



ThinkTopV50_V70_nPORT_IOL Add-On Instruction Guide for Allen Bradley Compact/ControlLogix PLC's

ThinkTop V50, V70



Version 1.0 2/2024



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1 Preliminary notes

This document demonstrates:

1. Integrating the ThinkTop Add-On Instruction into a PLC project

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2 Intended Use

The ThinkTopV50_V70_nPORT_IOL Add-On Instruction provides a logical user interface to ThinkTop Valves.

The Add-On Instruction is to be integrated in a PLC program to:

1. Parse the valve's Process Data Input
2. Allow the user to control the valve's Process Data Output
3. Provide the IO-Link master's port communication status
4. Feedback incorrect user input settings
5. Produce the status of IO-Link Data Storage features

3 Prerequisites

The user has:

1. RS Logix 5000 or Studio 5000 software.
2. An ifm IO-Link master AL112x, AL122x, AL132x, AL142x, AL192x.
3. A ThinkTop Valve version 50 or 70 is connected to a sensor port on the IO-Link master.



6 Integrate the ThinkTopV50_V70_nPORT_IOL to the PLC project's logic

Section 6.1 and 6.2 show the integration steps while offline with the PLC. It is also possible to perform the integration methods while online.

6.1 Import the Add-On Instruction

1. In the Controller Organizer, expand the **Assets** folder. Right click Add-On Instruction and select **Import Add-On Instruction...**

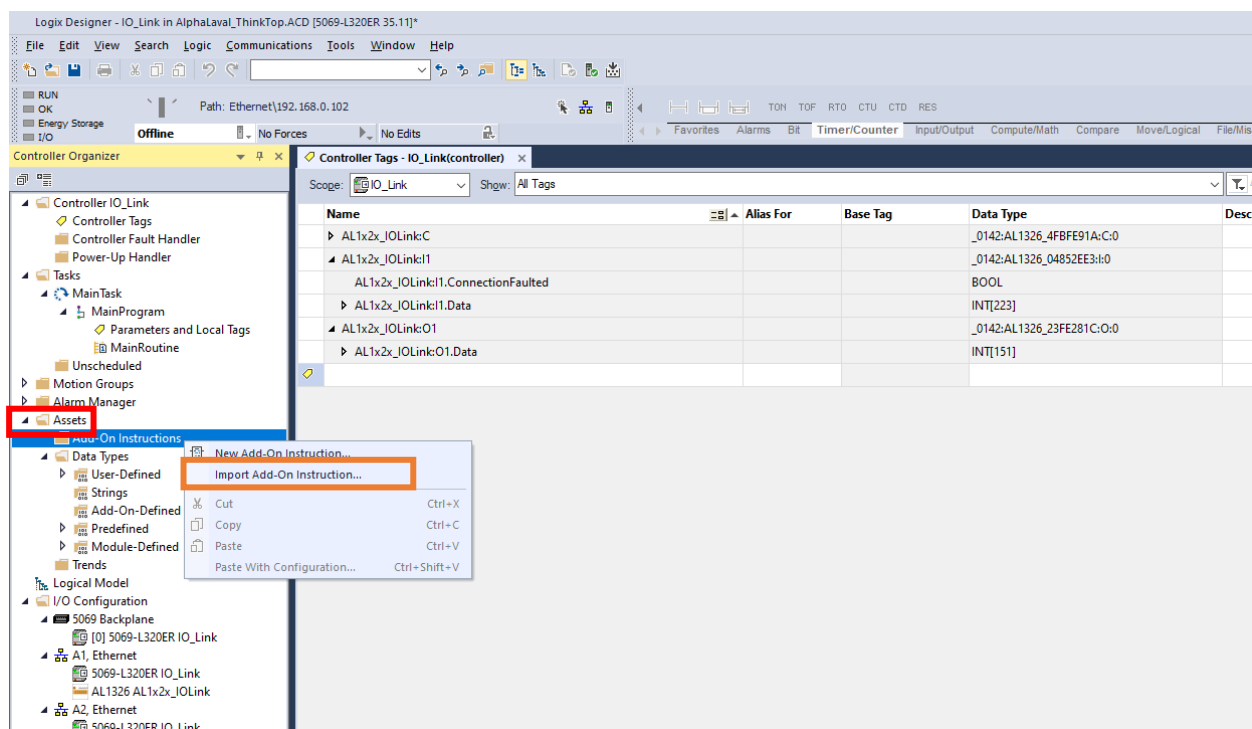


Figure 25



2. Select **ThinkTopV50_V70_nPORT_IOL.L5X** from the folder named **2. Add_On Instruction** in the ThinkTop_EIP_AllenBradley_StartupPackage and click **Open**.

