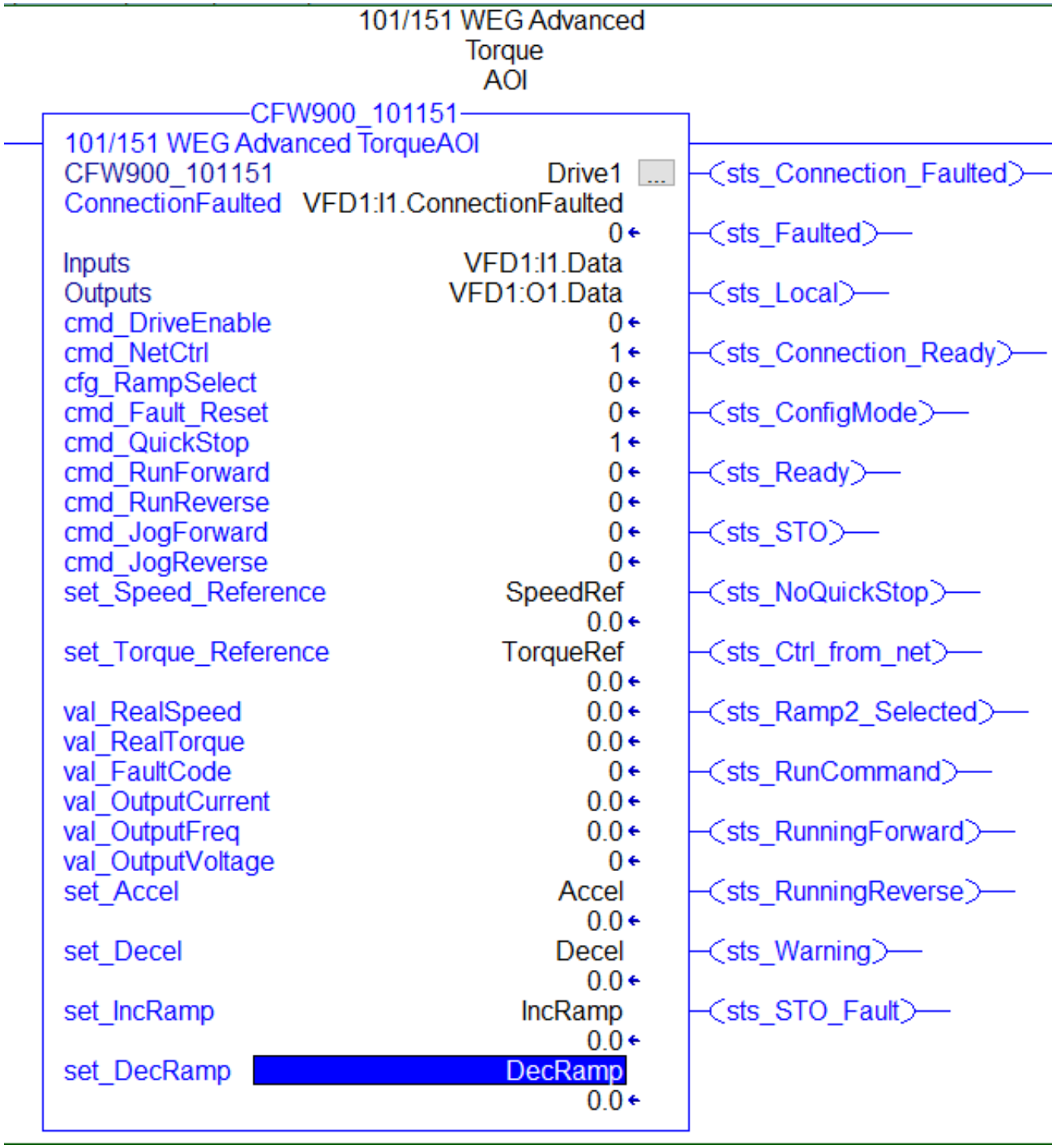

CFW900_101151
101/151 WEG Advanced TorqueAOI
CFW900_101151 Drive1
ConnectionFaulted
Inputs
Outputs
cmd_DriveEnable
cmd_NetCtrl
cfg_RampSelect
cmd_Fault_Reset
cmd_QuickStop
cmd_RunForward
cmd_RunReverse
cmd_JogForward
cmd_JogReverse
set_Speed_Reference
set_Torque_Reference
val_RealSpeed
val_RealTorque
val_FaultCode
val_OutputCurrent
val_OutputFreq
val_OutputVoltage
set_Accel
set_Decel
set_IncRamp
set_DecRamp
sts_Connection_Faulted
sts_Warning
sts_STO_Fault
New "Drive1" Ctrl+W
Cut Instruction Ctrl+X
Copy Instruction Ctrl+C
Paste Ctrl+V
Delete Instruction Del
Add Ladder Element... Alt+Ins
Edit Main Operand Description Ctrl+D
Save Instruction Defaults
Clear Instruction Defaults
Remove Force
Go To... Ctrl+G
Instruction Help F1
Remove Parameter
Remove All Unknown Parameters
Open Instruction Logic
Open Instruction Definition
Properties Alt+Enter



Give any appropriate description and scope (the tag can be either program or controller scoped)



Next the Connection Faulted, Inputs, Outputs, set_Speed_Reference, set_Torque_Reference, set_Accel, set_Decel, set_IncRamp, set_DecRamp need to be populated as follows:



SpeedRef, TorqueRef, Accel, Decel, IncRamp, and DecRamp are REAL tags to be created.

