Controller RotaryKnife
Chapter 9 Camming Example - Rotary knife
Controller Fault Handler
Power-Up Handler

Tasks

MainTask
- **UN01_ExampleMachine**
  - **MainRoutine**
  - **CM01_OperationLocal**
    Control Module: OperationLocal This routine monitors Unit level inputs to generate command triggers to initiate state transition commands used by the current active mode Operation
  - **CM03_FaultHandler**
    Fault Handler This routine monitors unit level events, and it merges all reported events (Unit and EMs) into an active and historical queue.
  - **CM04_SafetyRelay**
  - **SR20_Initialize**
    Initialize Data Performs initialization of any local parameters of this Equipment Module and contained Control Modules that require it
  - **UP00_Procedure**
  - **UP01_PackML**
  - **UP02_StateComplete**
- **EM_Axis01_W**
  - **MainRoutine**
  - **CM00_CalcWebDriveVelocity**
  - **CM00_Procedure**
  - **CM01_EMConditions**
  - **CM02_01_ServoAxisObject_W**
    This Control Module performs the state control for the slave axis; including Enable, Disable, Reset, Absolute Home, Stop, and Abort
  - **CM03_01_ServoAxisJog_W**
    Control Module Manual Jog Control This Control Module jogs the servo axis when the Unit is in Manual mode. This provides independent control of the servo axis.
  - **SR03_FaultHandler**
  - **SR20_Initialize**
    Initialize Data Performs initialization of any local parameters of this Equipment Module and contained Control Modules that require it
- **EM_Axis02_K**
  - **MainRoutine**
  - **CM00_Procedure**
  - **CM01_EMConditions**
  - **CM02_02_ServoAxisObject_K**
    This Control Module performs the state control for the slave axis; including Enable, Disable, Reset, Absolute Home, Stop, and Abort
  - **CM03_02_ServoAxisJog_K**
    Control Module Manual Jog Control This Control Module jogs the servo axis when the Unit is in Manual mode. This provides independent control of the servo axis.
  - **CM05_02_ServoAxisCam_K**
    This Control Module defines the Cam follower profile, and initiates the synchronization of this slave to the master
  - **SR03_FaultHandler**
  - **SR20_Initialize**
    Initialize Data Performs initialization of any local parameters of this Equipment Module and contained Control Modules that require it

PlotPosition
- **Main**
  - **MainRoutine**

Unscheduled

Motion Groups

Motion_Group
- **Axis_01_W**
- **Axis_02_K**

Ungrouped Axes

Add-On Instructions

Axis_ObjectAV
Virtual axis controls
- **Logic**
- **Prescan**

- **Axis_ObjectCD**
  Axis CIP Drive Object
  - **Logic**
  - **Prescan**
- **PackMLv3_StateModel**
  - **Logic**
  - **Prescan**

Data Types

- **User-Defined**
  - **EM_Faults**
    All the Fault bits related an Equipment
- **Strings**
  - **String_Short**
- **Add-On-Defined**
  - **Axis_ObjectAV**
    Virtual axis controls
  - **Axis_ObjectCD**
    Axis CIP Drive Object
  - **PackMLv3_StateModel**
- **Module-Defined**
  - **AB:1734_15SLOT:I:0**
  - **AB:1734_15SLOT:O:0**
  - **AB:1734_1SLOT:I:0**
  - **AB:1734_1SLOT:O:0**
  - **AB:1734_2SLOT:I:0**
  - **AB:1734_2SLOT:O:0**
  - **AB:1734_8CFG:C:0**
  - **AB:1734_DI8:C:0**
  - **AB:1734_DOB8:C:0**
  - **AB:1734_IE8:C:0**
  - **AB:1734_IE8:I:0**
  - **AB:1734_OE4:C:0**
  - **AB:1734_OE4:I:0**
  - **AB:1734_OE4:O:0**
  - **AB:1756_DI:C:0**
  - **AB:1756_DI:I:0**
  - **AB:1769_HSC1_Range:C:0**
  - **AB:1794_AEN_2SLOT:I:0**
  - **AB:1794_AEN_2SLOT:O:0**
  - **AB:1794_DO16:C:0**
  - **AB:1794_IB16:C:0**
  - **AB:440R_ENETR_42:I:0**
  - **AB:Embedded_AnalogIO1:C:0**
  - **AB:Embedded_AnalogIO1:I:0**
  - **AB:Embedded_AnalogIO1:O:0**
  - **AB:Embedded_DiscreteIO1:C:0**
  - **AB:Embedded_DiscreteIO1:I:0**
  - **AB:Embedded_DiscreteIO1:O:0**
  - **AB:Embedded_HSC1:C:0**
  - **AB:Embedded_HSC1:I:0**
  - **AB:Embedded_HSC1:O:0**
  - **AB:Embedded_HSC1_STRUCT_OUT1:O:0**
  - **AB:Motion_Diagnostics:S:1**

Trends

- **Positions**

I/O Configuration

- **1756 Backplane, 1756-A10**
  - **[5] 1756-L71 RotaryKnife**
  - **[7] 1756-EN2TR en2tr**

- **Ethernet**
  - **1756-EN2TR en2tr**
  - **2097-V31PR0-LM Axis_K_Servo**
  - **2198-H008-ERS Axis_W_Servo**

//
COMPANY: Rockwell Automation
FUNCTION: Local Input Summary
AUTHOR: Rockwell Automation
DATE CREATED: March 2011

Version Comments:

//

0 NOP

CLEAR FAULTS CONDITIONS

The Unit Conditions Set Here Are Used to Clear Faults and Initiate a State Transition of the Current Mode Operation Procedure from the Aborted State:
1) To the Clearing State, If the Clearing State is Enabled
2) To the Stopped State, If the Clearing State is Disabled

1 Inp_Hardwired_Clear — Wrk_ClearRequest

Clear pushbutton
HMI_I_Clear
<CLEAR_PB>

RESET CONDITIONS

The Unit Condition Set Here Is Used to Initate the Start Warning Cycle That Results in
a State Transition of the Current Mode Operation Procedure from the Stopped State:
1) To the Resetting State, If the Resetting State is Enabled
2) To the Idle State, If the Resetting State is Disabled

2 Inp_Hardwired_Reset — Wrk_ResetRequest

Reset push button
HMI_I_Reset
<RESET_PB>

START CONDITIONS

The Unit Condition Set Here is Used to
1) If the Idle State is Enabled, Initiate a State Transition of the Current Mode Operation Procedure:
a) From the Idle State to the Starting State, If the Starting State Is Enabled
b) From the Idle State to the Execute State, If the Starting State Is Disabled

2) If the Idle State is Disabled, Initiate the Start Warning Cycle That Results in
a State Transition of the Current Mode Operation Procedure from the Stopped State:
a) To the Resetting State, If the Resetting State Is Enabled
b) To the Starting State, If the Resetting State is Disabled and the Starting State Is Enabled
c) To the Execute State, If Bothe the Resetting and Starting States Are Disabled

3 Inp_Hardwired_Start — Wrk_StartRequest

Start push button
HMI_I_Start
<START_PB>

***** Changed polarity of Inp_Hardwired_Stop to match it being a N.C. contact

STOP CONDITIONS

The Unit Condition Set Here is Used to Initaite a State Transition of the Current Mode Operation Procedure to the:
1) Stopping State, If the Stopping State Is Enabled
2) Stopped State, If the Stopping State Is Disabled

From Any of the Following States:
Resetting, Idle, Starting, Execute, Holding, Held, UnHolding, Suspending, Suspended, UnSuspending, Completing

4

Inp_Hardwired_Stop — Wrk_StopRequest

Stop push button
HMI_I_Stop
<STOP_PB>

Use of the Holding state for the current mode is enabled
UN01_MachineStateModel.Sts_HoldingEnabled

UN01_MachineFault_Minor

ABORT CONDITIONS

The Unit Condition Set Here is Used to Initaite a State Transition of the Current Mode Operation Procedure to the:
1) Aborting State, If the Aborting State Is Enabled
2) Aborted State, If the Aborting State Is Disabled

From Any of the Following States:
Resetting, Idle, Starting, Execute, Holding, Held, UnHolding, Suspending, Suspended, UnSuspending, Completing, Stopped, Stopping, Clearing

5

UN01_MachineFaulted — Wrk_AbortRequest

HOLD CONDITIONS

The Unit Condition Set Here is Used to Initiate a State Transition of the Current Mode Operation Procedure from the Execute State to the:
1) Holding State, If the Holding State is Enabled
2) Held State, If the Holding State is Disabled

6

Inp_Hardwired_Hold — Wrk_HoldRequest

HMI_I_Hold

UN01_MachineFault_Minor

UN-HOLD CONDITIONS

The Unit Condition Set Here is Used to Initiate a State Transition of the Current Mode Operation Procedure from the Held State to the:
1) UnHolding State, If the UnHolding State is Enabled
2) Execute State, If the UnHolding State is Disabled

7

Inp_Hardwired_UnHold — Wrk_UnHoldRequest

HMI_I_UnHold

SUSPEND CONDITIONS

If any upstream or downstream material interlocks are not satisfied a suspend request will be made.

If a suspend request is made while the Machine is in the Execute State, Then a State Transition Is Initiated From the Execute State to the:
1) Suspending State, If the Suspending State Is Enabled
2) Suspended State, If the Suspending State Is Disabled

When ALL interlock conditions Are Satisfied, Then a State Transition Is Initiated From the Suspended State to the:
1) UnSuspending State, If the UnSuspending State Is Enabled
2) Execute State, If the UnSuspending State Is Disabled

8

Inp_UpstreamMaterialInterlock

Inp_DownstreamMaterialInterlock

Wrk_SuspendRequest

COMPLETE CONDITION

The Unit Condition Set Here is Used to Indicate That the Unit Has Produced the Desired Quantity of Good Product.
It is Used for Processes That Run Desired Batch or Job Quantities And Automatically Stop to Conserve Materials.
Such Processes Take Advantage of the Completing And Complete States of the PackML Model.

This Unit Condition is Generated By Comparing the Quantity of Good Product Counted or Calculated By the Program
(In this Example, the Information from the Performance Tracking AOI is Used to Calculate Good Product *),
to the Batch Count Setpoint for the Current Recipe.

The Condition Initiates a State Complete Transition from the Execute State to the:
1) Completing State, If the Completing State Is Enabled
2) Complete State, If the Completing State Is Disabled

* The Production Counting Data Used By the Performance Tracking AOI Must Be Generated By the Program and Input Into the AOI.
It May Be Preferred to Use the Production Counting Data Directly for Setting this Condition.

9

GE
Grtr Than or Eql (A>=B)
Source A Sts_GoodProducts
0
Source B Inp_BatchCountSetpoint
0

Wrk_CompleteRequest

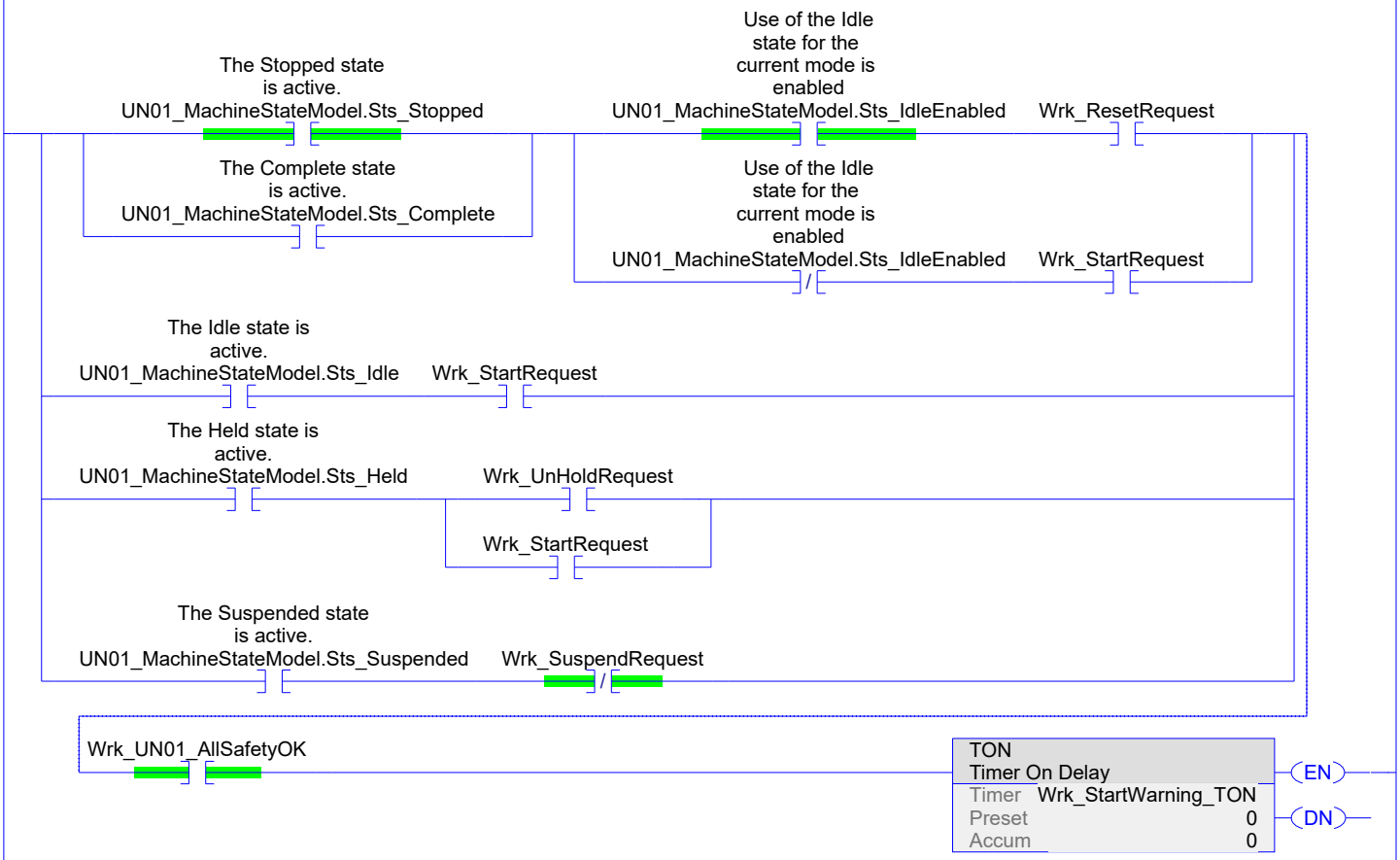
***** Wrk_StartWarning_TON preset changed to zero

UNIT START LOGIC

This Unit Start Logic is Used to Provide a Warning Cycle Time Before Motion Occurs on the Machine.
This Warning Cycle Should be Used Upon Initiating All State Transition Commands That Ultimately Result in Transition to the Execute State,
And May be Used to Provide Audible And/Or Visual Notification to the Operator That Motion Will Occur Upon Completion.

In case of Start warning buzzer included in the logic increase the timer preset to 1 or 2 sec

10



11

(End)

//
COMPANY: Rockwell Automation
FUNCTION: Fault Handler / Alarm Annunciation
AUTHOR: Rockwell Automation
DATE CREATED: March 2011

Version Comments:

//

0 [NOP]

COMMUNICATION FAULTS

1 Inp_NetworksOK] [— ( ) Wrk_UN01_NetworkCommunicationOK

ESTOP COLLECTION

2 Inp_ESTOPButton1] [Inp_ESTOPButton2] [Inp_ESTOPButton3] [— ( ) Wrk_UN01_EstopOK

GUARD DOOR COLLECTION

3 Inp_GuardDoor1] [Inp_GuardDoor2] [Inp_GuardDoor3] [— ( ) Wrk_UN01_GuardsOK

LIGHT CURTAIN COLLECTION

4 Inp_LightCurtain1] [Inp_LightCurtain2] [Inp_LightCurtain3] [— ( ) Wrk_UN01_LightCurtainsOK

ALL SAFETY INPUTS OK

5 Wrk_UN01_EstopOK] [Wrk_UN01_GuardsOK] [Wrk_UN01_LightCurtainsOK] [— ( ) Wrk_UN01_AllSafetyOK

MACHINE MAJOR FAULTS

ADD MAJOR MACHINE FAULTS THAT SHOULD RESULT IN AN ABORT REQUEST TO THE MACHINE

----

6 Wrk_UN01_NetworkCommunicationOK]/[— MOVE Move Source 1 Dest HMI_O_MajorFaultMessage 0

7 Inp_MachineJam_Infeed] [— MOVE Move Source 2 Dest HMI_O_MajorFaultMessage 0

8 Inp_MachineJam_Outfeed] [— MOVE Move Source 3 Dest HMI_O_MajorFaultMessage 0

GENERAL UNIT MAJOR FAULT - WILL RESULT IN MACHINE ABORT REQUEST. ADD MACHINE SPECIFIC MAJOR FAULT CONDITIONS AS RUNG IN CONDITIONS

9

NE
Not Equal
Source A HMI_O_MajorFaultMessage[0]
Source B 0

UN01_MachineFault_Major

MACHINE MINOR FAULTS

ADD MAJOR MACHINE FAULTS THAT SHOULD RESULT IN A HOLD (IF STATE IS ENABLED) OR STOP (IF HOLD STATE IS DISABLED) REQUEST TO THE MACHINE

10

Inp_LowLubrication

MOVE
Move
Source 1
Dest HMI_O_MinorFaultMessage[0]

Inp_LowLubrication (/)

EQ
Equal
Source A HMI_O_MinorFaultMessage[0]
Source B 1

MOVE
Move
Source 0
Dest HMI_O_MinorFaultMessage[0]

11

Inp_LowMagazine

MOVE
Move
Source 2
Dest HMI_O_MinorFaultMessage[0]

Inp_LowMagazine (/)

EQ
Equal
Source A HMI_O_MinorFaultMessage[0]
Source B 2

MOVE
Move
Source 0
Dest HMI_O_MinorFaultMessage[0]

GENERAL UNIT MINOR FAULT - WILL RESULT IN MACHINE HOLD REQUEST IF HOLDING STATE IS ENABLED OR STOP IF HOLDING STATE IS NOT ENABLED.

12

NE
Not Equal
Source A HMI_O_MinorFaultMessage[0]
Source B 0

UN01_MachineFault_Minor


```
----------------------------------------------------

CLEAR MACHINE FAULT INDICATORS

MAJOR FAULTS RESULT IN THE MACHINE STATE GOING TO ABORTING.  MAJOR MACHINE FAULTS SHOULD BE RESET IN THE CLEARING
STATE

MINOR FAULTS RESULT IN EITHER A HOLD CONDITION OR STOP CONDITION.  ONCE CONDITIONS INITIATING MINOR FAULTS ARE
SATISIFED THE FAULTS WILL CLEAR AUTOMATICALLY.  MINOR FAULT INDICATORS WILL ALSO BE CLEARED IN THE CLEARING STATE.


----------------------------------------------------
```

13

The Clearing state is active.
UN01_MachineStateModel.Sts_Clearing

MOVE
Move
Source 0
Dest HMI_O_MinorFaultMessage 0

MOVE
Move
Source 0
Dest HMI_O_MajorFaultMessage 0

14

GENERAL UNIT FAULT SUMMARY

All the Fault bits related an Equipment Any EM major fault active	This Tag is used to enable states for each Equipment Module	
EM_Fault[0].EM_MajorFaultAct	EM_Selected.0	UN01_MachineFaulted
EM_Fault[1].EM_MajorFaultAct	EM_Selected.1	
EM_Fault[2].EM_MajorFaultAct	EM_Selected.2	
EM_Fault[3].EM_MajorFaultAct	EM_Selected.3	
EM_Fault[4].EM_MajorFaultAct	EM_Selected.4	
EM_Fault[5].EM_MajorFaultAct	EM_Selected.5	
EM_Fault[6].EM_MajorFaultAct	EM_Selected.6	
EM_Fault[7].EM_MajorFaultAct	EM_Selected.7	
EM_Fault[8].EM_MajorFaultAct	EM_Selected.8	
EM_Fault[9].EM_MajorFaultAct	EM_Selected.9	
EM_Fault[10].EM_MajorFaultAct	EM_Selected.10	
EM_Fault[11].EM_MajorFaultAct	EM_Selected.11	
All the Fault bits related an Equipment Any EM major fault	All the Fault bits related an Equipment Any EM major fault	

active
EM_Fault[12].EM_MajorFaultAct

active
EM_Fault[12].EM_MajorFaultAct

All the Fault bits related an Equipment Any EM major fault active
EM_Fault[13].EM_MajorFaultAct

This Tag is used to enable states for each Equipment Module
EM_Selected.13

All the Fault bits related an Equipment Any EM major fault active
EM_Fault[14].EM_MajorFaultAct

This Tag is used to enable states for each Equipment Module
EM_Selected.14

All the Fault bits related an Equipment Any EM major fault active
EM_Fault[15].EM_MajorFaultAct

This Tag is used to enable states for each Equipment Module
EM_Selected.14

All the Fault bits related an Equipment Any EM major fault active
EM_Fault[16].EM_MajorFaultAct

This Tag is used to enable states for each Equipment Module
EM_Selected.16

All the Fault bits related an Equipment Any EM major fault active
EM_Fault[17].EM_MajorFaultAct

This Tag is used to enable states for each Equipment Module
EM_Selected.17

All the Fault bits related an Equipment Any EM major fault active
EM_Fault[18].EM_MajorFaultAct

This Tag is used to enable states for each Equipment Module
EM_Selected.18

All the Fault bits related an Equipment Any EM major fault active
EM_Fault[19].EM_MajorFaultAct

This Tag is used to enable states for each Equipment Module
EM_Selected.19

All the Fault bits related an Equipment Any EM major fault active
EM_Fault[20].EM_MajorFaultAct

This Tag is used to enable states for each Equipment Module
EM_Selected.20

All the Fault bits related an Equipment Any EM major fault active
EM_Fault[21].EM_MajorFaultAct

This Tag is used to enable states for each Equipment Module
EM_Selected.21

All the Fault bits related an Equipment Any EM major fault active
EM_Fault[22].EM_MajorFaultAct

This Tag is used to enable states for each Equipment Module
EM_Selected.22

All the Fault bits related an Equipment Any EM major fault active
EM_Fault[23].EM_MajorFaultAct

This Tag is used to enable states for each Equipment Module
EM_Selected.23

All the Fault bits related an Equipment Any EM major fault active
EM_Fault[24].EM_MajorFaultAct

This Tag is used to enable states for each Equipment Module
EM_Selected.24

All the Fault bits

This Tag is used to

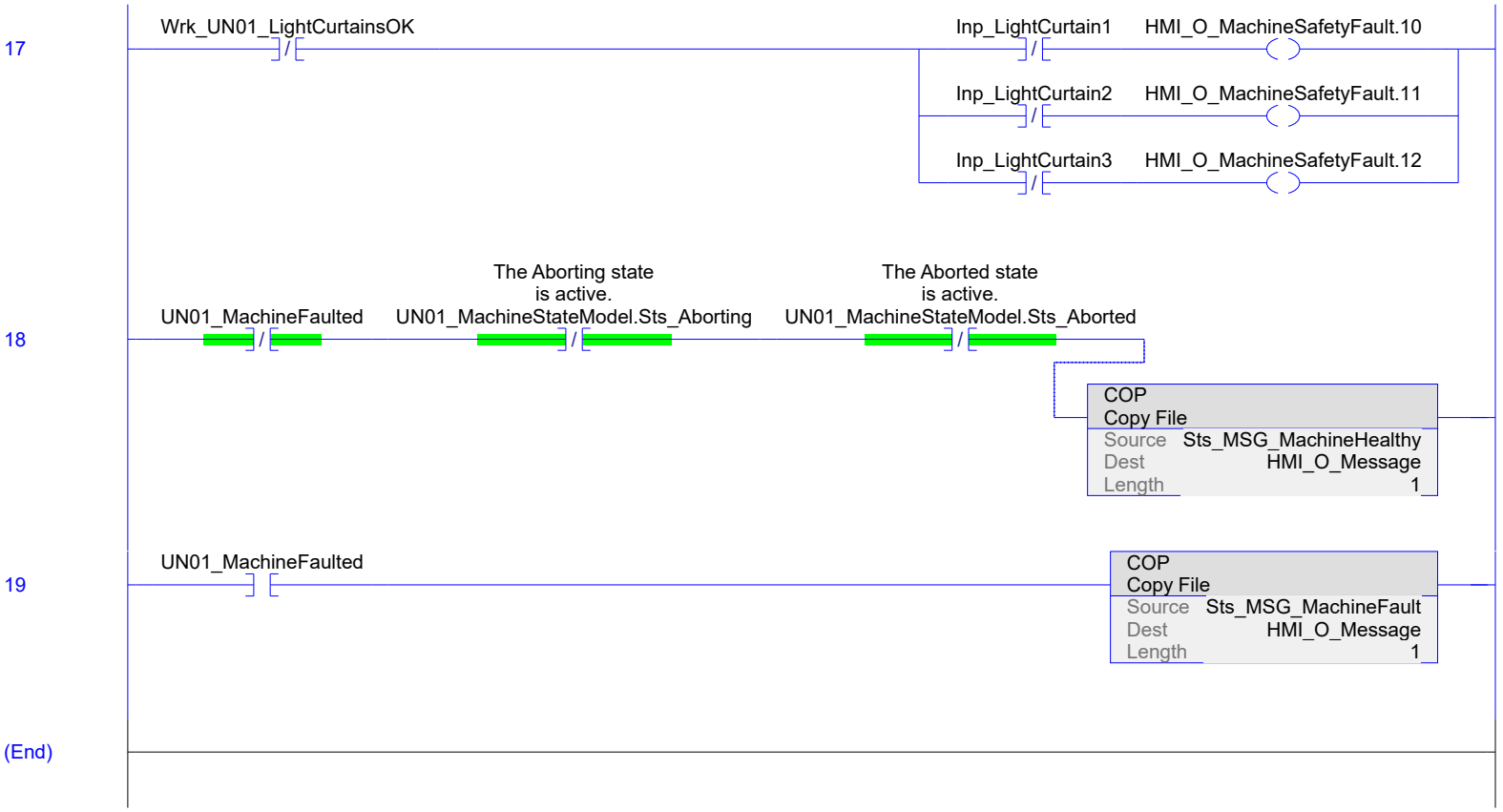
	related an Equipment Any EM major fault active EM_Fault[25].EM_MajorFaultAct	enable states for each Equipment Module EM_Selected.25
	All the Fault bits related an Equipment Any EM major fault active EM_Fault[26].EM_MajorFaultAct	This Tag is used to enable states for each Equipment Module EM_Selected.26
	All the Fault bits related an Equipment Any EM major fault active EM_Fault[27].EM_MajorFaultAct	This Tag is used to enable states for each Equipment Module EM_Selected.27
	All the Fault bits related an Equipment Any EM major fault active EM_Fault[28].EM_MajorFaultAct	This Tag is used to enable states for each Equipment Module EM_Selected.28
	All the Fault bits related an Equipment Any EM major fault active EM_Fault[29].EM_MajorFaultAct	This Tag is used to enable states for each Equipment Module EM_Selected.29
	All the Fault bits related an Equipment Any EM major fault active EM_Fault[30].EM_MajorFaultAct	This Tag is used to enable states for each Equipment Module EM_Selected.30
	All the Fault bits related an Equipment Any EM major fault active EM_Fault[31].EM_MajorFaultAct	This Tag is used to enable states for each Equipment Module EM_Selected.31
	Wrk_UN01_AllSafetyOK	
	UN01_MachineFault_Major	

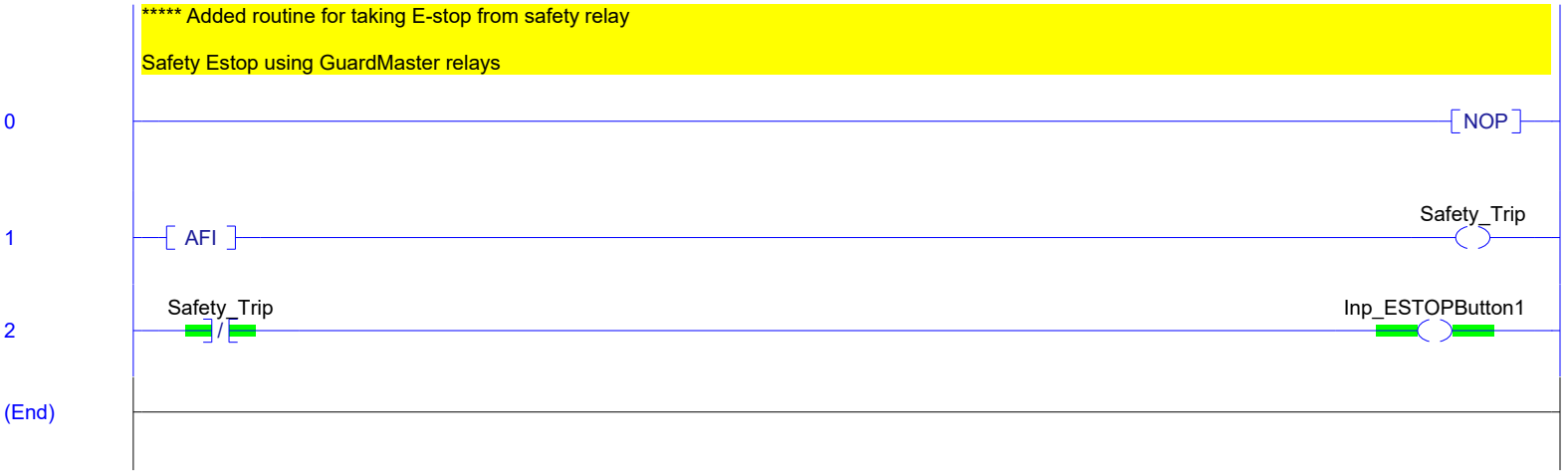
15

Wrk_UN01_EstopOK	Inp_ESTOPButton1	HMI_O_MachineSafetyFault.0
	Inp_ESTOPButton2	HMI_O_MachineSafetyFault.1
	Inp_ESTOPButton3	HMI_O_MachineSafetyFault.2

16

Wrk_UN01_GuardsOK	Inp_GuardDoor1	HMI_O_MachineSafetyFault.5
	Inp_GuardDoor2	HMI_O_MachineSafetyFault.6
	Inp_GuardDoor3	HMI_O_MachineSafetyFault.7





PackML implementation for a 2-axis machine using the H-Bridge gantry.

The bridge Y axis is here used as the X axis. Movement is Y and Z axes. Each axis is treated as a separate EM

Started with the Rockwell Power Programming BasicV4_2.acd sample project.

0 NOP

//
COMPANY: Rockwell Automation
FUNCTION: Main Routine
AUTHOR: Rockwell Automation/Kelvin Erickson
DATE CREATED: March 2011

Version Comments:

//

Initialize Data

Performs initialization of any local parameters of this Equipment Module and contained Control Modules that require it

1 S:FS — JSR Jump To Subroutine, Routine Name SR20_Initialize

Control Module: OperationLocal
This routine monitors Unit level inputs to generate command triggers to initiate state transition commands used by the current active mode Operation

2 JSR Jump To Subroutine, Routine Name CM01_OperationLocal

Fault Handler
This routine monitors unit level events, and it merges all reported events (Unit and EMs) into an active and historical queue.

3 JSR Jump To Subroutine, Routine Name CM03_FaultHandler

***** Added routine

4 JSR Jump To Subroutine, Routine Name CM04_SafetyRelay

5 JSR Jump To Subroutine, Routine Name UP02_StateComplete

6

JSR
Jump To Subroutine
Routine Name UP01_PackML

***** Added Routine

7

JSR
Jump To Subroutine
Routine Name UP00_Procedure

***** Following rungs added for C-More Panel

Indicator lamps for PackML state

8

NOP

9

Lamp_Flash_Tmr.DN

TON
Timer On Delay
Timer Lamp_Flash_Tmr
Preset 1000
Accum 180
EN
DN

10

CMP
Compare
Expression Lamp_Flash_Tmr.ACC>500

Lamp_Flash

11

The Idle state is active.
UN01_MachineStateModel.Sts_Idle

LA_IDLE

The Resetting state is active.
UN01_MachineStateModel.Sts_Resetting Lamp_Flash

12

The Execute state is active.
UN01_MachineStateModel.Sts_Execute

LA_EXECUTE

The Starting state is active.
UN01_MachineStateModel.Sts_Starting Lamp_Flash

13

The Aborted state is active.
UN01_MachineStateModel.Sts_Aborted

LA_ABORTED

The Aborting state is active.
UN01_MachineStateModel.Sts_Aborting Lamp_Flash

14

The Stopped state is active.
UN01_MachineStateModel.Sts_Stopped

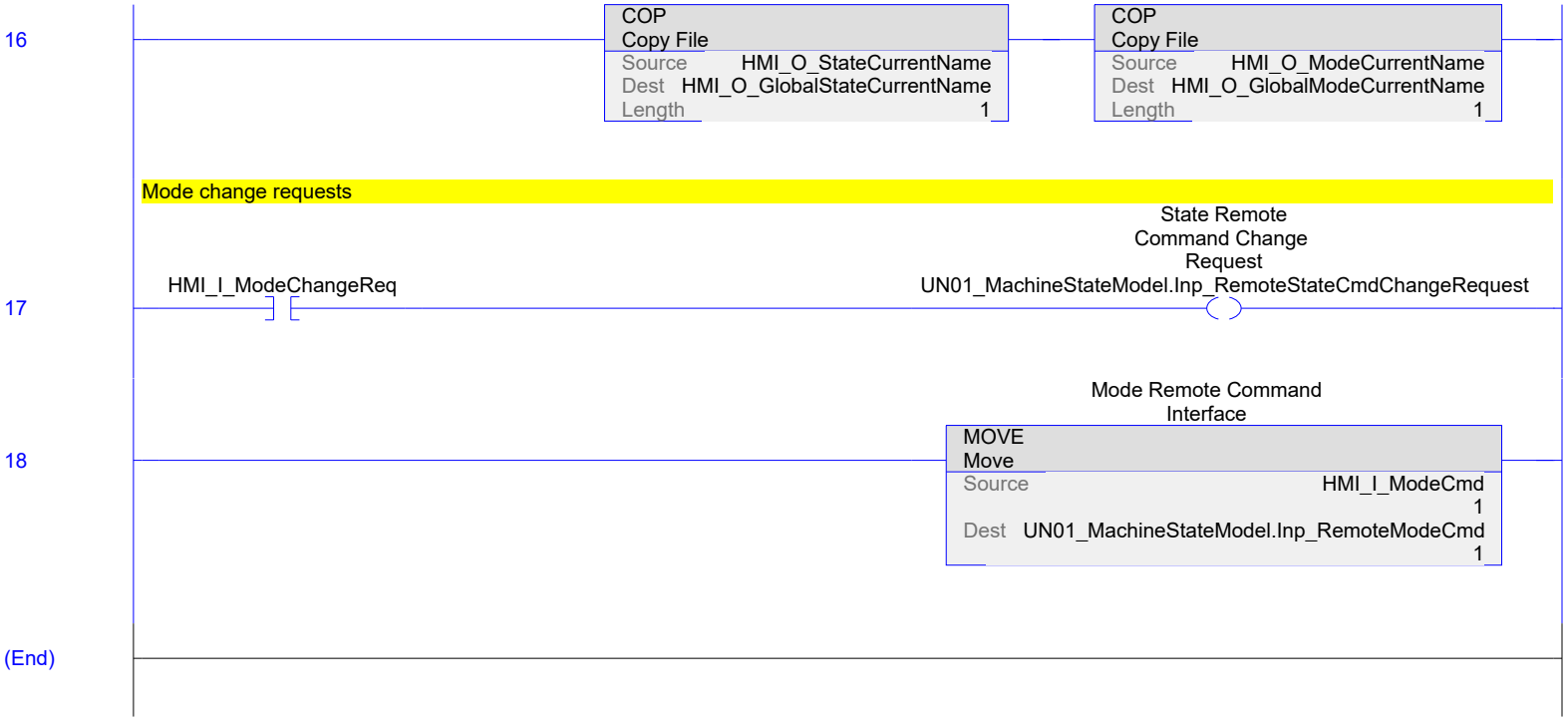
LA_STOPPED

The Stopping state is active.
UN01_MachineStateModel.Sts_Stopping Lamp_Flash

15

The Clearing state is active.
UN01_MachineStateModel.Sts_Clearing Lamp_Flash

LA_CLEARING



//
COMPANY: Rockwell Automation
FUNCTION: Machine Data Initialization
AUTHOR: Rockwell Automation
DATE CREATED: March 2011

Version Comments:

//

0 [NOP]

This Tag is used to enable states for each Equipment Module

1 MOVE Move
Source 0
Dest EM_Selected
2#0000_0000_0000_0000_0000_0000_0000_0110

INITIALIZE HMI MACHINE SPEED LIMITS
-RAMP INCREMENT
-MACHINE SPEED MINIMUM
-MACHINE SPEED MAXIMUM

2 MOVE Move
Source 5
Dest HMI_O_MachineSpeed_RMP
5

MOVE Move
Source 0
Dest HMI_O_MachineSpeed_LIMlo
0

MOVE Move
Source 100
Dest HMI_O_MachineSpeed_LIMhi
100

***** Axis numbers for unit procedure

3 MOVE Move
Source 1
Dest EM_Axis_Y_Num
1

MOVE Move
Source 2
Dest EM_Axis_Z_Num
2

***** Initialize value used to check for EM state complete bits

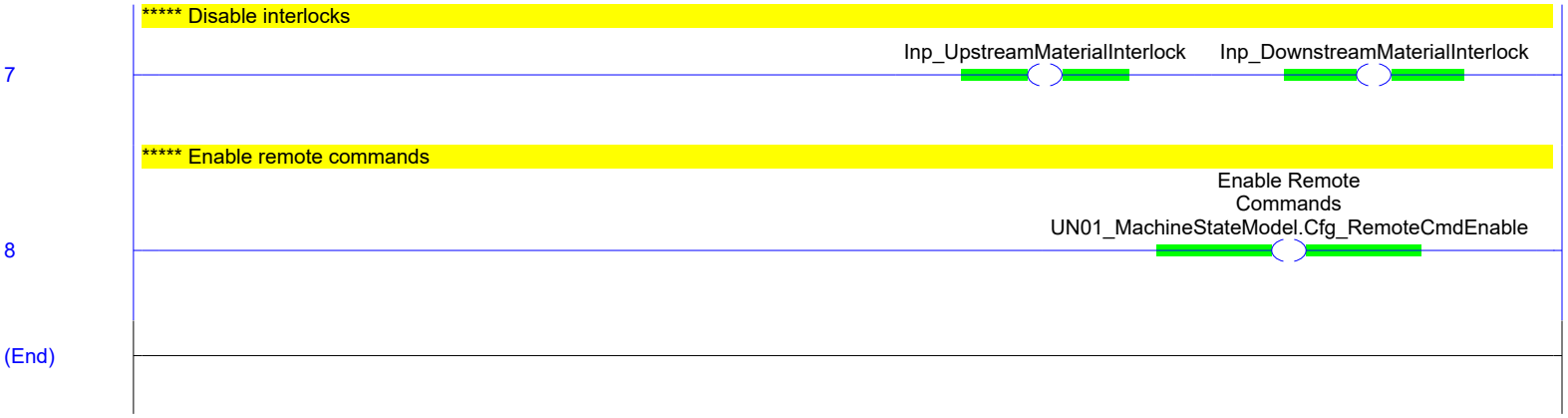
4 MOVE Move
Source -1
Dest Wrk_Compare_All_EM_Enabled
-1

***** Make networks okay and all unused safetys enabled

5 Inp_NetworksOK ( ) Inp_ESTOPButton2 ( ) Inp_ESTOPButton3 ( ) Inp_GuardDoor1 ( ) Inp_GuardDoor2 ( ) Inp_GuardDoor3 ( ) Inp_LightCurtain1 ( ) Inp_LightCurtain2 ( ) Inp_LightCurtain3 ( )

***** Disable unused stop

6 Inp_Hardwired_Stop ( )



***** Entire routine added

EXECUTE State motion steps/commands for overall operation

++++++++++++++++++++++++++++++++

0

NOP

First scan or resetting - clear all steps

1

s:fs

The Resetting state is active.
UP_Resetting
<UN01_MachineStateModel.Sts_Resetting>

MOVE
Move
Source 0
Dest UP_Exec_Step 1

Indication that all steps reset.
Used by RESETTING state and initial execute step

2

EQ
Equal
Source A UP_Exec_Step 1
Source B 0

UP_Exec_NoStepsActive

EXECUTE -

If no steps active, start in step 1

3

The Execute state is active.
UP_Execute
<UN01_MachineStateModel.Sts_Execute>

Current Mode ID

EQ
Equal
Source A UN01_MachineStateModel.Sts_ModeCurrent 1
Source B c_Produce 1

UP_Exec_NoStepsActive

MOVE
Move
Source 1
Dest UP_Exec_Step 1

No unit steps. Only EM procedures

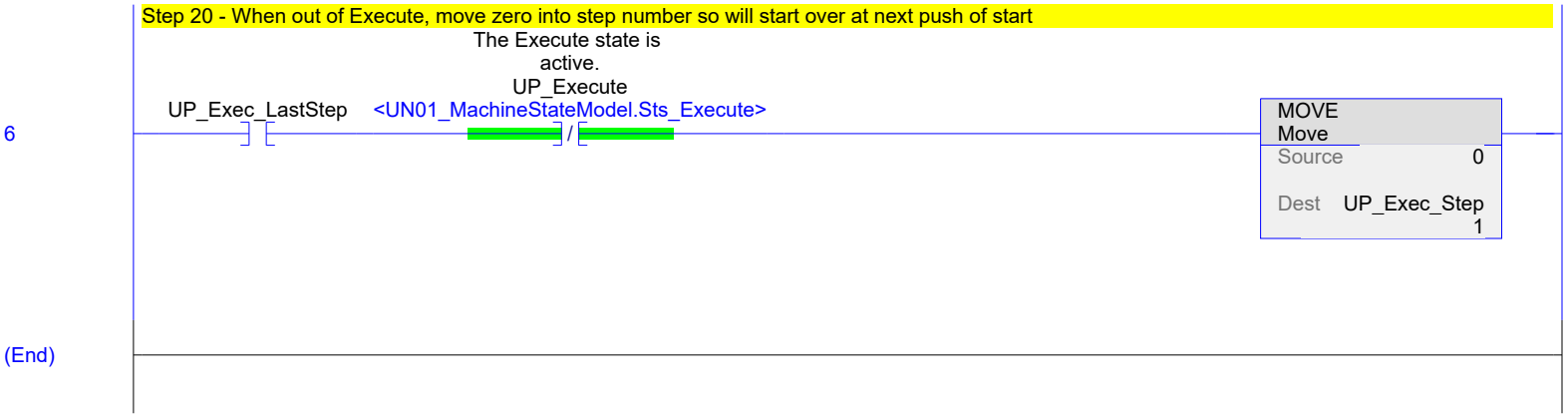
4

NOP

5

EQ
Equal
Source A UP_Exec_Step 1
Source B 20

UP_Exec_LastStep


Step 20 - When out of Execute, move zero into step number so will start over at next push of start
The Execute state is active.
UP_Execute
UP_Exec_LastStep
<UN01_MachineStateModel.Sts_Execute>
6
MOVE
Move
Source 0
Dest UP_Exec_Step 1
(End)