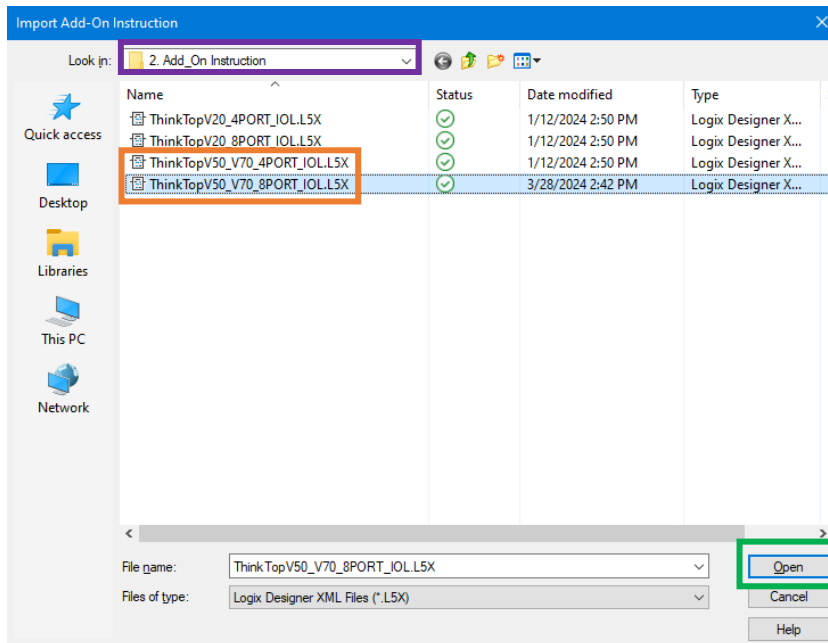


Figure 26

3. Click **OK** to Import.

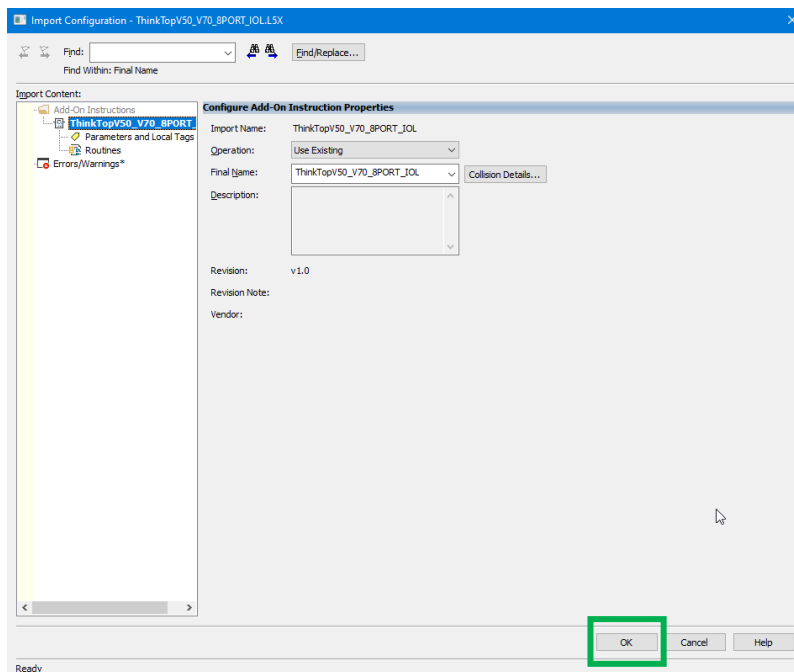


Figure 27



4. The **ThinkTopV50_V70_nPORT_IOL** Add-On Instruction is displayed in the Add-On Instructions folder.

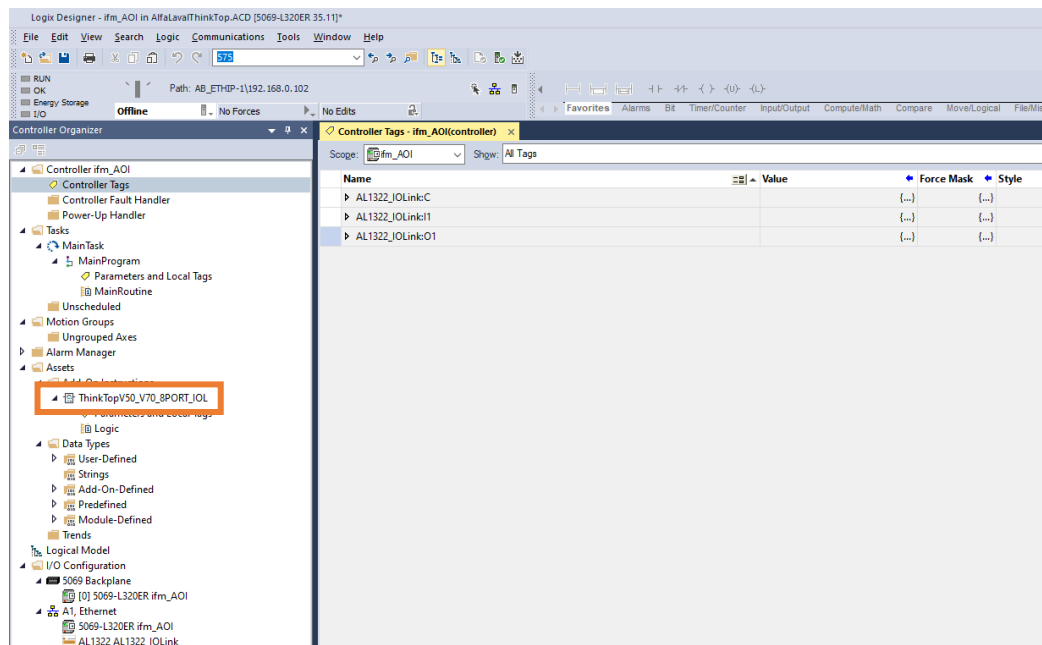


Figure 28



6.2 Integrate the ThinkTopV50_V70_nPORT_IOL Add-On Instruction in a routine

1. Click and drag the **ThinkTopV50_V70_nPORT_IOL** Add-On Instruction onto a rung of logic.

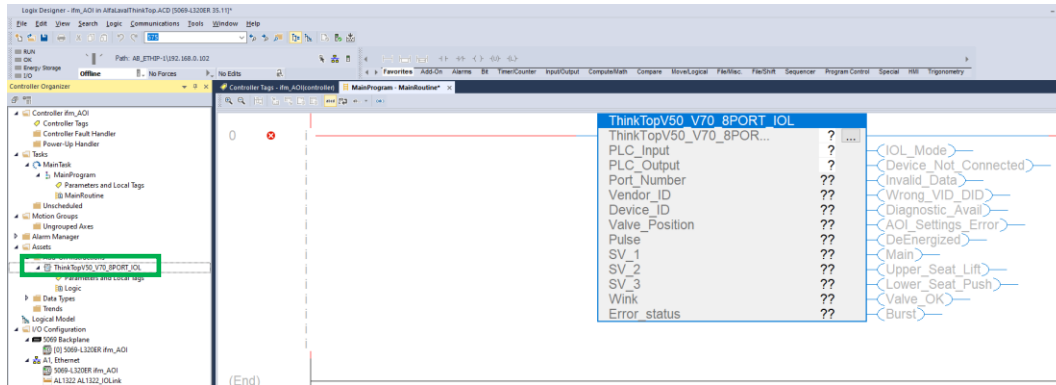


Figure 29

2. Define the Add-On Instruction tag name. Right click **?** and click **New Tag**.

