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YASKAWA

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Driving value

# Modular Machine Commissioning with MPiec Controllers

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YASKAWA

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# Topics

- How to design a project for use with a variable number of axes
- What to expect when a controller is operated with part of the configured machine missing
- Recommended procedure for ensuring all drive parameters are retained in the IEC Application's ZIP Project
- New simplified procedure for replacing a drive in the field without any special vendor software

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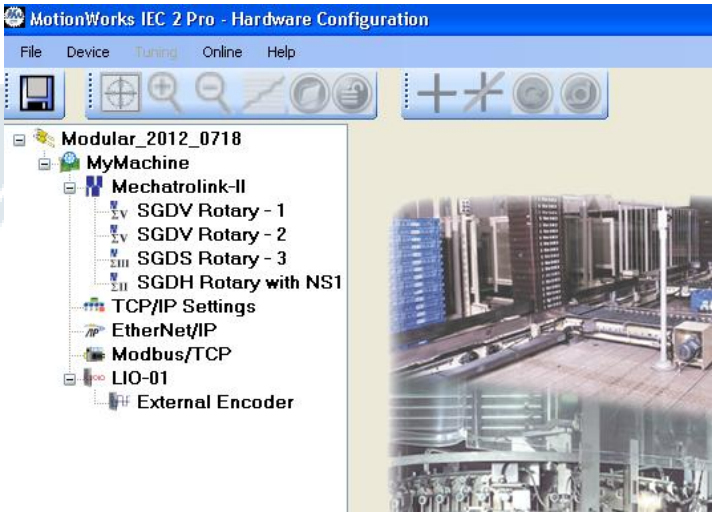
# Project Design

*Machine builder configures controller with all axes*




*Codes the project to use all possible axes*

*Includes a version number for each machine type*

*Eg) 0111 is a 3 axis machine version of a 4 axis machine (1111)*

```
1          1 Axis1.AxisNum := UINT#1;
2          2 Axis2.AxisNum := UINT#2;
3          3 Axis3.AxisNum := UINT#3;
4          4 Axis4.AxisNum := UINT#4;
5
6     16#0007 Version      := WORD#2#111;
```

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# Project Design

*Code completed*

*Axes tuned*

*Go online using Hardware Configuration with startup*

*Save*

*Project completed*

*Machine ships*

*Two situations for modular machines at customer:*

1) *Controller does not find configured axis on power up*
2) *Add axes after power up*

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# Configured axis not found on startup

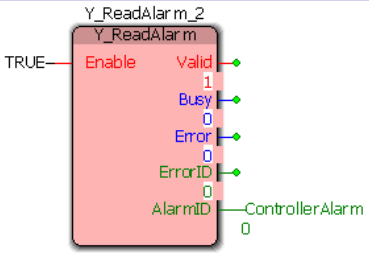
*On Power up expect a controller alarm:*

**Active Alarms**

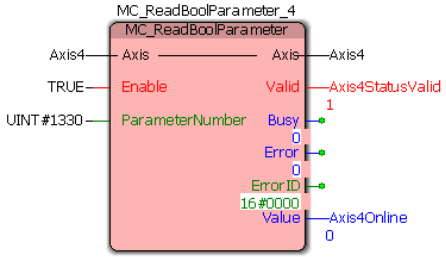
| Alarm Code | Source | Description |
|---|---|---|
| 2301 0008 | MLink Driver | Communication with a node failed during servo network startup. [hide details]<br>*An error occurred sending command to a node during initialization. The node may not support the configured communications rate. Communication with this node has been prohibited, but communication with other nodes may be possible.* |

Clear Alarms | Save...

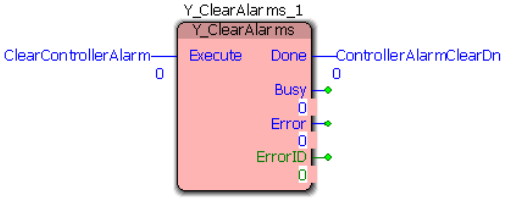
*This can be seen using Y_ReadAlarm*




*Controller Prm 1330 also gives status of node if it is online*




*Alarm can be cleared using Y_ClearAlarm*

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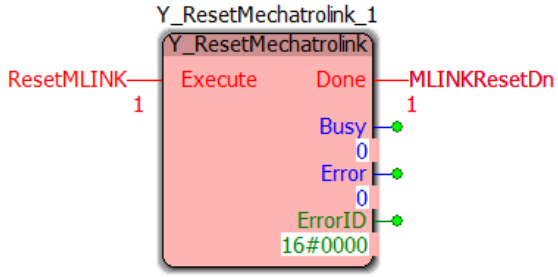
# Add configured axes

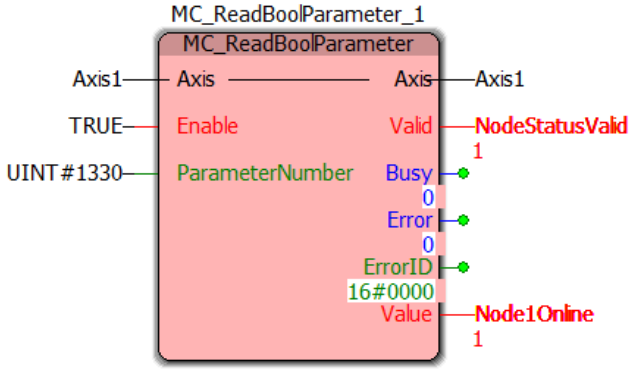
*Make sure MECHATROLINK axes are disabled*

*Re-add axis*

*Clear Alarms*

*Reset MECHATROLINK*




*Make sure re-added node is online*

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# Modular Machine Scenario

*OEM builds machine with 4 axes capability. Code for 4 axes*

*Customer buys 3 axis version*

*Customer can run :*

1. *All 3 axes together: (1,2,3)*
2. *Two axes at a time:  (1,2), (1,3), (2,3)*
3. *One axis at a time: (1), (2), (3)*