AOI Parameter Description

InOut Parameters

Parameter	Type	Description
Inputs	INT[10]	Input Assembly from CFW900
Outputs	INT[10]	Output Assembly to CFW900

Input Parameters

Parameter	Type	Description
Cfg_FailToStartDelay	DINT	Time in seconds before faulting on fail to start if VFD does not start when commanded Set to 0 to disable
Cfg_FailToStopDelay	DINT	Time in seconds before faulting on fail to stop if VFD does not stop when commanded Set to 0 to disable
ConnectionFaulted	BOOL	From CFW900 Ethernet Module. 1 = Connection is faulted 0 = Connection is OK
cfg_RampSelect	BOOL	1 = Ramp 2 (C.6.1.4/C.6.1.5) 0 = Ramp 1 (C.6.1.1/C.6.1.2)
cmd_DriveEnable	BOOL	1 = Enable operation of VFD 0 = Disable operation of VFD
cmd_Fault_Reset	BOOL	1 = Send Reset Fault Signal to VFD 0 = No action
cmd_JogForward	BOOL	1 = Jog Forward 0 = No Action / Stop
cmd_JogReverse	BOOL	1 = Jog Reverse 0 = No Action / Stop
cmd_NetCtrl	BOOL	1 = R2 (Ethernet) control 0 = R1 (Other) control
cmd_QuickStop	BOOL	1 = No Quick stop (must be 1 to run) 0 = Quick Stop
cmd_RunForward	BOOL	1 = Run Forward 0 = Stop
cmd_RunReverse	BOOL	1 = Run Reverse 0 = Stop
set_Speed_Reference	REAL	Speed Setpoint (0-100%)
set_Torque_Reference	REAL	Torque Setpoint (in %)
set_Accel	REAL	Acceleration Ramp Setpoint (0.1-999.9) in Seconds
set_Decel	REAL	Deceleration Ramp Setpoint (0.1-999.9) in Seconds
set_DecRamp	REAL	Decreasing Torque control ramp (0.1-999.9) in seconds
set_IncRamp	REAL	Increasing Torque control ramp (0.1-999.9) in seconds
cfg_AutoFaultResetNum	DINT	Maximum number of tries that AOI will send fault reset command while being maintained

Output Parameters

Parameter	Type	Description
sts_ConfigMode	BOOL	1 = VFD in Config Mode 0 = VFD in Operation Mode
sts_Connection_Faulted	BOOL	Goes high when connections interrupted. If “Run” signal is set, it must be reset before this will clear 1 = Connection has been faulted from VFD to PLC 0 = Connection OK
sts_Connection_Ready	BOOL	1 = Connection from VFD to PLC is established 0 = Connection not established
sts_Ctrl_from_net	BOOL	1 = VFD controlled remotely (PLC) 0 = VFD controlled locally
sts_Faulted	BOOL	1 = VFD Fault, connection fault, or failedToStart/Stop Fault 0 = No faults
sts_FailedToStart	BOOL	1 = VFD failed to start in time allotted 0 = Normal
sts_FailedToStop	BOOL	1 = VFD failed to stop in time allotted 0 = Normal
sts_Local	BOOL	1 = Local 0 = Remote
sts_NoQuickStop	BOOL	1 = No quick stop commanded 0 = Quick stop commanded
sts_Ramp2_Selected	BOOL	1 = Ramp 2 rates selected 0 = Ramp 1 rates selected
sts_Ready	BOOL	1 = VFD is ready to operate (states Ready, Enabled, or Stopping) 0 = VFD is not ready to operate
sts_RunCommand	BOOL	1 = Commanded to run 0 = Not commanded to run
sts_RunningForward	BOOL	1 = Running forward 0 = Not running forward
sts_RunningReverse	BOOL	1 = Running reverse 0 = Not running reverse
sts_STO	BOOL	1 = Safe Torque Off is active 0 = Safe Torque Off is not active

sts_STO_Fault	BOOL	1 = AOI is preventing running due to STO trip until cmd_RunForward/Reverse shows a rising edge 0 = Normal Operation
val_FaultCode	DINT	Fault code 1 from VFD
val_OutputCurrent	REAL	Output current in Amps from VFD
val_OutputFreq	REAL	Output frequency in Hertz from VFD
val_OutputVoltage	REAL	Output voltage in Volts from VFD
AutoFaultResetExceed	BOOL	Indicates when the maximum number of automatic fault clears has been exceeded. Set cmd_Fault_Reset to 0 to reset and allow fault clear to resume. 1 = Max number of fault clears reached. Fault Reset Disabled 0 = Under threshold for automatic fault clears. Fault Reset Allowed.

CFW900 Parameter Requirements

The following parameters must be set in the CFW900:

Parameter	**Setting**
C.9.5.1	101/151
C.9.5.2	1
C.9.5.3	7
C.9.5.4	1
C.9.5.5	7
C.4.1.1	Ethernet
C.4.2.2.1	Ethernet
C.4.2.2.2	Ethernet
C.4.2.2.3	Ethernet
C.4.2.2.4	Ethernet
C.4.3.1.2.2	Ethernet
C.9.2.1.1	3
C.9.2.1.2	7
C.9.2.1.3	5
C.9.2.1.4	60
C.9.2.1.5	USER DEFINED
C.9.2.1.6	USER DEFINED
C.9.2.1.7	USER DEFINED

C.9.2.1.8	USER DEFINED
C.9.2.2.2	100
C.9.2.2.3	101
C.9.2.2.4	4001
C.9.2.2.5	4002
C.9.2.2.6	USER DEFINED
C.9.2.2.7	USER DEFINED
C.9.2.2.8	USER DEFINED
C.9.2.2.9	USER DEFINED

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US.CFW900.AOI.Configuration