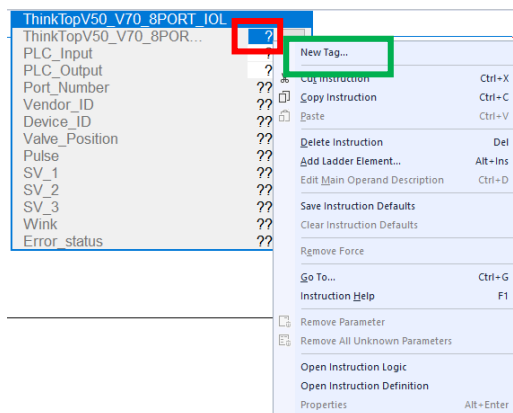


Figure 30

3. Create a **user defined name** and click **Create**.

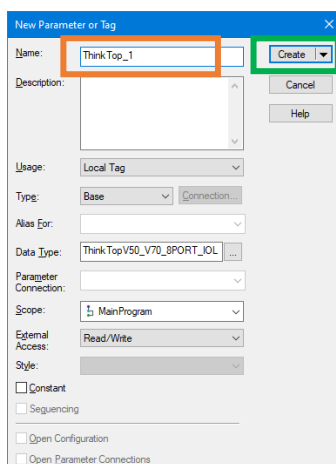


Figure 31



- Assign the PLC_Input and PLC_Output tags using the ifm IO-Link master's producing **input data array** and consuming **output data array** from the Controller Tags.

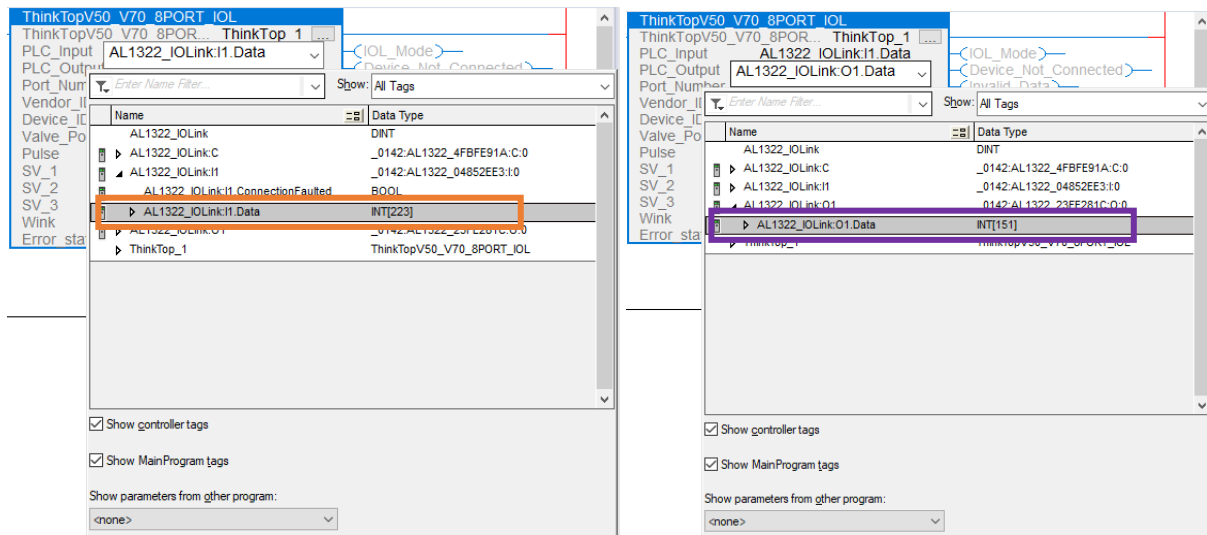


Figure 32

- Enter the port number of the IO-Link master where the ThinkTop valve is connected.
Value =1..4 (four port masters) or Value =1..8 (eight port masters)