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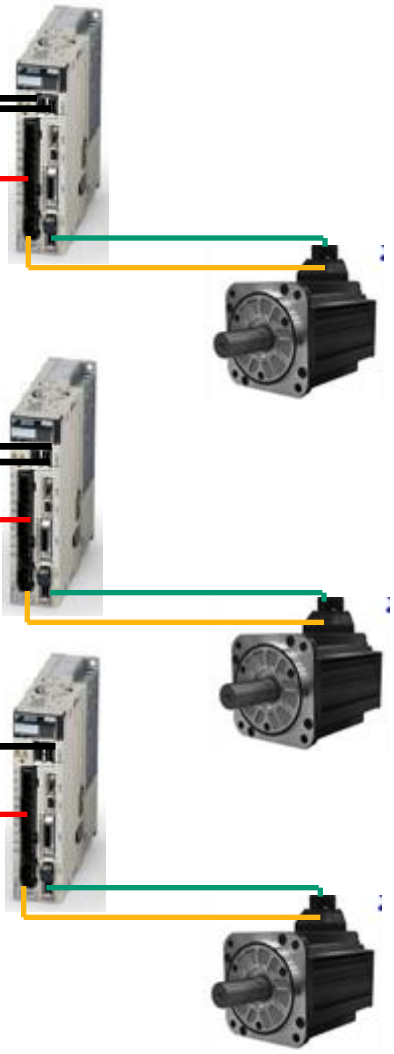
# Customer's 3 axis machine

```
Axis1.AxisNum := UINT#1;
Axis2.AxisNum := UINT#2;
Axis3.AxisNum := UINT#3;
Axis4.AxisNum := UINT#4;
```



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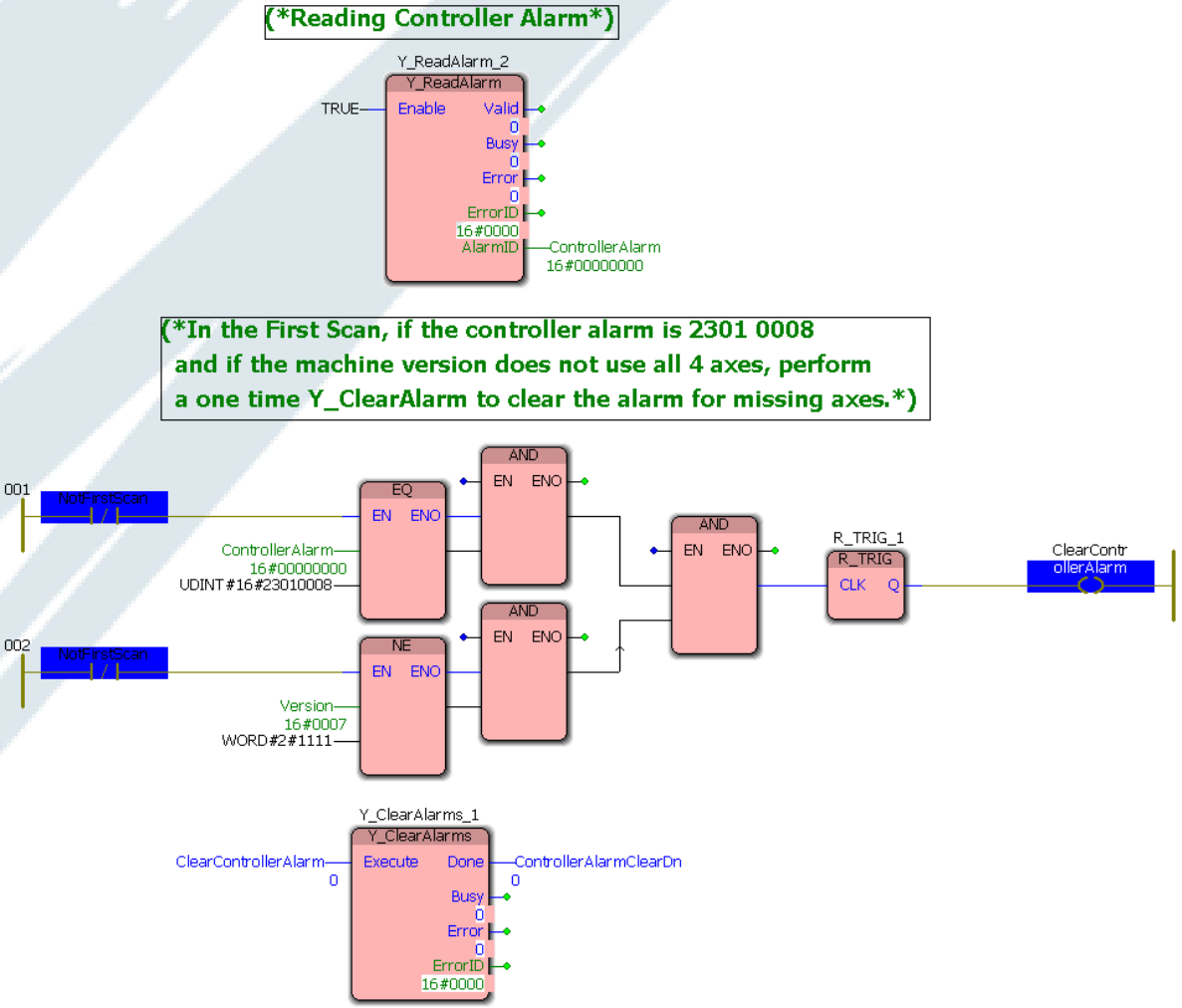
# All 3 axes together: (1,2,3)