//
COMPANY: Rockwell Automation
FUNCTION: PACK ML State and Mode Management
AUTHOR: Rockwell Automation
DATE CREATED: March 2011

Version Comments:

//

0 NOP

STATE COMMAND
CLEAR

This Command is Triggered by the Unit Condition Indicating a Clear Faults Request Has Been Received.
The Command Initiates in the PackML AOI for the Current Mode Operation Procedure to Transition From the Aborted State to:
1) The Clearing State, If Clearing is Enabled
2) The Stopped State, If Clearing is Disabled

1
The Aborted state is active.
UN01_MachineStateModel.Sts_Aborted
Wrk_ClearRequest
Request that current state transition to Clearing
UN01_MachineStateModel.Cmd_Clear

STATE COMMAND
RESET

This Command is Triggered by the Unit Condition Indicating the Start Warning Cycle Has Completed.
The Command Initiates in the PackML AOI for the Current Mode Operation Procedure to Transition From the Stopped or Complete State to:
1) The Resetting State, If Resetting Is Enabled
2) The Idle State, If Resetting is Disabled and Idle Is Enabled
3) The Starting State, If Resetting and Idle Are Disabled and Starting is Enabled
4) The Execute State, If Resetting, Idle, and Starting Are Disabled

2
The Stopped state is active.
UN01_MachineStateModel.Sts_Stopped
The Complete state is active.
UN01_MachineStateModel.Sts_Complete
Wrk_StartWarningExpired
Request that current state transition to Resetting
UN01_MachineStateModel.Cmd_Reset

STATE COMMAND
START

This Command is Triggered by the Unit Condition Indicating the Start Warning Cycle Has Completed.
The Command Initiates in the PackML AOI for the Current Mode Operation Procedure to Transition From the Idle State to:
1) The Starting State, If Starting is Enabled
2) The Execute State, If Starting is Disabled

3
The Idle state is active.
UN01_MachineStateModel.Sts_Idle
Wrk_StartWarningExpired
Request that current state transition to Starting
UN01_MachineStateModel.Cmd_Start

STATE COMMAND
HOLD

4
The Execute state is active.
UN01_MachineStateModel.Sts_Execute
Wrk_HoldRequest
Request that current state transition to Holding
UN01_MachineStateModel.Cmd_Hold

STATE COMMAND
UNHOLD

5

The Held state is active.
UN01_MachineStateModel.Sts_Held

Wrk_StartWarningExpired

Request that current state transition to Execute
UN01_MachineStateModel.Cmd_UnHold

STATE COMMAND
SUSPEND

6

The Execute state is active.
UN01_MachineStateModel.Sts_Execute

Wrk_SuspendRequest

Request that current state transition to Suspending
UN01_MachineStateModel.Cmd_Suspend

STATE COMMAND
UN-SUSPEND

7

The Suspended state is active.
UN01_MachineStateModel.Sts_Suspended

Wrk_StartWarningExpired

Request that current state transition to Execute
UN01_MachineStateModel.Cmd_UnSuspend

STATE COMMAND
STOP

This Command is Triggered by the Unit Condition Indicating Any Stop Condition Is Present.
The Command Initiates in the PackML AOI for the Current Mode Operation Procedure to Transition From the Following List of States (Resetting, Idle, Starting, Execute, Holding, Held, UnHolding, Suspending, Suspended, UnSuspending, Completing, Or Complete), When Each Is Enabled, To:
1) The Stopping State, If Stopping is Enabled
2) The Stopped State, If Stopping is Disabled

8

The Aborting state is active.
UN01_MachineStateModel.Sts_Aborting

The Aborted state is active.
UN01_MachineStateModel.Sts_Aborted

The Stopping state is active.
UN01_MachineStateModel.Sts_Stopping

The Stopped state is active.
UN01_MachineStateModel.Sts_Stopped

The Clearing state is active.
UN01_MachineStateModel.Sts_Clearing

Wrk_StopRequest

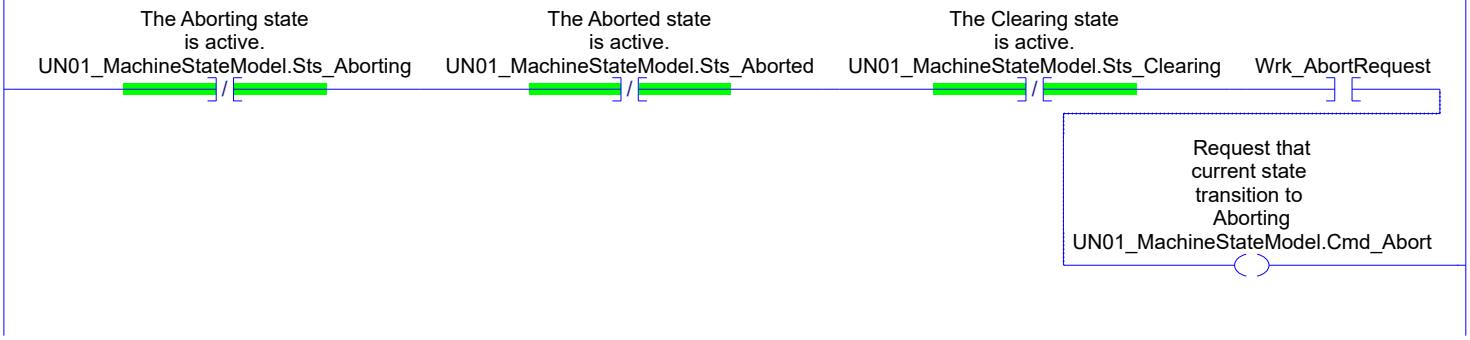
Request that current state transition to Stopping
UN01_MachineStateModel.Cmd_Stop

STATE COMMAND
ABORT

This Command is Triggered by the Unit Condition Indicating Any Fault Condition Is Present.
The Command Initiates in the PackML AOI for the Current Mode Operation Procedure to Transition From the Following List of States (Resetting, Idle, Starting, Execute, Holding, Held, UnHolding, Suspending, Suspended, UnSuspending, Completing, Complete, Stopping, Stopped, Or Clearing),
When Each Is Enabled, To:
1) The Aborting State, If Aborting is Enabled
2) The Aborted State, If Aborting is Disabled

HINT: MAKE SURE THAT ALL EQUIPMENT MODULES REPORT BACK A FAULTRESET_DONE AT SOME POINT IN TIME (EVEN IF FAULTS ARE PRESENT) TO AVOID THAT THE STATEMACHINE GETS STUCK IN CLEARING

9



MODE AND STATE MANAGEMENT
PackML V3.0 Model (Defined By ISA-TR88.00.02)

This Add-On Instruction (AOI) Manages the State Transitions and Configurations for Up To 32 Unit Modes,
and the Transitions Between Modes. Only One Mode May Be Active on the Unit At Any Given Time.
Each Mode is Executed as an Unique Operation Procedure in a Program Folder in the Controller Organizer.

Use the Configuration Tag Arrays (Prefixes Cfg_) to Setup the Modes and States for the Specific Machine Needs.
Each Element of the Array Corresponds to the Configuration for the Mode, Defined by Number.
Bits 1-17 of Each Element Corresponds to an Associated State of the Mode.

-- Cfg_ModeTransitions - DINT[32] - Use to Define Which State(s) Must Be Currently Active to Allow Transition From the Current Mode
to the Mode Requested by Cmd_Mode. Current and Requested Modes Both Need Same State Bit Set.
A Mode Transition May Be Requested at Any Time. If the Transition is NOT Allowed,
Then the Sts_ModeChangeNotAllowed Will Be Set To Indicate to the Operator.
Transition Occurs by Changing Current Mode to Requested Mode, But Maintains Current State in New Mode.

-- Cfg_DisableStates - DINT[32] - Use to Define for Each Mode Which State(s) Are Not Necessary to Perform the Associated Operation Procedure.
The Stopped, Aborted, and Execute States May NOT Be Disabled. When Online:
1) Disabling the Held State Will Automatically Disable the Holding and UnHolding States
2) Disabling the Suspended State Will Automatically Disable the Suspending and UnSuspending States
3) Disabling the Complete State Will Automatically Disable the Completing State.

-- Cfg_ModeNames - String_Short[32] - Use to Associate a Name to Each Mode. A Name is Often More Desirable For Operation and Design,
So the Name is Used to Display the Modes on the HMI Application. The String_Short Data Type is Defined for 12 Characters.
This Minimizes the Memory Impact of the Strings, But This May Be Expanded If Required for Your Application

Command Parameters (Prefixes Cmd_) Initiate Either Mode or State Transitions. Cmd_Mode Requests the Mode Using an Integer Value.
The State Transition Commands Are Boolean Parameters to Initiate State Transitions. The Cmd_StateComplete Bit is Used Transition
All Acting and Dual States Upon Completion of State Sequence. This Is REQUIRED for ALL Acting States, But Only Used for the
Dual State (Execute) If Complete Is Enabled.

Status Parameters (Prefixes Sts_) Indicate the Current State By Boolean Bit and String Name, the Enabled States for the Current Mode,
And the Current Mode by String Name. These Are Used By the Logic and HMI for Display and Decision-Making

PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
UN01_MachineStateModel.Cmd_StateComplete

10

PackMLv3_StateModel

PackMLv3_StateModel	UN01_MachineStateModel
Cfg_ModeTransitions	Cfg_ModeTransitions
Cfg_DisableStates	Cfg_DisableStates
Cfg_ModeNames	Cfg_ModeNames
Cmd_Mode	1
Cmd_Reset	0
Cmd_Start	0
Cmd_Stop	0
Cmd_Hold	0
Cmd_UnHold	0
Cmd_Suspend	0
Cmd_UnSuspend	0
Cmd_Abort	0
Cmd_Clear	0
Cmd_StateComplete	0
Sts_StateCurrentName	HMI_O_StateCurrentName
Sts_ModeCurrentName	HMI_O_ModeCurrentName

U

Sts_ModeChangeNotAllowed
Sts_Clearing
Sts_Stopped
Sts_Starting
Sts_Idle
Sts_Suspended
Sts_Execute
Sts_Stopping
Sts_Aborting
Sts_Aborted
Sts_Holding
Sts_Held
Sts_UnHolding
Sts_Suspending
Sts_UnSuspending
Sts_Resetting
Sts_Completing
Sts_Complete

(End)


```
////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
COMPANY:          Rockwell Automation
FUNCTION:         Procedural Routine - State Complete Verification for Equipment Modules
AUTHOR:           Rockwell Automation
DATE CREATED:     March 2011

Version Comments:

////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
```

0

NOP

1

Use of the Aborting state for the current mode is enabled
UN01_MachineStateModel.Sts_AbortingEnabled

The Aborting state is active.
UN01_MachineStateModel.Sts_Aborting

MEQ
Mask Equal
Source EM_Aborting_Done
2#0000_0000_0000_0000_0000_0000_0000_0000
Mask EM_Selected
2#0000_0000_0000_0000_0000_0000_0000_0110
Compare Wrk_Compare_All_EM_Enabled
-1

PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
UN01_MachineStateModel.Cmd_StateComplete
L

2

Use of the Clearing state for the current mode is enabled
UN01_MachineStateModel.Sts_ClearingEnabled

The Clearing state is active.
UN01_MachineStateModel.Sts_Clearing

MEQ
Mask Equal
Source EM_Clearing_Done
2#0000_0000_0000_0000_0000_0000_0000_0000
Mask EM_Selected
2#0000_0000_0000_0000_0000_0000_0000_0110
Compare Wrk_Compare_All_EM_Enabled
-1

PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
UN01_MachineStateModel.Cmd_StateComplete
L

3

Use of the Holding state for the current mode is enabled
UN01_MachineStateModel.Sts_HoldingEnabled

The Holding state is active.
UN01_MachineStateModel.Sts_Holding

MEQ
Mask Equal
Source EM_Holding_Done
2#0000_0000_0000_0000_0000_0000_0000_0000
Mask EM_Selected
2#0000_0000_0000_0000_0000_0000_0000_0110
Compare Wrk_Compare_All_EM_Enabled
-1

PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
UN01_MachineStateModel.Cmd_StateComplete
(L)

***** Also make sure unit procedure initialized

4

Use of the Resetting state for the current mode is enabled
UN01_MachineStateModel.Sts_ResettingEnabled

The Resetting state is active.
UN01_MachineStateModel.Sts_Resetting

MEQ
Mask Equal
Source EM_Resetting_Done
2#0000_0000_0000_0000_0000_0000_0000_0000
Mask EM_Selected
2#0000_0000_0000_0000_0000_0000_0000_0110
Compare Wrk_Compare_All_EM_Enabled
-1

UP_Exec_NoStepsActive

PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
UN01_MachineStateModel.Cmd_StateComplete
(L)

5

Use of the Starting state for the current mode is enabled
UN01_MachineStateModel.Sts_StartingEnabled

The Starting state is active.
UN01_MachineStateModel.Sts_Starting

MEQ
Mask Equal
Source EM_Starting_Done
2#0000_0000_0000_0000_0000_0000_0000_0000
Mask EM_Selected
2#0000_0000_0000_0000_0000_0000_0000_0110
Compare Wrk_Compare_All_EM_Enabled
-1

PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
UN01_MachineStateModel.Cmd_StateComplete
L

6

Use of the Stopping state for the current mode is enabled
UN01_MachineStateModel.Sts_StoppingEnabled

The Stopping state is active.
UN01_MachineStateModel.Sts_Stopping

MEQ
Mask Equal
Source EM_Stopping_Done
2#0000_0000_0000_0000_0000_0000_0000_0000
Mask EM_Selected
2#0000_0000_0000_0000_0000_0000_0000_0110
Compare Wrk_Compare_All_EM_Enabled
-1

PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
UN01_MachineStateModel.Cmd_StateComplete
L

7

Use of the UnHolding state for the current mode is enabled
UN01_MachineStateModel.Sts_UnHoldingEnabled

The Unholding state is active.
UN01_MachineStateModel.Sts_UnHolding

MEQ
Mask Equal
Source EM_UnHolding_Done
2#0000_0000_0000_0000_0000_0000_0000_0000
Mask EM_Selected
2#0000_0000_0000_0000_0000_0000_0000_0110
Compare Wrk_Compare_All_EM_Enabled
-1

PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
UN01_MachineStateModel.Cmd_StateComplete
L

8

Use of the Suspending state for the current mode is enabled
UN01_MachineStateModel.Sts_SuspendingEnabled

The Suspending state is active.
UN01_MachineStateModel.Sts_Suspending

MEQ
Mask Equal
Source EM_Suspending_Done
2#0000_0000_0000_0000_0000_0000_0000_0000
Mask EM_Selected
2#0000_0000_0000_0000_0000_0000_0000_0110
Compare Wrk_Compare_All_EM_Enabled
-1

PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
UN01_MachineStateModel.Cmd_StateComplete
(L)

9

Use of the UnSuspending state for the current mode is enabled
UN01_MachineStateModel.Sts_UnSuspendingEnabled

The UnSuspending state is active.
UN01_MachineStateModel.Sts_UnSuspending

MEQ
Mask Equal
Source EM_UnSuspending_Done
2#0000_0000_0000_0000_0000_0000_0000_0000
Mask EM_Selected
2#0000_0000_0000_0000_0000_0000_0000_0110
Compare Wrk_Compare_All_EM_Enabled
-1

PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
UN01_MachineStateModel.Cmd_StateComplete
(L)

***** Added state complete for COMPLETING state

10

Use of the Completing state for the current mode is enabled
UN01_MachineStateModel.Sts_CompletingEnabled

The Completing state is active.
UN01_MachineStateModel.Sts_Completing

MEQ
Mask Equal
Source EM_Completing_Done
0
Mask EM_Selected
2#0000_0000_0000_0000_0000_0000_0000_0110
Compare Wrk_Compare_All_EM_Enabled
-1

PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
UN01_MachineStateModel.Cmd_StateComplete
(L)

***** Added state complete for EXECUTE state. Complete when all EM's complete, or when unit procedure finished.

11

Use of the Execute state for the current mode is enabled
UN01_MachineStateModel.Sts_ExecuteEnabled

The Execute state is active.
UN01_MachineStateModel.Sts_Execute

PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
UN01_MachineStateModel.Cmd_StateComplete
(L)

MEQ
Mask Equal
Source EM_Execute_Done
0
Mask EM_Selected
2#0000_0000_0000_0000_0000_0000_0000_0110
Compare Wrk_Compare_All_EM_Enabled
-1

UP_Exec_LastStep

(End)


```
1  // Make sure web velocity is > zero. If not, set to 100 mm/sec
2  //
3  Web_Speed := HMI_I_MachineSpeed_CMD;
4  IF Web_Speed <= 0.0 THEN
5          Web_Speed := 100.0;
6  END_IF;
7  //
8  // Calculate servo velocity in rad/sec, taking into account radius of web drive and transmission from motor to ↵
   drive
9  //
10 Wrk_Web_Drive_Vel := (Web_Speed) / (Web_Drive_Pulley_Radius) * (Web_NTeeth_Drive / Web_NTeeth_Motor);
11
```


EXECUTE State motion steps/commands

++++++++++++++++++++++++++++++++

0

NOP

First scan or resetting or idle - clear all steps

1

s:fs

The Resetting state is active.
UP_Resetting
<UN01_MachineStateModel.Sts_Resetting>

The Idle state is active.
UP_Idle
<UN01_MachineStateModel.Sts_Idle>

MOVE
Move
Source 0
Dest Wrk_EMProcedureStep 2

Indication that all steps reset.
Used by RESETTING state and initial execute step

2

EQ
Equal
Source A Wrk_EMProcedureStep 2
Source B 0

EM Sequence no steps active
Wrk_EM_ProcedureNoStepsActive

EXECUTE -

If no steps active, start in step 1. Only in produce mode

3

Current Mode ID

EQ
Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent <UN01_MachineStateModel.Sts_ModeCurrent> 1
Source B c_Produce 1

The Execute state is active.
UP_Execute
<UN01_MachineStateModel.Sts_Execute>

EM Sequence no steps active
Wrk_EM_ProcedureNoStepsActive

MOVE
Move
Source 1
Dest Wrk_EMProcedureStep 2

****
** **
** Add your steps/blocks dealing with the axis motion here. **
** Remember the "Axis" tag for the motion blocks should be "Ref_ServoAxis" **
** Also, the "Motion Control" tag for the motion blocks should be a program tag, not a controller tag. **
** **
****

4

NOP

EM Procedure Step 1 - Start web drive

5

The Execute state is active.
UP_Execute
<UN01_MachineStateModel.Sts_Execute>

EQ
Equal
Source A Wrk_EMProcedureStep 2
Source B 1

JSR
Jump To Subroutine
Routine Name CM00_CalcWebDriveVelocity

MAJ
Motion Axis Jog
Axis Ref_ServoAxis_01 <Axis_01_W>
Motion Control Wrk_MI_Axis_Jog
Direction 0
Speed Wrk_Web_Drive_Vel 3.8961039
Speed Units Units per sec
Accel Rate 10
Accel Units % of Maximum
Decel Rate 10
Decel Units % of Maximum
Profile S-Curve
Accel Jerk 25
Decel Jerk 25
Jerk Units % of Time
Merge Disabled
Merge Speed Programmed
Lock Position 0
Lock Direction 0

EN
DN
ER
IP

Wrk_MI_Axis_Jog.IP

MOVE
Move
Source 2
Dest Wrk_EMProcedureStep 2

EM Procedure Step 2 - Wait for end of profile.

6

The Execute state is active.
UP_Execute
<UN01_MachineStateModel.Sts_Execute>

EQ
Equal
Source A Wrk_EMProcedureStep 2
Source B 2

Cam_EndOfProfile

MOVE
Move
Source 3
Dest Wrk_EMProcedureStep 2

EM Procedure Step 3 - Home axis position. Homed at end of profile so that no overflow on calculation of master lock position

7

The Execute state is active.
UP_Execute
<UN01_MachineStateModel.Sts_Execute>

EQ
Equal
Source A Wrk_EMProcedureStep 2
Source B 3

MAH
Motion Axis Home
Axis Ref_ServoAxis_01 <Axis_01_W>
Motion Control Wrk_MI_Axis_MAH
EN DN ER IP PC

Wrk_MI_Axis_MAH.PC

MOVE
Move
Source 4
Dest Wrk_EMProcedureStep 2

EM Procedure Step 4 - Wait for end of cam profile reset.

8

The Execute state is active.
UP_Execute
<UN01_MachineStateModel.Sts_Execute>

EQ
Equal
Source A Wrk_EMProcedureStep 2
Source B 4

Web_Homed

Cam_EndOfProfile /

MOVE
Move
Source 2
Dest Wrk_EMProcedureStep 2

Last step - when done, unlatch it, latch Execute_done Boolean for this axis.
Also, unlatch all .PC from motion instructions.

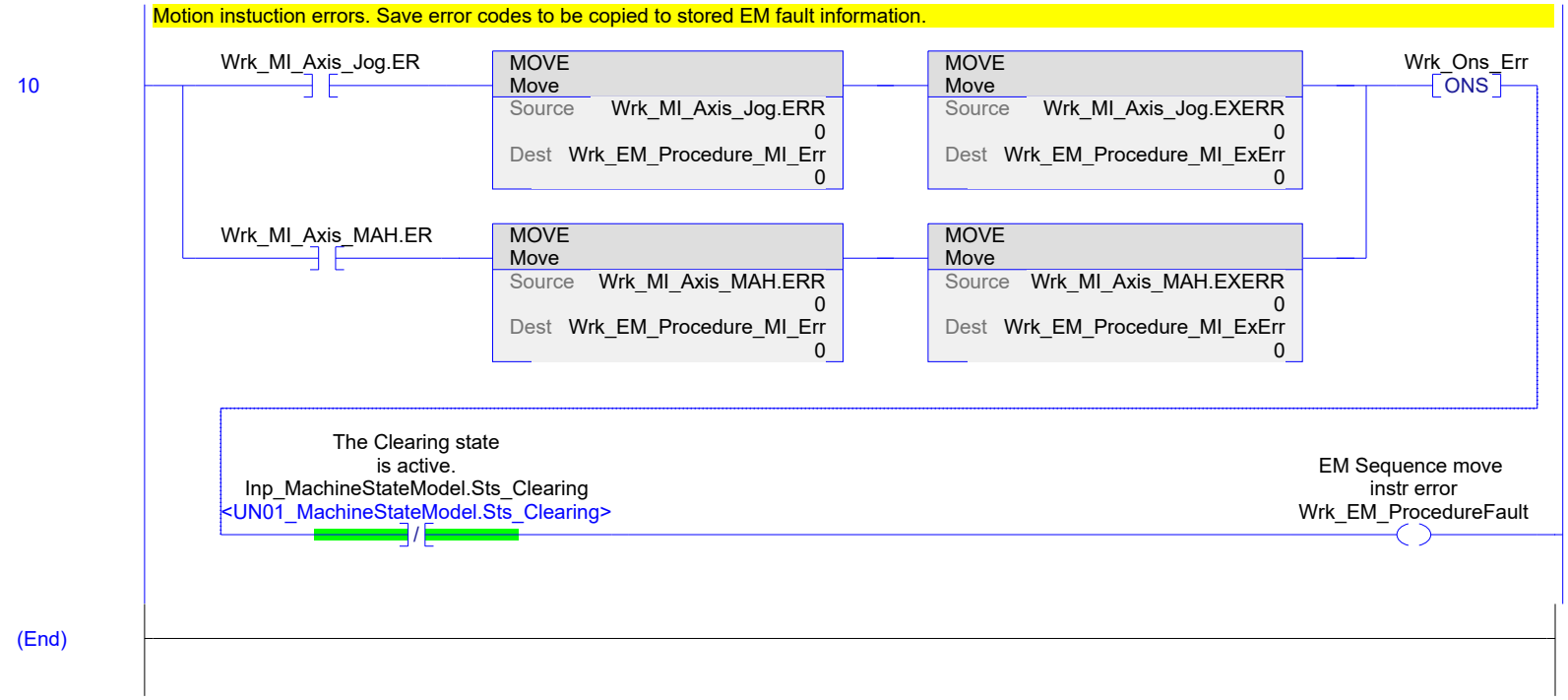
Axis_Move1 is a sample motion instruction tag.

9

The Execute state is active.
UP_Execute
<UN01_MachineStateModel.Sts_Execute>

EQ
Equal
Source A Wrk_EMProcedureStep 2
Source B 30

Wrk_EMProcedureDone



//

SECTION EQUIPMENT MODULE STATE COMPLETE HANDLING - SET DONE BITS

ALSO EM STATUS conditions that are a combination of axis conditions

//

0 NOP

***** Added additional conditions for Producing - EM procedure steps not active and homing finished if homing enabled

1

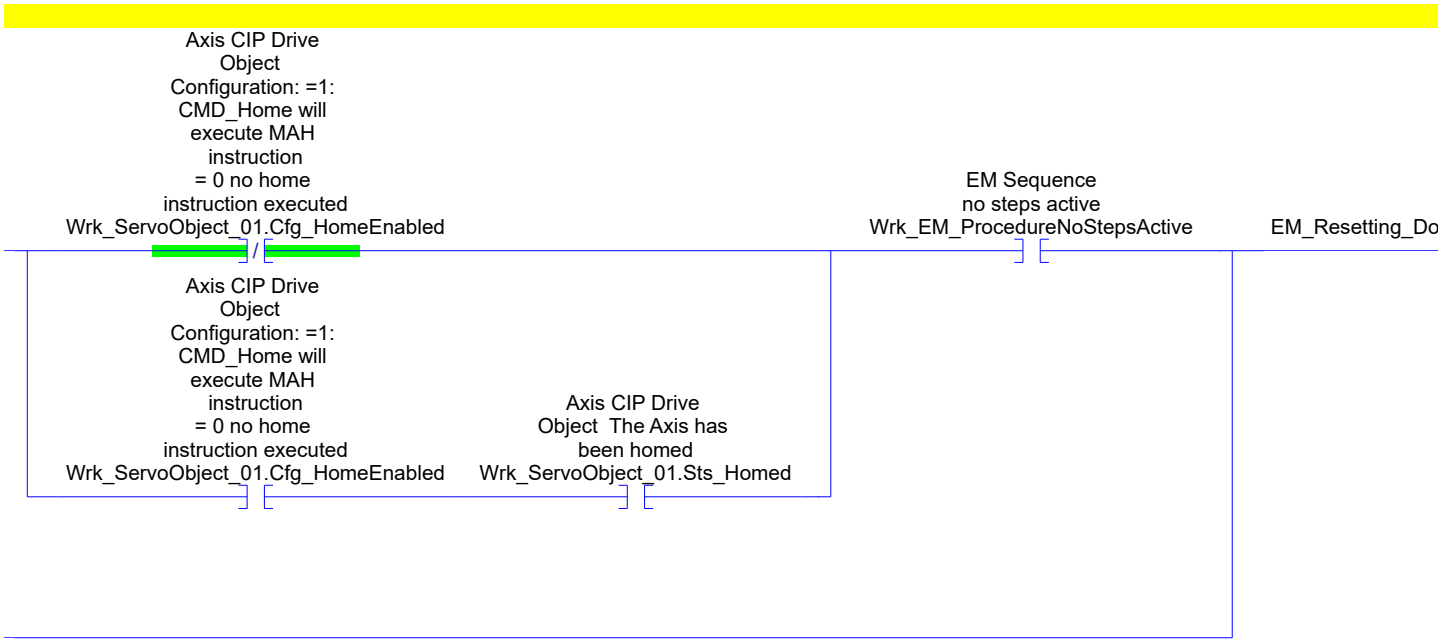
The Resetting state is active.
Inp_MachineStateModel.Sts_Resetting
<UN01_MachineStateModel.Sts_Resetting>

Current Mode ID
EQ
Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Produce
1

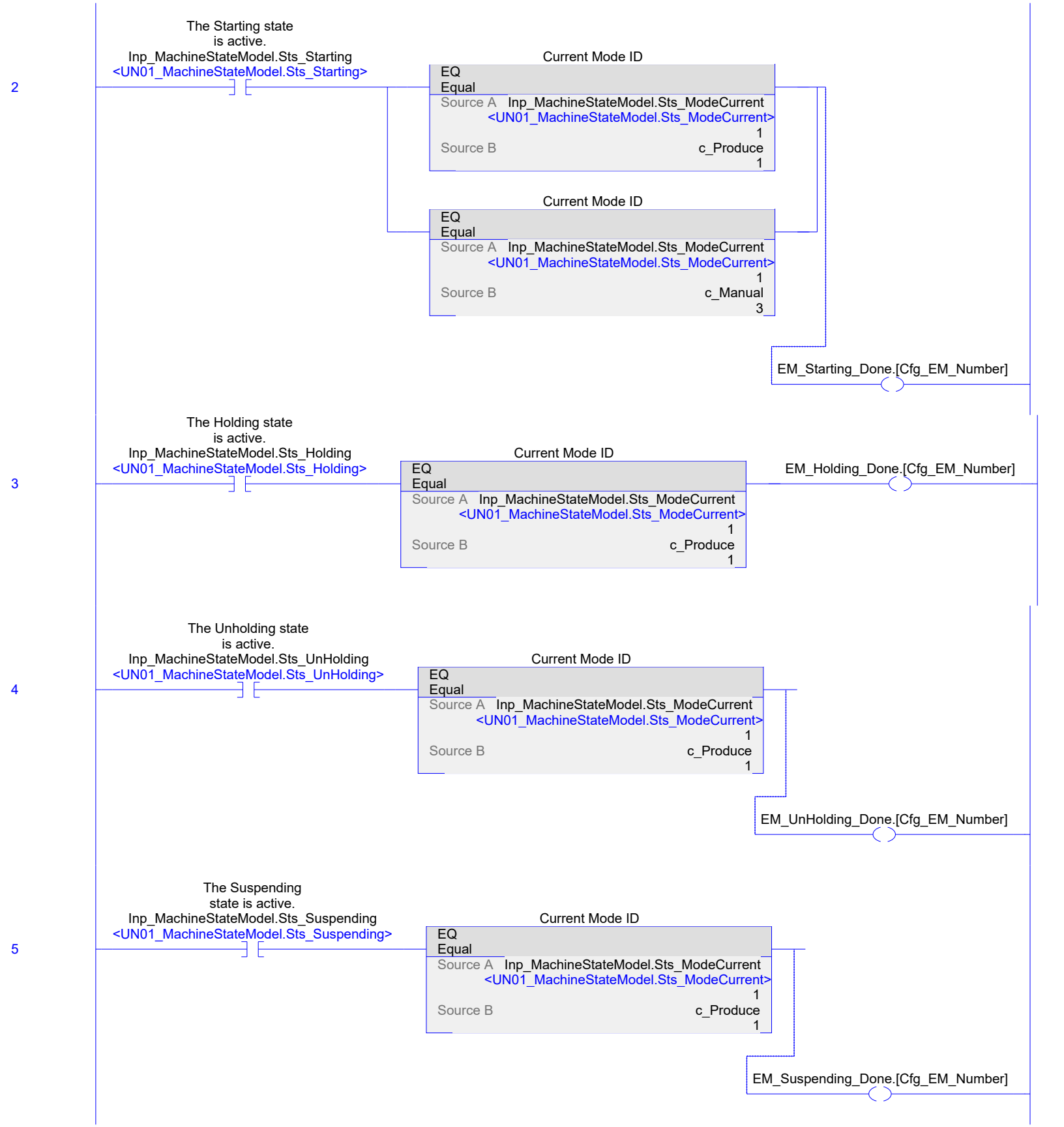
Axis CIP Drive Object Condition: Enable Done
Wrk_ServoObject_01.Sts_EnableDone

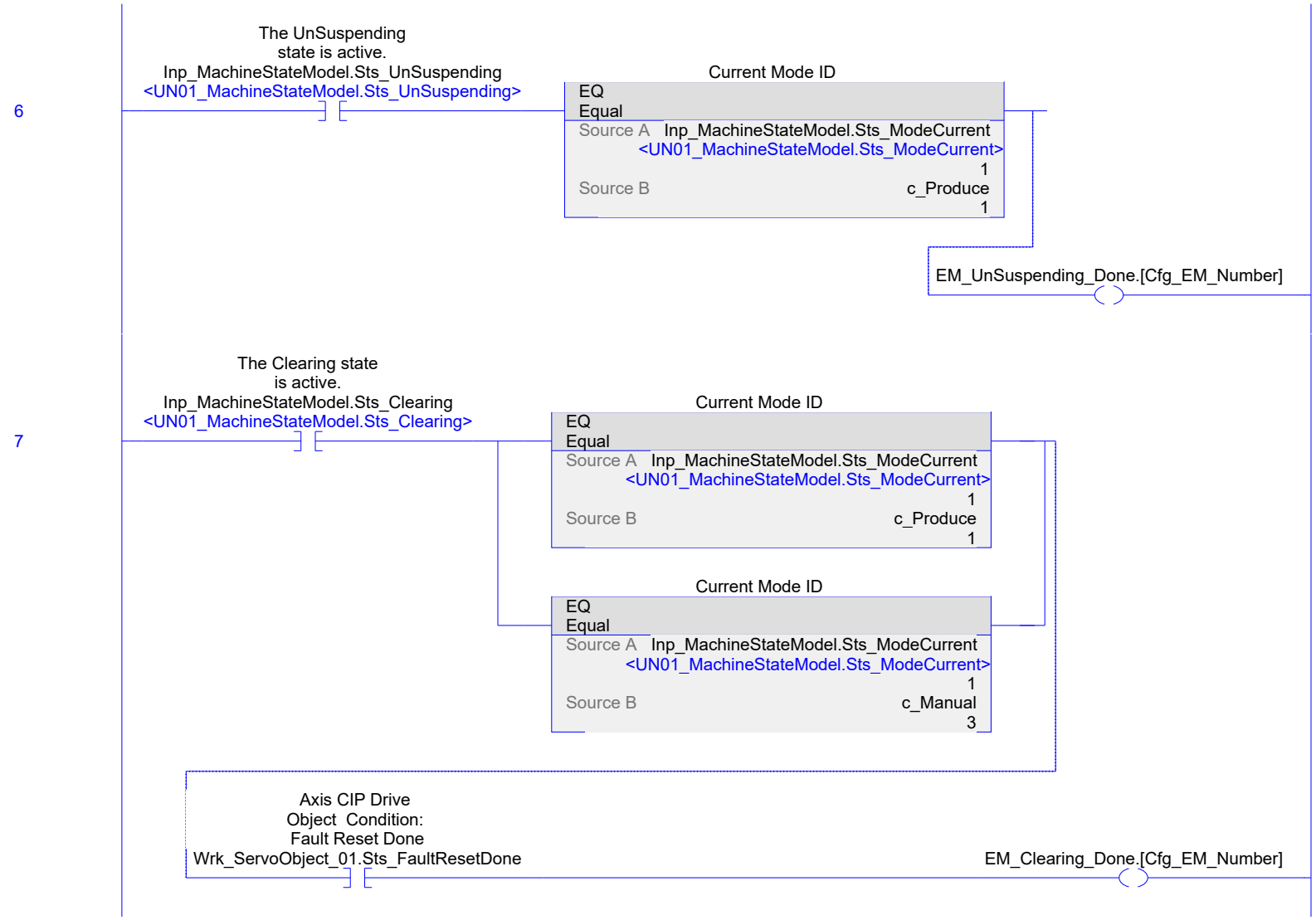
Current Mode ID
EQ
Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Manual
3

Axis CIP Drive Object Condition: Enable Done
Wrk_ServoObject_01.Sts_EnableDone


Axis CIP Drive Object Configuration: =1: CMD_Home will execute MAH instruction = 0 no home instruction executed
Wrk_ServoObject_01.Cfg_HomeEnabled
EM Sequence no steps active
Wrk_EM_ProcedureNoStepsActive
EM_Resetting_Do
Axis CIP Drive Object Configuration: =1: CMD_Home will execute MAH instruction = 0 no home instruction executed
Wrk_ServoObject_01.Cfg_HomeEnabled
Axis CIP Drive Object The Axis has been homed
Wrk_ServoObject_01.Sts_Homed


e.[Cfg_EM_Number]





8

The Stopping state is active.
Inp_MachineStateModel.Sts_Stopping
<UN01_MachineStateModel.Sts_Stopping>

Current Mode ID
EQ Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Produce
1

Current Mode ID
EQ Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Manual
3

Axis CIP Drive Object Condition: Stopping Done
Wrk_ServoObject_01.Sts_StopDone

Axis CIP Drive Object Condition: Disable Done
Wrk_ServoObject_01.Sts_DisableDone

EM_Stopping_Done.[Cfg_EM_Number]

9

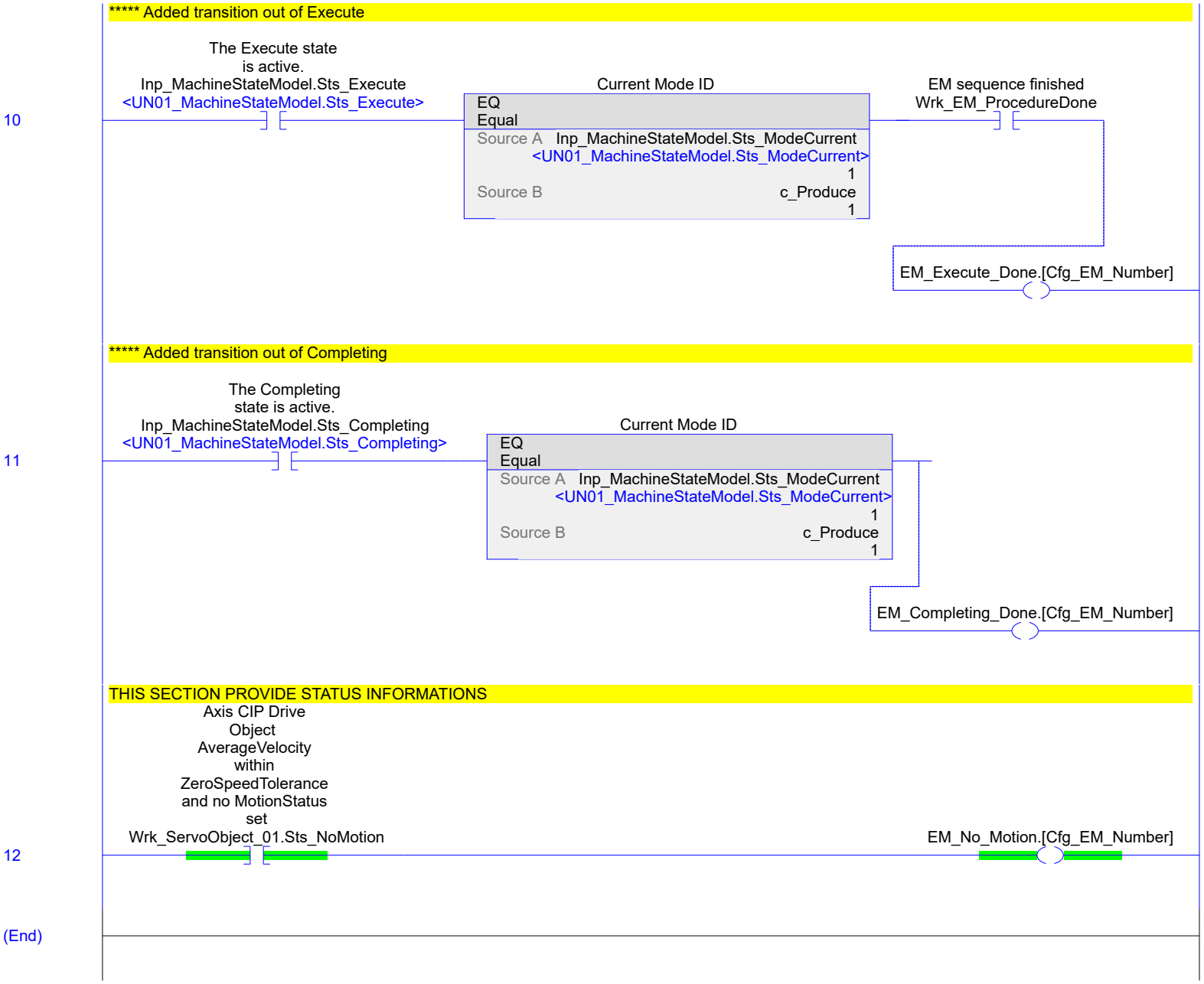
The Aborting state is active.
Inp_MachineStateModel.Sts_Aborting
<UN01_MachineStateModel.Sts_Aborting>

Current Mode ID
EQ Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Produce
1

Current Mode ID
EQ Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Manual
3

Axis CIP Drive Object Condition: Aborting Done
Wrk_ServoObject_01.Sts_AbortDone

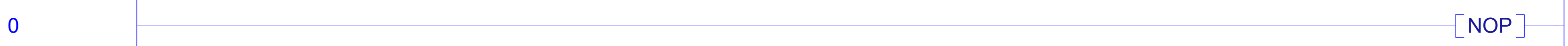
EM_Aborting_Done.[Cfg_EM_Number]