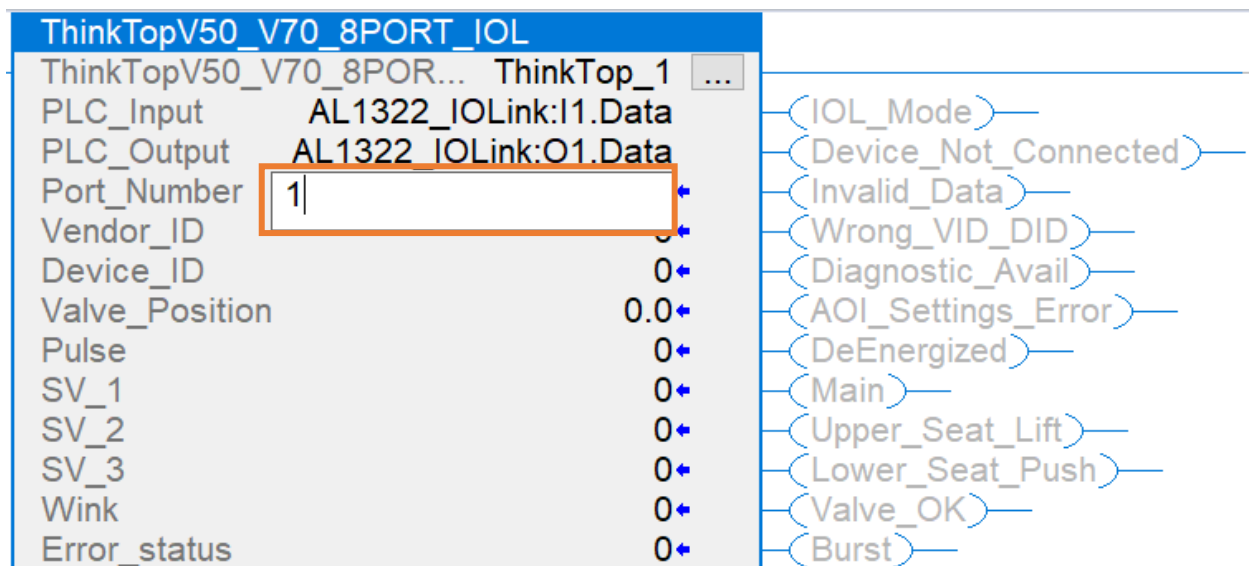


Figure 33



6. The rung is complete with no errors.

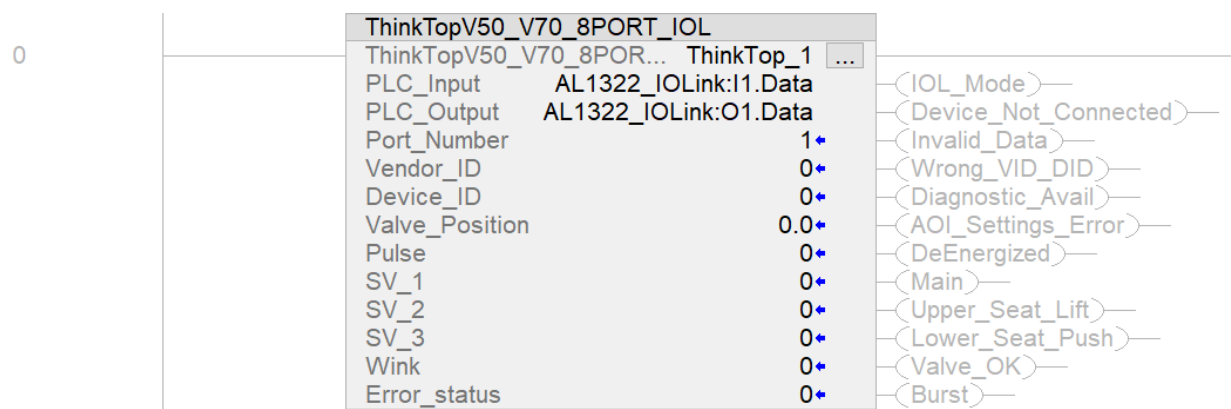


Figure 34

7. If the previous steps were made offline, the Add-On Instruction is ready to be downloaded to the PLC.
If the previous steps were made online, the pending edits are ready to be finalized.



7 ThinkTopV50_V70_nPORT_IOL Parameter Data Types and Descriptions

ThinkTopV50_V70_8PORT_IOL			
ThinkTopV50_V70_8POR...	ThinkTop_1	...	
PLC_Input	AL1322_IOLink:I1.Data		(IOL_Mode)
PLC_Output	AL1322_IOLink:O1.Data		(Device_Not_Connected)
Port_Number	1	+	(Invalid_Data)
Vendor_ID	0	+	(Wrong_VID_DID)
Device_ID	0	+	(Diagnostic_Avail)
Valve_Position	0.0	+	(AOI_Settings_Error)
Pulse	0	+	(DeEnergized)
SV_1	0	+	(Main)
SV_2	0	+	(Upper_Seat_Lift)
SV_3	0	+	(Lower_Seat_Push)
Wink	0	+	(Valve_OK)
Error_status	0	+	(Burst)

Figure 35

7.1 Add-On Instruction Output Parameter tags: Values produced to the PLC

Vendor_ID: Static integer (INT) value produced by IO-Link device while connected to the IO-Link master.