*Power on with 3 axes connected (1,2,3).*

*Clear alarm about missing axis 4*

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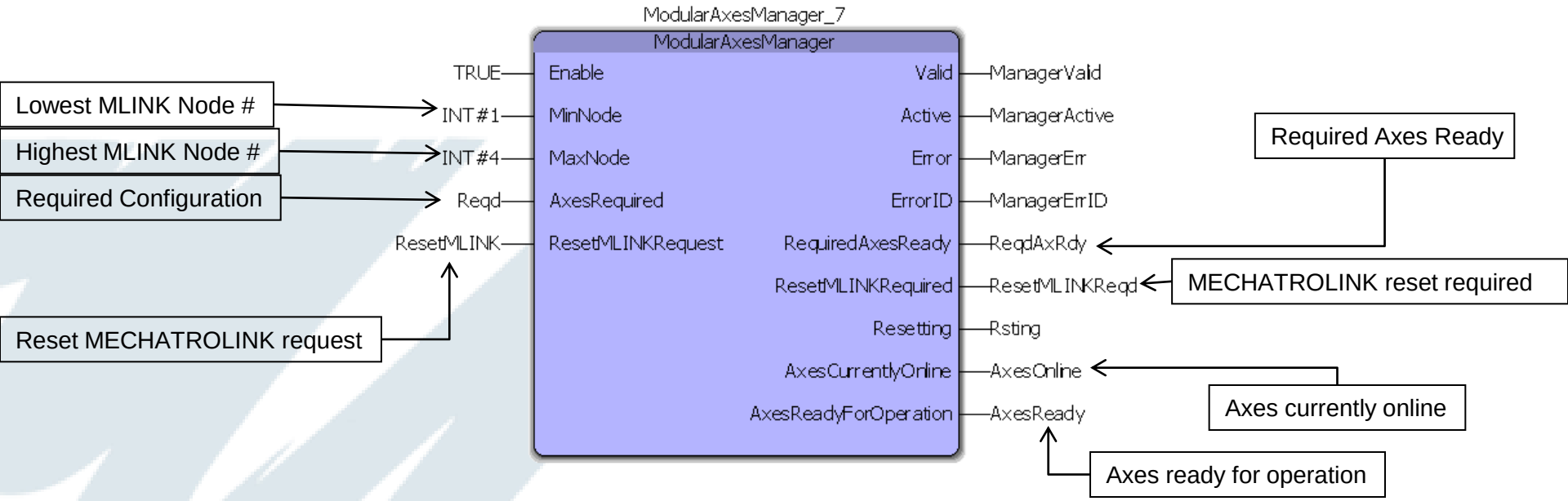
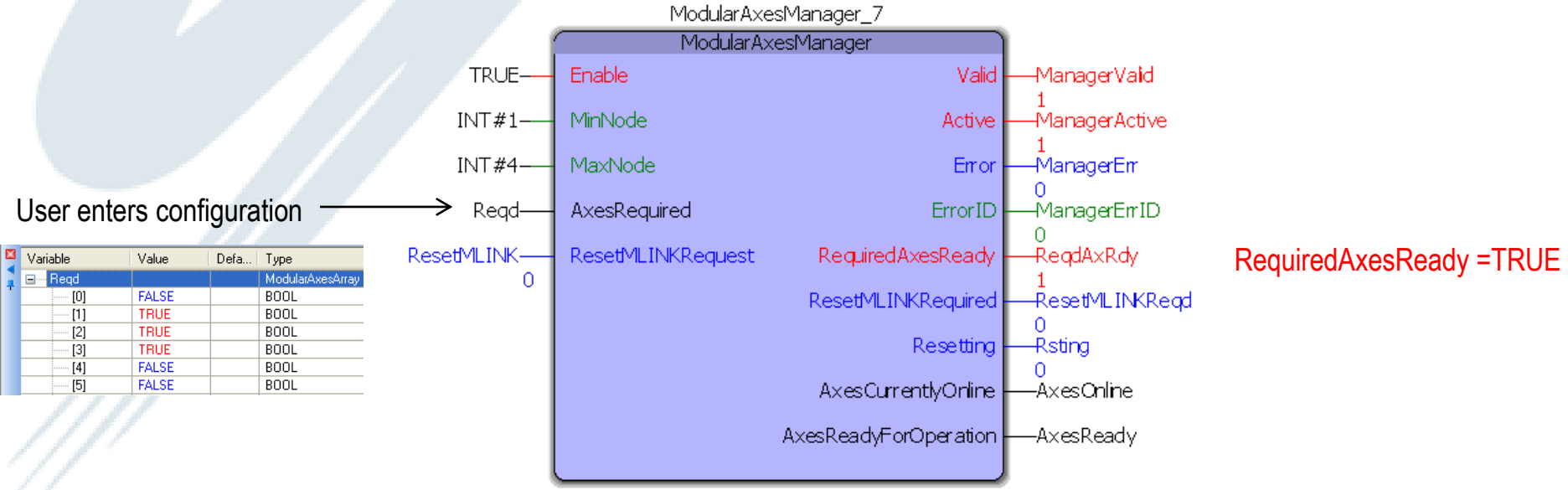
# All 3 axes together: (1,2,3)




| Variable | Value | Defa... | Type |
|---|---|---|---|
| Reqd | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | TRUE | | BOOL |
| [3] | TRUE | | BOOL |
| [4] | FALSE | | BOOL |
| [5] | FALSE | | BOOL |

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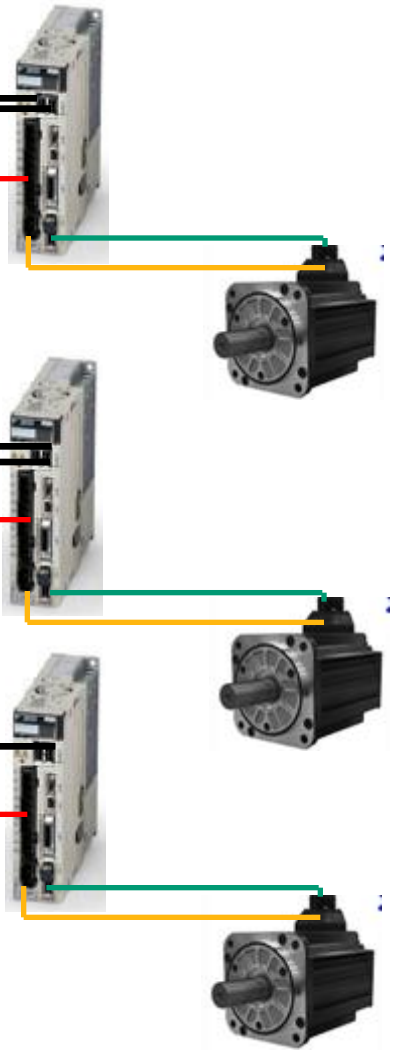
# Two Axes Mode (1,3)

```
Axis1.AxisNum := UINT#1;
Axis2.AxisNum := UINT#2;
Axis3.AxisNum := UINT#3;
Axis4.AxisNum := UINT#4;
```