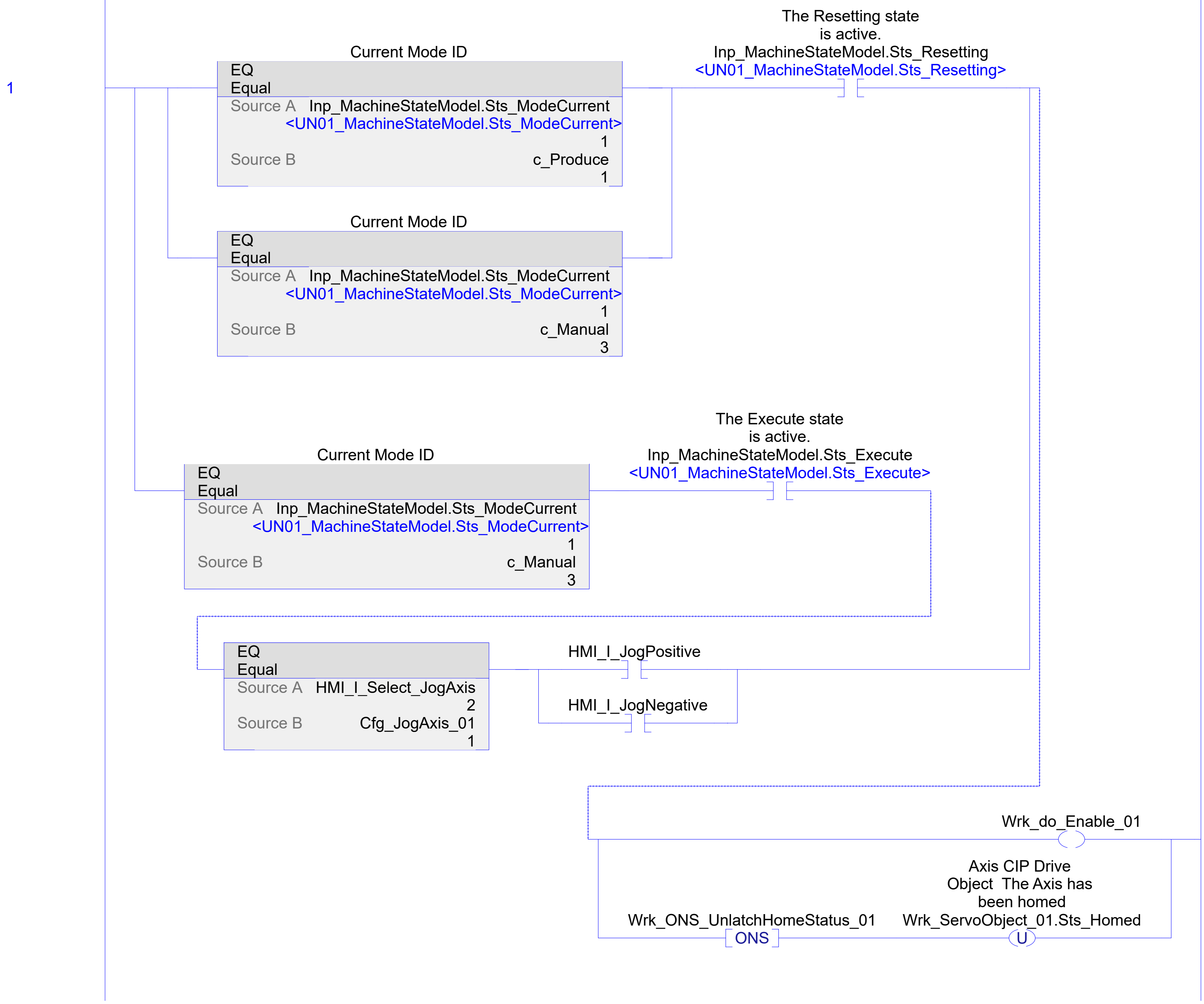
//
COMPANY: Rockwell Automation
FUNCTION: Servo Axis Object
AUTHOR: Rockwell Automation / Kelvin Erickson
DATE CREATED: July 2017

Version Comments: Deleted rung 1 in original CM02_ServoAxisObject getting motion status from master axis
Moved rungs dealing with command inputs to Axis_ObjectCD AOI from PP example CM00_Procedure into here.
Added "_1" suffix to axis-related tags in preparation to add second axis to EM

//

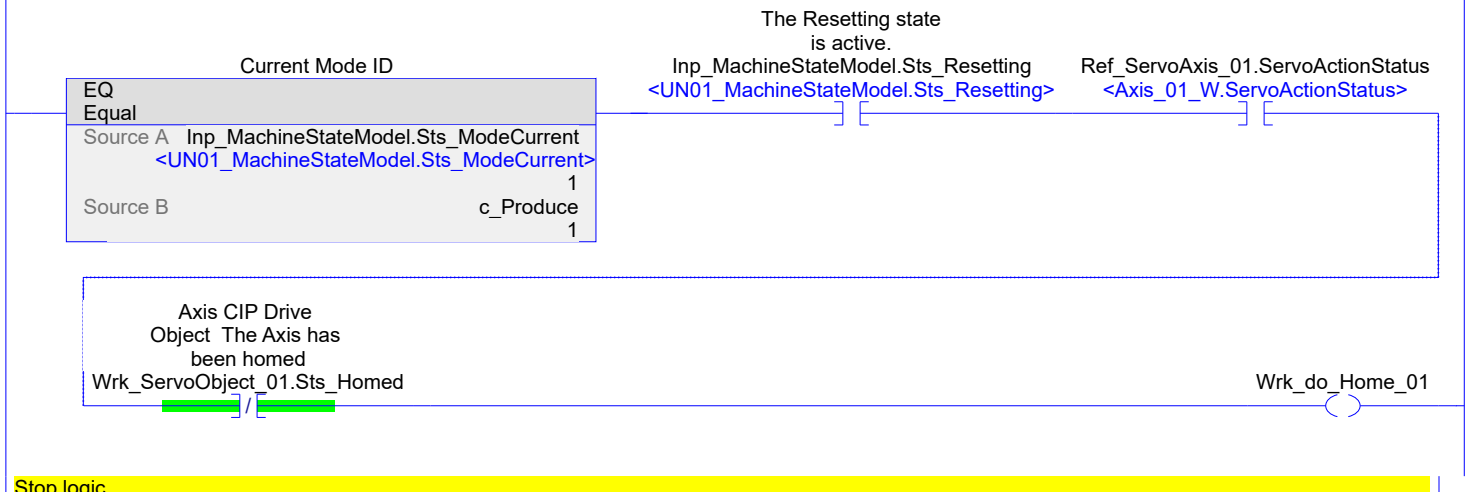


***** Added enable when resetting in Manual mode



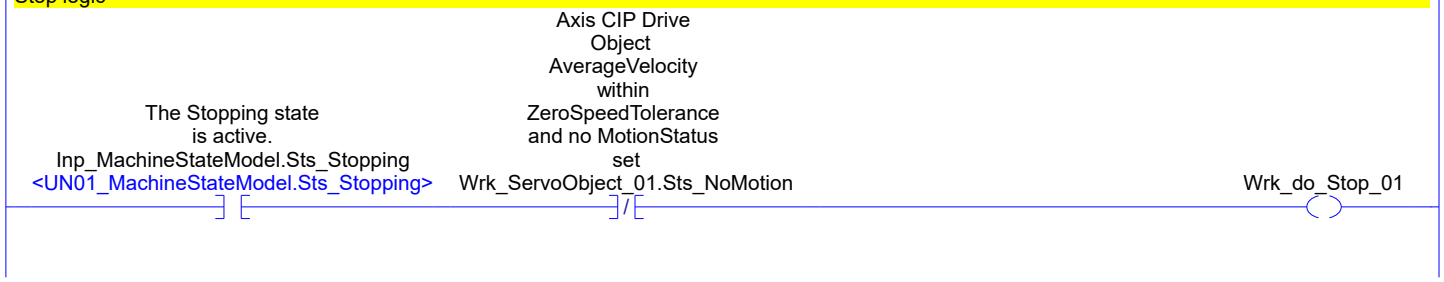
Homing logic

2



Stop logic

3



Disable logic for produce and manual (jogging). Disable if jogging inactive for 2 minutes.

4

The Stopping state is active.
Inp_MachineStateModel.Sts_Stopping
<UN01_MachineStateModel.Sts_Stopping>

Axis CIP Drive Object AverageVelocity within ZeroSpeedTolerance and no MotionStatus set
Wrk_ServoObject_01.Sts_NoMotion

The Aborting state is active.
Inp_MachineStateModel.Sts_Aborting
<UN01_MachineStateModel.Sts_Aborting>

Current Mode ID

EQ Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Manual
3

Ref_ServoAxis_01.ServoActionStatus
<Axis_01_W.ServoActionStatus>

HMI_I_JogNegative

Axis CIP Drive Object AverageVelocity within ZeroSpeedTolerance and no MotionStatus set
HMI_I_JogPositive
Wrk_ServoObject_01.Sts_NoMotion

TON Timer On Delay
Timer Wrk_DisableDelay_01
Preset 120000
Accum 0
EN
DN

Wrk_DisableDelay_01.DN

Wrk_do_Disable_01

SERVO AXIS OBJECT

5

Axis CIP Drive Object

Axis_ObjectCD
Axis CIP Drive Object

Axis_ObjectCD	Wrk_ServoObject_01	Sts_ER
Ref_Axis_CD	Ref_ServoAxis_01 <Axis_01_W>	Sts_EnableDone
		Sts_DisableDone
Inp_MotionGroup	Motion_Group	Sts_FaultResetDone
Cmd_Enable	Wrk_do_Enable_01 0	Sts_HomeDone
		Sts_AbortDone
Cmd_Disable	Wrk_do_Disable_01 0	Sts_StopDone
		Sts_CIP_StartInhibitActive
Cmd_FaultReset	Inp_MachineStateModel.Sts_Clearing <UN01_MachineStateModel.Sts_Clearing> 0	Sts_AxisOk
		Sts_NoMotion
		Sts_Homed
Cmd_Home	Wrk_do_Home_01 0	
Cmd_Abort	Inp_MachineStateModel.Sts_Aborting <UN01_MachineStateModel.Sts_Aborting> 0	
Cmd_Stop	Wrk_do_Stop_01 0	

(End)

//
COMPANY: Rockwell Automation
FUNCTION: Servo Axis Jogging
AUTHOR: Rockwell Automation
DATE CREATED: March 2009

Version Comments:

//

0 NOP

RELEASE JOG FUNCTION Axis number selected via HMI

1
Current Mode ID
EQ
Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Manual
3

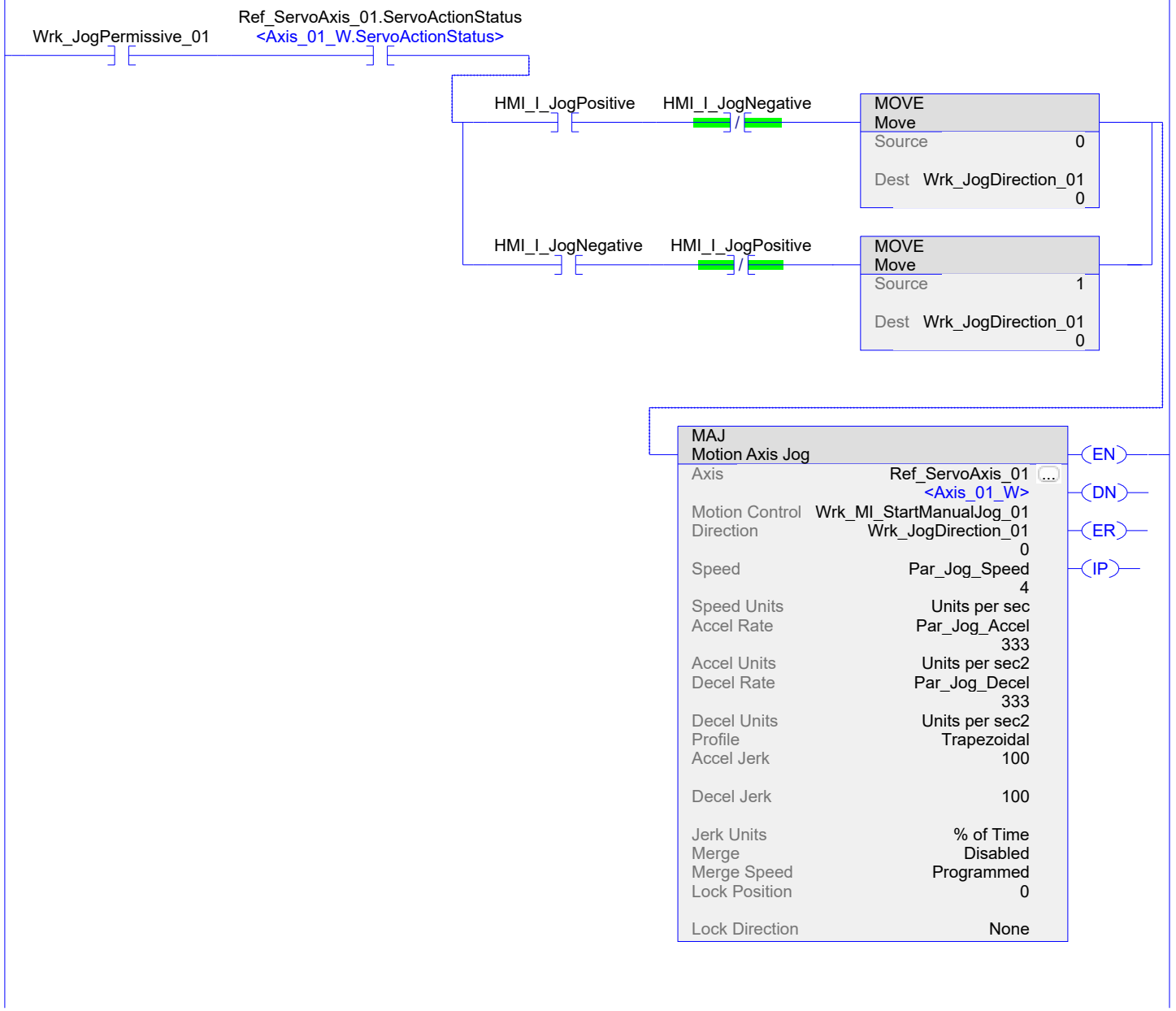
The Execute state
is active.
Inp_MachineStateModel.Sts_Execute
<UN01_MachineStateModel.Sts_Execute>

EQ
Equal
Source A HMI_I_Select_JogAxis
2
Source B Cfg_JogAxis_01
1

Wrk_JogPermissive_01

JOG SERVO AXIS

2



STOP SERVO AXIS

3

HMI_I_JogPositive HMI_I_JogNegative Wrk_MI_StartManualJog_01.IP

HMI_I_JogPositive HMI_I_JogNegative

Wrk_JogPermissive_01

MAS
Motion Axis Stop

Axis	Ref_ServoAxis_01 <Axis_01_W>
Motion Control	Wrk_MI_StopManualJog_01
Stop Type	All
Change Decel	Yes
Decel Rate	Par_Jog_Decel 333
Decel Units	Units per sec2
Change Decel Jerk	No
Decel Jerk	100
Jerk Units	% of Time

EN DN ER IP PC

FAULT RESET

4

The Clearing state is active. Inp_MachineStateModel.Sts_Clearing <UN01_MachineStateModel.Sts_Clearing>

Wrk_MI_StartManualJog_01.ER (U) Wrk_MI_StopManualJog_01.ER (U)

5

Wrk_MI_StartManualJog_01.ER

Wrk_MI_StopManualJog_01.ER

The Clearing state is active. Inp_MachineStateModel.Sts_Clearing <UN01_MachineStateModel.Sts_Clearing>

Jog instr error for axis 1 - X Wrk_JogFault_01

6

Wrk_MI_StartManualJog_01.ER

1 for Start Fault, 2 for Stop Fault

MOVE
Move

Source	1
Dest	Wrk_JogFault_Sts_Err_01 0

MI .ERR value

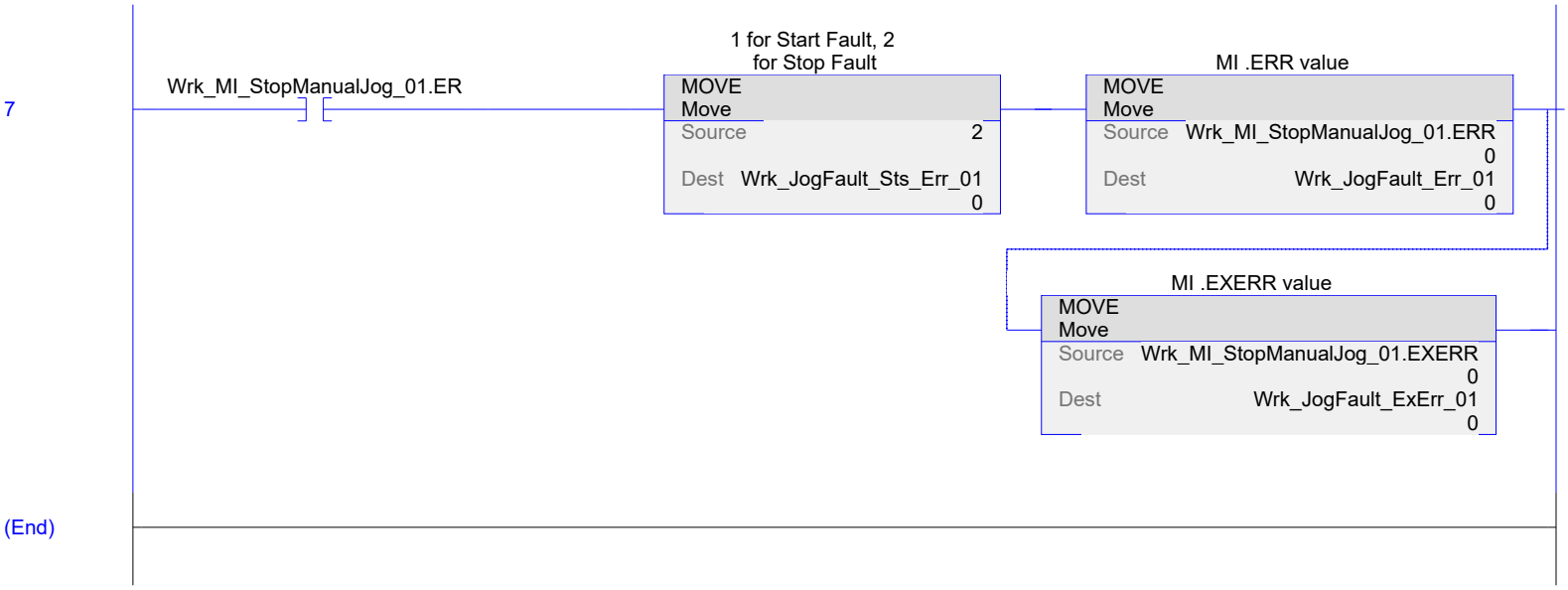
MOVE
Move

Source	Wrk_MI_StartManualJog_01.ERR 0
Dest	Wrk_JogFault_Err_01 0

MI .EXERR value

MOVE
Move

Source	Wrk_MI_StartManualJog_01.EXERR 0
Dest	Wrk_JogFault_ExErr_01 0


7
Wrk_MI_StopManualJog_01.ER
1 for Start Fault, 2 for Stop Fault
MOVE
Move
Source 2
Dest Wrk_JogFault_Sts_Err_01 0
MI .ERR value
MOVE
Move
Source Wrk_MI_StopManualJog_01.ERR 0
Dest Wrk_JogFault_Err_01 0
MI .EXERR value
MOVE
Move
Source Wrk_MI_StopManualJog_01.EXERR 0
Dest Wrk_JogFault_ExErr_01 0
(End)

//
COMPANY: Rockwell Automation
FUNCTION: Virtual Follower Axis - Equipment Module
AUTHOR: Rockwell Automation / Kelvin Erickson
DATE CREATED: July 2017

Version Comments: Started with EM_Follower01 program in Power Programming example, PPBasicV4_2.ACD

No gearing CM

//

0 NOP

INITIALIZE

Initialize Data

Performs initialization of any local parameters of this Equipment Module and contained Control Modules that require it

1 S:FS — JSR Jump To Subroutine, Routine Name SR20_Initialize

Set EM number to 1

2 MOVE Move, Source 1, Dest Cfg_EM_Number 1

Set axis numbers for jogging

HMI jog axis number for axis 1 - X

3 MOVE Move, Source 1, Dest Cfg_JogAxis_01 1

THIS EQUIPMENT MODULE IS SELECTED AND ACTIVE

This Tag is used to enable states for each Equipment Module

4 EM_Selected.[Cfg_EM_Number] ( )

5 JSR Jump To Subroutine, Routine Name CM00_Procedure

SERVO AXIS OBJECT AND IT`S LOGICAL FUNCTIONs

6

This Control Module performs the state control for the slave axis; including Enable, Disable, Reset, Absolute Home, Stop, and Abort

JSR
Jump To Subroutine
Routine Name CM02_01_ServoAxisObject_W

7

Control Module
Manual Jog Control

This Control Module jogs the servo axis when the Unit is in Manual mode. This provides independent control of the servo axis.

JSR
Jump To Subroutine
Routine Name CM03_01_ServoAxisJog_W

Summary of EM conditions and status based on CM's

8

JSR
Jump To Subroutine
Routine Name CM01_EMConditions

Map axis faults to EM

9

JSR
Jump To Subroutine
Routine Name SR03_FaultHandler

(End)

Simple fault handler for EM

0

NOP

Map axis errors, procedure motion instruction errors, and jogging errors into bits of EM_MajorFaults

If instruction fault in Axis_Object AOI, or in EM procedure, also save location of error and .ERR and .EXERR fields of instruction causing fault. Only save info for

1

Axis CIP Drive Object Any Fault occured on this Axis
Wrk_ServoObject_01.Sts_ER

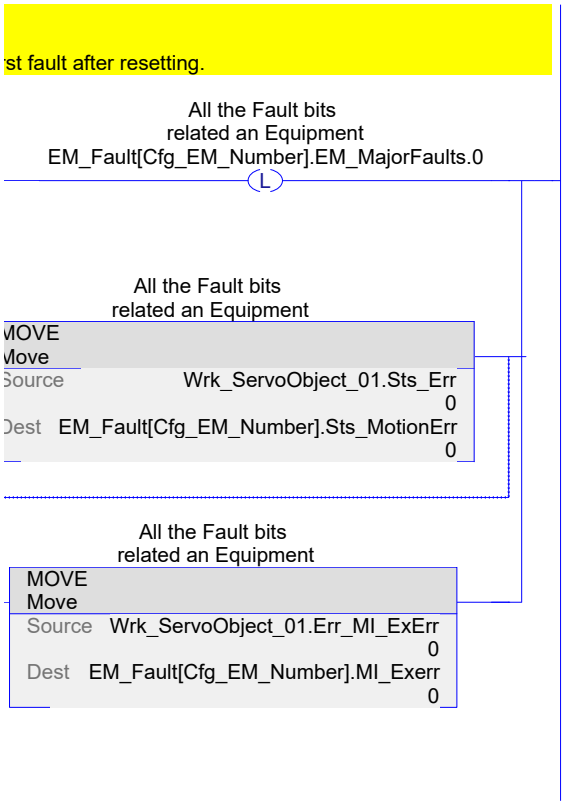
Axis CIP Drive Object Any instruction within the AOI faulted
Wrk_ServoObject_01.Err_InstructionFault

All the Fault bits related an Equipment

EQ
Equal
Source A EM_Fault[Cfg_EM_Number].Sts_MotionErr
0
Source B
0

All the Fault bits related an Equipment

MOVE
Move
Source Wrk_ServoObject_01.Err_MI_Err
0
Dest EM_Fault[Cfg_EM_Number].MI_Err
0



2

EM Sequence move instr error
Wrk_EM_ProcedureFault

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].EM_MajorFaults.2
L

All the Fault bits related an Equipment

EQ
Equal
Source A EM_Fault[Cfg_EM_Number].Sts_MotionErr
0
Source B 0

All the Fault bits related an Equipment

MOVE
Move
Source Wrk_EM_ProcedureStep
0
Dest EM_Fault[Cfg_EM_Number].Sts_MotionErr
0

All the Fault bits related an Equipment

MOVE
Move
Source Wrk_EM_Procedure_MI_Err
0
Dest EM_Fault[Cfg_EM_Number].MI_Err
0

All the Fault bits related an Equipment

MOVE
Move
Source Wrk_EM_Procedure_MI_ExErr
0
Dest EM_Fault[Cfg_EM_Number].MI_Exerr
0

3

Jog instr error for axis 1 - X
Wrk_JogFault_01

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].EM_MajorFaults.4
L

All the Fault bits related an Equipment
EQ Equal
Source A EM_Fault[Cfg_EM_Number].Sts_MotionErr 0
Source B 0

All the Fault bits related an Equipment
MOVE Move
Source Wrk_JogFault_Sts_Err_01 0
Dest EM_Fault[Cfg_EM_Number].Sts_MotionErr 0

All the Fault bits related an Equipment
MOVE Move
Source Wrk_JogFault_Err_01 0
Dest EM_Fault[Cfg_EM_Number].MI_Err 0

All the Fault bits related an Equipment
MOVE Move
Source Wrk_JogFault_ExErr_01 0
Dest EM_Fault[Cfg_EM_Number].MI_Exerr 0

***** Moved from CM04_ServoAxisGear

Watchdog for resetting - Create an error if timeout occurs

4

The Resetting state is active.
Inp_MachineStateModel.Sts_Resetting
<UN01_MachineStateModel.Sts_Resetting>

EM_Resetting_Done.[Cfg_EM_Number]
/

All the Fault bits related an Equipment
TON Timer On Delay
Timer EM_Fault[Cfg_EM_Number].WatchdogPrepareExecution
Preset 60000
Accum 0
EN
DN

***** Moved from CM04_ServoAxisGear
***** Added clear of Sts_Err

Clearing resets watchdog faults and other faults and warnings and clears instruction fault error details

5

The Clearing state is active.
Inp_MachineStateModel.Sts_Clearing
<UN01_MachineStateModel.Sts_Clearing>

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].StartFaultWatchdog
(U)

All the Fault bits related an Equipment
MOVE
Move
Source 0
Dest EM_Fault[Cfg_EM_Number].EM_MajorFaults
0

All the Fault bits related an Equipment
MOVE
Move
Source 0
Dest EM_Fault[Cfg_EM_Number].EM_MinorFaults
0

All the Fault bits related an Equipment
MOVE
Move
Source 0
Dest EM_Fault[Cfg_EM_Number].EM_Warnings
0

All the Fault bits related an Equipment
MOVE
Move
Source 0
Dest EM_Fault[Cfg_EM_Number].Sts_MotionErr
0

All the Fault bits related an Equipment
MOVE
Move
Source 0
Dest EM_Fault[Cfg_EM_Number].MI_Err
0

All the Fault bits related an Equipment
MOVE
Move
Source 0
Dest EM_Fault[Cfg_EM_Number].MI_Exerr
0

***** Moved from CM04_ServoAxisGear

Watchdog fault bit

6

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].WatchdogPrepareExecution.DN

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].StartFaultWatchdog
(L)

Summary of EM faults

7

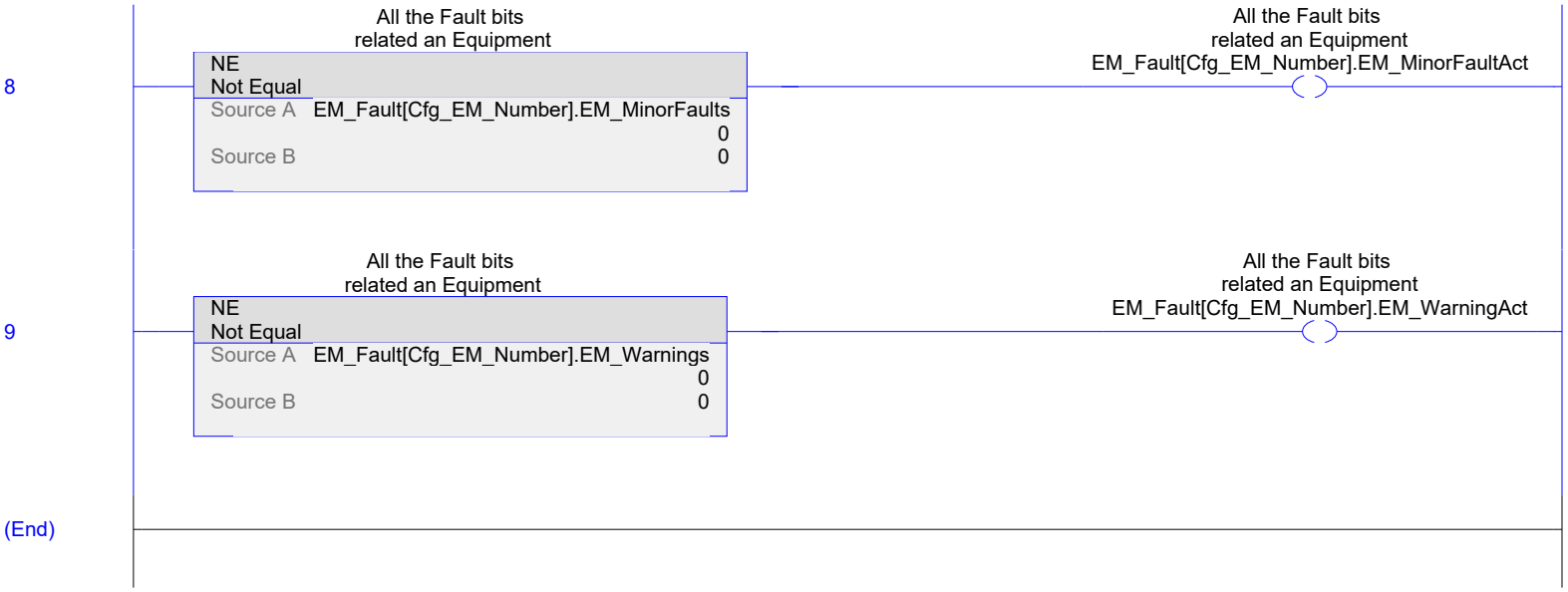
All the Fault bits related an Equipment
NE
Not Equal
Source A EM_Fault[Cfg_EM_Number].EM_MajorFaults
0
Source B 0

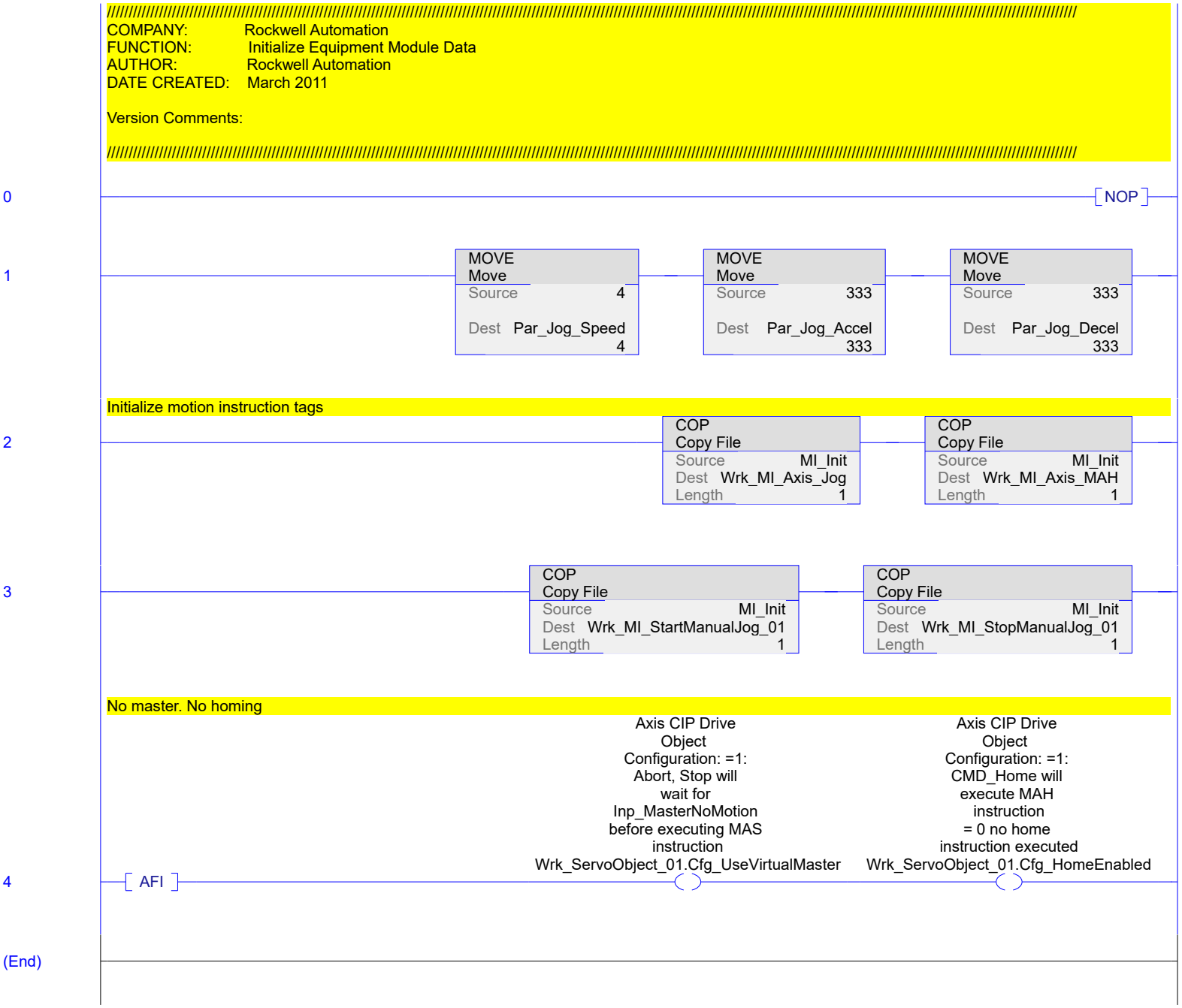
All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].EM_MajorFaultAct
( )

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].StartFaultInstruction

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].StartFaultCalculation

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].StartFaultWatchdog


8
All the Fault bits
related an Equipment
NE
Not Equal
Source A EM_Fault[Cfg_EM_Number].EM_MinorFaults
0
Source B
0
All the Fault bits
related an Equipment
EM_Fault[Cfg_EM_Number].EM_MinorFaultAct
9
All the Fault bits
related an Equipment
NE
Not Equal
Source A EM_Fault[Cfg_EM_Number].EM_Warnings
0
Source B
0
All the Fault bits
related an Equipment
EM_Fault[Cfg_EM_Number].EM_WarningAct
(End)



EXECUTE State motion steps/commands

++++++++++++++++++++++++++++++++

0

NOP

First scan or resetting - clear all steps, unlatch end of profile indication

1

s:fs

The Resetting state is active.
UP_Resetting
<UN01_MachineStateModel.Sts_Resetting>

The Idle state is active.
UP_Idle
<UN01_MachineStateModel.Sts_Idle>

MOVE
Move
Source 0
Dest Wrk_EM_ProcedureStep 5

Indication that all steps reset.
Used by RESETTING state and initial execute step

2

EQ
Equal
Source A Wrk_EM_ProcedureStep 5
Source B 0

EM Sequence no steps active
Wrk_EM_ProcedureNoStepsActive

EXECUTE -

If no steps active, start in step 1

3

Current Mode ID

EQ
Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent <UN01_MachineStateModel.Sts_ModeCurrent> 1
Source B c_Produce 1

The Execute state is active.
UP_Execute
<UN01_MachineStateModel.Sts_Execute>

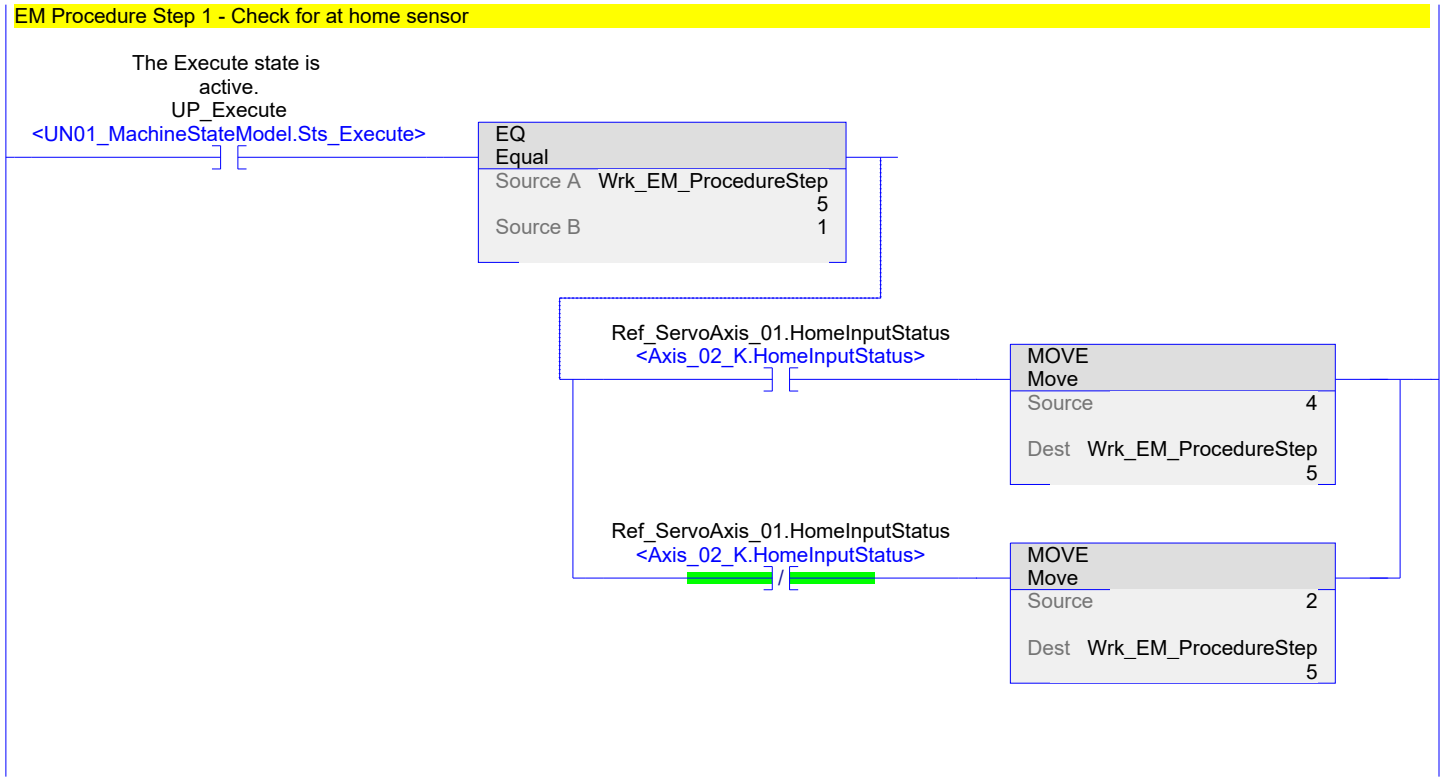
EM Sequence no steps active
Wrk_EM_ProcedureNoStepsActive

MOVE
Move
Source 1
Dest Wrk_EM_ProcedureStep 5

****
** **
** Add your steps/blocks dealing with the axis motion here. **
** Remember the "Axis" tag for the motion blocks should be "Ref_ServoAxis" **
** Also, the "Motion Control" tag for the motion blocks should be a program tag, not a controller tag. **
** **
****

4

NOP



EM Procedure Step 2 - Jog at 2 radians/sec until get to home sensor. Rotation in negative direction

6

The Execute state is active.
UP_Execute
<UN01_MachineStateModel.Sts_Execute>

EQ
Equal
Source A Wrk_EM_ProcedureStep 5
Source B 2

MAJ
Motion Axis Jog
Axis Ref_ServoAxis_01 <Axis_02_K>
Motion Control Wrk_MI_Axis_Jog
Direction 1
Speed 2.0
Speed Units Units per sec
Accel Rate 50
Accel Units % of Maximum
Decel Rate 50
Decel Units % of Maximum
Profile S-Curve
Accel Jerk 25
Decel Jerk 25
Jerk Units % of Time
Merge Disabled
Merge Speed Programmed
Lock Position 0
Lock Direction 0
EN
DN
ER
IP

Wrk_MI_Axis_Jog.IP

Ref_ServoAxis_01.HomeInputStatus
<Axis_02_K.HomeInputStatus>

MOVE
Move
Source 3
Dest Wrk_EM_ProcedureStep 5

EM Procedure Step 3 - Stop with quick decel

7

The Execute state is active.
UP_Execute
<UN01_MachineStateModel.Sts_Execute>

EQ
Equal
Source A Wrk_EM_ProcedureStep 5
Source B 3

MAS
Motion Axis Stop
Axis Ref_ServoAxis_01 <Axis_02_K>
Motion Control Wrk_MI_Axis_JogMAS
Stop Type Jog
Change Decel Yes
Decel Rate 50
Decel Units % of Maximum
Change Decel Jerk No
Decel Jerk 25
Jerk Units % of Maximum
EN DN ER IP PC

Wrk_MI_Axis_JogMAS.PC

MOVE
Move
Source 4
Dest Wrk_EM_ProcedureStep 5

EM Procedure Step 4 - Home knife position. Axis configured for passive homing

8

The Execute state is active.
UP_Execute
<UN01_MachineStateModel.Sts_Execute>

EQ
Equal
Source A Wrk_EM_ProcedureStep 5
Source B 4

MAH
Motion Axis Home
Axis Ref_ServoAxis_01 <Axis_02_K>
Motion Control Wrk_MI_Axis_MAH
EN DN ER IP PC

Wrk_MI_Axis_MAH.PC

MOVE
Move
Source 5
Dest Wrk_EM_ProcedureStep 5

EM Procedure Step 5 - Wait for registration sensor

9

The Execute state is active.
UP_Execute
<UN01_MachineStateModel.Sts_Execute>

EQ
Equal
Source A Wrk_EM_ProcedureStep 5
Source B 5

MAR
Motion Arm Registration
Axis Ref_MasterAxis <Axis_01_W>
Motion Control Wrk_MI_MasterAxisMAR
Trigger Condition Positive_Edge
Windowed Registration Disabled
Min. Position 0.0
Max. Position 100.0
Input Number 1
EN
DN
ER
IP
PC

Wrk_MI_MasterAxisMAR.PC

MOVE
Move
Source 6
Dest Wrk_EM_ProcedureStep 5

EM Procedure Step 6 - Execute cam and wait for end of cam.

10

The Execute state is active.
UP_Execute
<UN01_MachineStateModel.Sts_Execute>

EQ
Equal
Source A Wrk_EM_ProcedureStep 5
Source B 6

Wrk_do_Cam_01

Wrk_Cam_Done_01

MOVE
Move
Source 7
Dest Wrk_EM_ProcedureStep 5

EM Procedure Step 7 - Stop cam. Also wait for conveyor homed. During step, End of Profile indication stays on.

11

The Execute state is active.
UP_Execute
<UN01_MachineStateModel.Sts_Execute>

EQ
Equal
Source A Wrk_EM_ProcedureStep 5
Source B 7

Wrk_do_CamStop_01

Cam_EndOfProfile

Wrk_CamStop_Done_01 Web_Homed

MOVE
Move
Source 1
Dest Wrk_EM_ProcedureStep 5

Last step - when done, unlatch it, latch Execute_done Boolean for this axis.
Also, unlatch all .PC from motion instructions.

Axis_Move1 is a sample motion instruction tag.

12

The Execute state is active.
UP_Execute
<UN01_MachineStateModel.Sts_Execute>

EQ
Equal
Source A Wrk_EM_ProcedureStep 5
Source B 30

Wrk_EMProcedureDone

Motion instuction errors. Save error codes to be copied to stored EM fault information.