For Alfa Laval products value =1292 decimal / 0x050C hex

Device_ID: Static double integer (DINT) value produced while IO-Link device is connected to the IO-Link master.

Note: The vendor and device ID values are documented in the IO-Link Device Description pdf.

See folder 3. IO-Link Device Descriptions of the ThinkTop Startup package.

Valve_Position: Current valve position of data type REAL. Represents the actual distance between the top of the valve actuator and the top of the valve stem.

Value range will change depending on valve used. See IO-Link Device Description pdf.

Units in millimeters. If no data the value will =3276.4

Error_Status: Short description of the current error represented by an integer (INT).

Troubleshooting advice is available in the instruction manual.

Value range:

- 0: Everything is OK
- 16: Sensor target missing
- 17: Setup prerequisite issue
- 18: Pneumatic part issue
- 19: Seat lift sensor issue
- 20: Position not reached
- 21: Unexpected movement
- 22: Seat-lift sensor missing
- 23: Pilot valve 1 missing
- 24: Pilot valve 2 missing
- 25: Pilot valve 3 missing
- 26: Interlock active
- 27: Output short circuit
- 28: Setup aborted
- 29: Blocked button
- 30: Communication failure
- 31: Safety stop active



- IOL_Mode:** Binary (BOOL) state of the operating mode of the IO-Link master port.
Value range – TRUE (IO-Link mode) .. FALSE (port has been set to disabled, digital input or digital output mode)
Note: The eds file installation defaults all ports to IO-Link mode. The port mode may be changed in the configuration controller tags.
- Device_Not_Connected:** Binary (BOOL) state of the connection status to IO-Link device on the port.
Value range – FALSE (an IO-Link device is connected) .. TRUE (an IO-Link device is not connected)
- Invalid_Data:** Binary (BOOL) state of the IO-Link device's process data.
Value range – FALSE (valid) .. TRUE (invalid)
- Wrong_VID_DID:** Binary (BOOL) state of the match between configured and currently produced Vendor ID and Device ID values.
Value range – FALSE (both Vendor ID and Device ID match the configuration set in the Validation Data Storage settings in the configuration controller tag of the IO-Link master) .. TRUE (either the vendor ID and/or device ID do not match the Validation Data Storage settings). See [section 8](#) for configuring Validation Data Storage.
- Diagnostic_Avail:** Binary (BOOL) state of the presence of IO-Link Event data.
Value range – FALSE (no event data present) .. TRUE (event data present)
Note: Most commonly used to provide feedback when validation data storage settings are active. See Section 8 step 8.
- AOI_Settings_Error:** Binary (BOOL) state of at least one, Add-On Instruction user input error.
Value Range – FALSE (No error present) .. TRUE (at least one error present)
- DeEnergized:** Binary (BOOL) state of the De-energized valve position.
Value Range – FALSE (inactive) .. TRUE (active)
- Main:** Binary (BOOL) state of the main energized valve position.
Value Range – FALSE (inactive) .. TRUE (active)
- Upper_Seat_Lfit*:** Binary (BOOL) state of the Upper Seat Lift energized position
Value Range – FALSE (inactive) .. TRUE (active)
- Lower_Seat_Lift*:** Binary (BOOL) state of the Lower Seat Lift energized position
Value Range – FALSE (inactive) .. TRUE (active)
- Valve_OK:** Binary (BOOL) Current valve state
Value Range – TRUE (Valve system is OK) .. FALSE (Value system is NOT OK)

*Upper Seat Lift and Lower Seat Lift output functions are only available on ThinkTop V70.
When used with ThinkTop V50 the Upper Seat Lift and Lower Seat Lift outputs are set FALSE.



7.2 Add-On Instruction Input Parameter tags: Values consumed by the PLC

- Pulse:** User controlled binary setting (BOOL) to trigger one clean pulse on SV 1.
The pulse stroke length can be customized via acyclic commands. See the IO-Link Device Description pdf for the list of possible commands.
Value range – FALSE (Disable) .. TRUE (Enable)
- Burst*:** User controlled binary setting (BOOL) to enable burst clean
Value range – FALSE (Disable) .. TRUE (Enable)
- SV1:** User controlled binary setting (BOOL) to trigger solenoid valve 1 for main valve activation
Value range – FALSE (Disable) .. TRUE (Enable)
- SV2*:** User controlled binary setting (BOOL) to trigger solenoid valve 2 for upper seat lift activation
Value range – FALSE (Disable) .. TRUE (Enable)
- SV3*:** User controlled binary setting (BOOL) to trigger solenoid valve 3 for lower seat push activation
Value range – FALSE (Disable) .. TRUE (Enable)
- Wink:** User controlled binary setting (BOOL) to trigger a Visual indication for locating the unit (Purple flashing as default)
Value range – FALSE (Disable) .. TRUE (Enable)

*Burst, SV2 and SV3 input functions are only available on ThinkTop V70.
When used with ThinkTop V50 Burst, SV2 and SV3 input functions have no use.



9 Appendix

9.1 Appendix A: Setting a PC to a static IP address

1. Go to the PC's Control Panel
2. Click *Network and Sharing Center*
3. On the left side choose *Change adapter settings*
4. Right click on Ethernet port to be set and click *Properties* from the drop down menu.
5. Under *This connection uses the following items* menu scroll down and double click *Internet Protocol Version 4 (TCP/IPv4)*
6. In Internet Protocol Version 4 Properties window click to check *Use the following IP Address*
7. In the *IP address* field enter 192.168.1.n where n =1..254 and not =250.
8. In the *Subnet mask* field enter 255.255.255.0.
9. The *Default gateway* field is left empty and click OK.
10. Click OK to close the *Ethernet Properties* window
11. Verify the Ethernet connection that was changed now shows *Unidentified network*. The IP address of the PC is now set.