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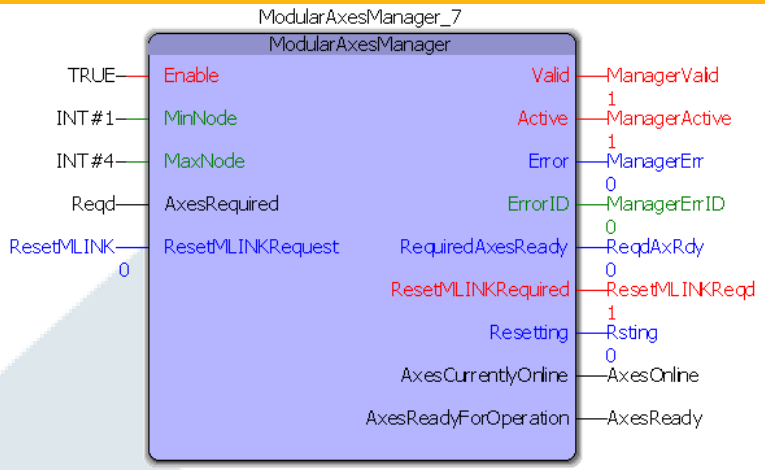
# Two Axes Mode (1,3)

1) Unhook Axis 2. (Estop)




| Variable | Value | Defa... | Type |
|---|---|---|---|
| Reqd | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | TRUE | | BOOL |
| [3] | TRUE | | BOOL |
| [4] | FALSE | | BOOL |

| Variable | Value | D... | Type |
|---|---|---|---|
| AxesOnline | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | FALSE | | BOOL |
| [3] | TRUE | | BOOL |
| [4] | FALSE | | BOOL |

| Variable | Value | Defa... | Type |
|---|---|---|---|
| AxesReady | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | FALSE | | BOOL |
| [2] | FALSE | | BOOL |
| [3] | FALSE | | BOOL |
| [4] | FALSE | | BOOL |

2) Update AxesRequired

3) Reset MECHATROLINK

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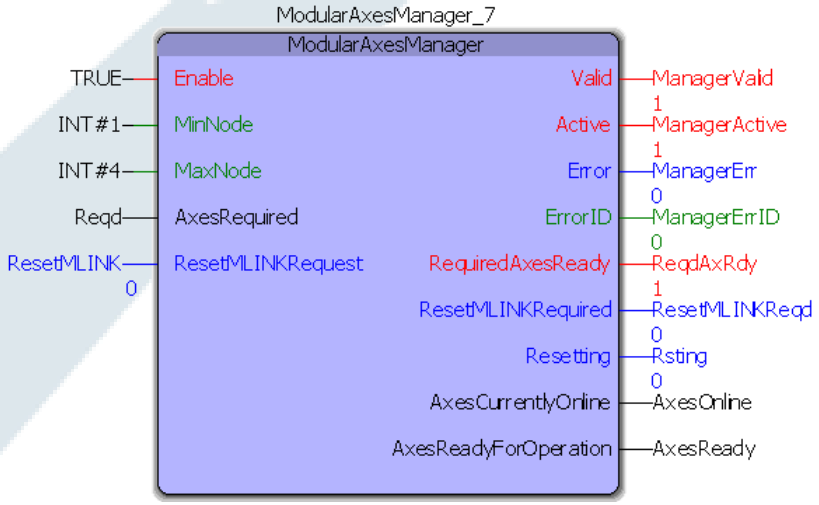


| Variable | Value | Defa... | Type |
|---|---|---|---|
| Reqd | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | FALSE | | BOOL |
| [3] | TRUE | | BOOL |
| [4] | FALSE | | BOOL |

| Variable | Value | D... | Type |
|---|---|---|---|
| AxesOnline | | | ModularAxesArra |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | FALSE | | BOOL |
| [3] | TRUE | | BOOL |
| [4] | FALSE | | BOOL |

| Variable | Value | Defa... | Type |
|---|---|---|---|
| AxesReady | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | FALSE | | BOOL |
| [3] | TRUE | | BOOL |
| [4] | FALSE | | BOOL |

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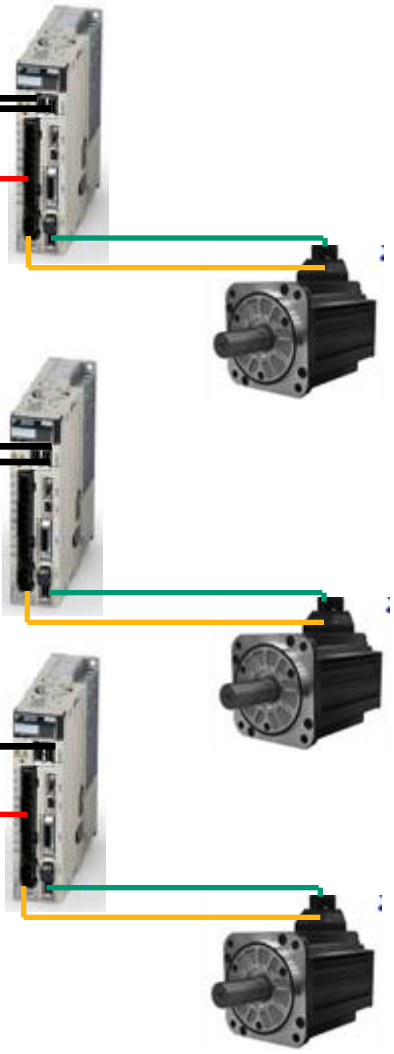
# One Axis Mode (1)

```
Axis1.AxisNum := UINT#1;
Axis2.AxisNum := UINT#2;
Axis3.AxisNum := UINT#3;
Axis4.AxisNum := UINT#4;
```