13

Wrk_MI_Axis_Jog.ER

MOVE Move — Source Wrk_MI_Axis_Jog.ERR 0 — Dest Wrk_EM_Procedure_MI_Err 78

MOVE Move — Source Wrk_MI_Axis_Jog.EXERR 0 — Dest Wrk_EM_Procedure_MI_ExErr 0

Wrk_MI_Axis_JogMAS.ER

MOVE Move — Source Wrk_MI_Axis_JogMAS.ERR 0 — Dest Wrk_EM_Procedure_MI_Err 78

MOVE Move — Source Wrk_MI_Axis_JogMAS.EXERR 0 — Dest Wrk_EM_Procedure_MI_ExErr 0

Wrk_MI_Axis_MAH.ER

MOVE Move — Source Wrk_MI_Axis_MAH.ERR 0 — Dest Wrk_EM_Procedure_MI_Err 78

MOVE Move — Source Wrk_MI_Axis_MAH.EXERR 0 — Dest Wrk_EM_Procedure_MI_ExErr 0

Wrk_MI_MasterAxisMAR.ER

MOVE Move — Source Wrk_MI_MasterAxisMAR.ERR 0 — Dest Wrk_EM_Procedure_MI_Err 78

MOVE Move — Source Wrk_MI_MasterAxisMAR.EXERR 0 — Dest Wrk_EM_Procedure_MI_ExErr 0

Wrk_MI_MasterAxisMDR.ER

MOVE Move — Source Wrk_MI_MasterAxisMDR.ERR 0 — Dest Wrk_EM_Procedure_MI_Err 78

MOVE Move — Source Wrk_MI_MasterAxisMDR.EXERR 0 — Dest Wrk_EM_Procedure_MI_ExErr 0

The Clearing state is active.
Inp_MachineStateModel.Sts_Clearing

Wrk_Ons_Err ONS — <UN01_MachineStateModel.Sts_Clearing> /

Wrk_EM_ProcedureFault

If stopped or aborted, cancel registration

14

The Stopped state is active.
UN01_MachineStateModel.Sts_Stopped

The Aborted state is active.
UN01_MachineStateModel.Sts_Aborted

MDR Motion Disarm Registration — EN DN ER
Axis Ref_MasterAxis <Axis_01_W>
Motion Control Wrk_MI_MasterAxisMDR
Input Number 1

(End)

//

SECTION EQUIPMENT MODULE STATE COMPLETE HANDLING - SET DONE BITS

ALSO EM STATUS conditions that are a combination of axis conditions

//

0 NOP

***** Added additional conditions for Producing - EM procedure steps not active and homing finished if homing enabled

1

The Resetting state is active.
Inp_MachineStateModel.Sts_Resetting
<UN01_MachineStateModel.Sts_Resetting>

Current Mode ID
EQ
Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Produce
1

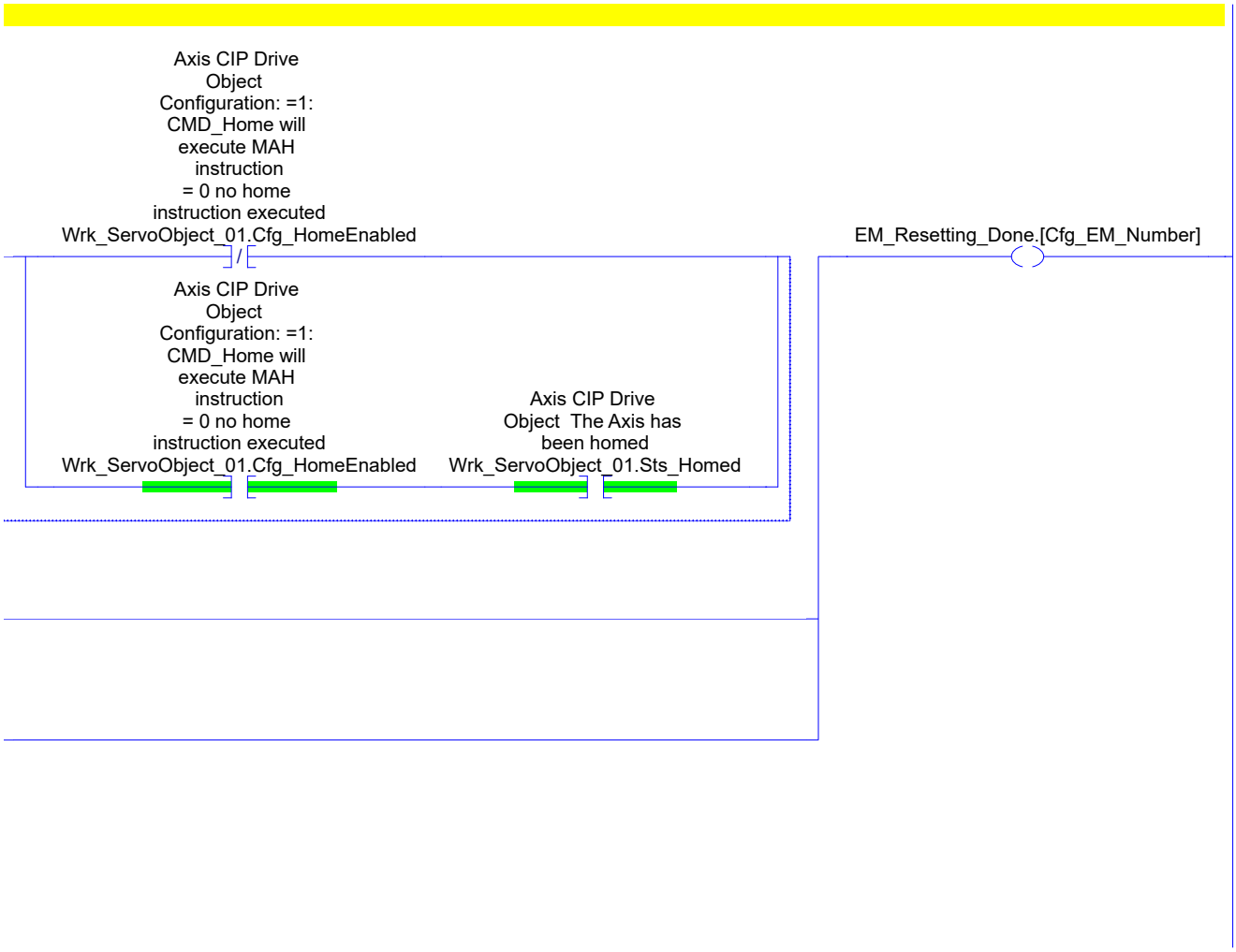
Axis CIP Drive Object Condition: Enable Done
Wrk_ServoObject_01.Sts_EnableDone

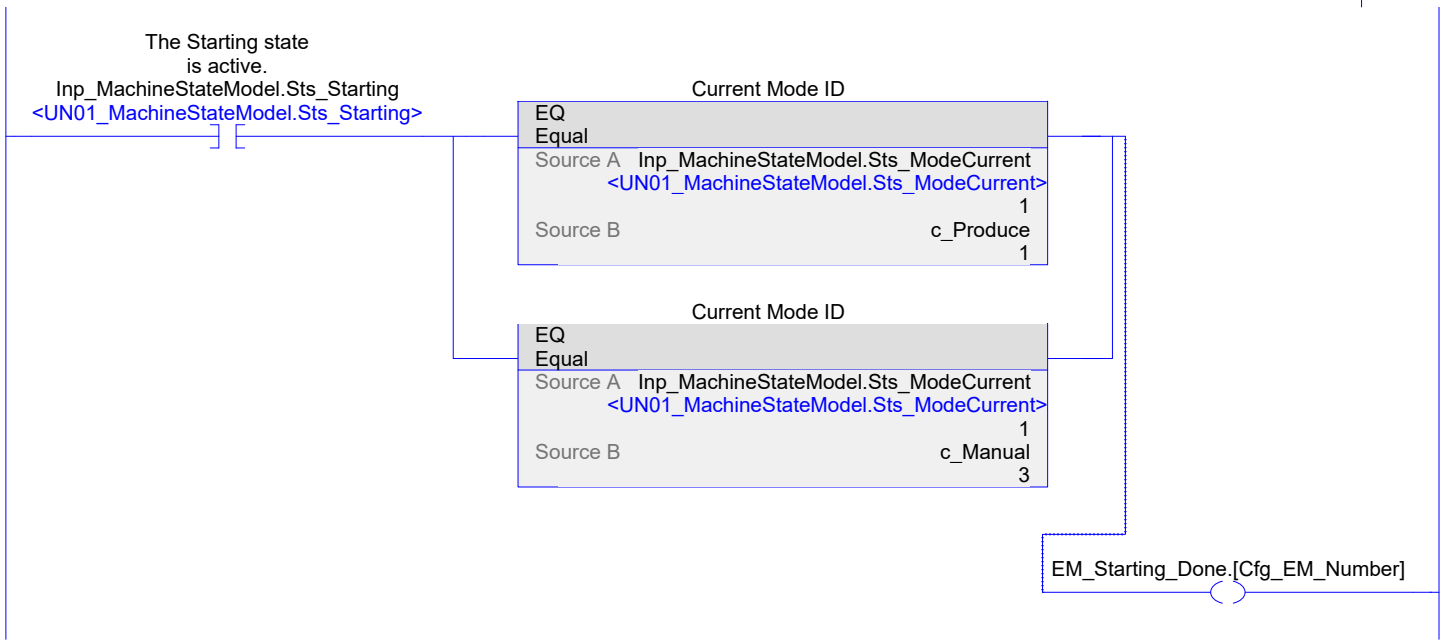
Wrk_Calc_Cam_Done_01

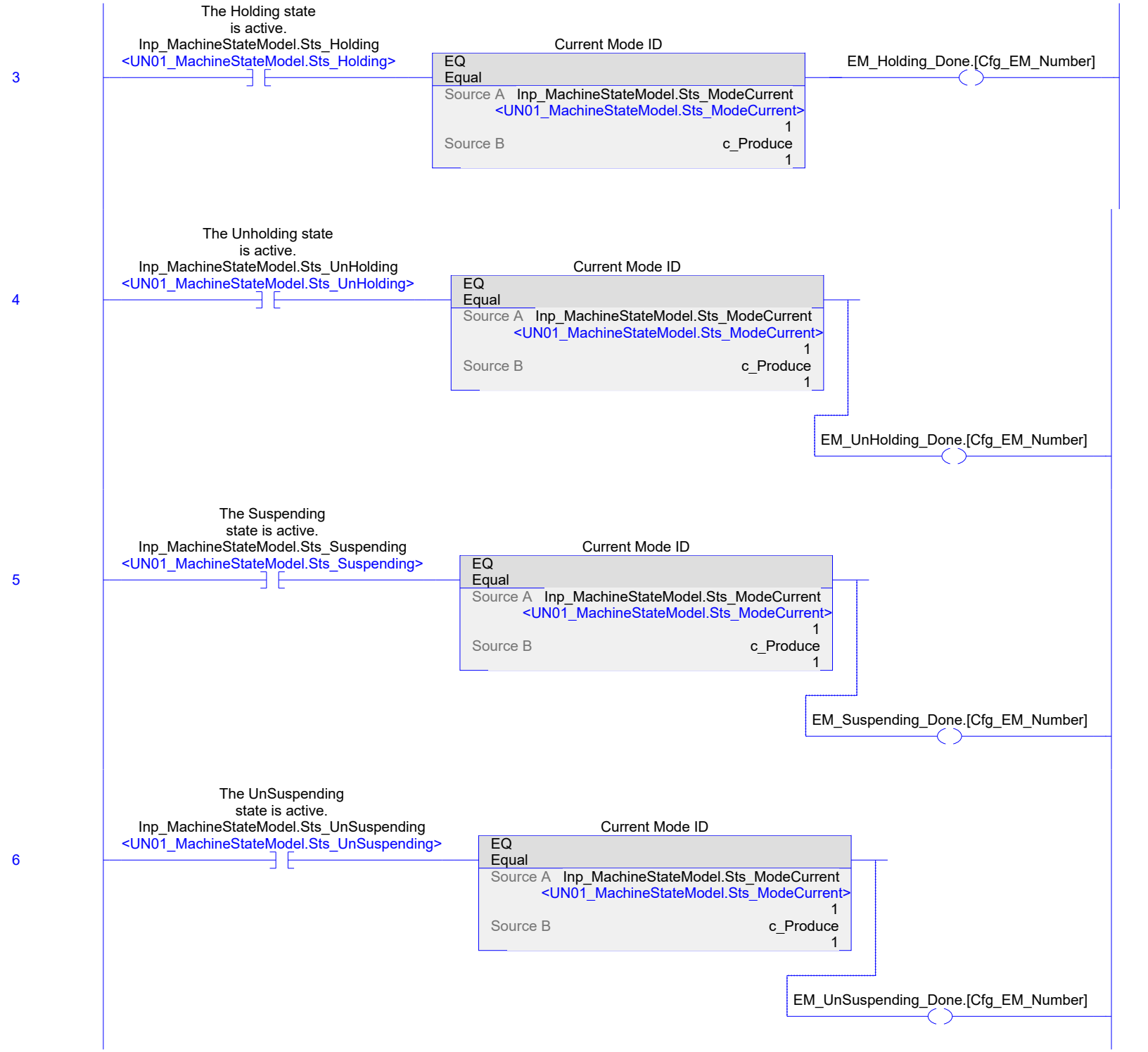
EM Sequence no steps active
Wrk_EM_ProcedureNoStepsActive

Current Mode ID
EQ
Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Manual
3

Axis CIP Drive Object Condition: Enable Done
Wrk_ServoObject_01.Sts_EnableDone


Axis CIP Drive Object Configuration: =1: CMD_Home will execute MAH instruction = 0 no home instruction executed
Wrk_ServoObject_01.Cfg_HomeEnabled
EM_Resetting_Done.[Cfg_EM_Number]
Axis CIP Drive Object Configuration: =1: CMD_Home will execute MAH instruction = 0 no home instruction executed
Wrk_ServoObject_01.Cfg_HomeEnabled
Axis CIP Drive Object The Axis has been homed
Wrk_ServoObject_01.Sts_Homed


2
The Starting state is active.
Inp_MachineStateModel.Sts_Starting
<UN01_MachineStateModel.Sts_Starting>
Current Mode ID
EQ
Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Produce
1
Current Mode ID
EQ
Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Manual
3
EM_Starting_Done.[Cfg_EM_Number]



7

The Clearing state is active.
Inp_MachineStateModel.Sts_Clearing
<UN01_MachineStateModel.Sts_Clearing>

Current Mode ID
EQ Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Produce
1

Current Mode ID
EQ Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Manual
3

Axis CIP Drive Object Condition: Fault Reset Done
Wrk_ServoObject_01.Sts_FaultResetDone

EM_Clearing_Done.[Cfg_EM_Number]

8

The Stopping state is active.
Inp_MachineStateModel.Sts_Stopping
<UN01_MachineStateModel.Sts_Stopping>

Current Mode ID
EQ Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Produce
1

Current Mode ID
EQ Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Manual
3

Axis CIP Drive Object Condition: Stopping Done
Wrk_ServoObject_01.Sts_StopDone

EM_Stopping_Done.[Cfg_EM_Number]

Axis CIP Drive Object Condition: Disable Done
Wrk_ServoObject_01.Sts_DisableDone

9

The Aborting state is active.
Inp_MachineStateModel.Sts_Aborting
<UN01_MachineStateModel.Sts_Aborting>

Current Mode ID
EQ Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Produce
1

Current Mode ID
EQ Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Manual
3

Axis CIP Drive Object Condition: Aborting Done
Wrk_ServoObject_01.Sts_AbortDone

EM_Aborting_Done.[Cfg_EM_Number]

***** Added transition out of Execute

10

The Execute state is active.
Inp_MachineStateModel.Sts_Execute
<UN01_MachineStateModel.Sts_Execute>

Current Mode ID
EQ Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Produce
1

EM sequence finished
Wrk_EM_ProcedureDone

EM_Execute_Done.[Cfg_EM_Number]

***** Added transition out of Completing

11

The Completing state is active.
Inp_MachineStateModel.Sts_Completing
<UN01_MachineStateModel.Sts_Completing>

Current Mode ID
EQ Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Produce
1

EM_Completing_Done.[Cfg_EM_Number]

THIS SECTION PROVIDE STATUS INFORMATIONS

12

Axis CIP Drive Object AverageVelocity within ZeroSpeedTolerance and no MotionStatus set
Wrk_ServoObject_01.Sts_NoMotion

EM_No_Motion.[Cfg_EM_Number]

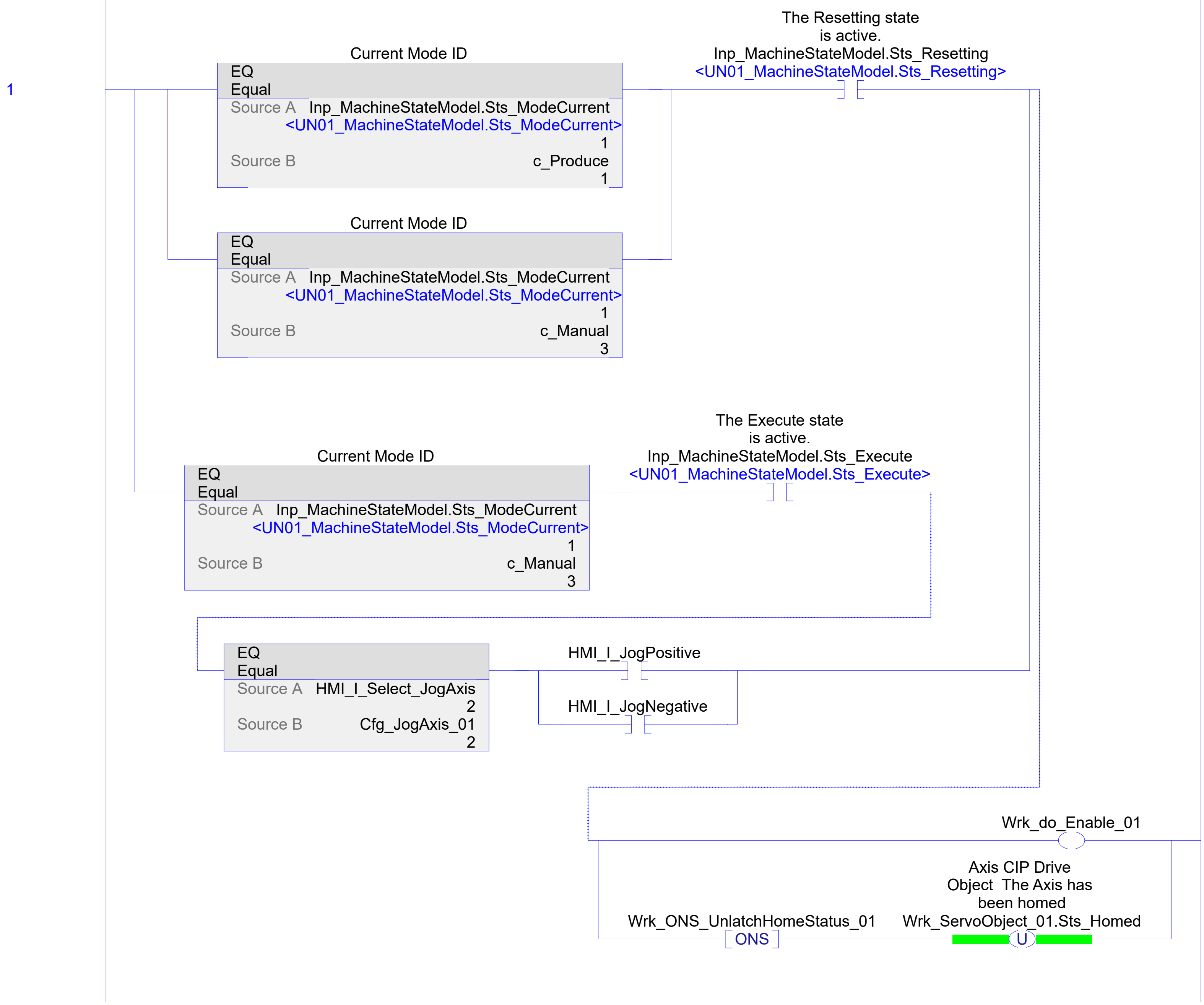
(End)

//
COMPANY: Rockwell Automation
FUNCTION: Servo Axis Object
AUTHOR: Rockwell Automation / Kelvin Erickson
DATE CREATED: July 2017

Version Comments: Deleted rung 1 in original CM02_ServoAxisObject getting motion status from master axis
Moved rungs dealing with command inputs to Axis_ObjectCD AOI from PP example CM00_Procedure into here.
Added "_1" suffix to axis-related tags in preparation to add second axis to EM

//

***** Added enable when resetting in Manual mode



Homing logic

2

Current Mode ID

EQ
Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Produce
1

The Resetting state is active.
Inp_MachineStateModel.Sts_Resetting
<UN01_MachineStateModel.Sts_Resetting>

Ref_ServoAxis_01.ServoActionStatus
<Axis_02_K.ServoActionStatus>

Axis CIP Drive Object The Axis has been homed
Wrk_ServoObject_01.Sts_Homed

Wrk_do_Home_01

Stop logic

3

The Stopping state is active.
Inp_MachineStateModel.Sts_Stopping
<UN01_MachineStateModel.Sts_Stopping>

Axis CIP Drive Object AverageVelocity within ZeroSpeedTolerance and no MotionStatus set
Wrk_ServoObject_01.Sts_NoMotion

Wrk_do_Stop_01

Disable logic for produce and manual (jogging). Disable if jogging inactive for 2 minutes.

4

The Stopping state is active. Inp_MachineStateModel.Sts_Stopping <UN01_MachineStateModel.Sts_Stopping>

Axis CIP Drive Object AverageVelocity within ZeroSpeedTolerance and no MotionStatus set Wrk_ServoObject_01.Sts_NoMotion

The Aborting state is active. Inp_MachineStateModel.Sts_Aborting <UN01_MachineStateModel.Sts_Aborting>

Current Mode ID

EQ Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent <UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Manual
3

Ref_ServoAxis_01.ServoActionStatus <Axis_02_K.ServoActionStatus>

HMI_I_JogNegative

Axis CIP Drive Object AverageVelocity within ZeroSpeedTolerance and no MotionStatus set Wrk_ServoObject_01.Sts_NoMotion

HMI_I_JogPositive

TON Timer On Delay
Timer Wrk_DisableDelay_01
Preset 0
Accum 0
EN
DN

Wrk_DisableDelay_01.DN

Wrk_do_Disable_01

SERVO AXIS OBJECT

5

Axis CIP Drive Object

Axis_ObjectCD
Axis CIP Drive Object

Axis_ObjectCD	Wrk_ServoObject_01	Sts_ER
Ref_Axis_CD	Ref_ServoAxis_01 <Axis_02_K>	Sts_EnableDone
		Sts_DisableDone
Inp_MotionGroup	Motion_Group	Sts_FaultResetDone
Cmd_Enable	Wrk_do_Enable_01 0	Sts_HomeDone
		Sts_AbortDone
Cmd_Disable	Wrk_do_Disable_01 0	Sts_StopDone
		Sts_CIP_StartInhibitActive
Cmd_FaultReset	Inp_MachineStateModel.Sts_Clearing <UN01_MachineStateModel.Sts_Clearing> 0	Sts_AxisOk
		Sts_NoMotion
		Sts_Homed
Cmd_Home	Wrk_do_Home_01 0	
Cmd_Abort	Inp_MachineStateModel.Sts_Aborting <UN01_MachineStateModel.Sts_Aborting> 0	
Cmd_Stop	Wrk_do_Stop_01 0	

(End)


```
//////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
COMPANY:          Rockwell Automation
FUNCTION:         Servo Axis Jogging
AUTHOR:           Rockwell Automation
DATE CREATED:     March 2009

Version Comments:

//////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
```

0

NOP

RELEASE JOG FUNCTION Axis number selected via HMI

1

Current Mode ID

EQ
Equal
Source A Inp_MachineStateModel.Sts_ModeCurrent
<UN01_MachineStateModel.Sts_ModeCurrent>
1
Source B c_Manual
3

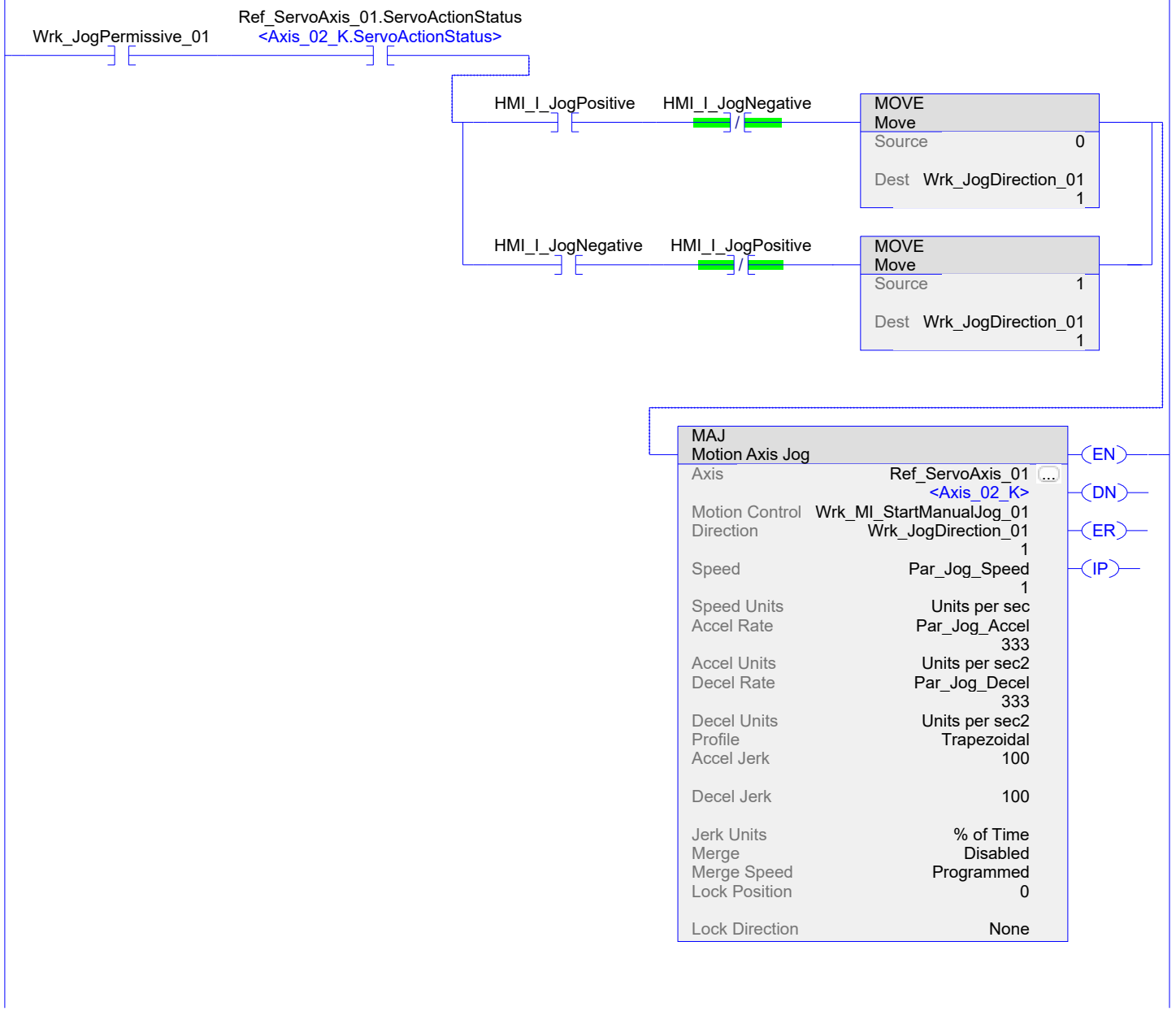
The Execute state
is active.
Inp_MachineStateModel.Sts_Execute
<UN01_MachineStateModel.Sts_Execute>

EQ
Equal
Source A HMI_I_Select_JogAxis
2
Source B Cfg_JogAxis_01
2

Wrk_JogPermissive_01

JOG SERVO AXIS

2



STOP SERVO AXIS

3

HMI_I_JogPositive HMI_I_JogNegative Wrk_MI_StartManualJog_01.IP

HMI_I_JogPositive HMI_I_JogNegative

Wrk_JogPermissive_01

MAS
Motion Axis Stop

Axis	Ref_ServoAxis_01 <Axis_02_K>	EN
Motion Control	Wrk_MI_StopManualJog_01	DN
Stop Type	All	ER
Change Decel	Yes	IP
Decel Rate	Par_Jog_Decel 333	PC
Decel Units	Units per sec2	
Change Decel Jerk	No	
Decel Jerk	100	
Jerk Units	% of Time	

FAULT RESET

4

The Clearing state is active. Inp_MachineStateModel.Sts_Clearing <UN01_MachineStateModel.Sts_Clearing>

Wrk_MI_StartManualJog_01.ER (U) Wrk_MI_StopManualJog_01.ER (U)

5

Wrk_MI_StartManualJog_01.ER

Wrk_MI_StopManualJog_01.ER

The Clearing state is active. Inp_MachineStateModel.Sts_Clearing <UN01_MachineStateModel.Sts_Clearing>

Jog instr error for axis 1 - X Wrk_JogFault_01

6

Wrk_MI_StartManualJog_01.ER

1 for Start Fault, 2 for Stop Fault

MOVE
Move

Source	1
Dest	Wrk_JogFault_Sts_Err_01 0

MI .ERR value

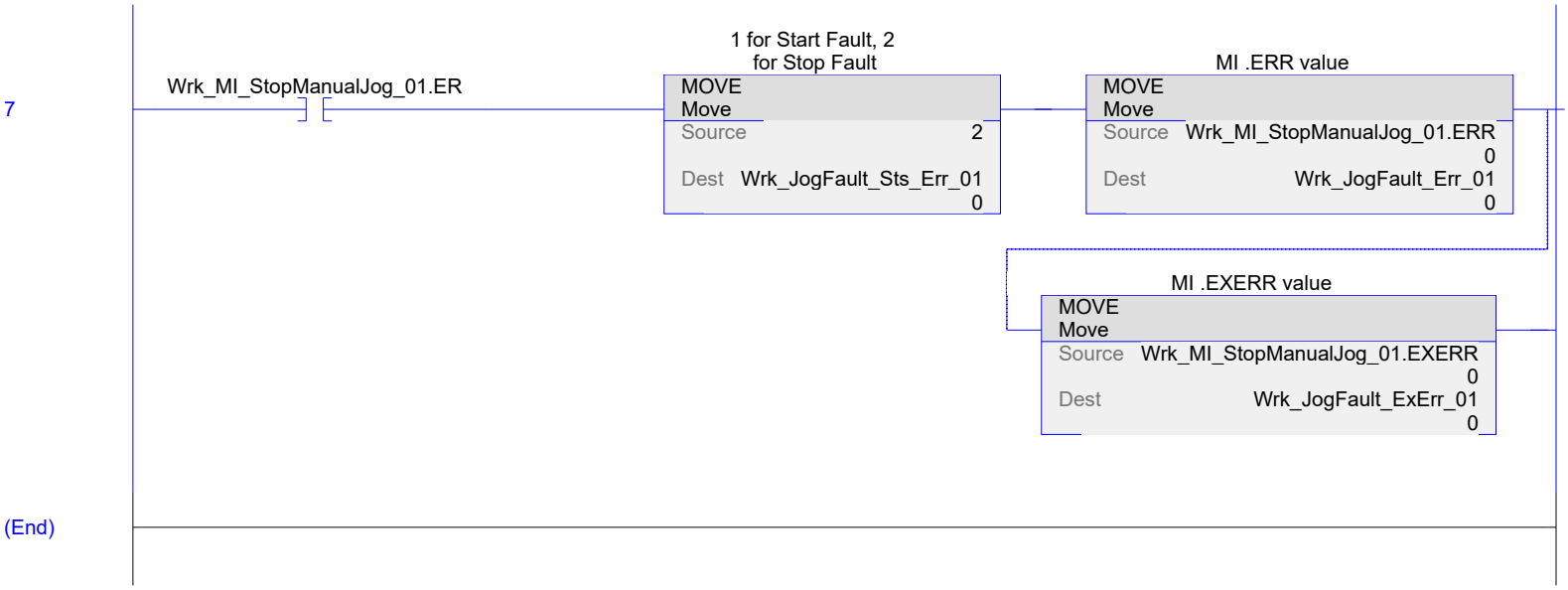
MOVE
Move

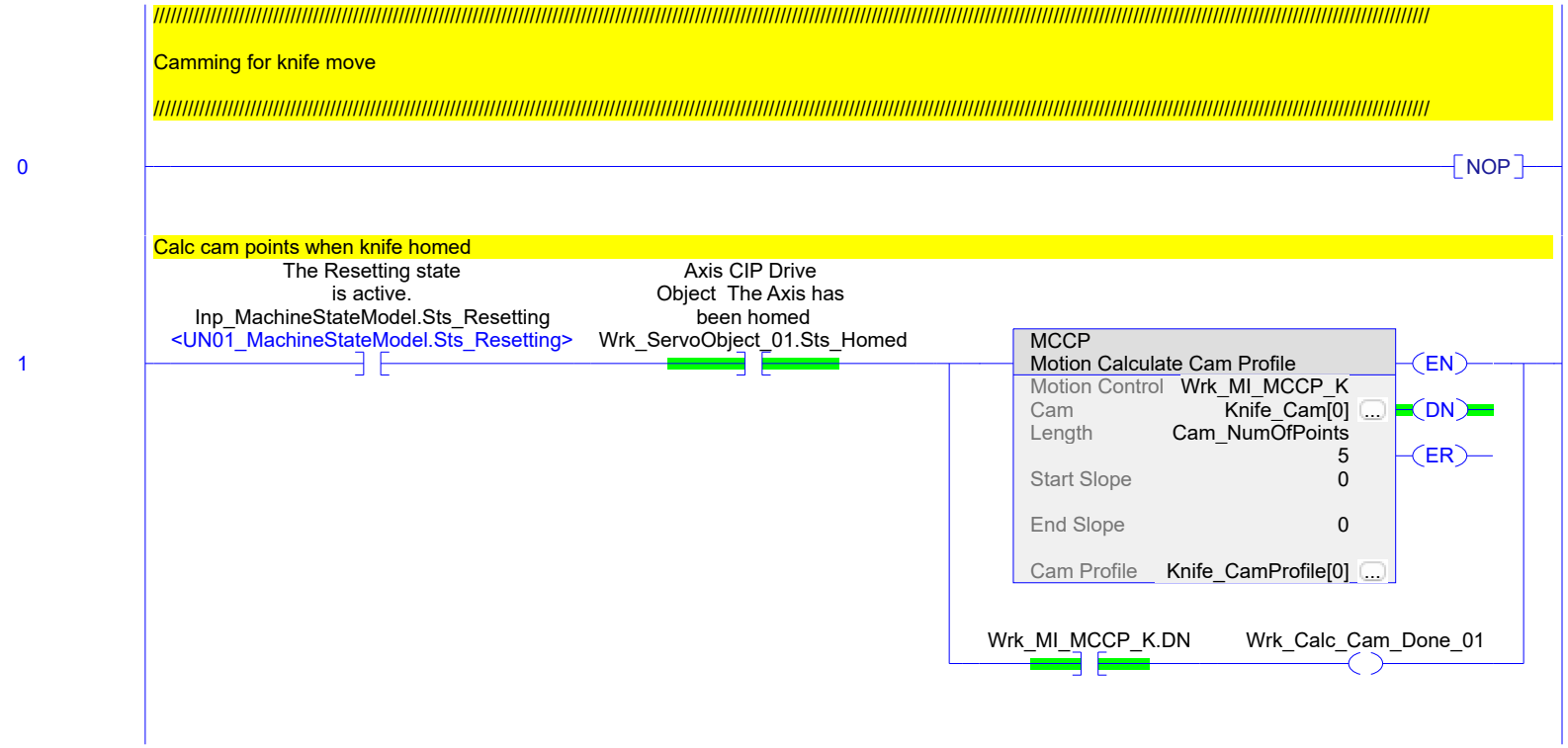
Source	Wrk_MI_StartManualJog_01.ERR 0
Dest	Wrk_JogFault_Err_01 0

MI .EXERR value

MOVE
Move

Source	Wrk_MI_StartManualJog_01.EXERR 0
Dest	Wrk_JogFault_ExErr_01 0





Do actual cam.
Master lock position is cam lock position plus registration postion
If master offset, execute an MAM

2

Wrk_do_Cam_01

CPT
Compute

Dest	Wrk_MasterLockPosition 40.72285
Expression	Cfg_CamLockPosition+Ref_MasterAxis.Registration1Position

MAPC
Motion Axis Position Cam

Slave Axis	Ref_ServoAxis_01 ... <Axis_02_K>
Master Axis	Ref_MasterAxis ... <Axis_01_W>
Motion Control	Wrk_MI_MAPC_K
Direction	0
Cam Profile	Knife_CamProfile ...
Slave Scaling	-1
Master Scaling	1
Execution Mode	Once
Execution Schedule	Immediate
Master Lock Position	Wrk_MasterLockPosition 40.72285
Cam Lock Position	Cfg_CamLockPosition 0.1
Cam Type	New Cam
Master Reference	Command
Master Direction	Forward Only

EN DN ER IP AC PC

NE
Not Equal

Source A	Cam_Master_Offset 0.0
Source B	0.0

Wrk_MI_MAPC_K.IP

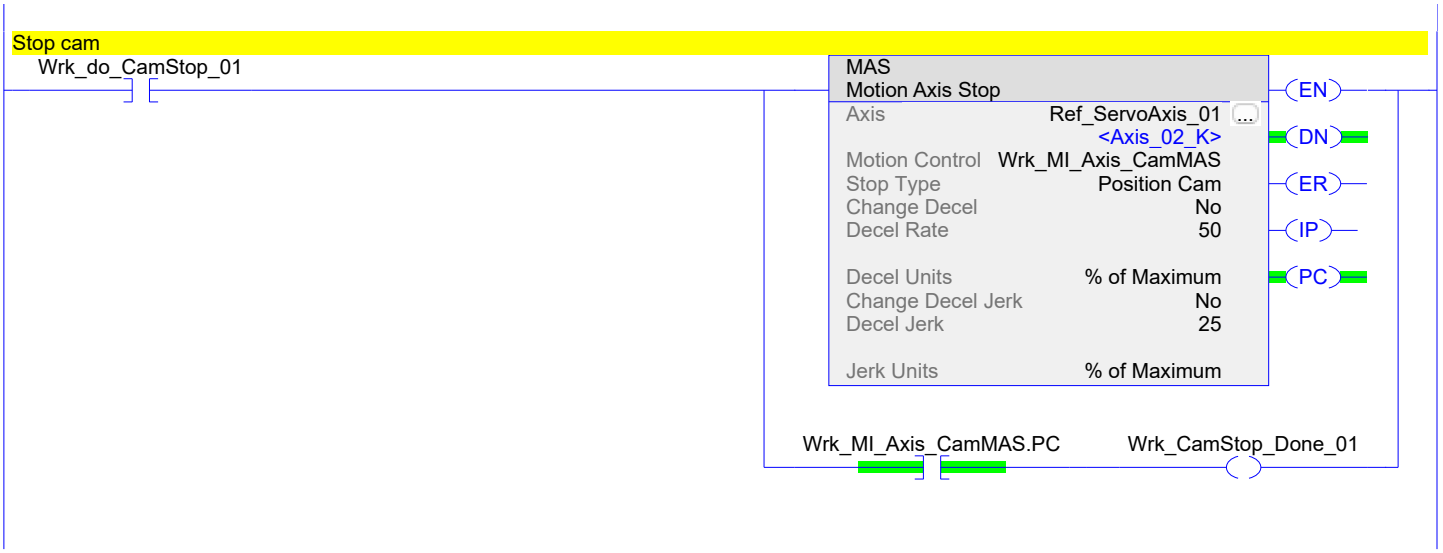
MAM
Motion Axis Move

Axis	Ref_ServoAxis_01 ... <Axis_02_K>
Motion Control	Wrk_MI_MAMOffset_K
Move Type	6
Position	Cam_Master_Offset 0.0
Speed	2.0
Speed Units	Units per sec
Accel Rate	50
Accel Units	% of Maximum
Decel Rate	50
Decel Units	% of Maximum
Profile	Trapezoidal
Accel Jerk	25
Decel Jerk	25
Jerk Units	% of Maximum
Merge	Disabled
Merge Speed	Current
Lock Position	0
Lock Direction	0
Event Distance	0
Calculated Data	0

EN DN ER IP PC

Wrk_MI_MAPC_K.PC

Wrk_Cam_Done_01



Handle Errors

4

Wrk_MI_MCCP_K.ER

MOVE Move — Source 1 — Dest Wrk_CamFault_Sts_Err_01 0

MOVE Move — Source Wrk_MI_MCCP_K.ERR 0 — Dest Wrk_CamFault_Err_01 0

MOVE Move — Source Wrk_MI_MCCP_K.EXERR 0 — Dest Wrk_CamFault_ExErr_01 0

Wrk_MI_MAPC_K.ER

MOVE Move — Source 2 — Dest Wrk_CamFault_Sts_Err_01 0

MOVE Move — Source Wrk_MI_MAPC_K.ERR 0 — Dest Wrk_CamFault_Err_01 0

MOVE Move — Source Wrk_MI_MAPC_K.EXERR 0 — Dest Wrk_CamFault_ExErr_01 0

Wrk_MI_MAMOffset_K.ER

MOVE Move — Source 3 — Dest Wrk_CamFault_Sts_Err_01 0

MOVE Move — Source Wrk_MI_MAMOffset_K.ERR 0 — Dest Wrk_CamFault_Err_01 0

MOVE Move — Source Wrk_MI_MAMOffset_K.EXERR 0 — Dest Wrk_CamFault_ExErr_01 0

Wrk_MI_Axis_CamMAS.ER

MOVE Move — Source 4 — Dest Wrk_CamFault_Sts_Err_01 0

MOVE Move — Source Wrk_MI_Axis_CamMAS.ERR 0 — Dest Wrk_CamFault_Err_01 0

MOVE Move — Source Wrk_MI_Axis_CamMAS.EXERR 0 — Dest Wrk_CamFault_ExErr_01 0

The Clearing state is active.
Inp_MachineStateModel.Sts_Clearing
<UN01_MachineStateModel.Sts_Clearing>

Wrk_Ons_CamErr [ONS] — / — Wrk_CamFault_01

(End)

//
COMPANY: Rockwell Automation
FUNCTION: Virtual Follower Axis - Equipment Module
AUTHOR: Rockwell Automation
DATE CREATED: March 2011

Version Comments:

//

0 NOP

INITIALIZE

Initialize Data

Performs initialization of any local parameters of this Equipment Module and contained Control Modules that require it

1 S:FS — JSR Jump To Subroutine, Routine Name SR20_Initialize

Set UM number

2 MOVE Move, Source 2, Dest Cfg_EM_Number 2

Set axis numbers for jogging

HMI jog axis number for axis 1 - X

3 MOVE Move, Source 2, Dest Cfg_JogAxis_01 2

THIS EQUIPMENT MODULE IS SELECTED AND ACTIVE

This Tag is used to enable states for each Equipment Module

4 EM_Selected.[Cfg_EM_Number] ( )

5 JSR Jump To Subroutine, Routine Name CM00_Procedure

SERVO AXIS OBJECT AND IT`S LOGICAL FUNCTIONs

6

This Control Module performs the state control for the slave axis; including Enable, Disable, Reset, Absolute Home, Stop, and Abort

JSR
Jump To Subroutine
Routine Name CM02_02_ServoAxisObject_K

7

Control Module Manual Jog Control

This Control Module jogs the servo axis when the Unit is in Manual mode. This provides independent control of the servo axis.