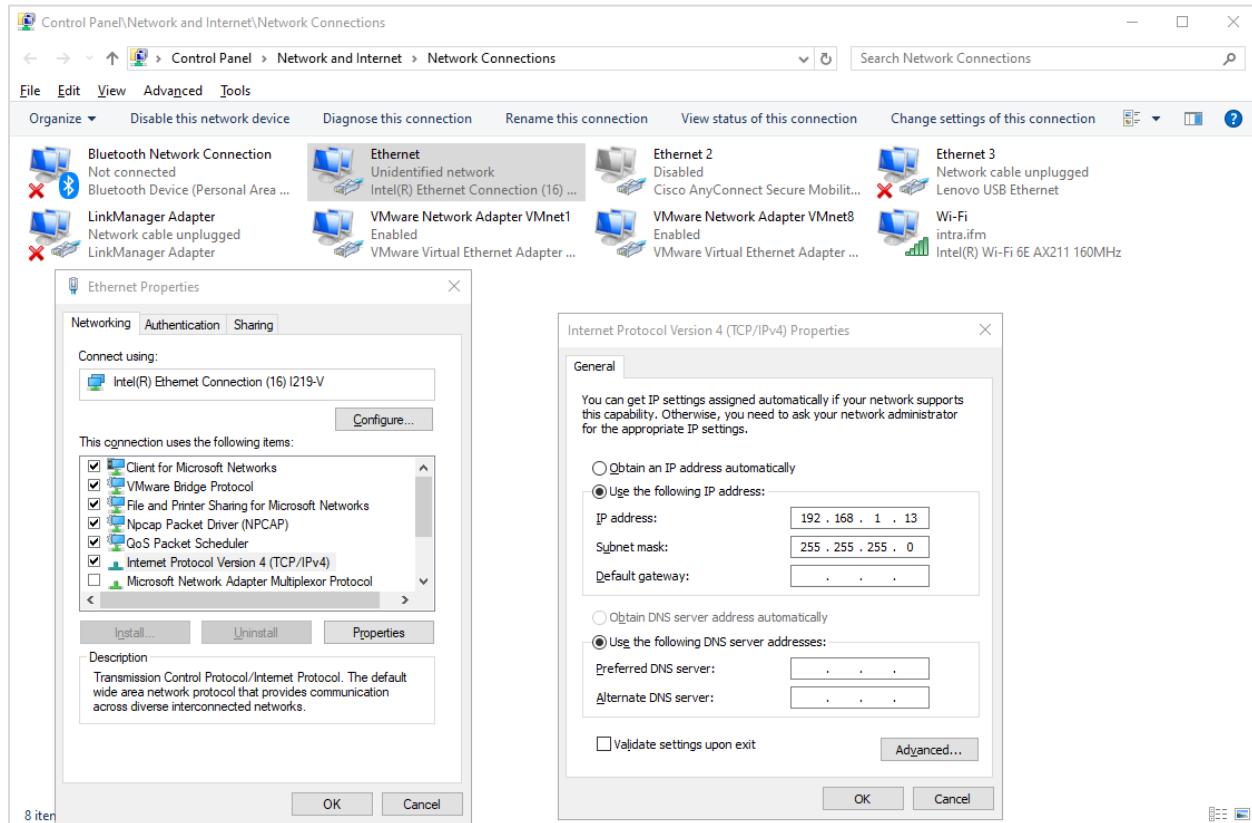


Figure 1A



9.2 Appendix B: Manually inhibiting an Ethernet/IP module

1. Manually inhibit the Ethernet/IP module by right clicking the Ethernet module and open **Properties**. Click **Connection** and check the **Inhibit Module** check box. Click **Apply**.