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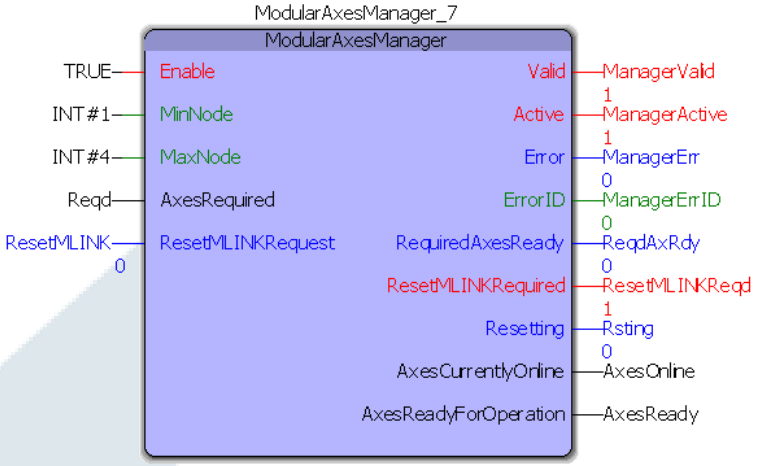
# One Axis Mode (1)

1) Unhook Axes 1 and 2. (Estop)




| Variable | Value | Defa... | Type |
|---|---|---|---|
| Reqd | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | FALSE | | BOOL |
| [3] | TRUE | | BOOL |
| [4] | FALSE | | BOOL |

| Variable | Value | D... | Type |
|---|---|---|---|
| AxesOnline | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | FALSE | | BOOL |
| [3] | FALSE | | BOOL |
| [4] | FALSE | | BOOL |

| Variable | Value | Defa... | Type |
|---|---|---|---|
| AxesReady | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | FALSE | | BOOL |
| [2] | FALSE | | BOOL |
| [3] | FALSE | | BOOL |
| [4] | FALSE | | BOOL |

2) Update AxesRequired

3) Reset MECHATROLINK

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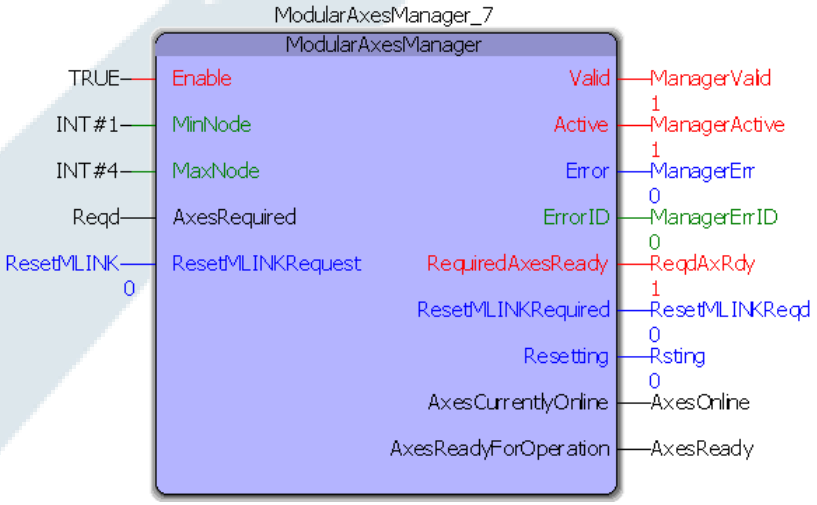
# One Axis Mode (1)




| Variable | Value | Defa... | Type |
|---|---|---|---|
| Reqd | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | FALSE | | BOOL |
| [3] | FALSE | | BOOL |
| [4] | FALSE | | BOOL |

| Variable | Value | D... | Type |
|---|---|---|---|
| AxesOnline | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | FALSE | | BOOL |
| [3] | FALSE | | BOOL |
| [4] | FALSE | | BOOL |

| Variable | Value | Defa... | Type |
|---|---|---|---|
| AxesReady | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | FALSE | | BOOL |
| [3] | FALSE | | BOOL |
| [4] | FALSE | | BOOL |