JSR
Jump To Subroutine
Routine Name CM03_02_ServoAxisJog_K

8

This Control Module defines the Cam follower profile, and initiates the synchronization of this slave to the master

JSR
Jump To Subroutine
Routine Name CM05_02_ServoAxisCam_K

Summary of EM conditions and status based on CM's

9

JSR
Jump To Subroutine
Routine Name CM01_EMConditions

Map axis faults to EM

10

JSR
Jump To Subroutine
Routine Name SR03_FaultHandler

(End)

Simple fault handler for EM

0

NOP

Map axis errors, procedure motion instruction errors, and jogging errors into bits of EM_MajorFaults

If instruction fault in Axis_Object AOI, or in EM procedure, also save location of error and .ERR and .EXERR fields of instruction causing fault. Only save info for

1

Axis CIP Drive Object Any Fault occured on this Axis
Wrk_ServoObject_01.Sts_ER

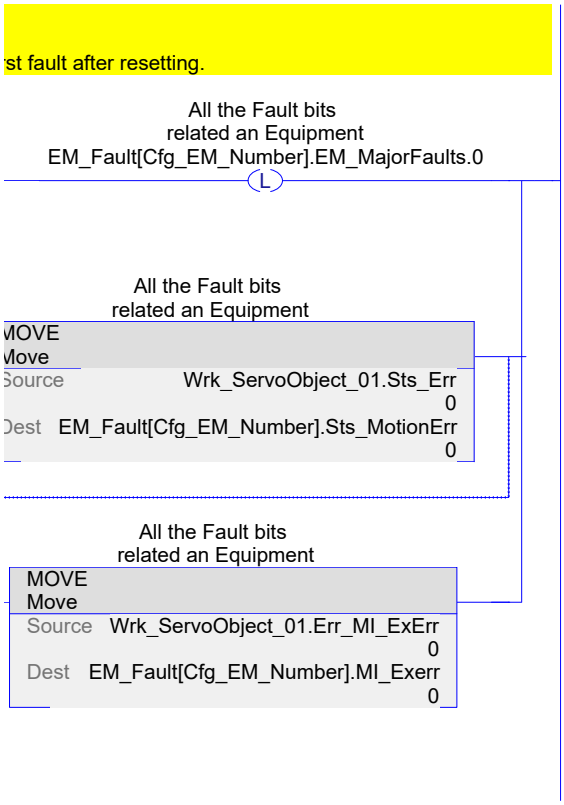
Axis CIP Drive Object Any instruction within the AOI faulted
Wrk_ServoObject_01.Err_InstructionFault

All the Fault bits related an Equipment

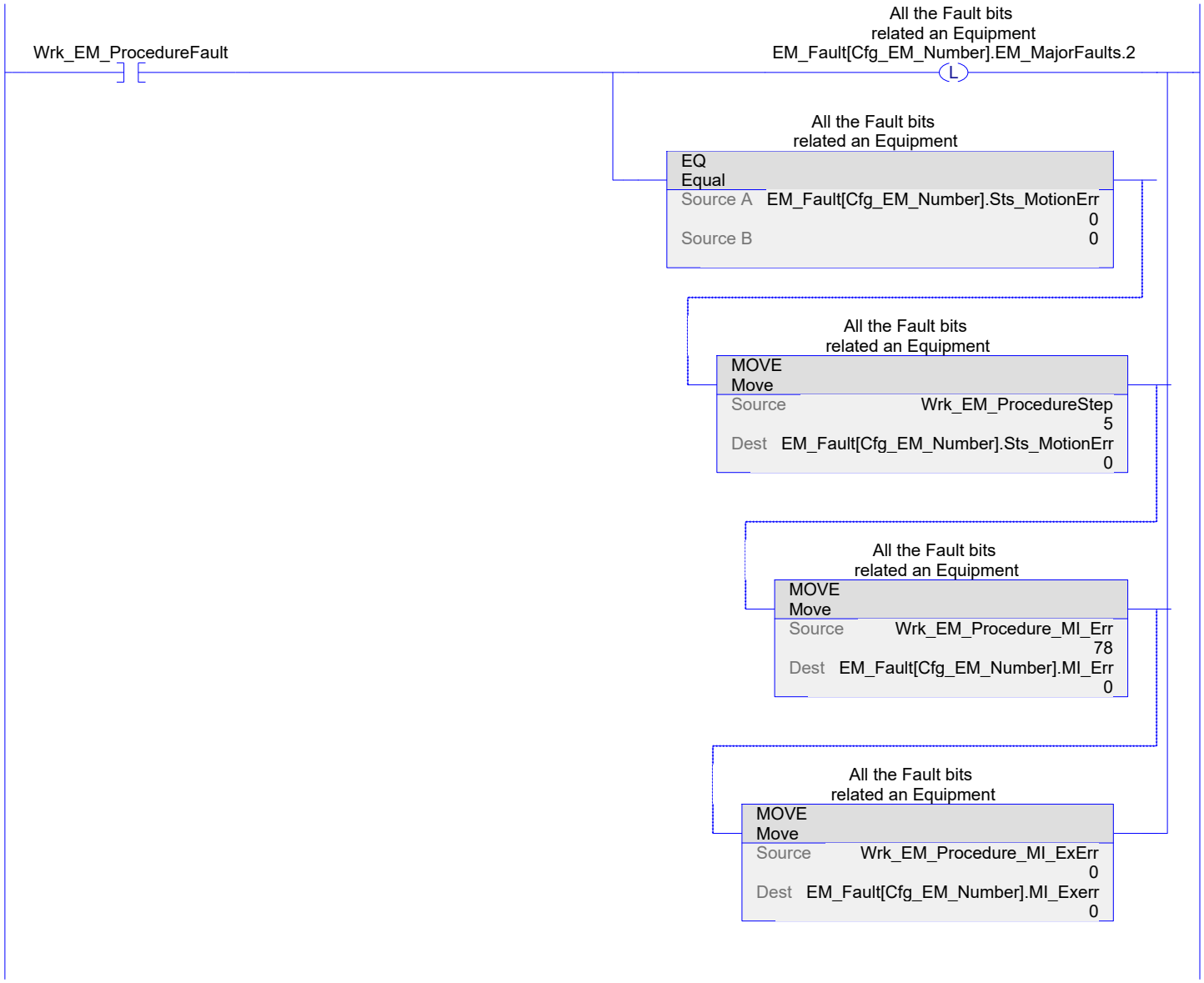
EQ
Equal
Source A EM_Fault[Cfg_EM_Number].Sts_MotionErr
0
Source B
0

All the Fault bits related an Equipment

MOVE
Move
Source Wrk_ServoObject_01.Err_MI_Err
0
Dest EM_Fault[Cfg_EM_Number].MI_Err
0



2



3

Jog instr error for axis 1 - X
Wrk_JogFault_01

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].EM_MajorFaults.4
L

All the Fault bits related an Equipment

EQ
Equal
Source A EM_Fault[Cfg_EM_Number].Sts_MotionErr
0
Source B 0

All the Fault bits related an Equipment

MOVE
Move
Source Wrk_JogFault_Sts_Err_01
0
Dest EM_Fault[Cfg_EM_Number].Sts_MotionErr
0

All the Fault bits related an Equipment

MOVE
Move
Source Wrk_JogFault_Err_01
0
Dest EM_Fault[Cfg_EM_Number].MI_Err
0

All the Fault bits related an Equipment

MOVE
Move
Source Wrk_JogFault_ExErr_01
0
Dest EM_Fault[Cfg_EM_Number].MI_Exerr
0

4

Wrk_CamFault_01

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].EM_MajorFaults.6
L

All the Fault bits related an Equipment
EQ Equal
Source A EM_Fault[Cfg_EM_Number].Sts_MotionErr 0
Source B 0

All the Fault bits related an Equipment
MOVE Move
Source Wrk_CamFault_Sts_Err_01 0
Dest EM_Fault[Cfg_EM_Number].Sts_MotionErr 0

All the Fault bits related an Equipment
MOVE Move
Source Wrk_CamFault_Err_01 0
Dest EM_Fault[Cfg_EM_Number].MI_Err 0

All the Fault bits related an Equipment
MOVE Move
Source Wrk_CamFault_ExErr_01 0
Dest EM_Fault[Cfg_EM_Number].MI_Exerr 0

***** Moved from CM04_ServoAxisGear

Watchdog for resetting - Create an error if timeout occurs

5

The Resetting state is active.
Inp_MachineStateModel.Sts_Resetting
<UN01_MachineStateModel.Sts_Resetting>

EM_Resetting_Done.[Cfg_EM_Number]
/

All the Fault bits related an Equipment
TON Timer On Delay
Timer EM_Fault[Cfg_EM_Number].WatchdogPrepareExecution
Preset 60000
Accum 0
EN
DN

***** Moved from CM04_ServoAxisGear
***** Added clear of Sts_Err

Clearing resets watchdog faults and other faults and warnings and clears instruction fault error details

6

The Clearing state is active.
Inp_MachineStateModel.Sts_Clearing
<UN01_MachineStateModel.Sts_Clearing>

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].StartFaultWatchdog
(U)

All the Fault bits related an Equipment
MOVE
Move
Source 0
Dest EM_Fault[Cfg_EM_Number].EM_MajorFaults
0

All the Fault bits related an Equipment
MOVE
Move
Source 0
Dest EM_Fault[Cfg_EM_Number].EM_MinorFaults
0

All the Fault bits related an Equipment
MOVE
Move
Source 0
Dest EM_Fault[Cfg_EM_Number].EM_Warnings
0

All the Fault bits related an Equipment
MOVE
Move
Source 0
Dest EM_Fault[Cfg_EM_Number].Sts_MotionErr
0

All the Fault bits related an Equipment
MOVE
Move
Source 0
Dest EM_Fault[Cfg_EM_Number].MI_Err
0

All the Fault bits related an Equipment
MOVE
Move
Source 0
Dest EM_Fault[Cfg_EM_Number].MI_Exerr
0

***** Moved from CM04_ServoAxisGear

Watchdog fault bit

7

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].WatchdogPrepareExecution.DN

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].StartFaultWatchdog
(L)

Summary of EM faults

8

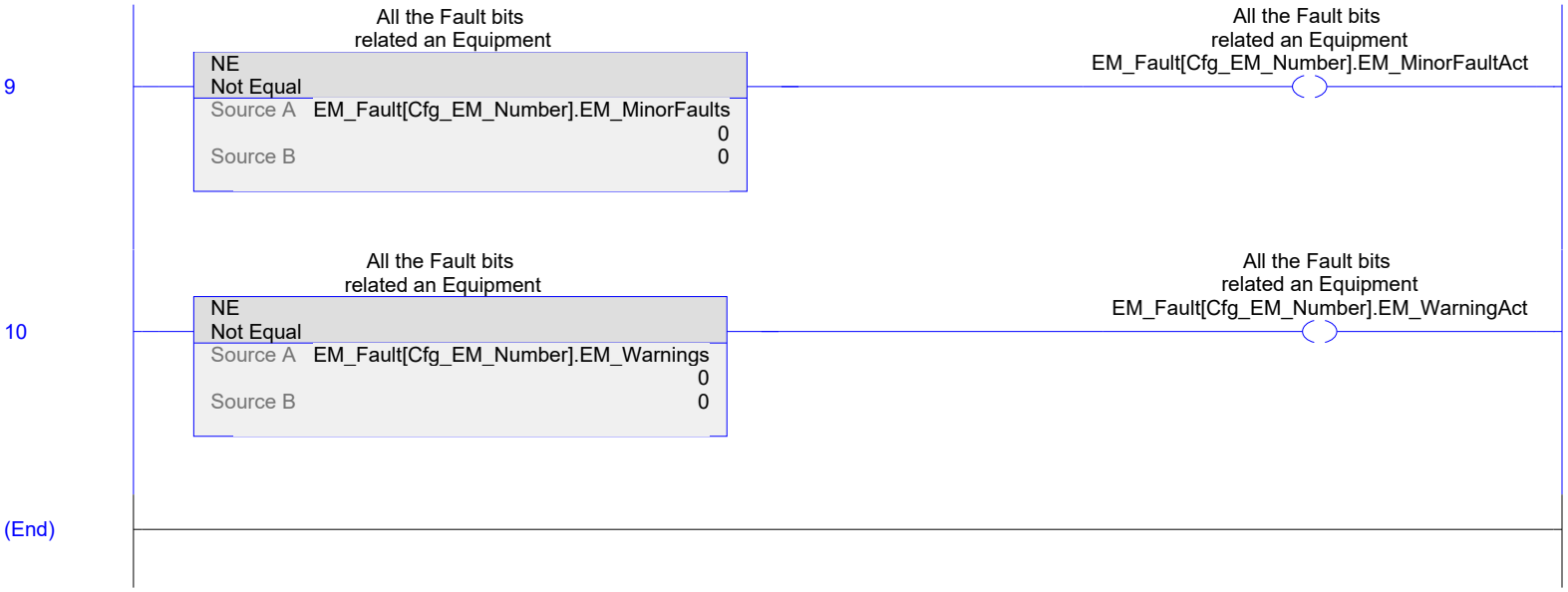
All the Fault bits related an Equipment
NE
Not Equal
Source A EM_Fault[Cfg_EM_Number].EM_MajorFaults
0
Source B 0

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].EM_MajorFaultAct
( )

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].StartFaultInstruction

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].StartFaultCalculation

All the Fault bits related an Equipment
EM_Fault[Cfg_EM_Number].StartFaultWatchdog



//
COMPANY: Rockwell Automation
FUNCTION: Initialize Equipment Module Data
AUTHOR: Rockwell Automation
DATE CREATED: March 2011

Version Comments:

//

0 NOP

1
MOVE Move — Source 1 — Dest Par_Jog_Speed 1
MOVE Move — Source 333 — Dest Par_Jog_Accel 333
MOVE Move — Source 333 — Dest Par_Jog_Decel 333

Initialize motion instruction tags

2
COP Copy File — Source MI_Init — Dest Wrk_MI_Axis_Move1 — Length 1
COP Copy File — Source MI_Init — Dest Wrk_MI_Axis_MAH — Length 1
COP Copy File — Source MI_Init — Dest Wrk_MI_Axis_JogMAS — Length 1
COP Copy File — Source MI_Init — Dest Wrk_MI_MasterAxisMAR — Length 1
COP Copy File — Source MI_Init — Dest Wrk_MI_MasterAxisMDR — Length 1

3
COP Copy File — Source MI_Init — Dest Wrk_MI_StartManualJog_01 — Length 1
COP Copy File — Source MI_Init — Dest Wrk_MI_StopManualJog_01 — Length 1

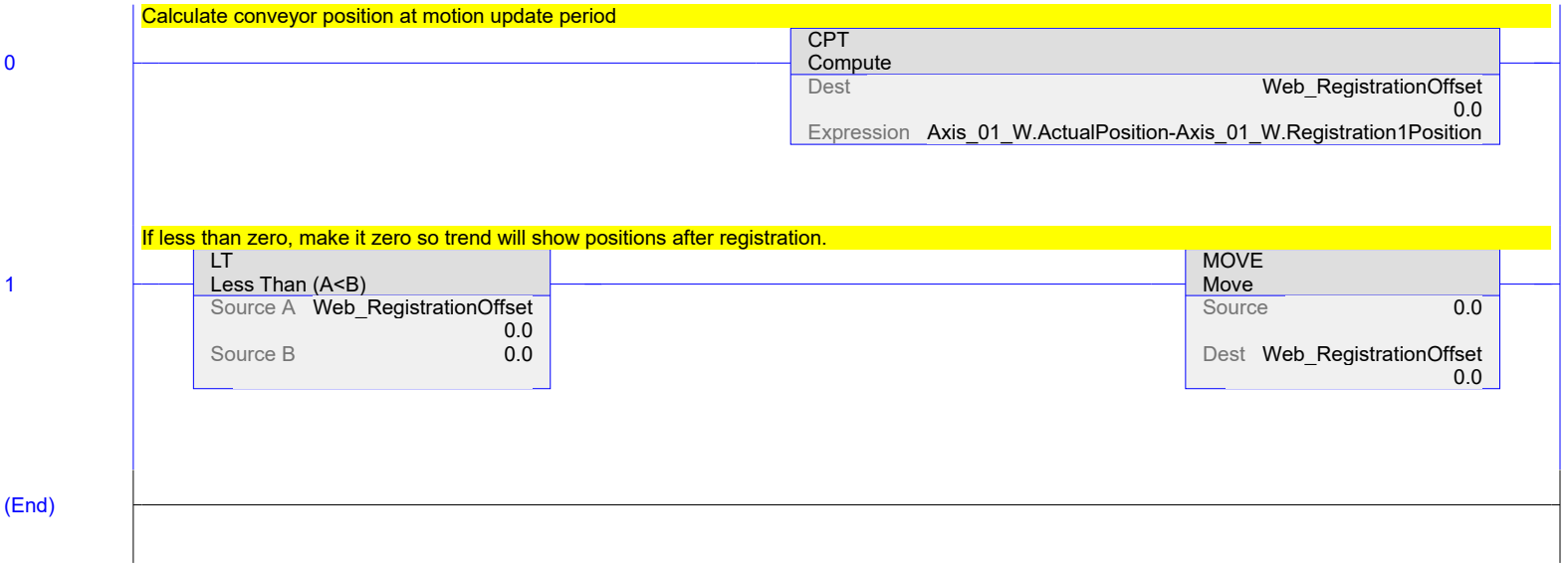
No master

4 AFI
Axis CIP Drive Object Configuration: =1: Abort, Stop will wait for Inp_MasterNoMotion before executing MAS instruction
Wrk_ServoObject_01.Cfg_UseVirtualMaster ( )

Set cam master offset to zero

5
MOVE Move — Source 0.0 — Dest Cam_Master_Offset 0.0

(End)



Signature Listing

Axis_ObjectAV
Virtual axis controls
Revision: v2.3
2.3 - Change error handling to match current Axis_ObjectCD
2.2 - v20 Update
2.1 - Help File Updaets
2.0 - AOI name update
1.0 - Initial Release
Signature: D2A65852, 2025-11-22T23:06:07.667Z

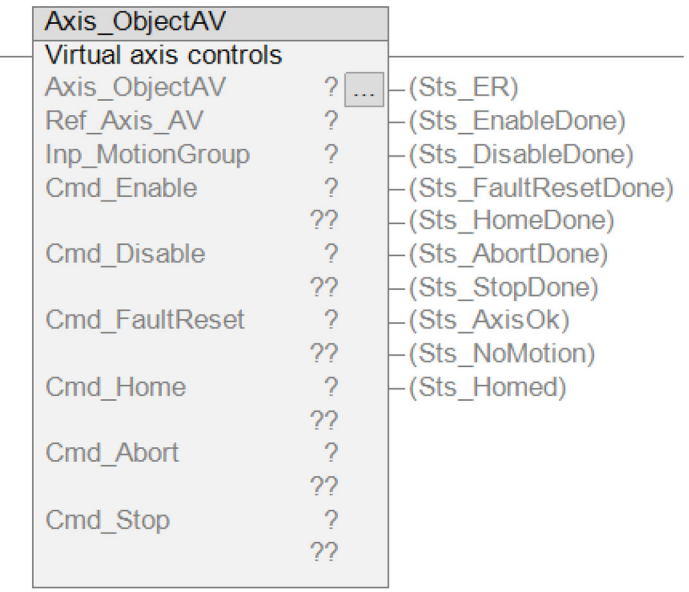
Axis_ObjectAV v2.3

Rockwell Automation

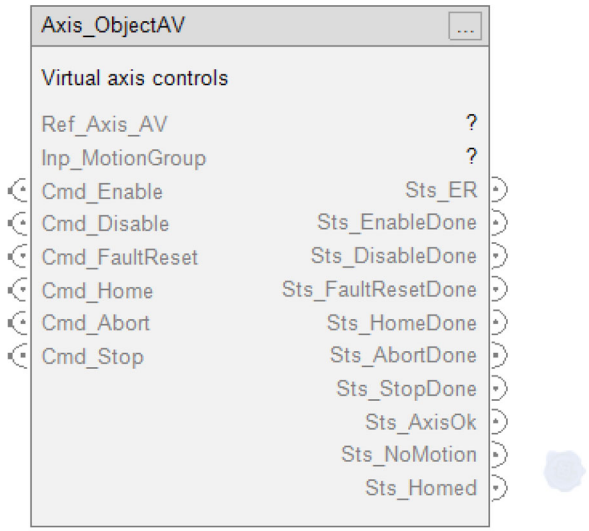
Virtual axis controls

Available Languages

Relay Ladder



Function Block



Structured Text

```
Axis_ObjectAV(Ref_Axis_AV, Inp_MotionGroup, Cmd_Enable, Cmd_Disable, Cmd_FaultReset, Cmd_Home, Cmd_Abort, Cmd_Stop);
```

Parameters

Required	Name	Data Type	Usage	Description
X	Axis_ObjectAV	Axis_ObjectAV	InOut	Virtual axis controls
	EnableIn	BOOL	Input	
	EnableOut	BOOL	Output	
X	Ref_Axis_AV	AXIS_VIRTUAL	InOut	Axis that will be controlled and or viewed for status information
X	Inp_MotionGroup	MOTION_GROUP	InOut	Motion Group that will be viewed for status
	Cfg_HMIFPDisplay	DINT	Input	

	Cfg_UseVirtualMaster	BOOL	Input	Configuration: =1: Abort, Stop will wait for Inp_MasterNoMotion before executing MAS instruction
	Cfg_HomeEnabled	BOOL	Input	Configuration: =1: CMD_Home will execute MAH instruction = 0 no home instruction executed
	Cfg_StopEnabled	BOOL	Input	Configuration: =1: CMD_Stop will execute MAS instruction = 0 no stop instruction executed
	Cfg_AbortEnabled	BOOL	Input	Configuration: =1: CMD_Abort will execute MAS instruction = 0 no stop instruction executed
	Cfg_ZeroSpeedTolerance	REAL	Input	Zero Speed Tolerance Window in units/sec for Sts_NoMotion
	Cfg_AbortRamp	REAL	Input	Ramp for MAS instruction in aborting
	Cfg_StopRamp	REAL	Input	Ramp for MAS instruction in stopping
	Inp_MasterNoMotion	BOOL	Input	If Cfg_UseVirtualMaster=1: Abort, Stop will wait for Inp_MasterNoMotion before executing MAS instruction
X	Cmd_Enable	BOOL	Input	Enables the Axis
X	Cmd_Disable	BOOL	Input	Disables the Axis
X	Cmd_FaultReset	BOOL	Input	Fault Reset
X	Cmd_Home	BOOL	Input	Home the Axis, if Cfg_HomeEnabled = 1
X	Cmd_Abort	BOOL	Input	Stops the axis with AbortRamp Waits for Inp_MasterNoMotion if CfgUseVirtualMaster=1
X	Cmd_Stop	BOOL	Input	Stops the axis with StopRamp Waits for Inp_MasterNoMotion if CfgUseVirtualMaster=1
	Sts_ER	BOOL	Output	Any Fault occured on this Axis
	Sts_EnableDone	BOOL	Output	Condition: Enable Done
	Sts_DisableDone	BOOL	Output	Condition: Disable Done
	Sts_FaultResetDone	BOOL	Output	Condition: Fault Reset Done
	Sts_HomeDone	BOOL	Output	Condition: Home Done
	Sts_AbortDone	BOOL	Output	Condition: Aborting Done
	Sts_StopDone	BOOL	Output	Condition: Stopping Done
	Sts_AxisOk	BOOL	Output	Status Display: Axis ready to enable
	Sts_NoMotion	BOOL	Output	AverageVelocity within ZeroSpeedTolerance and no MotionStatus set
	Sts_Homed	BOOL	Output	The Axis has been homed
	Err_General	BOOL	Output	Any General Fault
	Err_InstructionFault	BOOL	Output	Any instruction within the AOI faulted
	Err_MSOFault	BOOL	Output	MSO instruction Fault
	Err_MAHFault	BOOL	Output	MAH instruction Fault
	Sts_Err	DINT	Output	
	Err_MI_Err	DINT	Output	Motion instruction .ERR field if fault
	Err_MI_ExErr	DINT	Output	Motion instruction .EXERR field if fault

Extended Description

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Instruction Overview:

The Axis Virtual Object Add-On Instruction performs Enable, Disable, Fault Reset, Home, Stop, Abort, Diagnostics, and Status functions of a physical axis.

Instruction Execution:

This AOI is intended to be scanned unconditionally

Supplemental Descriptions:

These configuration tags need to be configured for the AOI to work correctly:

- Cfg_UseVirtualMaster
- Cfg_StopEnabled
- Cfg_HomeEnabled
- Cfg_AbortEnabled

Prescan:
The Prescan routine executes after the primary Logic routine executes in Prescan mode. It will initialize tag values to a known or predefined state prior to execution of the AOI.
When an add-on instruction executes in Prescan mode, any required parameters have their data passed.
• Values are passed to input parameters from their arguments in the instruction call.
• Values are passed from output parameters to their arguments defined in the instruction call.
These values are passed even when the rung condition is false.

-Cmd_Enable and Sts_EnableDone-
When the command Cmd_Enable is set, it is checked to see if the axis is ready to execute the MSO instruction (feedback on). When Cmd_Enable is successfully executed, the Sts_EnableDone bit will be set.

-Cmd_Disable and Sts_DisableDone-
When the command Cmd_Disable is set, it is checked to see if the axis is ready to execute the MSF instruction (feedback off). When Cmd_Disable is successfully executed, the Sts_DisableDone bit will be set.

-Cmd_FaultReset and Sts_FaultResetDone-
When the command Cmd_FaultReset is set, all Err-bits of the AOI are unlatched and the axis will be reset with a MASR instruction (Axis Shutdown Reset). When Cmd_FaultReset is successfully executed, the Sts_ FaultResetDone bit will be set.

-Cmd_Home, Sts_Homed and Sts_HomedDone-
When the command Cmd_Home is set, a home sequence is initiated if the axis is configured to do a home. To configure the axis to home, the Cfg_HomeEnabled bit must be set.

-Cfg_HomeEnabled-
0 - Home instruction is not executed
1 - CMD_Home will execute MAH instruction
When Cmd_Home is successfully executed, the Sts_Homed and Sts_HomeDone bits will be set.

-Cmd_Abort/Sts_AbortDone and Cmd_Stop/Sts_StopDone-
The two commands Cmd_Abort and Cmd_Stop initiate a stop of the axis.
If configured to do so, the command Cmd_Abort or Cmd_Stop will set a deceleration rate used by the MAS instruction (axis stop).

Cfg_AbortEnabled
0 - The axis does not execute the command
1 - The axis executes the command

Cfg_StopEnabled
0 - The axis does not execute the command
1 -The axis executes the command

-Cfg_UseVirtualMaster-
The axis can wait for the virtual master to be completely stopped before the MAS instruction is executed. If Cfg_UseVirtualMaster is set, abort will wait for Inp_MasterNoMotion before execution of the instruction. If not, it will be executed immediately.

-Cfg_UseVirtualMaster-
0 - Abort, Stop will execute the MAS instruction immediately
1 - Abort, Stop will wait for Inp_MasterNoMotion before executing MAS instruction

-Sts_NoMotion-
When Sts_NoMotion of the axis is detected and either a Cmd_Abort or Cmd_Stop command is set, either the Sts_AbortDone or Sts_StopDone status bit, as appropriate, will be set. 'No motion' is when none of the motion planner inputs (for example, gears, jogs, or CAMs) are active and the axis speed is less than the level configured in Cfg_ZeroSpeedTolerance.

The motion planner inputs are masked with the MotionStatus (Motion planner input) set this way:
65407 [dec] = 1111 1111 0111 1111 [bin]

Bit	Description
00	AccelStatus
01	DecelStatus
02	MoveStatus
03	JogStatus
04	GearingStatus

05 HomingStatus
06 StoppingStatus
07 AxisHomedStatus
08 PositionCamStatus
09 TimeCamStatus
10 PositionCamPendingStatus
11 TimeCamPendingStatus
12 GearingLockStatus
13 PositionCamLockStatus
14 MasterOffsetMoveStatus
15 CoordinatedMotionStatus

==========

General Information - Parameter Prefixing:

Inp_

Input:
Generally used to designate a connection to a real I/O input point or an upstream block.

Set_

Setpoint:
Used as a setpoint coming into the instruction. May come from the operator via the HMI, or from the controller program itself.

Cmd_

Command:
Generally used to as a command input either from the operator via the HMI or from the program.

Cfg_

Configuration:
Generally used to designate a configuration value.
Typically, but not always, something that is only changed irregularly.

Par_

Parameter:
Equipment parameter or input parameter from Batching systems.
Generally used to designate a value that receives changes on a regular basis.

Wrk_

Working Register:
In many cases the control routine will require some internal working storage locations.
This is targeted at the control routine that lies inside a normal UDT.
In the case of AOI's, these registers can simply become "Local Tags".

Out_

Output:
Generally used to designate a connection to a real I/O output point or a downstream block.

Val_

Value:
Designates a value calculated inside the instruction, which may or may not be the primary output of the instruction.

Rpt_

Report:
Designates a value calculated inside the instruction that is typically used for batch reporting.

Sts_

Status:
Status of the instruction. Also contains two required members.
Ex.
Sts_Alarm - An alarm exists. (Boolean)
Sts_ER - The instruction itself has an error. (Boolean)

Alm_

Alarm:
Alarm indicators to display which actual alarm is occurring. All of these are Booleans.

Rdy_

Ready:
Command ready bits. Booleans determined inside the control routines to reflect whether the routine will allow state change commands.
Used with the HMI faceplates to enable or disable command buttons.
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Execution

Condition	Description
EnableIn is true	
Prescan	

Revision v2.3 Notes

2.3 - Change error handling to match current Axis_ObjectCD
2.2 - v20 Update
2.1 - Help File Updaets
2.0 - AOI name update
1.0 - Initial Release

Name	Default	Data Type	Scope
Cfg_AbortEnabled	1	BOOL	Axis_ObjectAV

Configuration: =1: CMD_Abort will execute MAS instruction = 0 no stop instruction executed
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Cfg_AbortEnabled - Axis_ObjectAV/Logic - 11(XIC), 12(XIC)

Cfg_AbortRamp	100.0	REAL	Axis_ObjectAV

Ramp for MAS instruction in aborting
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Cfg_AbortRamp - Axis_ObjectAV/Logic - 11(MOVE)

Cfg_HMIFPDisplay	0	DINT	Axis_ObjectAV

Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
*Cfg_HMIFPDisplay - Axis_ObjectAV/Logic - *14(MOVE)*

Cfg_HomeEnabled	1	BOOL	Axis_ObjectAV

Configuration: =1: CMD_Home will execute MAH instruction = 0 no home instruction executed
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Cfg_HomeEnabled - Axis_ObjectAV/Logic - 10(XIC), 7(XIC)

Cfg_StopEnabled	1	BOOL	Axis_ObjectAV

Configuration: =1: CMD_Stop will execute MAS instruction = 0 no stop instruction executed
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Cfg_StopEnabled - Axis_ObjectAV/Logic - 11(XIC), 12(XIC)

Cfg_StopRamp	20.0	REAL	Axis_ObjectAV

Ramp for MAS instruction in stopping
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Cfg_StopRamp - Axis_ObjectAV/Logic - 11(MOVE)

Cfg_UseVirtualMaster	1	BOOL	Axis_ObjectAV

Configuration: =1: Abort, Stop will wait for Inp_MasterNoMotion before executing MAS instruction
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Cfg_UseVirtualMaster - Axis_ObjectAV/Logic - 11(XIO)

Cfg_ZeroSpeedTolerance 0.0 REAL Axis_ObjectAV
Zero Speed Tolerance Window in units/sec for Sts_NoMotion
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Cfg_ZeroSpeedTolerance - Axis_ObjectAV/Logic - 1(LE)

Cmd_Abort 0 BOOL Axis_ObjectAV
Stops the axis with AbortRamp Waits for Inp_MasterNoMotion if CfgUseVirtualMaster=1
Usage: Input Parameter
Required: Yes
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_Abort - Axis_ObjectAV/Logic - 11(XIC), 12(XIC)

Cmd_Disable 0 BOOL Axis_ObjectAV
Disables the Axis
Usage: Input Parameter
Required: Yes
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_Disable - Axis_ObjectAV/Logic - 4(XIC)

Cmd_Enable 0 BOOL Axis_ObjectAV
Enables the Axis
Usage: Input Parameter
Required: Yes
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_Enable - Axis_ObjectAV/Logic - 3(XIC)

Cmd_FaultReset 0 BOOL Axis_ObjectAV
Fault Reset
Usage: Input Parameter
Required: Yes
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_FaultReset - Axis_ObjectAV/Logic - 5(XIC), 6(XIO)

Cmd_Home 0 BOOL Axis_ObjectAV
Home the Axis, if Cfg_HomeEnabled = 1
Usage: Input Parameter
Required: Yes
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_Home - Axis_ObjectAV/Logic - 10(XIC), 7(XIC)

Cmd_Stop 0 BOOL Axis_ObjectAV
Stops the axis with StopRamp Waits for Inp_MasterNoMotion if CfgUseVirtualMaster=1
Usage: Input Parameter
Required: Yes
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_Stop - Axis_ObjectAV/Logic - 11(XIC), 12(XIC)

Err_General 0 BOOL Axis_ObjectAV
Any General Fault
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_General - Axis_ObjectAV/Logic - *2(OTL)*
*Err_General - Axis_ObjectAV/Prescan - *0(OTU)*

Err_InstructionFault 0 BOOL Axis_ObjectAV
Any instruction within the AOI faulted
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_InstructionFault - Axis_ObjectAV/Logic - *15(OTL), *15(OTU), *5(OTU)*

Err_MAHFault 0 BOOL Axis_ObjectAV
MAH instruction Fault
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_MAHFault - Axis_ObjectAV/Prescan - *0(OTU)*

Err_MI_Err 0 DINT Axis_ObjectAV
Motion instruction .ERR field if fault
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_MI_Err - Axis_ObjectAV/Logic - *11(MOVE), *5(MOVE), *5(MOVE), *5(MOVE), *8(MOVE)*

Err_MI_ExErr 0 DINT Axis_ObjectAV
Motion instruction .EXERR field if fault
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_MI_ExErr - Axis_ObjectAV/Logic - *11(MOVE), *5(MOVE), *5(MOVE), *5(MOVE), *8(MOVE)*

Inp_MasterNoMotion 0 BOOL Axis_ObjectAV
If Cfg_UseVirtualMaster=1: Abort, Stop will wait for Inp_MasterNoMotion before executing MAS instruction
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Inp_MasterNoMotion - Axis_ObjectAV/Logic - 11(XIC)

Inp_MotionGroup MOTION_GROUP Axis_ObjectAV
Motion Group that will be viewed for status
Usage: InOut Parameter
Required: Yes
Visible: Yes
OPC UA Access: None
Inp_MotionGroup.GroupStatus ?? DINT
Motion Group that will be viewed for status

Inp_MotionGroup (Continued)

Inp_MotionGroup.GroupStatus.1 ?? BOOL
Motion Group that will be viewed for status

Inp_MotionGroup.InhibStatus ?? BOOL
Motion Group that will be viewed for status

Inp_MotionGroup.GroupSynced ?? BOOL
Motion Group that will be viewed for status
Inp_MotionGroup.GroupSynced - Axis_ObjectAV/Logic - 16(XIC)

Inp_MotionGroup.AxisInhibitStatus
?? BOOL
Motion Group that will be viewed for status

Inp_MotionGroup.AxisTestModeStatus
?? BOOL
Motion Group that will be viewed for status

Inp_MotionGroup.GroupFault ?? DINT
Motion Group that will be viewed for status

Inp_MotionGroup.GroupOverlapFault
?? BOOL
Motion Group that will be viewed for status

Inp_MotionGroup.CSTLossFault ?? BOOL
Motion Group that will be viewed for status

Inp_MotionGroup.GroupTaskLoadingFault
?? BOOL
Motion Group that will be viewed for status

Inp_MotionGroup.ClockSyncFault ?? BOOL
Motion Group that will be viewed for status

Inp_MotionGroup.GroupAlarm ?? DINT
Motion Group that will be viewed for status

Inp_MotionGroup.ClockSyncAlarm
?? BOOL
Motion Group that will be viewed for status

Inp_MotionGroup.AxisFault ?? DINT
Motion Group that will be viewed for status

Inp_MotionGroup.PhysicalAxisFault
?? BOOL
Motion Group that will be viewed for status

Inp_MotionGroup.ModuleFault ?? BOOL
Motion Group that will be viewed for status

Inp_MotionGroup.ConfigFault ?? BOOL
Motion Group that will be viewed for status

Inp_MotionGroup.TaskMaxScanTime
?? DINT
Motion Group that will be viewed for status

Inp_MotionGroup.TaskLastScanTime
?? DINT
Motion Group that will be viewed for status

Inp_MotionGroup.TaskLastIOTime
?? DINT
Motion Group that will be viewed for status

Inp_MotionGroup.TaskMaxIOTime
?? DINT
Motion Group that will be viewed for status

Inp_MotionGroup.TaskAverageScanTime
?? DINT
Motion Group that will be viewed for status

Inp_MotionGroup.TaskAverageIOTime
?? DINT
Motion Group that will be viewed for status

Ref_Axis_AV AXIS_VIRTUAL Axis_ObjectAV
Axis that will be controlled and or viewed for status information
Usage: InOut Parameter
Required: Yes

Ref_Axis_AV (Continued)
Visible: Yes
OPC UA Access: None
Ref_Axis_AV - Axis_ObjectAV/Logic - 11(MAS), 5(MAFR), 5(MASR), 8(MAH)

Ref_Axis_AV.AxisFault ?? DINT
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.AxisFault - Axis_ObjectAV/Logic - 13(NE)

Ref_Axis_AV.AxisFault.1 ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.AxisFault.2 ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.PhysicalAxisFault ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.ModuleFault ?? BOOL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.ModuleFault - Axis_ObjectAV/Logic - 16(XIO)

Ref_Axis_AV.ConfigFault ?? BOOL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.ConfigFault - Axis_ObjectAV/Logic - 2(XIC)

Ref_Axis_AV.GroupFault ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.AxisStatus ?? DINT
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.AxisStatus.2 ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.ServoActionStatus ?? BOOL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.ServoActionStatus - Axis_ObjectAV/Logic - 3(XIC)

Ref_Axis_AV.DriveEnableStatus ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.ShutdownStatus ?? BOOL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.ShutdownStatus - Axis_ObjectAV/Logic - 16(XIO)

Ref_Axis_AV.ConfigUpdateInProcess
?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.InhibitStatus ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.DirectControlStatus ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.AxisUpdateStatus ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.MotionStatus ?? DINT
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.MotionStatus - Axis_ObjectAV/Logic - 1(MEQ)

Ref_Axis_AV.AccelStatus ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.DecelStatus ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.MoveStatus ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.JogStatus ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.GearingStatus ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.HomingStatus ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.StoppingStatus ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.AxisHomedStatus ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV.PositionCamStatus ?? BOOL
Axis that will be controlled and or viewed for status information

Ref_Axis_AV (Continued)

Ref_Axis_AV.TimeCamStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.PositionCamPendingStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.TimeCamPendingStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.GearingLockStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.PositionCamLockStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.TimeCamLockStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.MasterOffsetMoveStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.CoordinatedMotionStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.TransformStateStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.ControlledByTransformStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.MoveLockStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.JogLockStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.MasterOffsetMoveLockStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.MaximumSpeedExceeded	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.AxisEvent	??	DINT
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.WatchEventArmedStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.WatchEventStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.RegEvent1ArmedStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.RegEvent1Status	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.RegEvent2ArmedStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.RegEvent2Status	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.HomeEventArmedStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.HomeEventStatus	??	BOOL
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.OutputCamStatus	??	DINT
Axis that will be controlled and or viewed for status information		
Ref_Axis_AV.OutputCamPendingStatus		

Ref_Axis_AV (Continued)
?? DINT
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.OutputCamLockStatus
?? DINT
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.OutputCamTransitionStatus
?? DINT
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.ActualPosition ?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.StrobeActualPosition ?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.StartActualPosition ?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.AverageVelocity ?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.AverageVelocity - Axis_ObjectAV/Logic - 1(ABS)
Ref_Axis_AV.ActualVelocity ?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.ActualAcceleration ?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.WatchPosition ?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.Registration1Position ?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.Registration2Position ?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.Registration1Time ?? DINT
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.Registration2Time ?? DINT
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.InterpolationTime ?? DINT
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.InterpolatedActualPosition
?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.InterpolatedCommandPosition
?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.MasterOffset ?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.StrobeMasterOffset ?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.StartMasterOffset ?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.CommandPosition ?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.StrobeCommandPosition
?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.StartCommandPosition
?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.CommandVelocity ?? REAL
Axis that will be controlled and or viewed for status information
Ref_Axis_AV.CommandAcceleration
?? REAL
Axis that will be controlled and or viewed for status information

Sts_AbortDone 0 BOOL Axis_ObjectAV
Condition: Aborting Done
Usage: Output Parameter

Sts_AbortDone (Continued)
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_AbortDone - Axis_ObjectAV/Logic - *12(OTE)*

Sts_AxisOk 0 BOOL Axis_ObjectAV
Status Display: Axis ready to enable
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_AxisOk - Axis_ObjectAV/Logic - *16(OTE)*

Sts_DisableDone 0 BOOL Axis_ObjectAV
Condition: Disable Done
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_DisableDone - Axis_ObjectAV/Logic - *4(OTE)*

Sts_EnableDone 0 BOOL Axis_ObjectAV
Condition: Enable Done
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_EnableDone - Axis_ObjectAV/Logic - *3(OTE)*

Sts_ER 0 BOOL Axis_ObjectAV
Any Fault occured on this Axis
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_ER - Axis_ObjectAV/Logic - *13(OTE), 14(XIC), 16(XIO), 6(XIO)*

Sts_Err 0 DINT Axis_ObjectAV
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_Err - Axis_ObjectAV/Logic - *11(MOVE), *5(MOVE), *5(MOVE), *5(MOVE), *8(MOVE), 13(NE), 15(EQ), 15(NE)*