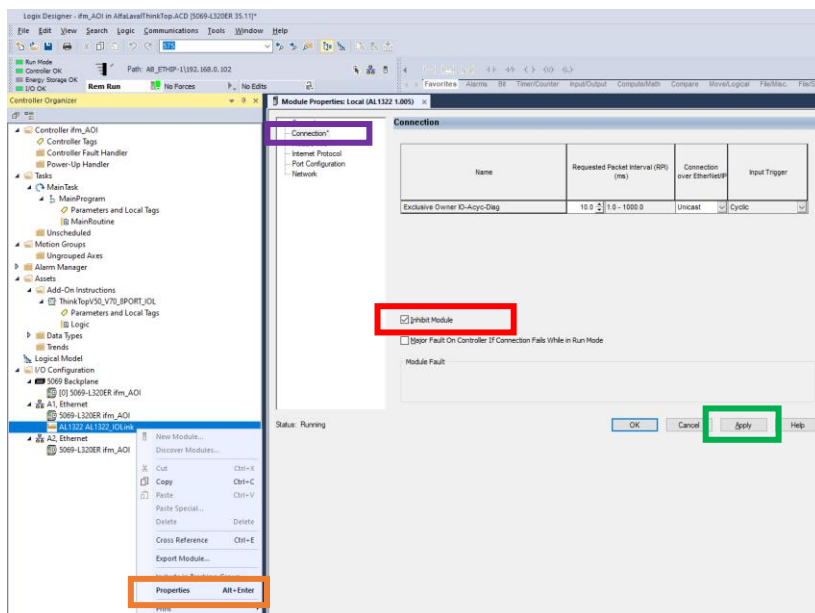


Figure 1B

2. The module will be inhibited as shown by the **error icon** on the Ethernet module and by the **Status text**.

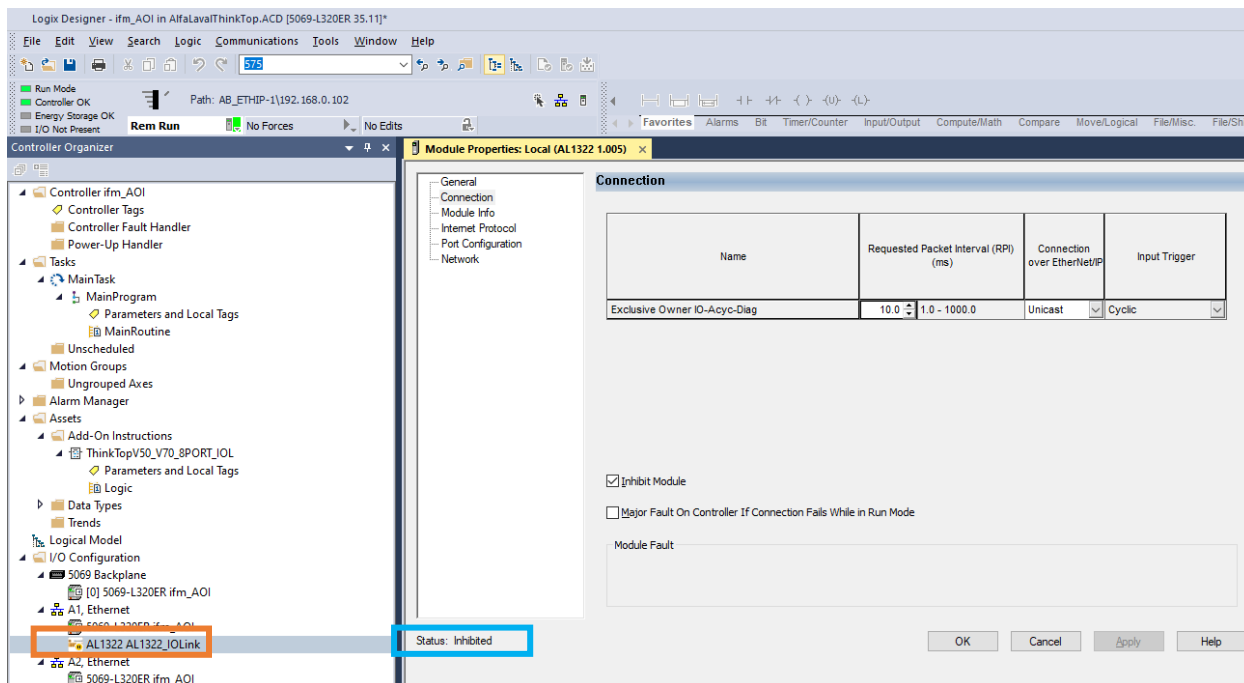


Figure 2B



3. Uninhibit the Ethernet/IP module by unchecking the **Inhibit Module** check box and click **Apply**.

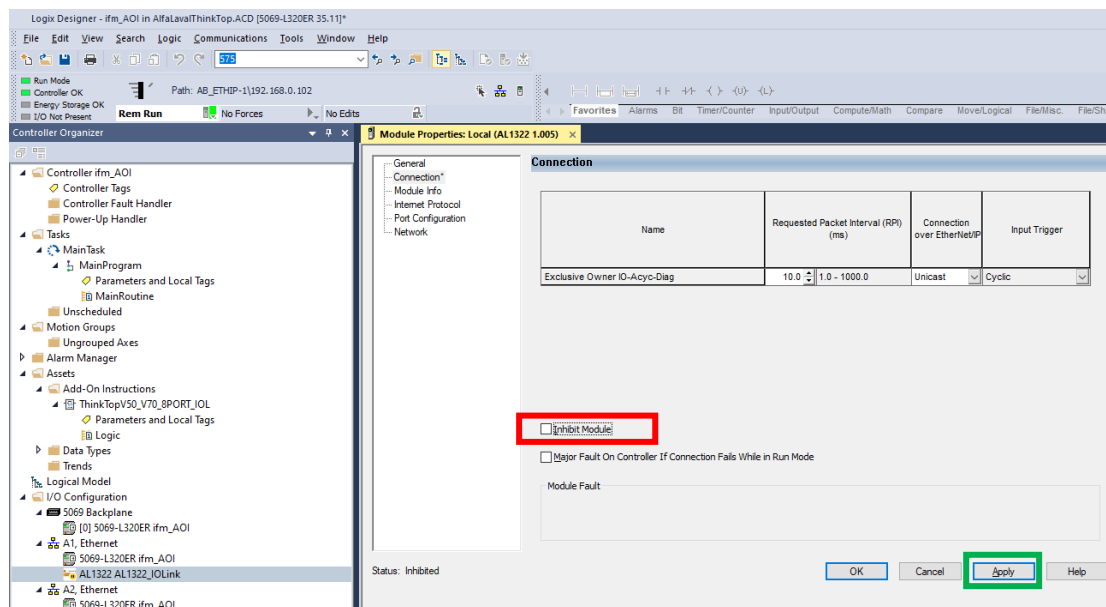


Figure 3B

4. The Ethernet/IP module will be uninhibited. No **error icon** will be shown on the Ethernet module and the **Status text** will show Running.