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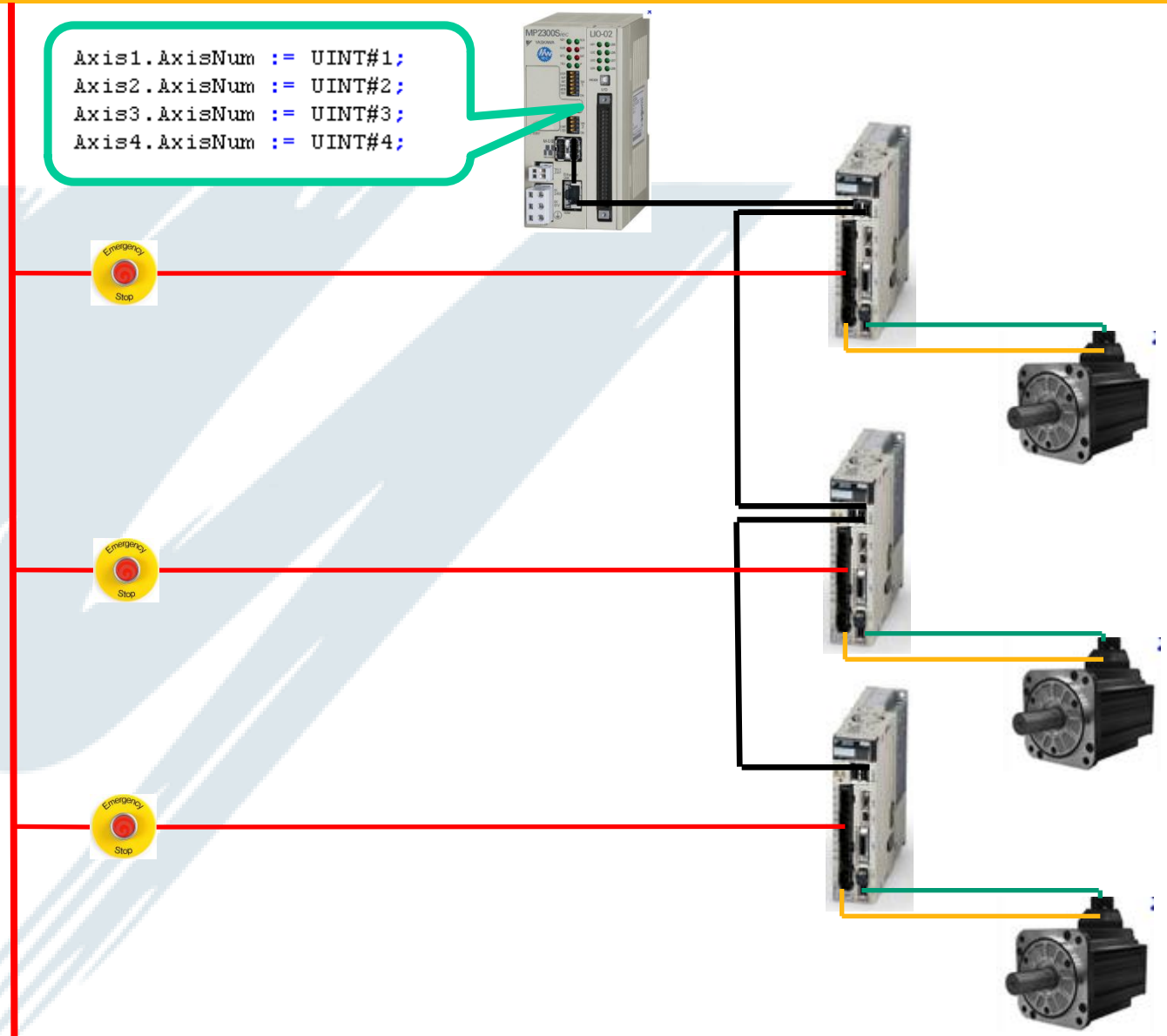
# Three Axes Mode (1, 2, 3)

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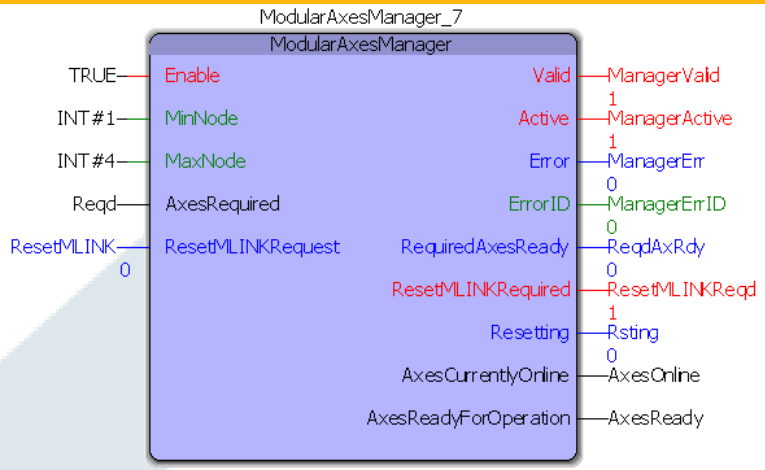
# Back to all three axes (1, 2, 3)

1) Plug in power to axes 2 and 3




| Variable | Value | Defa... | Type |
|---|---|---|---|
| Reqd | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | FALSE | | BOOL |
| [3] | FALSE | | BOOL |
| [4] | FALSE | | BOOL |

| Variable | Value | D... | Type |
|---|---|---|---|
| AxesOnline | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | TRUE | | BOOL |
| [3] | TRUE | | BOOL |
| [4] | FALSE | | BOOL |

| Variable | Value | Defa... | Type |
|---|---|---|---|
| AxesReady | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | FALSE | | BOOL |
| [2] | FALSE | | BOOL |
| [3] | FALSE | | BOOL |
| [4] | FALSE | | BOOL |

2) Update AxesRequired

3) Reset MECHATROLINK

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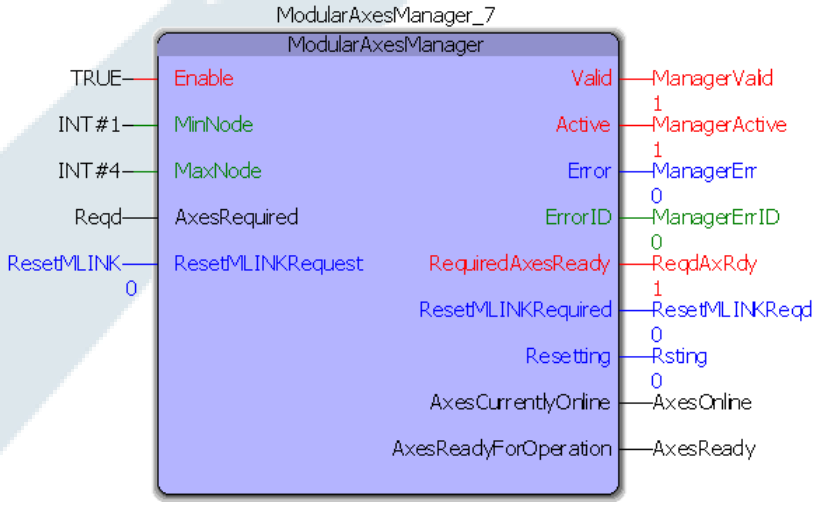


| Variable | Value | Defa... | Type |
|---|---|---|---|
| Reqd | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | TRUE | | BOOL |
| [3] | TRUE | | BOOL |
| [4] | FALSE | | BOOL |

| Variable | Value | D... | Type |
|---|---|---|---|
| AxesOnline | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | TRUE | | BOOL |
| [3] | TRUE | | BOOL |
| [4] | FALSE | | BOOL |

| Variable | Value | Defa... | Type |
|---|---|---|---|
| AxesReady | | | ModularAxesArray |
| [0] | FALSE | | BOOL |
| [1] | TRUE | | BOOL |
| [2] | TRUE | | BOOL |
| [3] | TRUE | | BOOL |
| [4] | FALSE | | BOOL |