Sts_FaultResetDone 0 BOOL Axis_ObjectAV
Condition: Fault Reset Done
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_FaultResetDone - Axis_ObjectAV/Logic - *6(OTL), *6(OTU)*

Sts_Homed 0 BOOL Axis_ObjectAV
The Axis has been homed
Usage: Output Parameter

Sts_Homed (Continued)
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_Homed - Axis_ObjectAV/Logic - *7(OTU), *9(OTL), 10(XIC)*
*Sts_Homed - Axis_ObjectAV/Prescan - *0(OTU)*

Sts_HomeDone 0 BOOL Axis_ObjectAV
Condition: Home Done
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_HomeDone - Axis_ObjectAV/Logic - *10(OTE)*

Sts_NoMotion 0 BOOL Axis_ObjectAV
AverageVelocity within ZeroSpeedTolerance and no MotionStatus set
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_NoMotion - Axis_ObjectAV/Logic - *1(OTE), 11(XIO), 12(XIC)*

Sts_StopDone 0 BOOL Axis_ObjectAV
Condition: Stopping Done
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_StopDone - Axis_ObjectAV/Logic - *12(OTE)*

Name	Default	Data Type	Scope
AverageVelocity	0.0	REAL	Axis_ObjectAV
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
*AverageVelocity - Axis_ObjectAV/Logic - *1(ABS), 1(LE)*			
DecelRate	0.0	REAL	Axis_ObjectAV
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
*DecelRate - Axis_ObjectAV/Logic - *11(MOVE), *11(MOVE), 11(MAS)*			
FaultReset_delay		TIMER	Axis_ObjectAV
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
*FaultReset_delay - Axis_ObjectAV/Logic - *6(TON)*			
FaultReset_delay.DN	0	BOOL	
FaultReset_delay.DN - Axis_ObjectAV/Logic - 6(XIC)			
HomeSequence	0	DINT	Axis_ObjectAV
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
*HomeSequence - Axis_ObjectAV/Logic - *7(MOVE), *8(MOVE), *9(MOVE), 8(EQ), 9(EQ)*			
*HomeSequence - Axis_ObjectAV/Prescan - *0(MOVE)*			
HomeStart	0	BOOL	Axis_ObjectAV
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
*HomeStart - Axis_ObjectAV/Logic - *7(ONS)*			
Sts_ER_ONS	0	BOOL	Axis_ObjectAV
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
*Sts_ER_ONS - Axis_ObjectAV/Logic - *14(ONS)*			
Wrk_MI_FaultReset		MOTION_INSTRUCTION	Axis_ObjectAV
Usage:	Local Tag		
External Access:	None		
OPC UA Access:	None		
*Wrk_MI_FaultReset - Axis_ObjectAV/Logic - *5(MAFR)*			
Wrk_MI_FaultReset.ER	0	BOOL	
Wrk_MI_FaultReset.ER - Axis_ObjectAV/Logic - 5(XIC)			
Wrk_MI_FaultReset.ERR	0	INT	
Wrk_MI_FaultReset.ERR - Axis_ObjectAV/Logic - 5(MOVE)			
Wrk_MI_FaultReset.EXERR	0	SINT	
Wrk_MI_FaultReset.EXERR - Axis_ObjectAV/Logic - 5(MOVE)			
Wrk_MI_Home		MOTION_INSTRUCTION	Axis_ObjectAV
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
*Wrk_MI_Home - Axis_ObjectAV/Logic - *8(MAH)*			
Wrk_MI_Home.ER	0	BOOL	
Wrk_MI_Home.ER - Axis_ObjectAV/Logic - 8(XIC)			
Wrk_MI_Home.PC	0	BOOL	
Wrk_MI_Home.PC - Axis_ObjectAV/Logic - 9(XIC)			
Wrk_MI_Home.ERR	0	INT	
Wrk_MI_Home.ERR - Axis_ObjectAV/Logic - 8(MOVE)			

Wrk_MI_Home (Continued)

Wrk_MI_Home.EXERR	0	SINT	
Wrk_MI_Home.EXERR - Axis_ObjectAV/Logic - 8(MOVE)			
Wrk_MI_ShutdownReset		MOTION_INSTRUCTION	Axis_ObjectAV
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
*Wrk_MI_ShutdownReset - Axis_ObjectAV/Logic - *5(MASR)*			
Wrk_MI_ShutdownReset.DN	0	BOOL	
Wrk_MI_ShutdownReset.DN - Axis_ObjectAV/Logic - 6(XIC)			
Wrk_MI_ShutdownReset.ER	0	BOOL	
Wrk_MI_ShutdownReset.ER - Axis_ObjectAV/Logic - 5(XIC), 6(XIC)			
Wrk_MI_ShutdownReset.ERR	0	INT	
Wrk_MI_ShutdownReset.ERR - Axis_ObjectAV/Logic - 5(MOVE)			
Wrk_MI_ShutdownReset.EXERR	0	SINT	
Wrk_MI_ShutdownReset.EXERR - Axis_ObjectAV/Logic - 5(MOVE)			
Wrk_MI_Stop		MOTION_INSTRUCTION	Axis_ObjectAV
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
*Wrk_MI_Stop - Axis_ObjectAV/Logic - *11(MAS)*			
Wrk_MI_Stop.EN	0	BOOL	
*Wrk_MI_Stop.EN - Axis_ObjectAV/Logic - *11(OTU)*			
Wrk_MI_Stop.ER	0	BOOL	
Wrk_MI_Stop.ER - Axis_ObjectAV/Logic - 11(XIC)			
Wrk_MI_Stop.IP	0	BOOL	
Wrk_MI_Stop.IP - Axis_ObjectAV/Logic - 11(XIO)			
Wrk_MI_Stop.ERR	0	INT	
Wrk_MI_Stop.ERR - Axis_ObjectAV/Logic - 11(MOVE)			
Wrk_MI_Stop.EXERR	0	SINT	
Wrk_MI_Stop.EXERR - Axis_ObjectAV/Logic - 11(MOVE)			
Wrk_ONS_Init	0	BOOL	Axis_ObjectAV
Usage:	Local Tag		
External Access:	None		
OPC UA Access:	None		
*Wrk_ONS_Init - Axis_ObjectAV/Logic - *5(ONS)*			


```
**********************************************************************************************************************************************
COMPANY:          Rockwell Automation
FUNCTION:         Axis Servo Drive Object
AUTHOR:           Rockwell Automation/Kelvin Erickson
DATE CREATED:     March 4 2009

Version Comments: Error handling and fault reset modified to match Rev 1.12 of Axis_ObjectCD

**********************************************************************************************************************************************
```

0

NOP

THIS RUNG IS USED TO VERIFY THAT ALL MOTION PLANER INPUTs (GEARs, JOGs, CAMs etc.) ARE NOT ACTIVE AND AXIS SPEED IS LESS THAN SOME SET LEVEL

No motion state

Description : MotionStatus
Bit 00 AccelStatus
Bit 01 DecelStatus
Bit 02 MoveStatus
Bit 03 JogStatus
Bit 04 GearingStatus
Bit 05 HomingStatus
Bit 06 StoppingStatus
Bit 07 AxisHomedStatus
Bit 08 PositionCamStatus
Bit 09 TimeCamStatus
Bit 10 PositionCamPendingStatus
Bit 11 TimeCamPendingStatus
Bit 12 GearingLockStatus
Bit 13 PositionCamLockStatus
Bit 14 MasterOffsetMoveStatus
Bit 15 CoordinatedMotionStatus

65407 = 1111 1111 0111 1111

1

Axis that will be controlled and or viewed for status information

ABS Absolute Value	
Source	Ref_Axis_AV.AverageVelocity ??
Dest	AverageVelocity 0.0

LE Less Than or Eql (A<=B)	
Source A	AverageVelocity 0.0
Source B	Cfg_ZeroSpeedTolerance 0.0

MEQ Mask Equal	
Source	Ref_Axis_AV.MotionStatus ??
Mask	65407
Compare	0

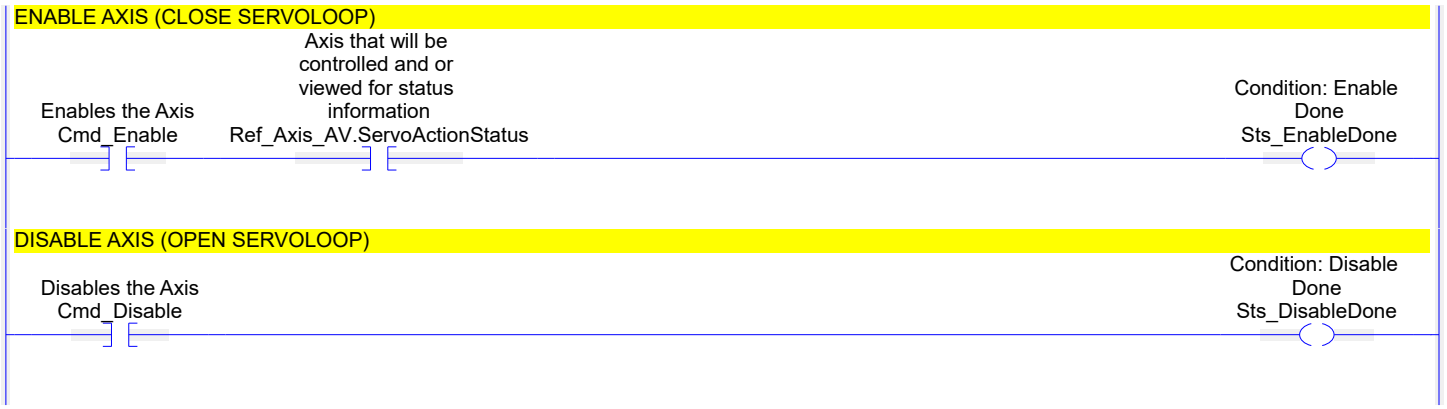
AverageVelocity within ZeroSpeedTolerance and no MotionStatus set Sts_NoMotion

AXIS ERRORS

2

Axis that will be controlled and or viewed for status information
Ref_Axis_AV.ConfigFault

Any General Fault
Err_General
L


ENABLE AXIS (CLOSE SERVOLOOP)
Axis that will be controlled and or viewed for status information
Enables the Axis
Cmd_Enable
Ref_Axis_AV.ServoActionStatus
Condition: Enable Done
Sts_EnableDone
3
DISABLE AXIS (OPEN SERVOLOOP)
Disables the Axis
Cmd_Disable
Condition: Disable Done
Sts_DisableDone
4

//

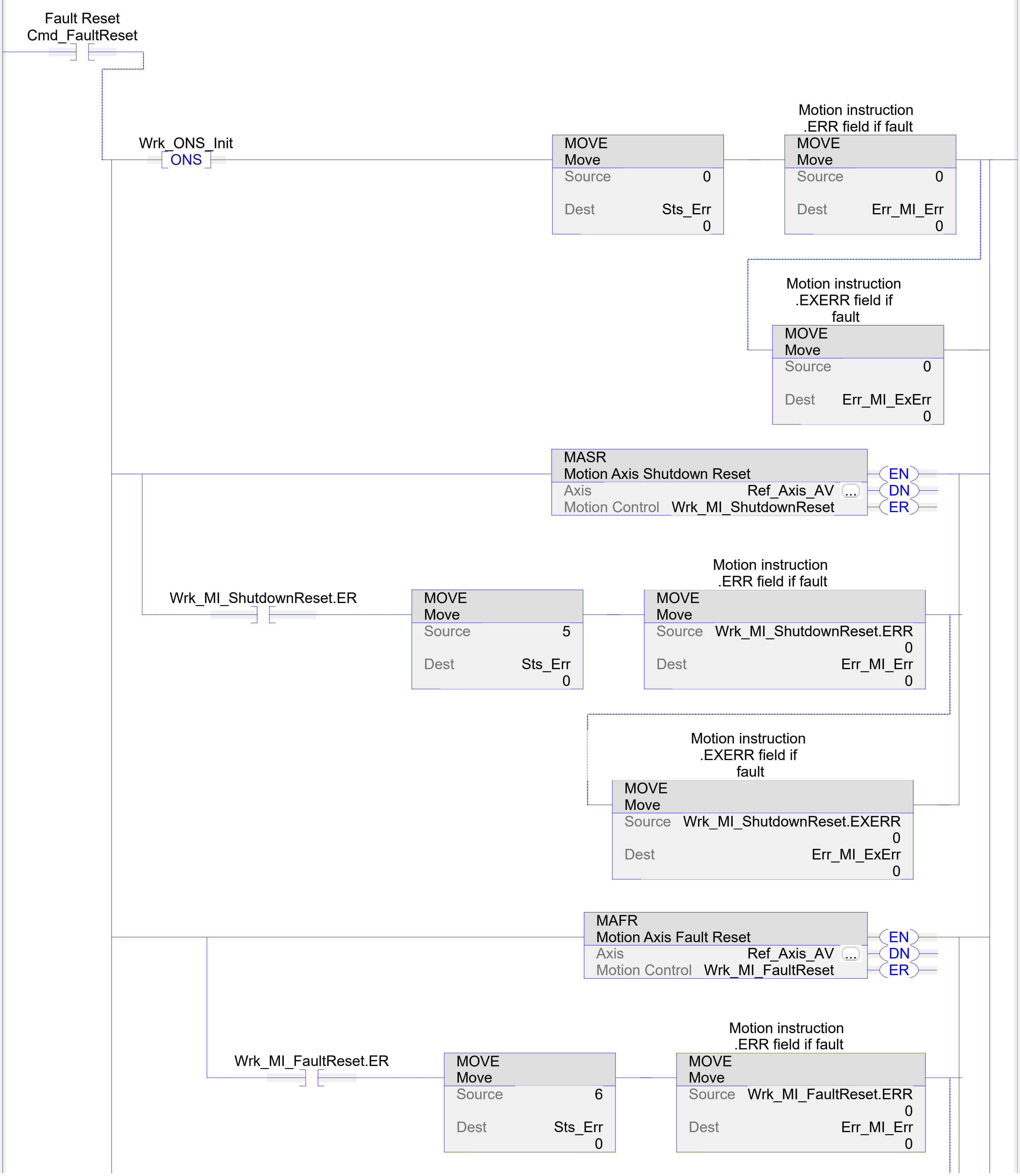
- SECTION AXIS FAULT RESET

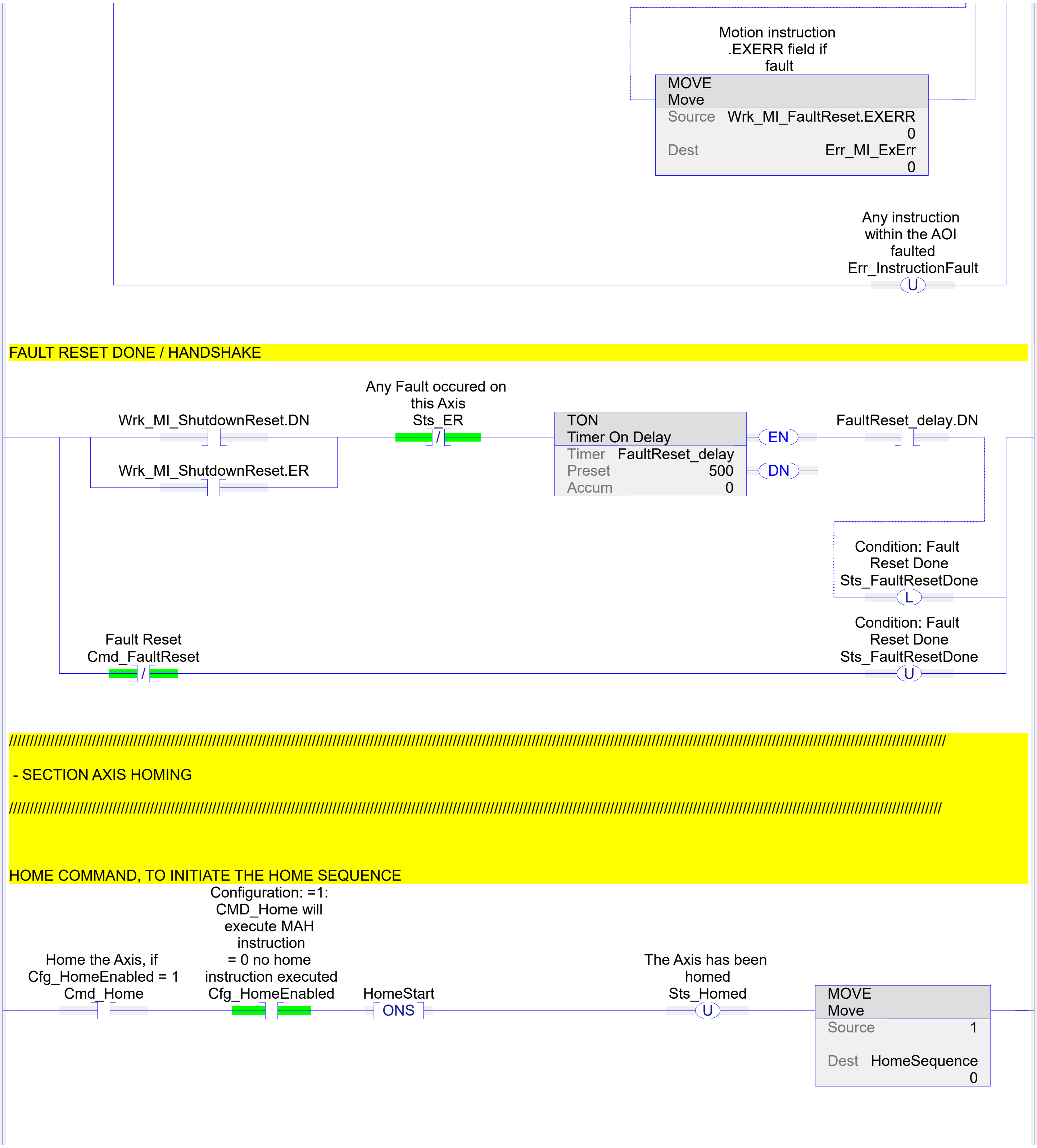
//

- RESET FAULTs

***** Corrected to zero Sts_Err and Sts_ExtErr only on transition of Cmd_FaultReset

5




Motion instruction .EXERR field if fault
MOVE
Move
Source Wrk_MI_FaultReset.EXERR
0
Dest Err_MI_ExErr
0
Any instruction within the AOI faulted
Err_InstructionFault
U
FAULT RESET DONE / HANDSHAKE
6
Wrk_MI_ShutdownReset.DN
Wrk_MI_ShutdownReset.ER
Any Fault occured on this Axis
Sts_ER
TON
Timer On Delay
Timer FaultReset_delay
Preset 500
Accum 0
EN
DN
FaultReset_delay.DN
Condition: Fault Reset Done
Sts_FaultResetDone
L
Fault Reset
Cmd_FaultReset
Condition: Fault Reset Done
Sts_FaultResetDone
U
- SECTION AXIS HOMING
HOME COMMAND, TO INITIATE THE HOME SEQUENCE
7
Home the Axis, if Cfg_HomeEnabled = 1
Cmd_Home
Configuration: =1: CMD_Home will execute MAH instruction = 0 no home instruction executed
Cfg_HomeEnabled
HomeStart
ONS
The Axis has been homed
Sts_Homed
U
MOVE
Move
Source 1
Dest HomeSequence
0

HOME SEQUENCE EXECUTION (CONFIGURATION VIA AXIS PROPERTIES WIZARDS)

8

EQ
Equal
Source A HomeSequence
0
Source B 1

MAH
Motion Axis Ho
Axis
Motion Control

Motion instruction
.ERR field if fault

Wrk_MI_Home.ER

MOVE
Move
Source 7
Dest Sts_Err
0

MOVE
Move
Source Wrk_MI_Home.ERR
0
Dest Err_MI_Err
0

MOVE
Move
Sourc
Dest

e
Ref_Axis_AV ...
Wrk_MI_Home

EN
DN
ER
IP
PC

tion instruction
EXERR field if
fault

Wrk_MI_Home.EXERR
0
Err_MI_ExErr
0

MOVE
Move
Source 2
Dest HomeSequence
0

AXIS IS HOMED

9

EQ
Equal
Source A HomeSequence
0
Source B 2

Wrk_MI_Home.PC

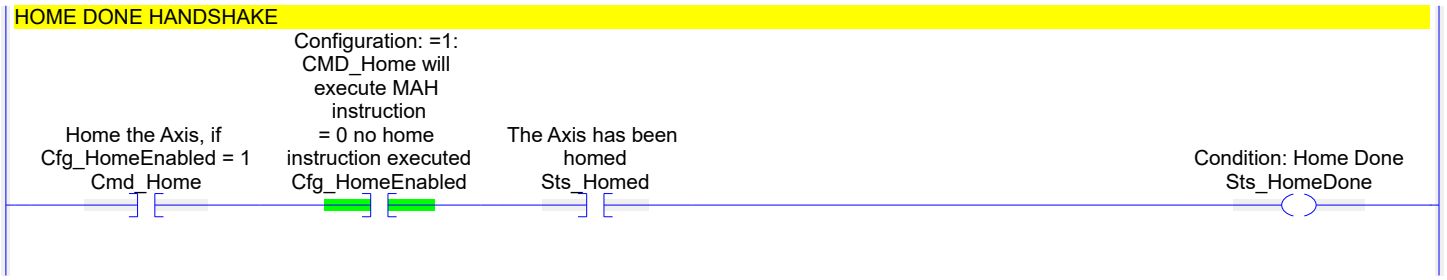
The Axis has been
homed
Sts_Homed

L

MOVE
Move
Source 3
Dest HomeSequence
0

HOME DONE HANDSHAKE

10



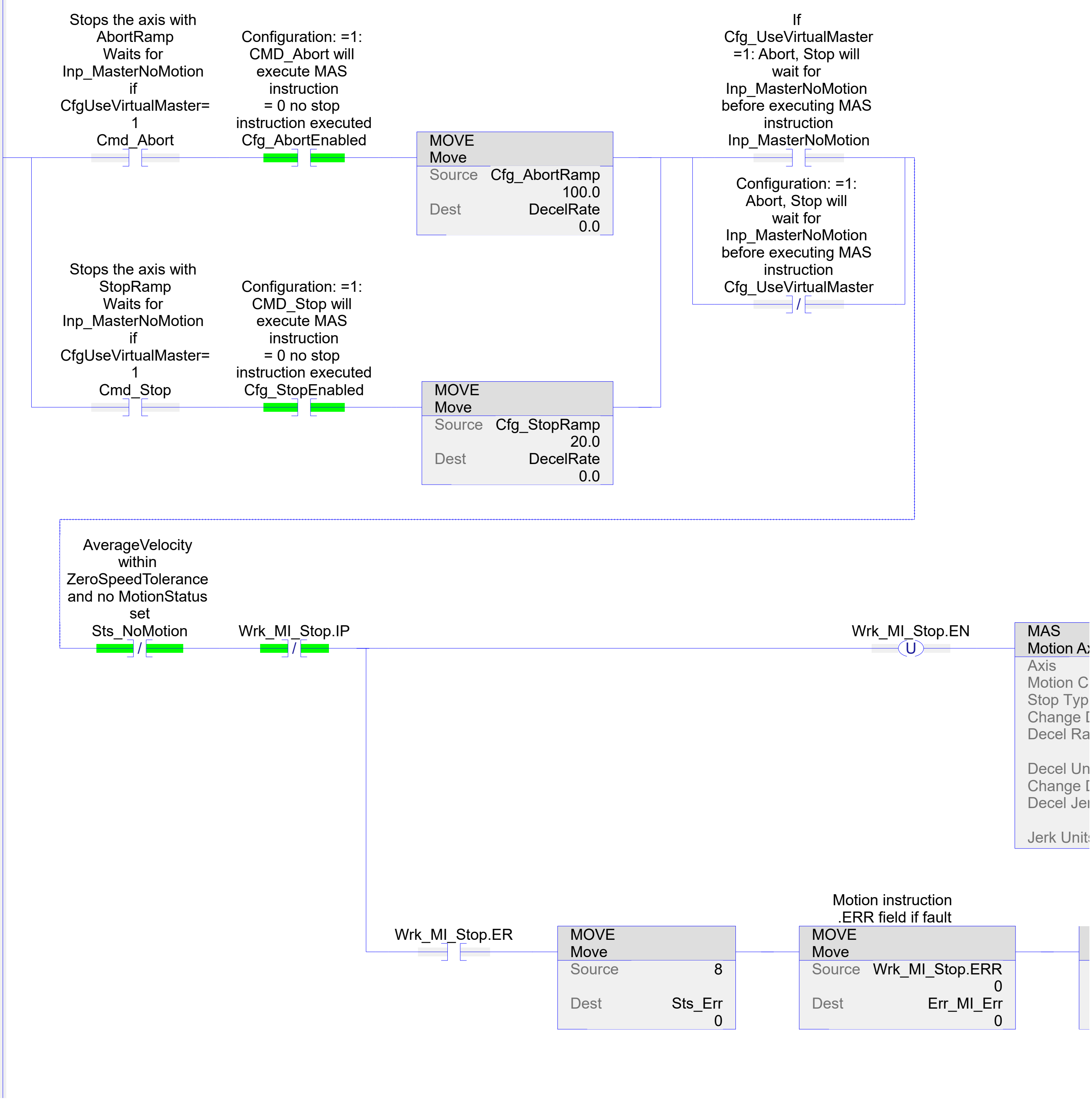
//

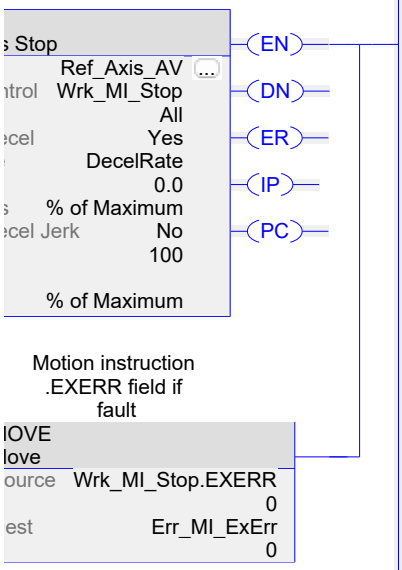
- SECTION AXIS STOP

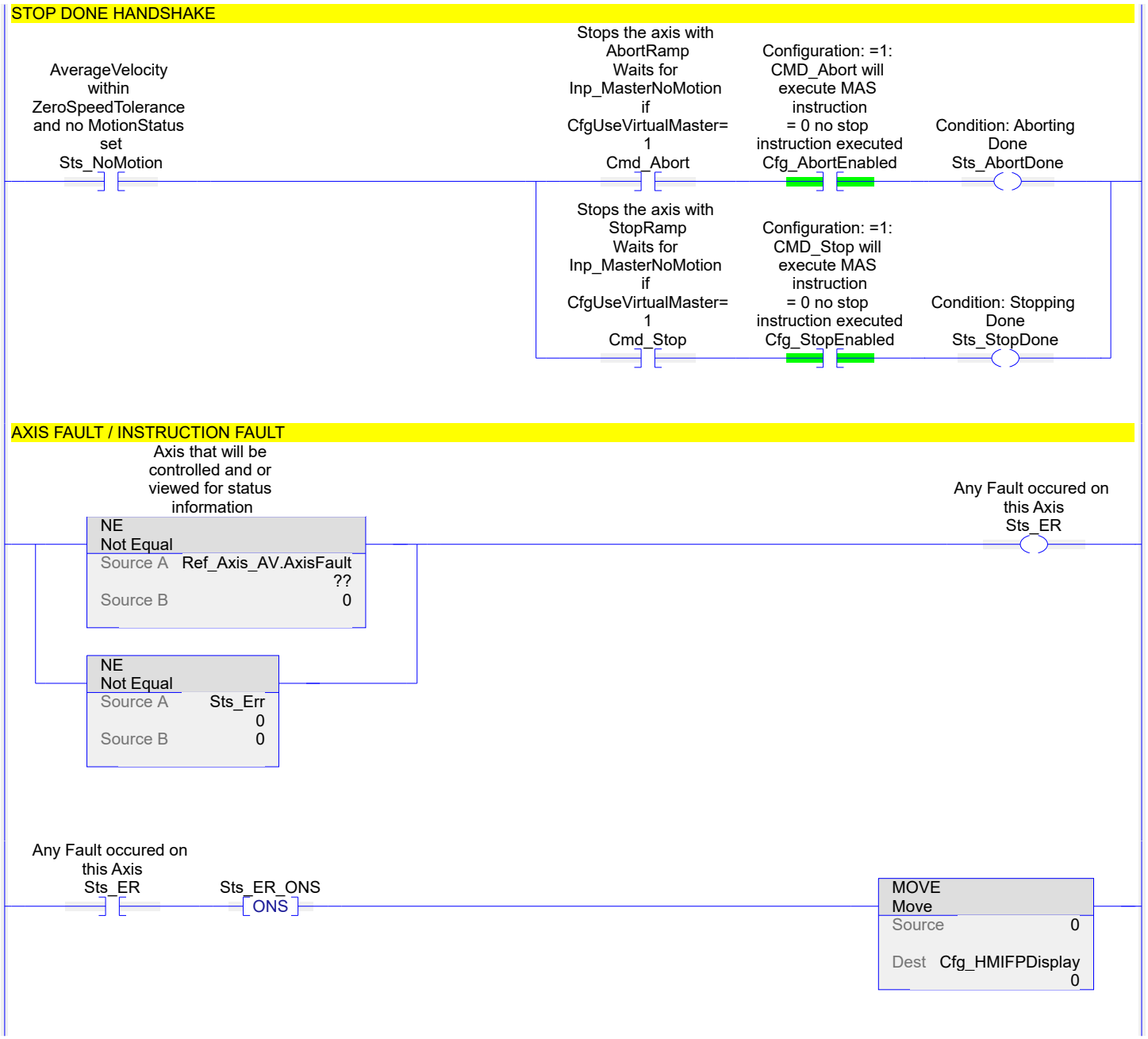
//

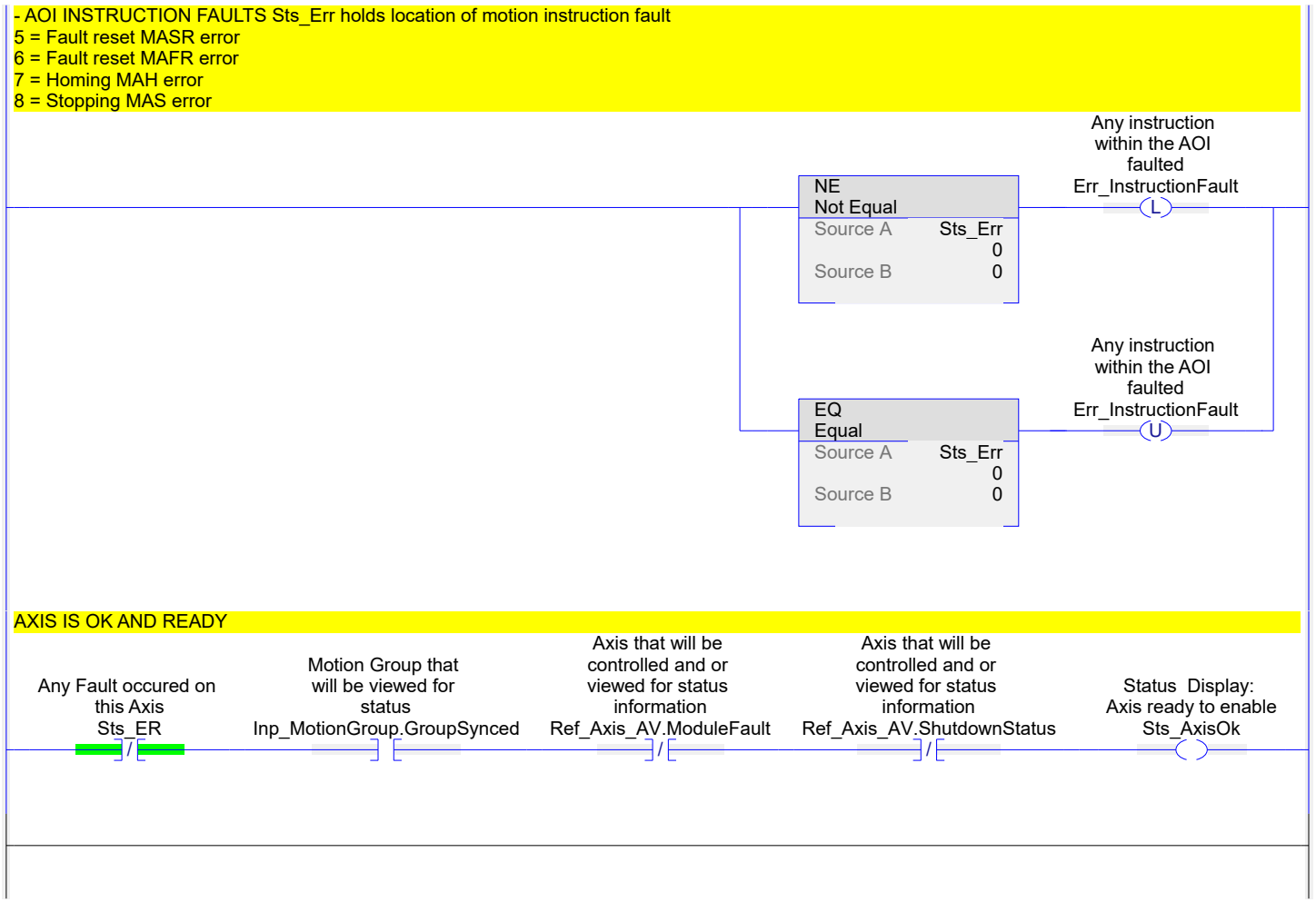
WHENEVER THE MACHINE ENTERS EITHER STOPPING OR ABORTING, STOP THE AXIS
- If stopping, all axes are stopped AFTER the imaginary stops. This provides a coordinated stop
- Aborting cause all axes independently to stop.

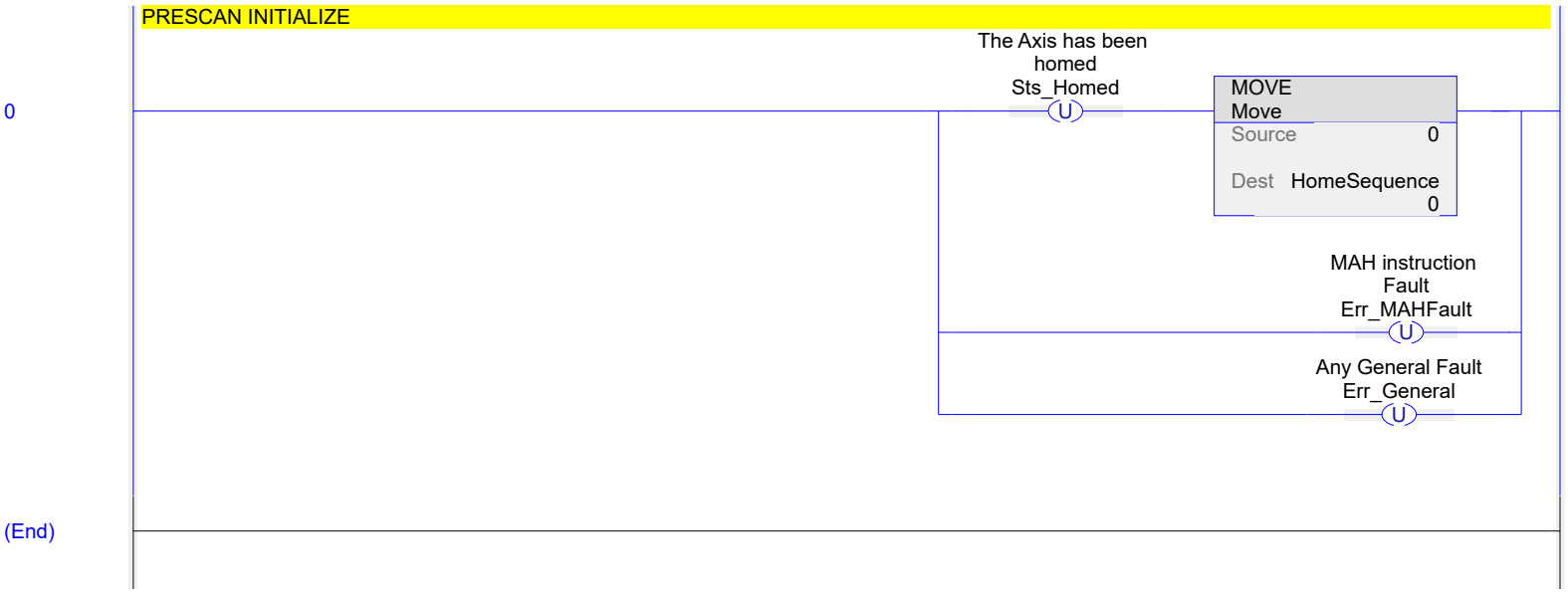
11




s Stop
Ref_Axis_AV
ntrol Wrk_MI_Stop
All
ecel Yes
DecelRate
0.0
s % of Maximum
ecel Jerk No
100
% of Maximum
EN
DN
ER
IP
PC
Motion instruction .EXERR field if fault
IOVE
love
ource Wrk_MI_Stop.EXERR
0
est Err_MI_ExErr
0


STOP DONE HANDSHAKE
AverageVelocity within ZeroSpeedTolerance and no MotionStatus set
Sts_NoMotion
Stops the axis with AbortRamp Waits for Inp_MasterNoMotion if CfgUseVirtualMaster= 1
Cmd_Abort
Configuration: =1: CMD_Abort will execute MAS instruction = 0 no stop instruction executed
Cfg_AbortEnabled
Condition: Aborting Done
Sts_AbortDone
12
Stops the axis with StopRamp Waits for Inp_MasterNoMotion if CfgUseVirtualMaster= 1
Cmd_Stop
Configuration: =1: CMD_Stop will execute MAS instruction = 0 no stop instruction executed
Cfg_StopEnabled
Condition: Stopping Done
Sts_StopDone
AXIS FAULT / INSTRUCTION FAULT
Axis that will be controlled and or viewed for status information
NE
Not Equal
Source A Ref_Axis_AV.AxisFault ??
Source B 0
Any Fault occured on this Axis
Sts_ER
13
NE
Not Equal
Source A Sts_Err 0
Source B 0
Any Fault occured on this Axis
Sts_ER
Sts_ER_ONS
ONS
14
MOVE
Move
Source 0
Dest Cfg_HMIFPDisplay 0




PRESCAN INITIALIZE
0
The Axis has been homed
Sts_Homed
U
MOVE
Move
Source 0
Dest HomeSequence 0
MAH instruction Fault
Err_MAHFault
U
Any General Fault
Err_General
U
(End)

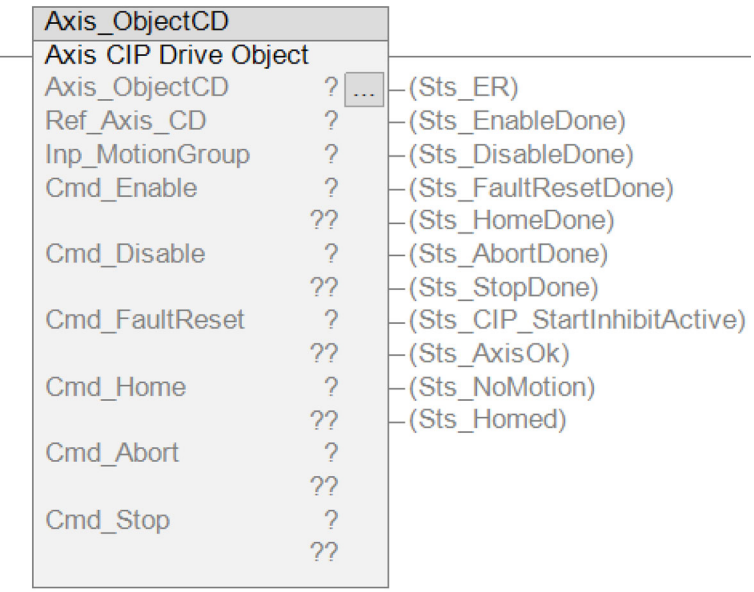
Axis_ObjectCD v1.13

Rockwell Automation

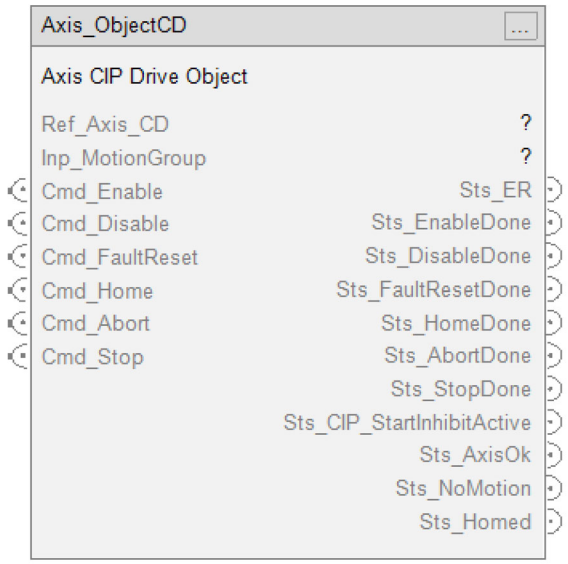
Axis CIP Drive Object

Available Languages

Relay Ladder



Function Block



Structured Text

```
Axis_ObjectCD(Ref_Axis_CD, Inp_MotionGroup, Cmd_Enable, Cmd_Disable, Cmd_FaultReset, Cmd_Home, Cmd_Abort, Cmd_Stop);
```

Parameters

Required	Name	Data Type	Usage	Description
X	Axis_ObjectCD	Axis_ObjectCD	InOut	Axis CIP Drive Object
	EnableIn	BOOL	Input	
	EnableOut	BOOL	Output	
	Cfg_UseVirtualMaster	BOOL	Input	Configuration: =1: Abort, Stop will wait for Inp_MasterNoMotion before executing MAS instruction

	Cfg_HomeEnabled	BOOL	Input	Configuration: =1: CMD_Home will execute MAH instruction = 0 no home instruction executed
	Cfg_StopEnabled	BOOL	Input	Configuration: =1: CMD_Stop will execute MAS instruction = 0 no stop instruction executed
	Cfg_AbortEnabled	BOOL	Input	Configuration: =1: CMD_Abort will execute MAS instruction = 0 no stop instruction executed
	Cfg_ZeroSpeedTolerance	REAL	Input	Zero Speed Tolerance Window in units/sec for Sts_NoMotion
	Cfg_AbortRamp	REAL	Input	Ramp for MAS instruction in aborting
	Cfg_StopRamp	REAL	Input	Ramp for MAS instruction in stopping
	Inp_MasterNoMotion	BOOL	Input	If Cfg_UseVirtualMaster=1: Abort, Stop will wait for Inp_MasterNoMotion before executing MAS instruction
X	Ref_Axis_CD	AXIS_CIP_DRIVE	InOut	Servo Axis, Data type Axis CIP Drive
X	Inp_MotionGroup	MOTION_GROUP	InOut	Motion Group
X	Cmd_Enable	BOOL	Input	Enables the Axis
X	Cmd_Disable	BOOL	Input	Disables the Axis
X	Cmd_FaultReset	BOOL	Input	Fault Reset
X	Cmd_Home	BOOL	Input	Home the Axis, if Cfg_HomeEnabled = 1
X	Cmd_Abort	BOOL	Input	Stops the axis with AbortRamp Waits for Inp_MasterNoMotion if CfgUseVirtualMaster=1
X	Cmd_Stop	BOOL	Input	Stops the axis with StopRamp Waits for Inp_MasterNoMotion if CfgUseVirtualMaster=1
	Sts_ER	BOOL	Output	Any Fault occured on this Axis
	Sts_EnableDone	BOOL	Output	Condition: Enable Done
	Sts_DisableDone	BOOL	Output	Condition: Disable Done
	Sts_FaultResetDone	BOOL	Output	Condition: Fault Reset Done
	Sts_HomeDone	BOOL	Output	Condition: Home Done
	Sts_AbortDone	BOOL	Output	Condition: Aborting Done
	Sts_StopDone	BOOL	Output	Condition: Stopping Done
	Sts_CIP_StartInhibitActive	BOOL	Output	
	Sts_AxisOk	BOOL	Output	Status Display: Axis ready to enable
	Sts_AbsoluteReferenceStatus	BOOL	Output	Absolute Feedback device shows Reference Ok
	Sts_NoMotion	BOOL	Output	AverageVelocity within ZeroSpeedTolerance and no MotionStatus set
	Sts_Homed	BOOL	Output	The Axis has been homed
	Err_PosOvertravel	BOOL	Output	Any positive Overtravel Fault
	Err_NegOvertravel	BOOL	Output	Any neagtive Overtravel Fault
	Err_FeedbackFault	BOOL	Output	Any Feedback Fault including Aux Feedback
	Err_DeviceCommunication	BOOL	Output	Any General Fault
	Err_PowerFault	BOOL	Output	Any Overload/Voltage Fault
	Err_TemperatureFault	BOOL	Output	Any Temperature Fault
	Err_PositionError	BOOL	Output	Position Error window exceeded
	Err_GuardFault	BOOL	Output	Any Guard Fault (Safety Fault)
	Err_InstructionFault	BOOL	Output	Any instruction within the AOI faulted
	Out_AxisCipState	DINT	Output	CipState
	Cfg_HMIFPDisplay	DINT	Input	HMI Display tag used with HMI Global Object
	Sts_Err	DINT	Output	
	Err_MI_Err	DINT	Output	Motion instruction .ERR field if fault
	Err_MI_ExErr	DINT	Output	Motion instuction .EXERR field if fault

Extended Description

==========

Instruction Overview:

The Axis Cip Drive Object Add-On Instruction performs Enable, Disable, Fault Reset, Home, Stop, Abort, Diagnostics, and Status functions of a physical axis.
The AOI consists of Parameters and Local Tags, and a routine for Logic and Prescan.