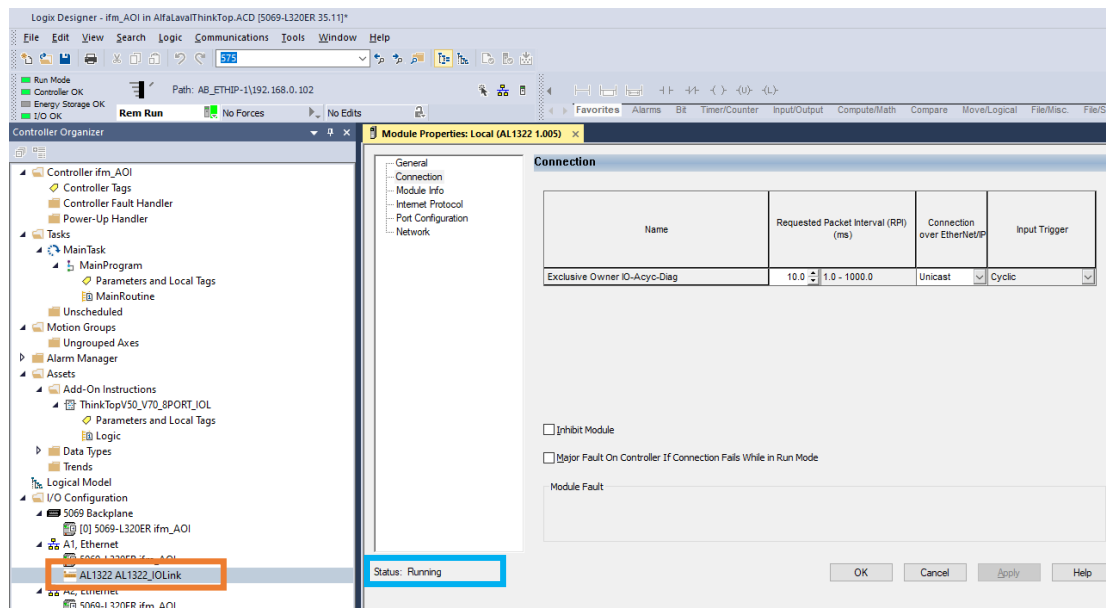


Figure 4B



9.3 Appendix C: Using an SSV instruction to inhibit an Ethernet/IP module

1. Create a rung of logic with a Set System Value function.
 - a. Class Name =select Module
 - b. Instance =Select Ethernet module name
 - c. Attribute Name =select Mode
 - d. Source =create a user defined tag as a DINT with default value =0



Figure 1C

The module status is running.

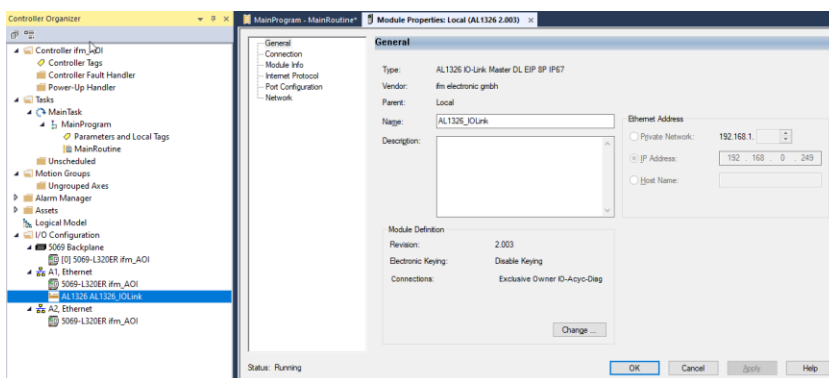


Figure 2C

2. Enter a value of 4 in the Source tag to inhibit the module.



Figure 3C

The module status is inhibited.

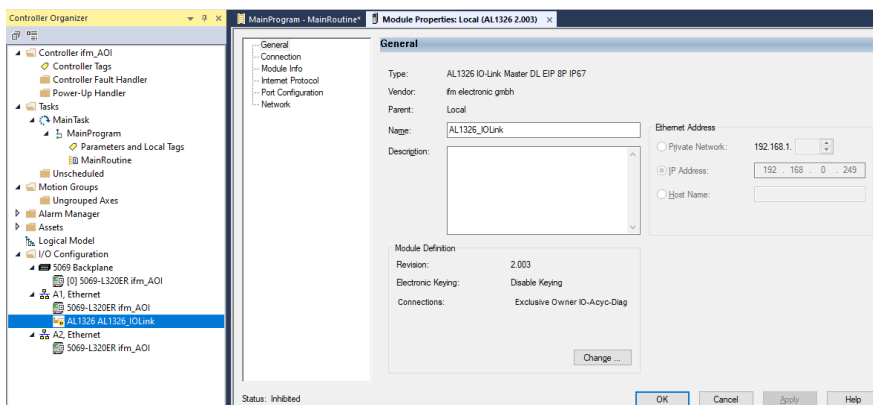


Figure 4C

3. Set the Source Value =0 as in step 1 to inhibit the module.