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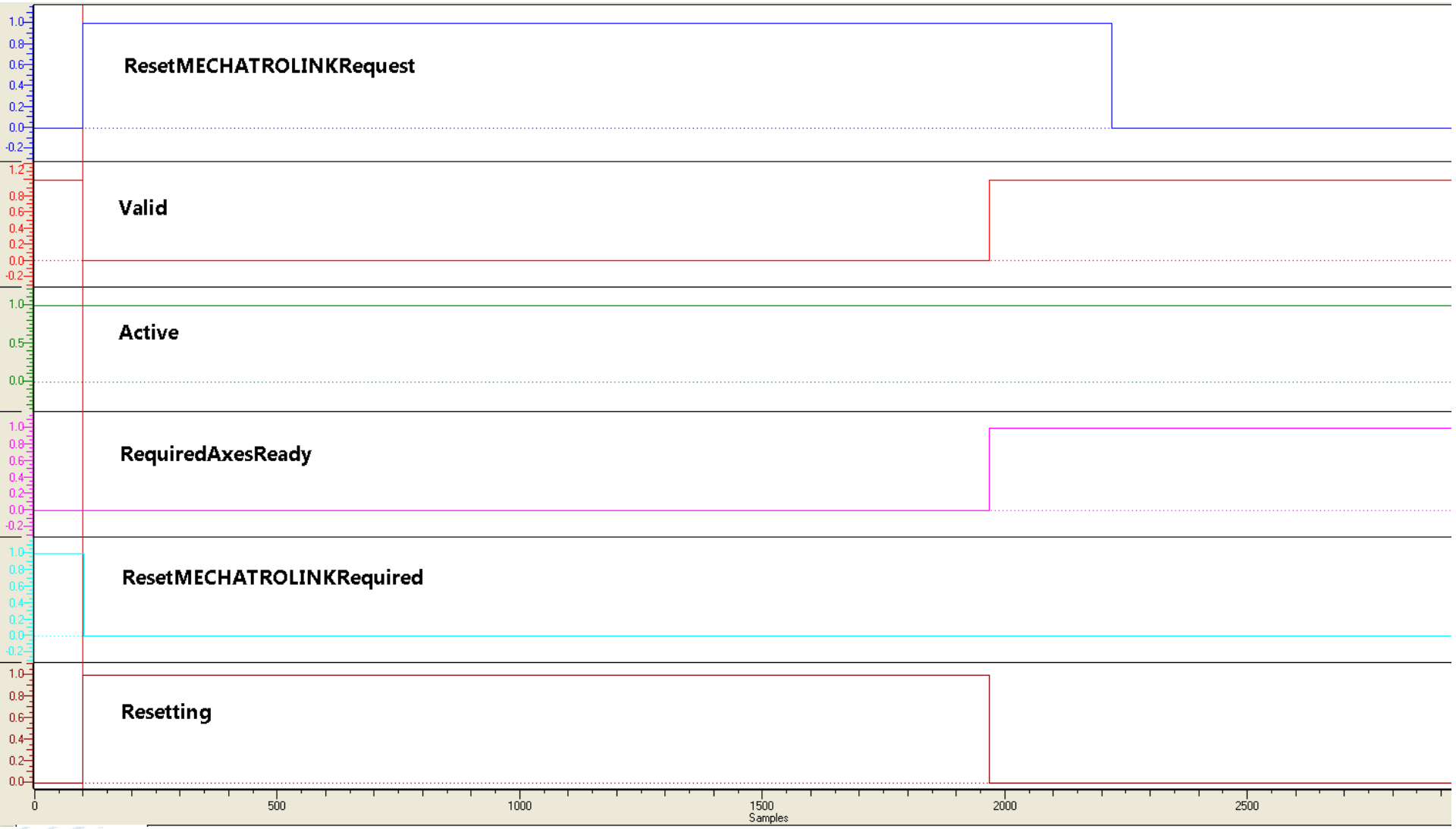


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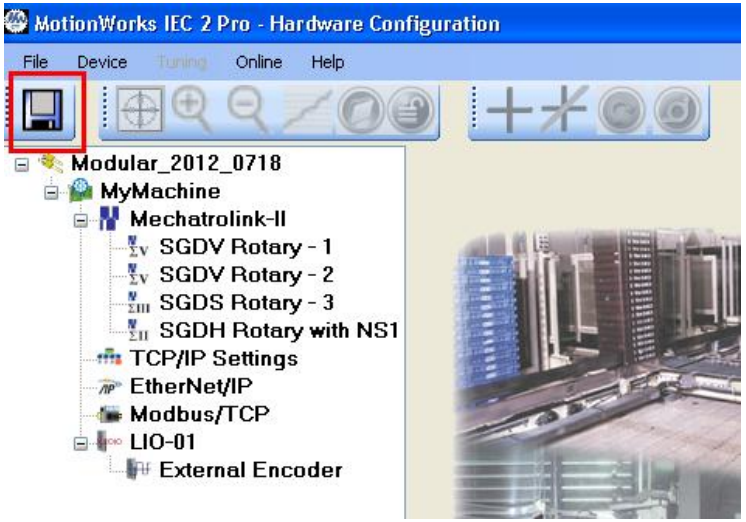
# Drive Parameter Control from MotionWorks IEC