Instruction Execution:

This instruction is intended to be executed unconditionally.

Supplemental Descriptions:

These configuration tags need to be configured for the AOI to work correctly:

-Cfg_UseVirtualMaster
-Cfg_StopEnabled
-Cfg_HomeEnabled
-Cfg_AbortEnabled

Prescan
The Prescan routine executes after the primary Logic routine executes in Prescan mode. It will initialize tag values to a known or predefined state prior to execution of the AOI.
When an add-on instruction executes in Prescan mode, any required parameters have their data passed.
Values are passed to input parameters from their arguments in the instruction call.
Values are passed from output parameters to their arguments defined in the instruction call.
These values are passed even when the rung condition is false.

Cmd_Enable and Sts_EnableDone
When the command Cmd_Enable is set, it is checked to see if the axis is ready to execute the MSO instruction (feedback on). When Cmd_Enable is successfully executed, the Sts_EnableDone bit will be set.

Cmd_Disable and Sts_DisableDone
When the command Cmd_Disable is set, it is checked to see if the axis is ready to execute the MSF instruction (feedback off). When Cmd_Disable is successfully executed, the Sts_DisableDone bit will be set.

Cmd_FaultReset and Sts_FaultResetDone
When the command Cmd_FaultReset is set, all Err-bits of the AOI are unlatched and the axis will be reset with a MASR instruction (Axis Shutdown Reset). When Cmd_FaultReset is successfully executed, the Sts_ FaultResetDone bit will be set.

Cmd_Home, Sts_Homed and Sts_HomedDone
When the command Cmd_Home is set, a home sequence is initiated if the axis is configured to do a home. To configure the axis to home, the Cfg_HomeEnabled bit must be set.

Cfg_HomeEnabled	Behavior
0	Home instruction is not executed
1	CMD_Home will execute MAH instruction

When Cmd_Home is successfully executed, the Sts_Homed and Sts_HomeDone bits will be set.

Cmd_Abort/Sts_AbortDone and Cmd_Stop/Sts_StopDone
The two commands Cmd_Abort and Cmd_Stop initiate a stop of the axis.
If configured to do so, the command Cmd_Abort or Cmd_Stop will set a deceleration rate used by the MAS instruction (axis stop).

Cfg_AbortEnabled	Cfg_StopEnabled	Behavior
0	0	The axis does not execute the command
1	1	The axis executes the command

The axis can wait for the virtual master to be completely stopped before the MAS instruction is executed. If Cfg_UseVirtualMaster is set, abort will wait for Inp_MasterNoMotion before execution of the instruction. If not, it will be executed immediately.

Cfg_UseVirtualMaster	Behavior
0	Abort, Stop will execute the MAS instruction immediately
1	Abort, Stop will wait for Inp_MasterNoMotion before executing MAS instruction

When Sts_NoMotion of the axis is detected and either a Cmd_Abort or Cmd_Stop command is set, either the Sts_AbortDone or Sts_StopDone status bit, as appropriate, will be set.

Sts_NoMotion
???No motion??? is when none of the motion planner inputs (for example, gears, jogs, or CAMs) are active and the axis speed is less than the level configured in Cfg_ZeroSpeedTolerance.

The motion planner inputs are masked with the MotionStatus (Motion planner input) set this way:
65407 [dec] = 1111 1111 0111 1111 [bin]

Bit	Description
00	AccelStatus
01	DecelStatus
02	MoveStatus
03	JogStatus
04	GearingStatus
05	HomingStatus
06	StoppingStatus
07	AxisHomedStatus
08	PositionCamStatus
09	TimeCamStatus
10	PositionCamPendingStatus
11	TimeCamPendingStatus
12	GearingLockStatus
13	PositionCamLockStatus
14	MasterOffsetMoveStatus
15	CoordinatedMotionStatus

Sts_Err - Error Codes
1 - MSO Instruction Execution Error
2 - MSO Instruction Execution Watchdog Timeout
3 - MSF Instruction Execution Error
4 - MSF Instruction Execution Watchdog Timeout
5 - MASR Instruction Execution Error
6 - MAFR Instruction Execution Error
7 - MAH Instruction Execution Error
8 - MAS Instruction Execution Error

==========

General Information - Parameter Prefixing:

Inp_

Input:
Generally used to designate a connection to a real I/O input point or an upstream block.

Set_

Setpoint:
Used as a setpoint coming into the instruction. May come from the operator via the HMI, or from the controller program itself.

Cmd_

Command:
Generally used to as a command input either from the operator via the HMI or from the program.

Cfg_

Configuration:
Generally used to designate a configuration value.
Typically, but not always, something that is only changed irregularly.

Par_

Parameter:
Equipment parameter or input parameter from Batching systems.
Generally used to designate a value that receives changes on a regular basis.

Wrk_

Working Register:

In many cases the control routine will require some internal working storage locations.
This is targeted at the control routine that lies inside a normal UDT.
In the case of AOI's, these registers can simply become "Local Tags".

Out_

Output:
Generally used to designate a connection to a real I/O output point or a downstream block.

Val_

Value:
Designates a value calculated inside the instruction, which may or may not be the primary output of the instruction.

Rpt_

Report:
Designates a value calculated inside the instruction that is typically used for batch reporting.

Sts_

Status:
Status of the instruction. Also contains two required members.
Ex.
Sts_Alarm - An alarm exists. (Boolean)
Sts_ER - The instruction itself has an error. (Boolean)

Alm_

Alarm:
Alarm indicators to display which actual alarm is occurring. All of these are Booleans.

Rdy_

Ready:
Command ready bits. Booleans determined inside the control routines to reflect whether the routine will allow state change commands.
Used with the HMI faceplates to enable or disable command buttons.
==========

==========

Execution

Condition	Description
EnableIn is true	

Prescan

Revision v1.13 Notes

1.12 - Correct repeated output and AFI warnings
1.11 - Fix rung 2 to use DriveEnableStatus. Fix rung 4 to zero Sts_Err only on positive transition
1.10 - Fix homing to work with Kinetix 350
1.9 - Fix Device Comm Error anom.
1.8 - PosErr reset, add inhibit conditions to ER
1.7 - Add watchdog for fault reset
1.6 - Change Error annunciation for instruction faults
1.5 - Add notification for Inhibit Conditions
1.4 - v20 Update

Name	Default	Data Type	Scope
Cfg_AbortEnabled	1	BOOL	Axis_ObjectCD

Configuration: =1: CMD_Abort will execute MAS instruction = 0 no stop instruction executed
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Cfg_AbortEnabled - Axis_ObjectCD/Logic - 10(XIC), 11(XIC)

Cfg_AbortRamp	100.0	REAL	Axis_ObjectCD

Ramp for MAS instruction in aborting
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Cfg_AbortRamp - Axis_ObjectCD/Logic - 10(MOVE)

Cfg_HMIFPDisplay	0	DINT	Axis_ObjectCD

HMI Display tag used with HMI Global Object
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
*Cfg_HMIFPDisplay - Axis_ObjectCD/Logic - *20(MOVE)*

Cfg_HomeEnabled	1	BOOL	Axis_ObjectCD

Configuration: =1: CMD_Home will execute MAH instruction = 0 no home instruction executed
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Cfg_HomeEnabled - Axis_ObjectCD/Logic - 6(XIC), 9(XIC)

Cfg_StopEnabled	1	BOOL	Axis_ObjectCD

Configuration: =1: CMD_Stop will execute MAS instruction = 0 no stop instruction executed
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Cfg_StopEnabled - Axis_ObjectCD/Logic - 10(XIC), 11(XIC)

Cfg_StopRamp	20.0	REAL	Axis_ObjectCD

Ramp for MAS instruction in stopping
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Cfg_StopRamp - Axis_ObjectCD/Logic - 10(MOVE)

Cfg_UseVirtualMaster	1	BOOL	Axis_ObjectCD

Configuration: =1: Abort, Stop will wait for Inp_MasterNoMotion before executing MAS instruction
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Cfg_UseVirtualMaster - Axis_ObjectCD/Logic - 10(XIO)

Cfg_ZeroSpeedTolerance 0.1 REAL Axis_ObjectCD
Zero Speed Tolerance Window in units/sec for Sts_NoMotion
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Cfg_ZeroSpeedTolerance - Axis_ObjectCD/Logic - 13(LE)

Cmd_Abort 0 BOOL Axis_ObjectCD
Stops the axis with AbortRamp Waits for Inp_MasterNoMotion if CfgUseVirtualMaster=1
Usage: Input Parameter
Required: Yes
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_Abort - Axis_ObjectCD/Logic - 10(XIC), 11(XIC)

Cmd_Disable 0 BOOL Axis_ObjectCD
Disables the Axis
Usage: Input Parameter
Required: Yes
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_Disable - Axis_ObjectCD/Logic - 2(XIO), 3(XIC)

Cmd_Enable 0 BOOL Axis_ObjectCD
Enables the Axis
Usage: Input Parameter
Required: Yes
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_Enable - Axis_ObjectCD/Logic - 2(XIC)

Cmd_FaultReset 0 BOOL Axis_ObjectCD
Fault Reset
Usage: Input Parameter
Required: Yes
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_FaultReset - Axis_ObjectCD/Logic - 4(XIC), 5(XIC), 5(XIO)

Cmd_Home 0 BOOL Axis_ObjectCD
Home the Axis, if Cfg_HomeEnabled = 1
Usage: Input Parameter
Required: Yes
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_Home - Axis_ObjectCD/Logic - 6(XIC), 9(XIC)

Cmd_Stop 0 BOOL Axis_ObjectCD
Stops the axis with StopRamp Waits for Inp_MasterNoMotion if CfgUseVirtualMaster=1
Usage: Input Parameter
Required: Yes
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_Stop - Axis_ObjectCD/Logic - 10(XIC), 11(XIC)

Err_DeviceCommunication 0 BOOL Axis_ObjectCD
Any General Fault
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_DeviceCommunication - Axis_ObjectCD/Logic - *18(OTL), *18(OTL), *4(OTU)*
*Err_DeviceCommunication - Axis_ObjectCD/Prescan - *4(OTU)*

Err_FeedbackFault 0 BOOL Axis_ObjectCD
Any Feedback Fault including Aux Feedback
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_FeedbackFault - Axis_ObjectCD/Logic - *18(OTL), *4(OTU)*
*Err_FeedbackFault - Axis_ObjectCD/Prescan - *4(OTU)*

Err_GuardFault 0 BOOL Axis_ObjectCD
Any Guard Fault (Safety Fault)
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_GuardFault - Axis_ObjectCD/Logic - *18(OTL), *18(OTL), *4(OTU)*
*Err_GuardFault - Axis_ObjectCD/Prescan - *4(OTU)*

Err_InstructionFault 0 BOOL Axis_ObjectCD
Any instruction within the AOI faulted
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_InstructionFault - Axis_ObjectCD/Logic - *17(OTL), *17(OTU), *4(OTU)*
*Err_InstructionFault - Axis_ObjectCD/Prescan - *4(OTU)*

Err_MI_Err 0 DINT Axis_ObjectCD
Motion instruction .ERR field if fault
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_MI_Err - Axis_ObjectCD/Logic - *10(MOVE), *2(MOVE), *3(MOVE), *4(MOVE), *4(MOVE), *4(MOVE), *7(MOVE)*
*Err_MI_Err - Axis_ObjectCD/Prescan - *3(MOVE)*

Err_MI_ExErr 0 DINT Axis_ObjectCD
Motion instuction .EXERR field if fault
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_MI_ExErr - Axis_ObjectCD/Logic - *10(MOVE), *2(MOVE), *3(MOVE), *4(MOVE), *4(MOVE), *4(MOVE), *7(MOVE)*
*Err_MI_ExErr - Axis_ObjectCD/Prescan - *3(MOVE)*

Err_NegOvertravel 0 BOOL Axis_ObjectCD
Any neagtive Overtravel Fault
Usage: Output Parameter

Err_NegOvertravel (Continued)
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_NegOvertravel - Axis_ObjectCD/Logic - *18(OTL), *4(OTU)*
*Err_NegOvertravel - Axis_ObjectCD/Prescan - *4(OTU)*

Err_PositionError 0 BOOL Axis_ObjectCD
Position Error window exceeded
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_PositionError - Axis_ObjectCD/Logic - *18(OTL)*

Err_PosOvertravel 0 BOOL Axis_ObjectCD
Any positive Overtravel Fault
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_PosOvertravel - Axis_ObjectCD/Logic - *18(OTL), *4(OTU)*
*Err_PosOvertravel - Axis_ObjectCD/Prescan - *4(OTU)*

Err_PowerFault 0 BOOL Axis_ObjectCD
Any Overload/Voltage Fault
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_PowerFault - Axis_ObjectCD/Logic - *18(OTL), *4(OTU)*
*Err_PowerFault - Axis_ObjectCD/Prescan - *4(OTU)*

Err_TemperatureFault 0 BOOL Axis_ObjectCD
Any Temperature Fault
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Err_TemperatureFault - Axis_ObjectCD/Logic - *18(OTL), *4(OTU)*
*Err_TemperatureFault - Axis_ObjectCD/Prescan - *4(OTU)*

Inp_MasterNoMotion 0 BOOL Axis_ObjectCD
If Cfg_UseVirtualMaster=1: Abort, Stop will wait for Inp_MasterNoMotion before executing MAS instruction
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Inp_MasterNoMotion - Axis_ObjectCD/Logic - 10(XIC)

Inp_MotionGroup MOTION_GROUP Axis_ObjectCD
Motion Group
Usage: InOut Parameter
Required: Yes
Visible: Yes
OPC UA Access: None
Inp_MotionGroup.GroupStatus ?? DINT

Inp_MotionGroup (Continued)			
Motion Group			
Inp_MotionGroup.GroupStatus.1	??	BOOL	
Motion Group			
Inp_MotionGroup.InhibStatus	??	BOOL	
Motion Group			
Inp_MotionGroup.GroupSynced	??	BOOL	
Motion Group			
Inp_MotionGroup.GroupSynced - Axis_ObjectCD/Logic - 19(XIC)			
Inp_MotionGroup.AxisInhibitStatus			
	??	BOOL	
Motion Group			
Inp_MotionGroup.AxisTestModeStatus			
	??	BOOL	
Motion Group			
Inp_MotionGroup.GroupFault	??	DINT	
Motion Group			
Inp_MotionGroup.GroupOverlapFault			
	??	BOOL	
Motion Group			
Inp_MotionGroup.CSTLossFault	??	BOOL	
Motion Group			
Inp_MotionGroup.GroupTaskLoadingFault			
	??	BOOL	
Motion Group			
Inp_MotionGroup.ClockSyncFault	??	BOOL	
Motion Group			
Inp_MotionGroup.GroupAlarm	??	DINT	
Motion Group			
Inp_MotionGroup.ClockSyncAlarm			
	??	BOOL	
Motion Group			
Inp_MotionGroup.AxisFault	??	DINT	
Motion Group			
Inp_MotionGroup.PhysicalAxisFault			
	??	BOOL	
Motion Group			
Inp_MotionGroup.ModuleFault	??	BOOL	
Motion Group			
Inp_MotionGroup.ConfigFault	??	BOOL	
Motion Group			
Inp_MotionGroup.TaskMaxScanTime			
	??	DINT	
Motion Group			
Inp_MotionGroup.TaskLastScanTime			
	??	DINT	
Motion Group			
Inp_MotionGroup.TaskLastIOTime			
	??	DINT	
Motion Group			
Inp_MotionGroup.TaskMaxIOTime			
	??	DINT	
Motion Group			
Inp_MotionGroup.TaskAverageScanTime			
	??	DINT	
Motion Group			
Inp_MotionGroup.TaskAverageIOTime			
	??	DINT	
Motion Group			
Out_AxisCipState	0	DINT	Axis_ObjectCD
CipState			
Usage:	Output Parameter		

Out_AxisCipState (Continued)
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Out_AxisCipState - Axis_ObjectCD/Logic - *1(MOVE), 16(EQ)*

Ref_Axis_CD AXIS_CIP_DRIVE Axis_ObjectCD
Servo Axis, Data type Axis CIP Drive
Usage: InOut Parameter
Required: Yes
Visible: Yes
OPC UA Access: None
Ref_Axis_CD - Axis_ObjectCD/Logic - 10(MAS), 2(MSO), 3(MSF), 4(MAFR), 4(MASR), 7(MAH)

Ref_Axis_CD.AxisFault ?? DINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.AxisFault.1 ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.AxisFault.5 ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.AxisFault.6 ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.AxisFault.7 ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.PhysicalAxisFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ModuleFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ModuleFault - Axis_ObjectCD/Logic - 19(XIO)

Ref_Axis_CD.ConfigFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.GroupFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotionFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.GuardFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardFault - Axis_ObjectCD/Logic - 18(XIC)

Ref_Axis_CD.InitializationFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.InitializationFault - Axis_ObjectCD/Logic - 19(XIO)

Ref_Axis_CD.APRFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.APRFault - Axis_ObjectCD/Logic - 14(XIO)

Ref_Axis_CD.SafetyFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.AxisStatus ?? DINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.AxisStatus.1 ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.AxisStatus.2 ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ServoActionStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ServoActionStatus - Axis_ObjectCD/Logic - 2(XIC), 2(XIO), 2(XIO), 3(XIO)

Ref_Axis_CD.DriveEnableStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.DriveEnableStatus - Axis_ObjectCD/Logic - 2(XIC), 2(XIO), 2(XIO), 3(XIC)

Ref_Axis_CD.ShutdownStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ShutdownStatus - Axis_ObjectCD/Logic - 19(XIO)

Ref_Axis_CD.ConfigUpdateInProcess
?? BOOL

Ref_Axis_CD (Continued)		
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.InhibitStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.DirectControlStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AxisUpdateStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.MotionStatus	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.MotionStatus - Axis_ObjectCD/Logic - 13(MEQ)		
Ref_Axis_CD.AccelStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.DecelStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.MoveStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.JogStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GearingStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.HomingStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.StoppingStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AxisHomedStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PositionCamStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TimeCamStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PositionCamPendingStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TimeCamPendingStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GearingLockStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PositionCamLockStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TimeCamLockStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.MasterOffsetMoveStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CoordinatedMotionStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TransformStateStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ControlledByTransformStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.DirectVelocityControlStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.DirectTorqueControlStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		

Ref_Axis_CD (Continued)
Ref_Axis_CD.MoveLockStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.JogLockStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.MasterOffsetMoveLockStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.MaximumSpeedExceeded
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.MotionAlarmStatus ?? DINT
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SoftTravelLimitPositiveAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SoftTravelLimitNegativeAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.MotionFaultStatus ?? DINT
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.MotionFaultStatus.1 ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.MotionFaultStatus.2 ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SoftTravelLimitPositiveFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SoftTravelLimitPositiveFault - Axis_ObjectCD/Logic - 18(XIC)
Ref_Axis_CD.SoftTravelLimitNegativeFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SoftTravelLimitNegativeFault - Axis_ObjectCD/Logic - 18(XIC)
Ref_Axis_CD.AxisEvent ?? DINT
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.WatchEventArmedStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.WatchEventStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.RegEvent1ArmedStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.RegEvent1Status ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.RegEvent2ArmedStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.RegEvent2Status ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.HomeEventArmedStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.HomeEventStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.OutputCamStatus ?? DINT
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.OutputCamPendingStatus
?? DINT
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.OutputCamLockStatus
?? DINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD (Continued)

Ref_Axis_CD.OutputCamTransitionStatus ?? DINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ActualPosition ?? REAL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.StrobeActualPosition ?? REAL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.StartActualPosition ?? REAL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.AverageVelocity ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.AverageVelocity - Axis_ObjectCD/Logic - 13(ABS)

Ref_Axis_CD.ActualVelocity ?? REAL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ActualAcceleration ?? REAL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.WatchPosition ?? REAL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.Registration1Position ?? REAL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.Registration1PositiveEdgePosition ?? REAL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.Registration1NegativeEdgePosition ?? REAL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.Registration2Position ?? REAL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.Registration2PositiveEdgePosition ?? REAL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.Registration2NegativeEdgePosition ?? REAL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.Registration1Time ?? DINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.Registration1PositiveEdgeTime ?? DINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.Registration1NegativeEdgeTime ?? DINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.Registration2Time ?? DINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.Registration2PositiveEdgeTime ?? DINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.Registration2NegativeEdgeTime ?? DINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.InterpolationTime ?? DINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.InterpolatedActualPosition ?? REAL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.InterpolatedCommandPosition ?? REAL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MasterOffset ?? REAL

Ref_Axis_CD (Continued)
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.StrobeMasterOffset	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.StartMasterOffset	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CommandPosition	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.StrobeCommandPosition	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.StartCommandPosition	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.DirectCommandVelocity	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CommandVelocity	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CommandAcceleration	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CommandTorque	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ModuleFaults	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ModuleFaults - Axis_ObjectCD/Logic - 16(NE), 18(NE)		
Ref_Axis_CD.ControlSyncFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ModuleSyncFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TimerEventFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ModuleHardwareFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ModuleConnFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ConnFormatFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.LocalModeFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CPUWatchdogFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ClockJitterFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CyclicReadFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CyclicWriteFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ClockSkewFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ControlConnFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ClockSyncFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.LogicWatchdogFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.DuplicateAddressFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SystemConnectionFault	??	BOOL

Ref_Axis_CD (Continued)
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ModuleAlarmStatus	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ControlSyncAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ModuleSyncAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TimerEventAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CPUOverloadAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ClockJitterAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.OutOfRangeAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ClockSkewAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ClockSyncAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.NodeAddressAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AttributeErrorCode	??	INT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AttributeErrorID	??	INT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PositionFineCommand	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PositionReference	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PositionFeedback1	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PositionFeedback2	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PositionError	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PositionIntegratorOutput	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PositionLoopOutput	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.VelocityFineCommand	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.VelocityFeedforwardCommand	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.VelocityReference	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.VelocityFeedback	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.VelocityFeedback1	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.VelocityFeedback2	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.VelocityError	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.VelocityIntegratorOutput	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.VelocityLoopOutput	??	REAL
Servo Axis, Data type Axis CIP Drive		

Ref_Axis_CD (Continued)		
Ref_Axis_CD.VelocityLimitSource	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AccelerationFineCommand		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AccelerationFeedforwardCommand		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AccelerationReference		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AccelerationFeedback		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.LoadObserverAccelerationEstimate		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.LoadObserverTorqueEstimate		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueReference	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueReferenceFiltered		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueReferenceLimited		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueEstimate	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueNotchFilterFrequencyEstimate		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueNotchFilterMagnitudeEstimate		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueNotchFilterWidthEstimate		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueNotchFilter2FrequencyEstimate		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueNotchFilter2MagnitudeEstimate		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueNotchFilter2WidthEstimate		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueNotchFilter3FrequencyEstimate		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueNotchFilter3MagnitudeEstimate		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueNotchFilter3WidthEstimate		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueNotchFilter4FrequencyEstimate		
	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueNotchFilter4MagnitudeEstimate		
	??	REAL

Ref_Axis_CD (Continued)
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TorqueNotchFilter4WidthEstimate
?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TorqueLowPassFilterBandwidthEstimate
?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.AdaptiveTuningGainScalingFactor
?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.CurrentCommand ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.CurrentReference ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.CurrentFeedback ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.CurrentError ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FluxCurrentReference
?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FluxCurrentFeedback
?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FluxCurrentError ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.OperativeCurrentLimit
?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.CurrentLimitSource ?? DINT
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.MotorElectricalAngle
?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SlipCompensation ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.OutputFrequency ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.OutputCurrent ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.OutputVoltage ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.OutputPower ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ConverterOutputCurrent
?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ConverterOutputPower
?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.DCBusVoltage ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.DCBusInputCurrent ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.MotorCapacity ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.InverterCapacity ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ConverterCapacity ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusRegulatorCapacity
?? REAL

Ref_Axis_CD (Continued)		
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.DigitalInputs	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AnalogInput1	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AnalogInput2	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ACLineFrequency	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ACLineCurrent	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ACLineVoltage	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.BusVoltageReference	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.BusVoltageFeedback	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.BusVoltageError	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.BusObserverVoltageRateEstimate	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.BusObserverCurrentEstimate	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ActiveCurrentReference	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ActiveCurrentReferenceFiltered	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ActiveCurrentReferenceCompensated	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ReactiveCurrentReference	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ReactiveCurrentReferenceCompensated	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ActiveCurrentReferenceLimited	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ReactiveCurrentReferenceLimited	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ActiveCurrentFeedback	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ActiveCurrentError	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ReactiveCurrentFeedback	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ReactiveCurrentError	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ConverterOperativeCurrentLimit	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ConverterCurrentLimitSource	??	DINT

Ref_Axis_CD (Continued)
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineElectricalAngle ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackSectionCoil1CurrentFeedback ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackSectionCoil2CurrentFeedback ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackSectionCoil3CurrentFeedback ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackSectionCoil4CurrentFeedback ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackSectionCoil5CurrentFeedback ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackSectionCoil6CurrentFeedback ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackSectionCoil7CurrentFeedback ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackSectionCoil8CurrentFeedback ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackSectionCoil9CurrentFeedback ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackSectionCoil10CurrentFeedback ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackSectionCoil11CurrentFeedback ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackSectionCoil12CurrentFeedback ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.AccelerometerFeedbackDeviceX ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.AccelerometerFeedbackDeviceY ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.AccelerometerFeedbackDeviceZ ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.AccelerometerFeedbackDeviceXRMS ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.AccelerometerFeedbackDeviceYRMS ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.AccelerometerFeedbackDeviceZRMS ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.PositionTrim ?? REAL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.VelocityTrim ?? REAL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD (Continued)		
Ref_Axis_CD.AccelerationTrim	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueTrim	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.VelocityFeedforwardGain	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AccelerationFeedforwardGain	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PositionLoopBandwidth	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PositionIntegratorBandwidth	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.VelocityLoopBandwidth	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.VelocityIntegratorBandwidth	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.LoadObserverBandwidth	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.LoadObserverIntegratorBandwidth	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueLimitPositive	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueLimitNegative	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.VelocityLowPassFilterBandwidth	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueLowPassFilterBandwidth	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SystemInertia	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CurrentDisturbance	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.DigitalOutputs	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AnalogOutput1	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AnalogOutput2	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.BusVoltageSetPoint	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ActiveCurrentTrim	??	REAL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardStatus	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardStatus.2	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardOKStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardConfigLockedStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		

Ref_Axis_CD (Continued)
Ref_Axis_CD.GuardGateDriveOutputStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardGateDriveOutputStatus - Axis_ObjectCD/Logic - 18(XIO)
Ref_Axis_CD.GuardStopInputStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardStopRequestStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardStopInProgressStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardStopDecelStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardStopStandstillStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardStopOutputStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardLimitedSpeedInputStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardLimitedSpeedRequestStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardLimitedSpeedMonitorInProgressStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardLimitedSpeedOutputStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardMaxSpeedMonitorInProgressStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardMaxAccelMonitorInProgressStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardDirectionMonitorInProgressStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardDoorControlLockStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardDoorControlOutputStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardDoorMonitorInputStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardDoorMonitorInProgressStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardLockMonitorInputStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardEnablingSwitchInputStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.GuardEnablingSwitchInProgressStatus

Ref_Axis_CD (Continued)		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardResetInputStatus		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardResetRequiredStatus		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardStopInputCycleRequiredStatus		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardFaults	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardInternalFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardConfigurationFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardGateDriveFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardResetFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardFeedback1Fault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardFeedback2Fault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardFeedbackSpeedCompareFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardFeedbackPositionCompareFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardStopInputFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardStopOutputFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardStopDecelFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardStopStandstillFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardStopMotionFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardLimitedSpeedInputFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardLimitedSpeedOutputFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardLimitedSpeedMonitorFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.GuardMaxSpeedMonitorFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		

Ref_Axis_CD (Continued)

Ref_Axis_CD.GuardMaxAccelMonitorFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.GuardDirectionMonitorFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.GuardDoorMonitorInputFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.GuardDoorMonitorFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.GuardDoorControlOutputFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.GuardLockMonitorInputFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.GuardLockMonitorFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.GuardEnablingSwitchMonitorInputFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.GuardEnablingSwitchMonitorFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.GuardFeedback1VoltageMonitorFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.GuardFeedback2VoltageMonitorFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.CIPAxisState ?? INT
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.CIPAxisState - Axis_ObjectCD/Logic - 1(MOVE), 16(EQ), 16(LIMIT), 18(LIMIT), 2(EQ)

Ref_Axis_CD.CIPAxisStatus ?? DINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.LocalControlStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.AlarmStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.DCBusUpStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.PowerStructureEnabledStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorFluxUpStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.TrackingCommandStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.PositionLockStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.VelocityLockStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.VelocityStandstillStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.VelocityThresholdStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD (Continued)		
Ref_Axis_CD.VelocityLimitStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AccelerationLimitStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.DecelerationLimitStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueThresholdStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueLimitStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CurrentLimitStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ThermalLimitStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.FeedbackIntegrityStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CIPShutdownStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.InProcessStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.DCBusUnload	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ACPowerLossStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PositionControlModeStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.VelocityControlModeStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueControlModeStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CIPAxisStatus2	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.MotoringStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.RegeneratingStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.RideThruStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ACLineSyncStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.BusVoltageLockStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ReactivePowerOnlyModeStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.VoltageControlModeStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PowerLossStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ACLineVoltageSagStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ACLinePhaseLossStatus		

Ref_Axis_CD (Continued)

?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineFrequencyChangeStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineSyncLossStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.SinglePhaseStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusVoltageLimitStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusVoltageRateLimitStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ActiveCurrentRateLimitStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ReactiveCurrentRateLimitStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ReactivePowerLimitStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ReactivePowerRateLimitStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ActiveCurrentLimitStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ReactiveCurrentLimitStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotoringPowerLimitStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.RegenerativePowerLimitStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterThermalLimitStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.CIPAxisStatusRA ?? DINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.TorqueNotchFilterFrequencyDetectedStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.TorqueNotchFilterTuneUnsuccessfulStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.TorqueNotchFilterMultipleFreqStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.TorqueNotchFilterFreqBelowLimitStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.TorqueNotchFilterFreqAboveLimitStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.AdaptiveTuneGainStabilizationStatus
?? BOOL

Ref_Axis_CD (Continued)
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.TestModeStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CIPAxisStatus2RA	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CIPAxisIOStatus	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.EnableInputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.HomeInputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.Registration1InputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.Registration2InputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PositiveOvertravelInputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.NegativeOvertravelInputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.Feedback1ThermostatStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ResistiveBrakeOutputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.MechanicalBrakeOutputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.MotorThermostatInputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CIPAxisIOStatusRA	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.RegenerativePowerInputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.BusCapacitorInputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ShuntThermalSwitchInputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ContactorEnableOuputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PreChargeInputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ACLineContactorInputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.RegenerativePowerOutputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.BusConditionerModuleInputStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ConverterInputStatus		

Ref_Axis_CD (Continued)

?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterOutputStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.CIPAxisFaults ?? LINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorOvercurrentFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorCommutationFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.MotorCommutationFault - Axis_ObjectCD/Logic - 18(XIC)

Ref_Axis_CD.MotorOverspeedFLFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorOverspeedULFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorOvertemperatureFLFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.MotorOvertemperatureFLFault - Axis_ObjectCD/Logic - 18(XIC)

Ref_Axis_CD.MotorOvertemperatureULFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorThermalOverloadFLFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.MotorThermalOverloadFLFault - Axis_ObjectCD/Logic - 18(XIC)

Ref_Axis_CD.MotorThermalOverloadULFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorPhaseLossFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.InverterOvercurrentFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.InverterOvercurrentFault - Axis_ObjectCD/Logic - 18(XIC)

Ref_Axis_CD.InverterOvertemperatureFLFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.InverterOvertemperatureFLFault - Axis_ObjectCD/Logic - 18(XIC)

Ref_Axis_CD.InverterOvertemperatureULFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.InverterThermalOverloadFLFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.InverterThermalOverloadFLFault - Axis_ObjectCD/Logic - 18(XIC)

Ref_Axis_CD.InverterThermalOverloadULFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterOvercurrentFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterGroundCurrentFLFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterGroundCurrentULFault

Ref_Axis_CD (Continued)

?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterOvertemperatureFLFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ConverterOvertemperatureFLFault - Axis_ObjectCD/Logic - 18(XIC)

Ref_Axis_CD.ConverterOvertemperatureULFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterThermalOverloadFLFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ConverterThermalOverloadFLFault - Axis_ObjectCD/Logic - 18(XIC)

Ref_Axis_CD.ConverterThermalOverloadULFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterACPowerLossFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterACSinglePhaseLossFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ConverterACSinglePhaseLossFault - Axis_ObjectCD/Logic - 18(XIC)

Ref_Axis_CD.ConverterACPhaseShortFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterPreChargeFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusRegulatorOvertemperatureFLFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusRegulatorOvertemperatureFLFault - Axis_ObjectCD/Logic - 18(XIC)

Ref_Axis_CD.BusRegulatorOvertemperatureULFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusRegulatorThermalOverloadFLFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusRegulatorThermalOverloadFLFault - Axis_ObjectCD/Logic - 18(XIC)

Ref_Axis_CD.BusRegulatorThermalOverloadULFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusRegulatorFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusModuleFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusUndervoltageFLFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusUndervoltageFLFault - Axis_ObjectCD/Logic - 18(XIC)

Ref_Axis_CD.BusUndervoltageULFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusOvervoltageFLFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusOvervoltageFLFault - Axis_ObjectCD/Logic - 18(XIC)

Ref_Axis_CD.BusOvervoltageULFault
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusPowerLossFault ?? BOOL

Ref_Axis_CD (Continued)
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusPowerBlownFuseFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusPowerLeakageFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusPowerSharingFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackSignalNoiseFLFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackSignalNoiseULFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackSignalLossFLFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackSignalLossULFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackDataLossFLFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackDataLossULFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackDeviceFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackDeviceFault - Axis_ObjectCD/Logic - 18(XIC)
Ref_Axis_CD.SensorFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BrakeSlipFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.HardwareOvertravelPositiveFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.HardwareOvertravelPositiveFault - Axis_ObjectCD/Logic - 18(XIC)
Ref_Axis_CD.HardwareOvertravelNegativeFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.HardwareOvertravelNegativeFault - Axis_ObjectCD/Logic - 18(XIC)
Ref_Axis_CD.ExcessivePositionErrorFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ExcessivePositionErrorFault - Axis_ObjectCD/Logic - 18(XIC)
Ref_Axis_CD.ExcessiveVelocityErrorFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.OvertorqueLimitFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.UndertorqueLimitFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ExcessiveBusVoltageErrorFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.AmbientTemperatureRiseFault
?? BOOL

Ref_Axis_CD (Continued)
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.IllegalControlModeFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.EnableInputDeactivatedFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ControllerInitiatedFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ExternalInputFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.CIPAxisFaults2 ?? LINT
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineOvervoltageFLFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineOvervoltageULFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineUndervoltageFLFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineUndervoltageULFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineHighFrequencyFLFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineHighFrequencyULFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineLowFrequencyFLFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineLowFrequencyULFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineVoltageUnbalanceFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineCurrentUnbalanceFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineVoltageSagFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineFrequencyChangeFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineSyncLossFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineSyncFailureFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.InverterGroundCurrentFLFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.InverterGroundCurrentULFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD (Continued)

Ref_Axis_CD.InverterOutputPhaseShortFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.AuxiliaryPowerSupplyFLFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.AuxiliaryPowerSupplyULFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusInputOvercurrentFLFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusInputOvercurrentULFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.CIPAxisFaultsRA ?? LINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.CommutationStartupFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorVoltageMismatchFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.FeedbackFilterNoiseFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.FeedbackBatteryLossFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.FeedbackBatteryLowFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.FeedbackIncrementalCountErrorFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ControlModuleOvertemperatureFLFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ControlModuleOvertemperatureULFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterPreChargeOverloadFLFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ConverterPreChargeOverloadFLFault - Axis_ObjectCD/Logic - 18(XIC)

Ref_Axis_CD.ConverterPreChargeOverloadULFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ExcessiveCurrentFeedbackOffsetFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.RegenerativePowerSupplyFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.PWMFrequencyReducedFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.CurrentLimitReducedFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.TorqueProveFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD (Continued)

Ref_Axis_CD.DecelOverrideFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PreventativeMaintenanceFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.MotorTestFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.HardwareConfigurationFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.FirmwareChangeFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ConverterPreChargeInputDeactivatedFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.DCCommonBusFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.RuntimeErrorFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.BackplaneCommunicationErrorFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafetyModuleCommunicationErrorFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ACLineContactorFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ACLineResonanceFLFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ACLineResonanceULFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TrackStopFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.LostMoverAssociationFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.UnassociatedMoverFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PeripheralHardwareFLFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PeripheralHardwareULFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PeripheralOverTemperatureFLFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PeripheralOverTemperatureULFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PeripheralUnderTemperatureFLFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PeripheralUnderTemperatureULFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		

Ref_Axis_CD (Continued)

Ref_Axis_CD.PeripheralCommunicationFLFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.PeripheralCommunicationULFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.AdapterCommunicationFLFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.AdapterCommunicationULFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ExcessiveMotorVoltageFeedbackOffsetFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLinePhaseReversalFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.PhaseThermalImbalanceFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.DCBusVoltageImbalanceFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.PredictiveMaintenanceFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ProductSpecificFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.CIPAxisAlarms ?? LINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorOvercurrentAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorCommutationAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorOverspeedFLAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorOverspeedULAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorOvertemperatureFLAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorOvertemperatureULAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorThermalOverloadFLAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorThermalOverloadULAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MotorPhaseLossAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.InverterOvercurrentAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.InverterOvertemperatureFLAlarm

Ref_Axis_CD (Continued)

?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.InverterOvertemperatureULAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.InverterThermalOverloadFLAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.InverterThermalOverloadULAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterOvercurrentAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterGroundCurrentFLAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterGroundCurrentULAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterOvertemperatureFLAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterOvertemperatureULAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterThermalOverloadFLAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterThermalOverloadULAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterACPowerLossAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterACSinglePhaseLossAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterACPhaseShortAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ConverterPreChargeAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusRegulatorOvertemperatureFLAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusRegulatorOvertemperatureULAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusRegulatorThermalOverloadFLAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusRegulatorThermalOverloadULAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusRegulatorAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusModuleAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.BusUndervoltageFLAlarm
?? BOOL

Ref_Axis_CD (Continued)
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusUndervoltageULAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusOvervoltageFLAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusOvervoltageULAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusPowerLossAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusPowerBlownFuseAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusPowerLeakageAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusPowerSharingAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackSignalNoiseFLAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackSignalNoiseULAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackSignalLossFLAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackSignalLossULAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackDataLossFLAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackDataLossULAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackDeviceAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SensorAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BrakeSlipAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.HardwareOvertravelPositiveAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.HardwareOvertravelNegativeAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ExcessivePositionErrorAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ExcessiveVelocityErrorAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.OvertorqueLimitAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.UndertorqueLimitAlarm

Ref_Axis_CD (Continued)