STEP 1:
Save latest drive parameters using the Hardware configuration




STEP 2:
Verify on the project archive page (on web page)

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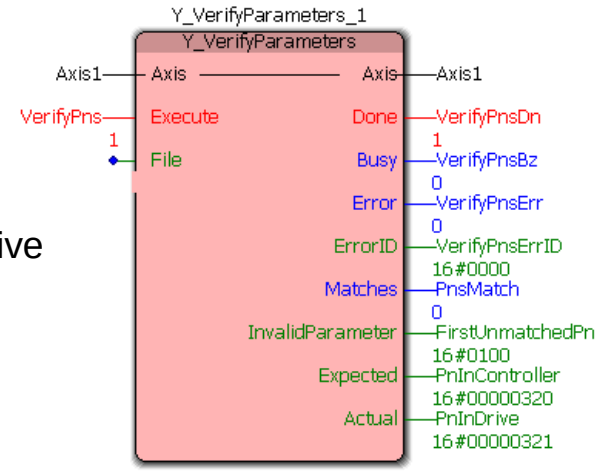
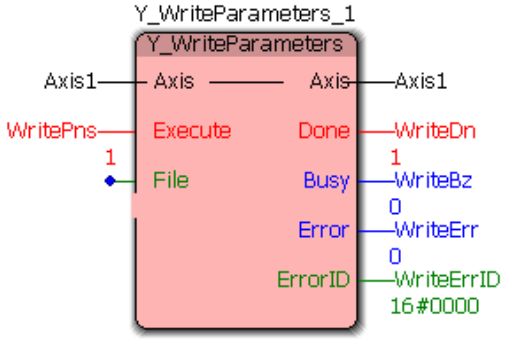
# Drive Parameter Control from MotionWorks IEC

STEP 3: Y_VerifyParameters
Compare Drive Parameter on controller with drive parameter on drive




STEP 4: Y_WriteParameters
Write drive parameters stored on controller to the drive
Used when drives are replaced in the field

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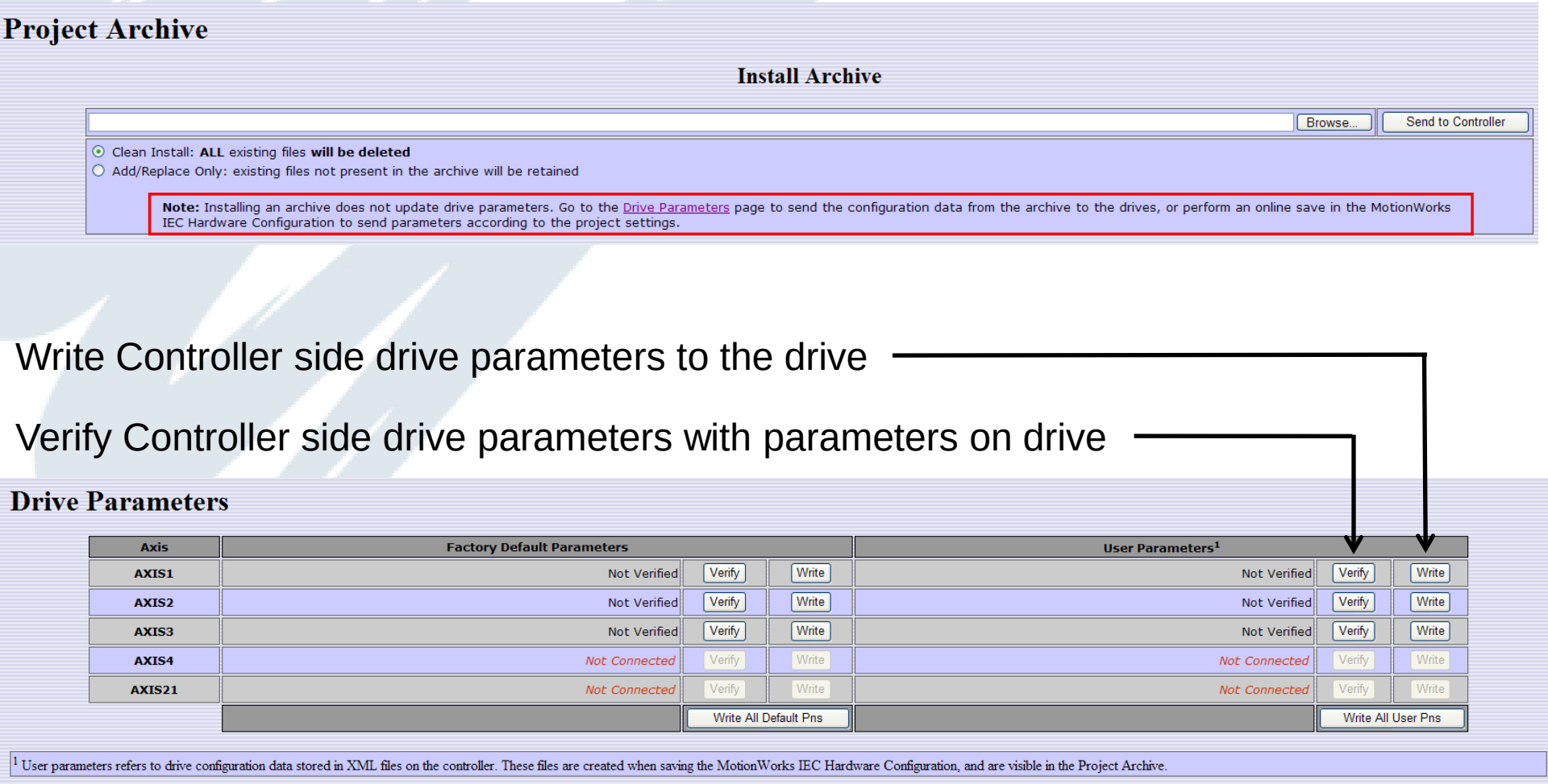
# Drive Parameter Control from the Web Server

New feature on web server Project Archive page for Controller Firmware 2.2

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# Thank you

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