?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ExcessiveBusVoltageErrorAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.AmbientTemperatureRiseAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.IllegalControlModeAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.EnableInputDeactivatedAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ControllerInitiatedAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ExternalInputAlarm ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.CIPAxisAlarms2 ?? LINT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineOvervoltageFLAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineOvervoltageULAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineUndervoltageFLAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineUndervoltageULAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineHighFrequencyFLAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineHighFrequencyULAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineLowFrequencyFLAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineLowFrequencyULAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineVoltageUnbalanceAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineCurrentUnbalanceAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineVoltageSagAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineFrequencyChangeAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineSyncLossAlarm
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.ACLineSyncFailureAlarm
?? BOOL

Ref_Axis_CD (Continued)		
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.InverterGroundCurrentFLAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.InverterGroundCurrentULAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.InverterOutputPhaseShortAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AuxiliaryPowerSupplyFLAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AuxiliaryPowerSupplyULAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.BusInputOvercurrentFLAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.BusInputOvercurrentULAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CIPAxisAlarmsRA	??	LINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CommutationStartupAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.MotorVoltageMismatchAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.FeedbackFilterNoiseAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.FeedbackBatteryLossAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.FeedbackBatteryLowAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.FeedbackIncrementalCountErrorAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ControlModuleOvertemperatureFLAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ControlModuleOvertemperatureULAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ConverterPreChargeOverloadFLAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ConverterPreChargeOverloadULAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ExcessiveCurrentFeedbackOffsetAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.RegenerativePowerSupplyAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PWMFrequencyReducedAlarm		
	??	BOOL

Ref_Axis_CD (Continued)		
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CurrentLimitReducedAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TorqueProveAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.DecelOverrideAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PreventativeMaintenanceAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.MotorTestAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.HardwareConfigurationAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.FirmwareChangeAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ConverterPreChargeInputDeactivatedAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.DCCommonBusAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.RuntimeErrorAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.BackplaneCommunicationErrorAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafetyModuleCommunicationErrorAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ACLineContactorAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ACLineResonanceFLAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ACLineResonanceULAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.TrackStopAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.LostMoverAssociationAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.UnassociatedMoverAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PeripheralHardwareFLAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PeripheralHardwareULAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PeripheralOverTemperatureFLAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PeripheralOverTemperatureULAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		

Ref_Axis_CD (Continued)

Ref_Axis_CD.PeripheralUnderTemperatureFLAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PeripheralUnderTemperatureULAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PeripheralCommunicationFLAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PeripheralCommunicationULAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AdapterCommunicationFLAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AdapterCommunicationULAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ExcessiveMotorVoltageFeedbackOffsetAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ACLinePhaseReversalAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PhaseThermalImbalanceAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.DCBusVoltageImbalanceAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.PredictiveMaintenanceAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ProductSpecificAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AxisSafetyAlarms	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafetyCoreAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafetyFeedbackAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafeTorqueOffAlarm		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SS1Alarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SS2Alarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SOSAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SBCAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SMTAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SSMAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SLSAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SLAAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		

Ref_Axis_CD (Continued)

Ref_Axis_CD.SDIAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SCAAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SLPAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafetyValidatorAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafetyAbortAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AxisSafetyAlarmsRA	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SFXAlarm	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CIPInitializationFaults	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.BootBlockChecksumFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.MainBlockChecksumFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.NonvolatileMemoryChecksumFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CIPInitializationFaultsRA	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CIPInitializationFaultsRA.19	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.FeedbackDataCorruptionFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.FeedbackDataRangeFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.FeedbackCommunicationStartupFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.FeedbackAbsoluteOverspeedFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.FeedbackAbsolutePowerOffTravelFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.FeedbackAbsoluteStartupSpeedFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CommutationOffsetUninitializedFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.InvalidFPGAImageFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.InvalidBoardSupportPackageFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.InvalidSafetyFirmwareFault		

Ref_Axis_CD (Continued)
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.PowerBoardFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.IllegalOptionCardFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.OptionStorageChecksumFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ModuleVoltageMismatchFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ModuleVoltageMismatchFault - Axis_ObjectCD/Logic - 18(XIC)
Ref_Axis_CD.UnknownModuleFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FactoryConfigurationErrorFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.IllegalAddressFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SeriesMismatchFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.OpenSlotFault ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.MoverAxisAssignmentFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackBackplaneCommunicationFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.UnassociatedSectionAxisFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackConfigurationFault
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.CIPStartInhibits ?? INT
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.CIPStartInhibits - Axis_ObjectCD/Logic - 15(NE)
Ref_Axis_CD.AxisEnableInputInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.MotorNotConfiguredInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackNotConfiguredInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.CommutationNotConfigured
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SafeTorqueOffActiveInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ConverterBusUnloadInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BusInputOvercurrentInhibit
?? BOOL

Ref_Axis_CD (Continued)
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.InvalidSlipSpeedInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.CIPStartInhibitsRA ?? INT
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.CIPStartInhibitsRA - Axis_ObjectCD/Logic - 15(NE)
Ref_Axis_CD.VoltsHertzCurveDefinitionInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.MotorFeedbackRequiredInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SpeedLimitConfigurationInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TorqueProveConfigurationInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SafeTorqueOffInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SafetyResetRequiredInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SafetyNotConfiguredInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.StopCommandActiveInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.FeedbackDeviceResetInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.BrakeMalfunctionInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.ACLineContactorInputInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackSectionNotEnabledInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.TrackMoverMotorMismatchInhibit
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.AxisSafetyState ?? INT
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.AxisSafetyDataA ?? DINT
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.AxisSafetyDataB ?? DINT
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.AxisSafetyStatus ?? DINT
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SafetyFaultStatus ?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SafetyResetRequestStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive
Ref_Axis_CD.SafetyResetRequiredStatus
?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD (Continued)

Ref_Axis_CD.SafeTorqueOffActiveStatus		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafeTorqueDisabledStatus		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SBCActiveStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SBCEngagedStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SS1ActiveStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SS2ActiveStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SOSActiveStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SOSStandstillStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SMTActiveStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SMTOvertemperatureStatus		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SSMActiveStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SSMStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SLSActiveStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SLSLimitStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SLAActiveStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SLALimitStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SDIActiveStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SDILimitStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafePositiveMotionStatus		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafeNegativeMotionStatus		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SCAActiveStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SCAStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SLPActiveStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SLPLimitStatus	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafetyOutputConnectionClosedStatus		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafetyOutputConnectionIdleStatus		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AxisSafetyStatusRA	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafeBrakeIntegrityStatus		

Ref_Axis_CD (Continued)		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafeFeedbackHomedStatus		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AxisSafetyFaults	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafetyCoreFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafetyFeedbackFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafeTorqueOffFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SS1Fault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SS2Fault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SOSFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SBCFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SMTFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SSMFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SLSFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SLAFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SDIFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SCAFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SLPFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafetyValidatorFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SafetyAbortFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.AxisSafetyFaultsRA	??	DINT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.SFXFault	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.CIPAPRFaults	??	INT
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.MemoryWriteErrorAPRFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.MemoryReadErrorAPRFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.FeedbackSerialNumberMismatchAPRFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.BufferAllocationAPRFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.ScalingConfigurationChangedAPRFault		
	??	BOOL
Servo Axis, Data type Axis CIP Drive		
Ref_Axis_CD.FeedbackModeChangedAPRFault		
	??	BOOL

Ref_Axis_CD (Continued)
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.FeedbackIntegrityLossAPRFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.FeedbackPositionRangeChangedAPRFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.CIPAPRFaultsRA ?? INT
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.PersistentMediaAPRFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.FirmwareErrorAPRFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.FeedbackBatteryLossAPRFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MoverSequencingWithoutReferenceAPRFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Ref_Axis_CD.MoverAssignmentSequenceChangedAPRFault ?? BOOL
Servo Axis, Data type Axis CIP Drive

Sts_AbortDone 0 BOOL Axis_ObjectCD
Condition: Aborting Done
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_AbortDone - Axis_ObjectCD/Logic - *11(OTE)*

Sts_AbsoluteReferenceStatus 0 BOOL Axis_ObjectCD
Absolute Feedback device shows Reference Ok
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_AbsoluteReferenceStatus - Axis_ObjectCD/Logic - *14(OTE)*

Sts_AxisOk 0 BOOL Axis_ObjectCD
Status Display: Axis ready to enable
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_AxisOk - Axis_ObjectCD/Logic - *19(OTE)*

Sts_CIP_StartInhibitActive 0 BOOL Axis_ObjectCD
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_CIP_StartInhibitActive - Axis_ObjectCD/Logic - *15(OTE), 16(XIC)*

Sts_DisableDone 0 BOOL Axis_ObjectCD
Condition: Disable Done

Sts_DisableDone (Continued)
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_DisableDone - Axis_ObjectCD/Logic - *3(OTE)*

Sts_EnableDone 0 BOOL Axis_ObjectCD
Condition: Enable Done
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_EnableDone - Axis_ObjectCD/Logic - *2(OTE)*

Sts_ER 0 BOOL Axis_ObjectCD
Any Fault occured on this Axis
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_ER - Axis_ObjectCD/Logic - *16(OTE), 18(XIC), 19(XIO), 2(XIO), 20(XIC)*

Sts_Err 0 DINT Axis_ObjectCD
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_Err - Axis_ObjectCD/Logic - *10(MOVE), *2(MOVE), *2(MOVE), *3(MOVE), *3(MOVE), *4(MOVE), *4(MOVE), *4(MOVE), *7(MOVE), 16(NE), 17(EQ), 17(NE)*
*Sts_Err - Axis_ObjectCD/Prescan - *3(MOVE)*

Sts_FaultResetDone 0 BOOL Axis_ObjectCD
Condition: Fault Reset Done
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_FaultResetDone - Axis_ObjectCD/Logic - *5(OTL), *5(OTU)*

Sts_Homed 0 BOOL Axis_ObjectCD
The Axis has been homed
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_Homed - Axis_ObjectCD/Logic - *6(OTU), *8(OTL), 9(XIC)*
*Sts_Homed - Axis_ObjectCD/Prescan - *2(OTU)*

Sts_HomeDone 0 BOOL Axis_ObjectCD
Condition: Home Done
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_HomeDone - Axis_ObjectCD/Logic - *9(OTE)*

Sts_NoMotion	0	BOOL	Axis_ObjectCD

AverageVelocity within ZeroSpeedTolerance and no MotionStatus set

Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None

*Sts_NoMotion - Axis_ObjectCD/Logic - *13(OTE), 11(XIC)*

Sts_StopDone	0	BOOL	Axis_ObjectCD

Condition: Stopping Done

Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None

*Sts_StopDone - Axis_ObjectCD/Logic - *11(OTE)*

Name	Default	Data Type	Scope
Wrk_DecelRate	0.0	REAL	Axis_ObjectCD
Usage:	Local Tag		
External Access:	None		
OPC UA Access:	None		
*Wrk_DecelRate - Axis_ObjectCD/Logic - *10(MOVE), *10(MOVE), 10(MAS)*			
Wrk_ER_ONS	0	BOOL	Axis_ObjectCD
Usage:	Local Tag		
External Access:	None		
OPC UA Access:	None		
*Wrk_ER_ONS - Axis_ObjectCD/Logic - *20(ONS)*			
Wrk_FaultReset_delay		TIMER	Axis_ObjectCD
Usage:	Local Tag		
External Access:	None		
OPC UA Access:	None		
*Wrk_FaultReset_delay - Axis_ObjectCD/Logic - *5(TON)*			
Wrk_FaultReset_delay.DN	0	BOOL	
Wrk_FaultReset_delay.DN - Axis_ObjectCD/Logic - 5(XIC)			
Wrk_HomeSequence	0	DINT	Axis_ObjectCD
Usage:	Local Tag		
External Access:	None		
OPC UA Access:	None		
*Wrk_HomeSequence - Axis_ObjectCD/Logic - *6(MOVE), *7(MOVE), *8(MOVE), 7(EQ), 8(EQ)*			
*Wrk_HomeSequence - Axis_ObjectCD/Prescan - *2(MOVE)*			
Wrk_MI_Disable		MOTION_INSTRUCTION	Axis_ObjectCD
Usage:	Local Tag		
External Access:	None		
OPC UA Access:	None		
*Wrk_MI_Disable - Axis_ObjectCD/Logic - *3(MSF)*			
*Wrk_MI_Disable - Axis_ObjectCD/Prescan - *1(COP)*			
Wrk_MI_Disable.DN	0	BOOL	
Wrk_MI_Disable.DN - Axis_ObjectCD/Logic - 3(XIC)			
Wrk_MI_Disable.ER	0	BOOL	
Wrk_MI_Disable.ER - Axis_ObjectCD/Logic - 3(XIC), 3(XIC)			
Wrk_MI_Disable.ERR	0	INT	
Wrk_MI_Disable.ERR - Axis_ObjectCD/Logic - 3(MOVE)			
Wrk_MI_Disable.EXERR	0	SINT	
Wrk_MI_Disable.EXERR - Axis_ObjectCD/Logic - 3(MOVE)			
Wrk_MI_Enable		MOTION_INSTRUCTION	Axis_ObjectCD
Usage:	Local Tag		
External Access:	None		
OPC UA Access:	None		
*Wrk_MI_Enable - Axis_ObjectCD/Logic - *2(MSO)*			
*Wrk_MI_Enable - Axis_ObjectCD/Prescan - *1(COP)*			
Wrk_MI_Enable.ER	0	BOOL	
Wrk_MI_Enable.ER - Axis_ObjectCD/Logic - 2(XIC)			
Wrk_MI_Enable.ERR	0	INT	
Wrk_MI_Enable.ERR - Axis_ObjectCD/Logic - 2(MOVE)			
Wrk_MI_Enable.EXERR	0	SINT	
Wrk_MI_Enable.EXERR - Axis_ObjectCD/Logic - 2(MOVE)			
Wrk_MI_FaultReset		MOTION_INSTRUCTION	Axis_ObjectCD
Usage:	Local Tag		
External Access:	None		
OPC UA Access:	None		
*Wrk_MI_FaultReset - Axis_ObjectCD/Logic - *4(MAFR)*			
*Wrk_MI_FaultReset - Axis_ObjectCD/Prescan - *1(COP)*			
Wrk_MI_FaultReset.ER	0	BOOL	

Wrk_MI_FaultReset (Continued)
Wrk_MI_FaultReset.ER - Axis_ObjectCD/Logic - 4(XIC)
Wrk_MI_FaultReset.ERR 0 INT
Wrk_MI_FaultReset.ERR - Axis_ObjectCD/Logic - 4(MOVE)
Wrk_MI_FaultReset.EXERR 0 SINT
Wrk_MI_FaultReset.EXERR - Axis_ObjectCD/Logic - 4(MOVE)

Wrk_MI_Home MOTION_INSTRUCTION Axis_ObjectCD
Usage: Local Tag
External Access: None
OPC UA Access: None
*Wrk_MI_Home - Axis_ObjectCD/Logic - *7(MAH)*
*Wrk_MI_Home - Axis_ObjectCD/Prescan - *1(COP)*
Wrk_MI_Home.ER 0 BOOL
Wrk_MI_Home.ER - Axis_ObjectCD/Logic - 7(XIC)
Wrk_MI_Home.PC 0 BOOL
Wrk_MI_Home.PC - Axis_ObjectCD/Logic - 8(XIC)
Wrk_MI_Home.ERR 0 INT
Wrk_MI_Home.ERR - Axis_ObjectCD/Logic - 7(MOVE)
Wrk_MI_Home.EXERR 0 SINT
Wrk_MI_Home.EXERR - Axis_ObjectCD/Logic - 7(MOVE)

Wrk_MI_Init MOTION_INSTRUCTION Axis_ObjectCD
Usage: Local Tag
External Access: None
OPC UA Access: None
Wrk_MI_Init - Axis_ObjectCD/Prescan - 1(COP), 1(COP), 1(COP), 1(COP), 1(COP), 1(COP)
Wrk_MI_Init.FLAGS 0 DINT
*Wrk_MI_Init.FLAGS - Axis_ObjectCD/Prescan - *1(MOVE)*
Wrk_MI_Init.ERR 0 INT
*Wrk_MI_Init.ERR - Axis_ObjectCD/Prescan - *1(MOVE)*
Wrk_MI_Init.STATUS 0 SINT
*Wrk_MI_Init.STATUS - Axis_ObjectCD/Prescan - *1(MOVE)*
Wrk_MI_Init.STATE 0 SINT
*Wrk_MI_Init.STATE - Axis_ObjectCD/Prescan - *1(MOVE)*
Wrk_MI_Init.SEGMENT 0 DINT
*Wrk_MI_Init.SEGMENT - Axis_ObjectCD/Prescan - *1(MOVE)*
Wrk_MI_Init.EXERR 0 SINT
*Wrk_MI_Init.EXERR - Axis_ObjectCD/Prescan - *1(MOVE)*

Wrk_MI_ShutdownReset MOTION_INSTRUCTION Axis_ObjectCD
Usage: Local Tag
External Access: None
OPC UA Access: None
*Wrk_MI_ShutdownReset - Axis_ObjectCD/Logic - *4(MASR)*
*Wrk_MI_ShutdownReset - Axis_ObjectCD/Prescan - *1(COP)*
Wrk_MI_ShutdownReset.ER 0 BOOL
Wrk_MI_ShutdownReset.ER - Axis_ObjectCD/Logic - 4(XIC)
Wrk_MI_ShutdownReset.ERR 0 INT
Wrk_MI_ShutdownReset.ERR - Axis_ObjectCD/Logic - 4(MOVE)
Wrk_MI_ShutdownReset.EXERR 0 SINT
Wrk_MI_ShutdownReset.EXERR - Axis_ObjectCD/Logic - 4(MOVE)

Wrk_MI_Stop MOTION_INSTRUCTION Axis_ObjectCD
Usage: Local Tag
External Access: None
OPC UA Access: None
*Wrk_MI_Stop - Axis_ObjectCD/Logic - *10(MAS)*
*Wrk_MI_Stop - Axis_ObjectCD/Prescan - *1(COP)*
Wrk_MI_Stop.ER 0 BOOL
Wrk_MI_Stop.ER - Axis_ObjectCD/Logic - 10(XIC)
Wrk_MI_Stop.ERR 0 INT
Wrk_MI_Stop.ERR - Axis_ObjectCD/Logic - 10(MOVE)

Wrk_MI_Stop (Continued)
Wrk_MI_Stop.EXERR 0 SINT
Wrk_MI_Stop.EXERR - Axis_ObjectCD/Logic - 10(MOVE)

Wrk_MSFwatchdog TIMER Axis_ObjectCD
Usage: Local Tag
External Access: None
OPC UA Access: None
*Wrk_MSFwatchdog - Axis_ObjectCD/Logic - *3(TON)*
Wrk_MSFwatchdog.PRE 0 DINT
*Wrk_MSFwatchdog.PRE - Axis_ObjectCD/Logic - *3(MOVE)*
Wrk_MSFwatchdog.DN 0 BOOL
Wrk_MSFwatchdog.DN - Axis_ObjectCD/Logic - 3(XIC)

Wrk_MSOwatchdog TIMER Axis_ObjectCD
Usage: Local Tag
External Access: None
OPC UA Access: None
*Wrk_MSOwatchdog - Axis_ObjectCD/Logic - *2(TON)*
Wrk_MSOwatchdog.PRE 0 DINT
*Wrk_MSOwatchdog.PRE - Axis_ObjectCD/Logic - *2(MOVE)*
Wrk_MSOwatchdog.DN 0 BOOL
Wrk_MSOwatchdog.DN - Axis_ObjectCD/Logic - 2(XIC)

Wrk_ONS_HomeStart 0 BOOL Axis_ObjectCD
Usage: Local Tag
External Access: None
OPC UA Access: None
*Wrk_ONS_HomeStart - Axis_ObjectCD/Logic - *6(ONS)*
*Wrk_ONS_HomeStart - Axis_ObjectCD/Prescan - *2(OTU)*

Wrk_ONS_Init 0 BOOL Axis_ObjectCD
Usage: Local Tag
External Access: None
OPC UA Access: None
*Wrk_ONS_Init - Axis_ObjectCD/Logic - *4(ONS)*

Wrk_Velocity 0.0 REAL Axis_ObjectCD
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*Wrk_Velocity - Axis_ObjectCD/Logic - *13(ABS), 13(LE)*


```
////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
COMPANY:          Rockwell Automation
FUNCTION:         AXIS_CIP_DRIVE AOI
AUTHOR:           Rockwell Automation/Kelvin Erickson Missouri S&T
DATE UPDATED:     July 2020

FUNCTION:

Version Comments: Modified homing sequence to omit check for status of home switch

////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
```

0

NOP

```
//////////////////////////////////////////////////////// CIP AXIS STATE ////////////////////////////////////////////////////////////////////////////

 - ENUMERATION :

   0 = Initializing
   1 = Pre-Charge
   2 = Stopped
   3 = Starting
   4 = Running
   5 = Testing
   6 = Stopping
   7 = Aborting
   8 = Faulted
   9 = Start Inhibited
   10 = Shutdown
   11 = Axis Inhibited
   12 = Not Grouped
   13 = No Module
   14...255 = Reserved
```

1

CipState

MOVE	
Move	
Source	Ref_Axis_CD.CIPAxisState ??
Dest	Out_AxisCipState 0

//

- SECTION AXIS ENABLE

//

ENABLE AXIS (CLOSE SERVOLOOP)

***** Changed occurances of Ref_Axis_CD.PowerStructureEnabledStatus to Ref_Axis_CD.DriveEnableStatus

2

Enables the Axis
Cmd_Enable

EQ
Equal
Source A Ref_Axis_CD.CIPAxisState
??
Source B 2

Servo Axis, Data
type Axis CIP Drive
Ref_Axis_CD.ServoActionStatus

Servo Axis, Data
type Axis CIP Drive
Ref_Axis_CD.DriveEnableStatus

Disables the Axis
Cmd_Disable

Any Fault occured on
this Axis
Sts_ER

Wrk_MI_Enable.ER

MOVE
Move
Source

Dest

Servo Axis, Data
type Axis CIP Drive
Ref_Axis_CD.DriveEnableStatus

Servo Axis, Data
type Axis CIP Drive
Ref_Axis_CD.ServoActionStatus

Servo Axis, Data
type Axis CIP Drive
Ref_Axis_CD.DriveEnableStatus

Servo Axis, Data
type Axis CIP Drive
Ref_Axis_CD.ServoActionStatus

MOVE
Move
Source 250

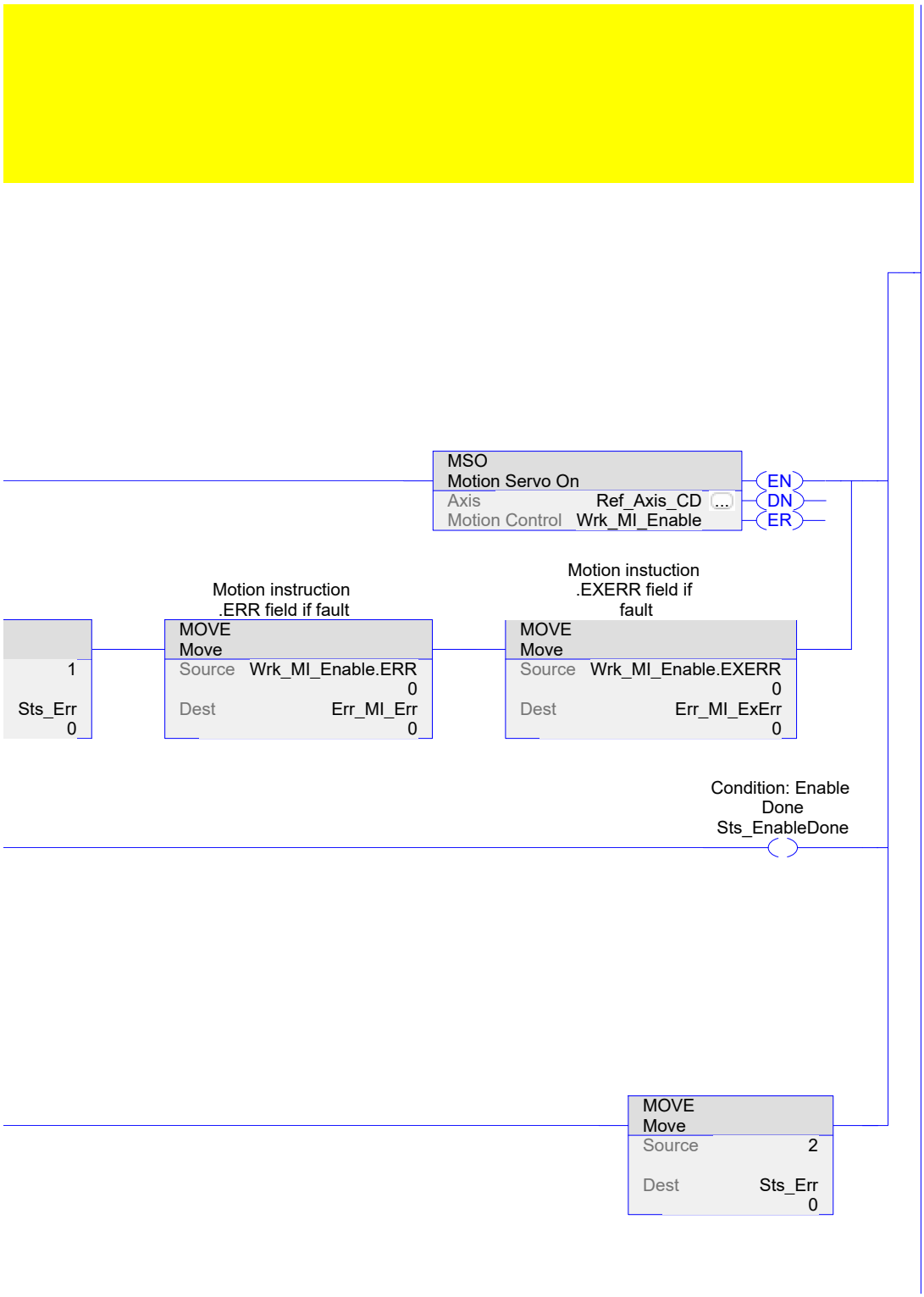
Dest Wrk_MSOwatchdog.PRE
0

TON
Timer On Delay
Timer Wrk_MSOwatchdog
Preset 0
Accum 0

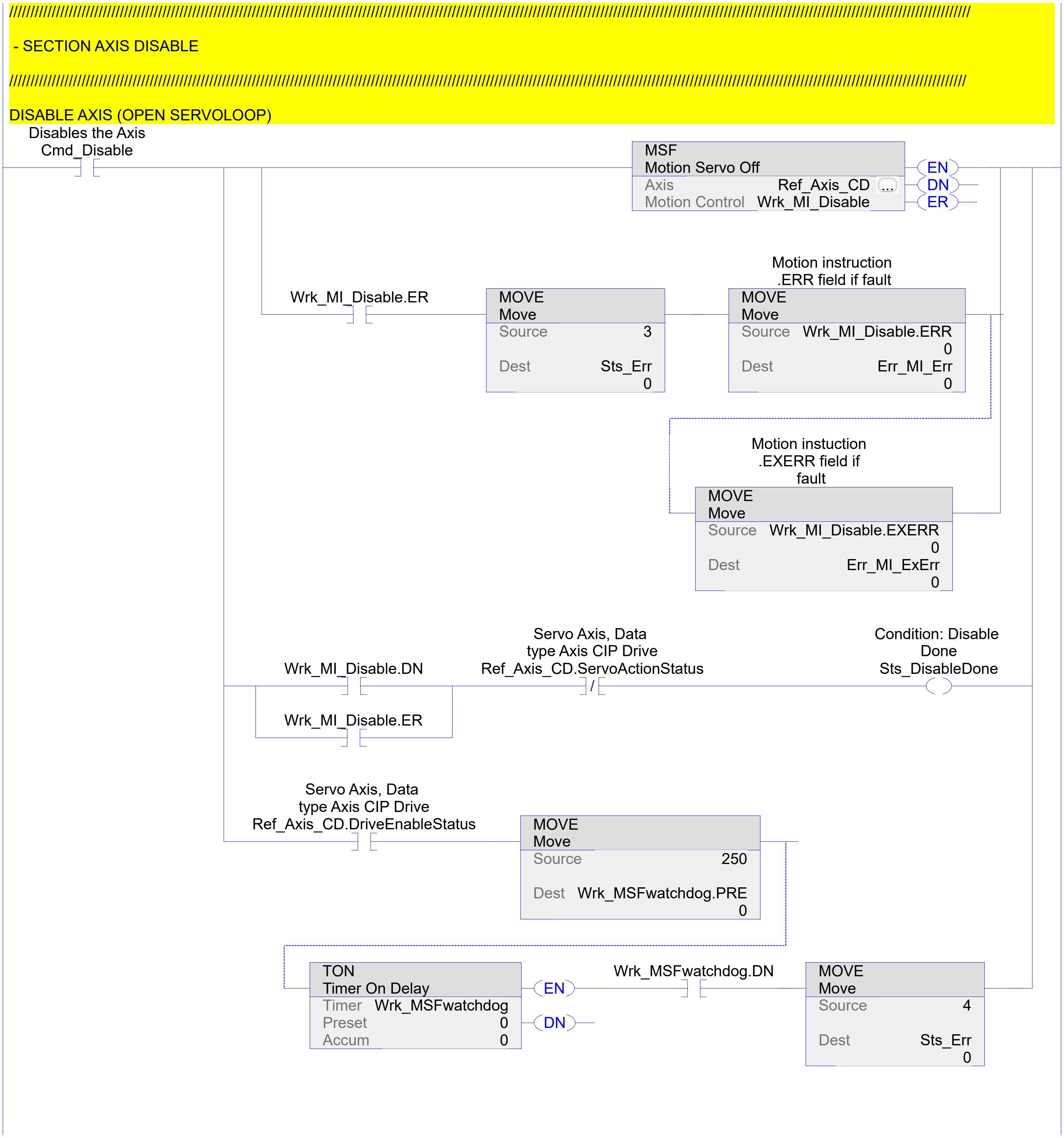
EN

DN

Wrk_MSOwatchdog.DN



3


- SECTION AXIS DISABLE
DISABLE AXIS (OPEN SERVOLOOP)
Disables the Axis
Cmd_Disable
MSF
Motion Servo Off
Axis Ref_Axis_CD
Motion Control Wrk_MI_Disable
EN
DN
ER
Wrk_MI_Disable.ER
MOVE
Move
Source 3
Dest Sts_Err
0
Motion instruction
.ERR field if fault
MOVE
Move
Source Wrk_MI_Disable.ERR
0
Dest Err_MI_Err
0
Motion instuction
.EXERR field if
fault
MOVE
Move
Source Wrk_MI_Disable.EXERR
0
Dest Err_MI_ExErr
0
Wrk_MI_Disable.DN
Wrk_MI_Disable.ER
Servo Axis, Data
type Axis CIP Drive
Ref_Axis_CD.ServoActionStatus
Condition: Disable
Done
Sts_DisableDone
Servo Axis, Data
type Axis CIP Drive
Ref_Axis_CD.DriveEnableStatus
MOVE
Move
Source 250
Dest Wrk_MSFwatchdog.PRE
0
TON
Timer On Delay
Timer Wrk_MSFwatchdog
Preset 0
Accum 0
EN
DN
Wrk_MSFwatchdog.DN
MOVE
Move
Source 4
Dest Sts_Err
0

//

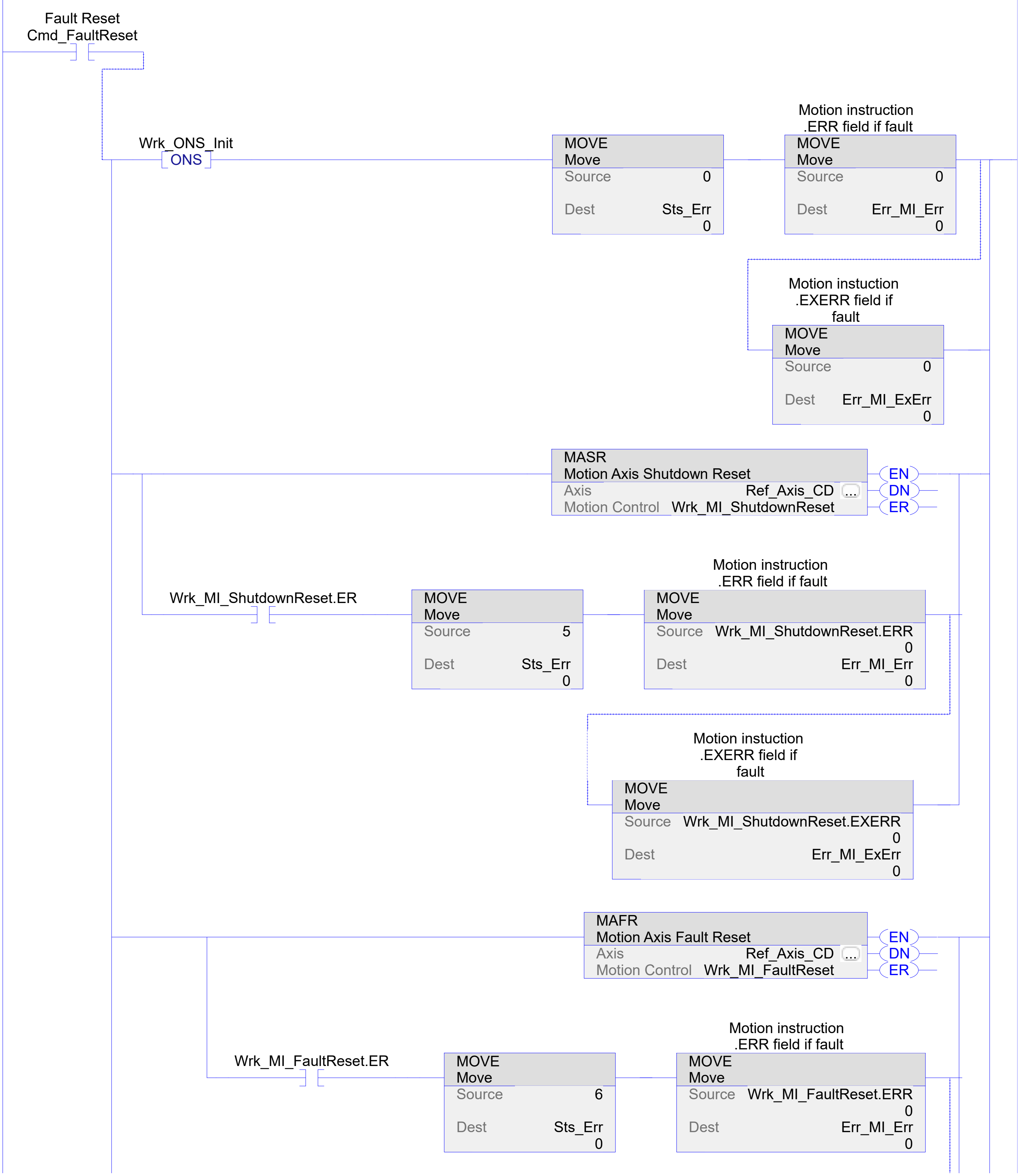
- SECTION AXIS FAULT RESET

//

- RESET FAULTs

***** Corrected to zero Sts_Err and Sts_ExtErr only on transition of Cmd_FaultReset

4



Motion instuction .EXERR field if fault
MOVE Move
Source Wrk_MI_FaultReset.EXERR 0
Dest Err_MI_ExErr 0

Any instruction within the AOI faulted
Err_InstructionFault (U)

Any positive Overtravel Fault
Err_PosOvertravel (U)

Any neagtive Overtravel Fault
Err_NegOvertravel (U)

Any Feedback Fault including Aux Feedback
Err_FeedbackFault (U)

Any General Fault
Err_DeviceCommunication (U)

Any Overload/Voltage Fault
Err_PowerFault (U)

Any Temperature Fault
Err_TemperatureFault (U)

Any Guard Fault (Safety Fault)
Err_GuardFault (U)

FAULT RESET DONE / HANDSHAKE

5

Fault Reset
Cmd_FaultReset] [

TON Timer On Delay
Timer Wrk_FaultReset_delay
Preset 500
Accum 0
(EN) (DN)

Wrk_FaultReset_delay.DN] [

Condition: Fault Reset Done
Sts_FaultResetDone (L)

Fault Reset
Cmd_FaultReset]/[

Condition: Fault Reset Done
Sts_FaultResetDone (U)

//

- SECTION AXIS HOMING

//

HOME COMMAND, TO INITIATE THE HOME SEQUENCE

6

Home the Axis, if Cfg_HomeEnabled = 1
Cmd_Home] [

Configuration: =1: CMD_Home will execute MAH instruction
= 0 no home instruction executed
Cfg_HomeEnabled] [

Wrk_ONS_HomeStart [ONS]

The Axis has been homed
Sts_Homed (U)

MOVE Move
Source 1
Dest Wrk_HomeSequence 0

HOME SEQUENCE EXECUTION (CONFIGURATION VIA AXIS PROPERTIES WIZARDS)

7

EQ
Equal
Source A Wrk_HomeSequence
0
Source B 1

MAH
Motion Ax
Axis
Motion Co

Wrk_MI_Home.ER

MOVE
Move
Source 7
Dest Sts_Err
0

Motion instruction
.ERR field if fault

MOVE
Move
Source Wrk_MI_Home.ERR
0
Dest Err_MI_Err
0

Home
Ref_Axis_CD ...
trol Wrk_MI_Home

EN
DN
ER
IP
PC

Motion instuction
.EXERR field if
fault

OVE
ove
ource Wrk_MI_Home.EXERR
0
est Err_MI_ExErr
0

MOVE
Move
Source 2
Dest Wrk_HomeSequence
0

AXIS IS HOMED

8

EQ
Equal
Source A Wrk_HomeSequence
0
Source B 2

Wrk_MI_Home.PC

The Axis has been
homed
Sts_Homed
L

MOVE
Move
Source 3
Dest Wrk_HomeSequence
0

HOME DONE HANDSHAKE

9

Home the Axis, if Cfg_HomeEnabled = 1
Cmd_Home

Configuration: =1: CMD_Home will execute MAH instruction = 0 no home instruction executed
Cfg_HomeEnabled

The Axis has been homed
Sts_Homed

Condition: Home Done
Sts_HomeDone

//

- SECTION AXIS STOP

//

WHENEVER THE MACHINE ENTERS EITHER STOPPING OR ABORTING, STOP THE AXIS
- If stopping, all axes are stopped AFTER the imaginary stops. This provides a coordinated stop
- Aborting cause all axes independently to stop.

10

Stops the axis with AbortRamp Waits for Inp_MasterNoMotion if CfgUseVirtualMaster= 1
Cmd_Abort

Configuration: =1: CMD_Abort will execute MAS instruction = 0 no stop instruction executed
Cfg_AbortEnabled

MOVE
Move
Source Cfg_AbortRamp
100.0
Dest Wrk_DecelRate
0.0

Stops the axis with StopRamp Waits for Inp_MasterNoMotion if CfgUseVirtualMaster= 1
Cmd_Stop

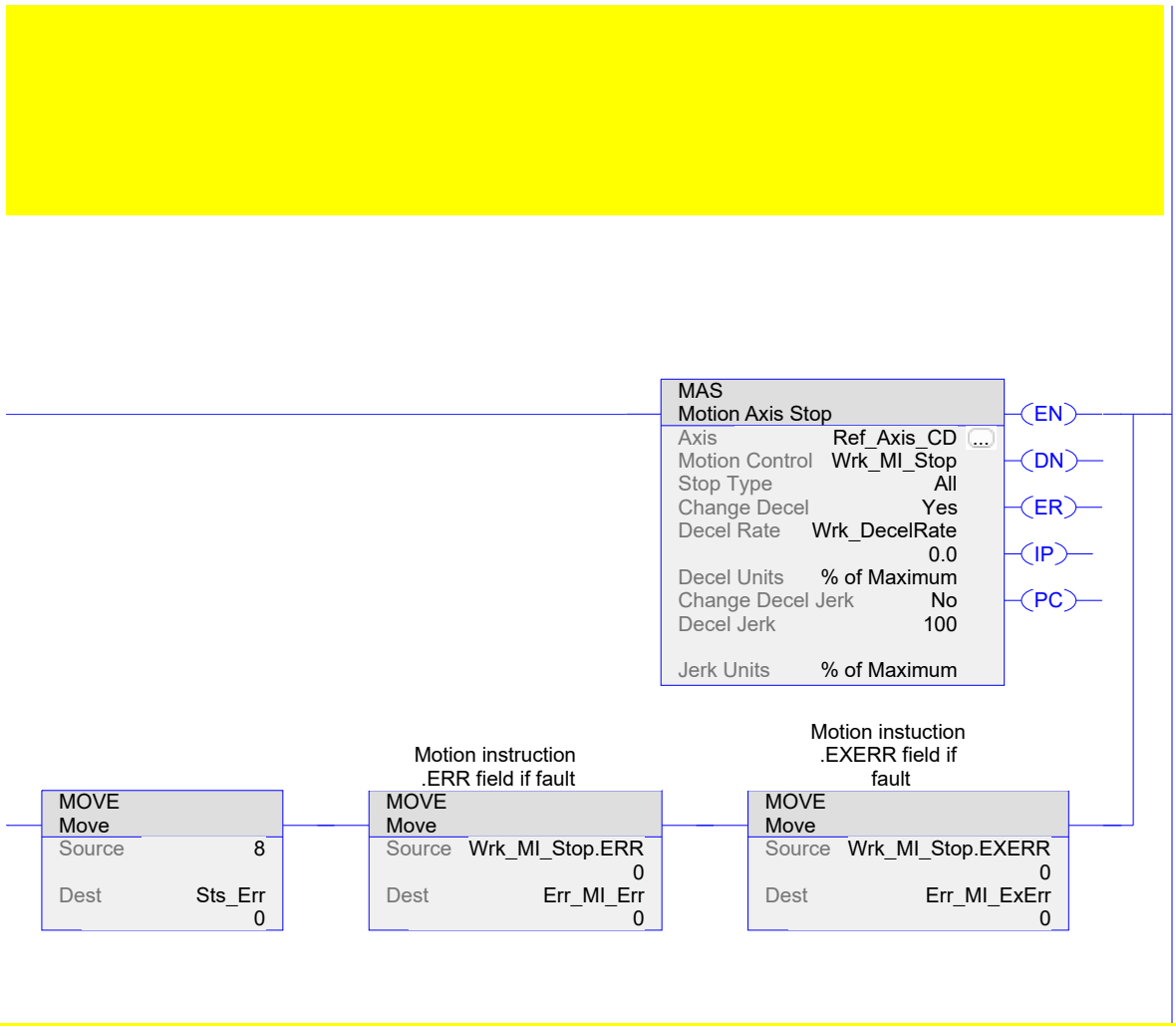
Configuration: =1: CMD_Stop will execute MAS instruction = 0 no stop instruction executed
Cfg_StopEnabled

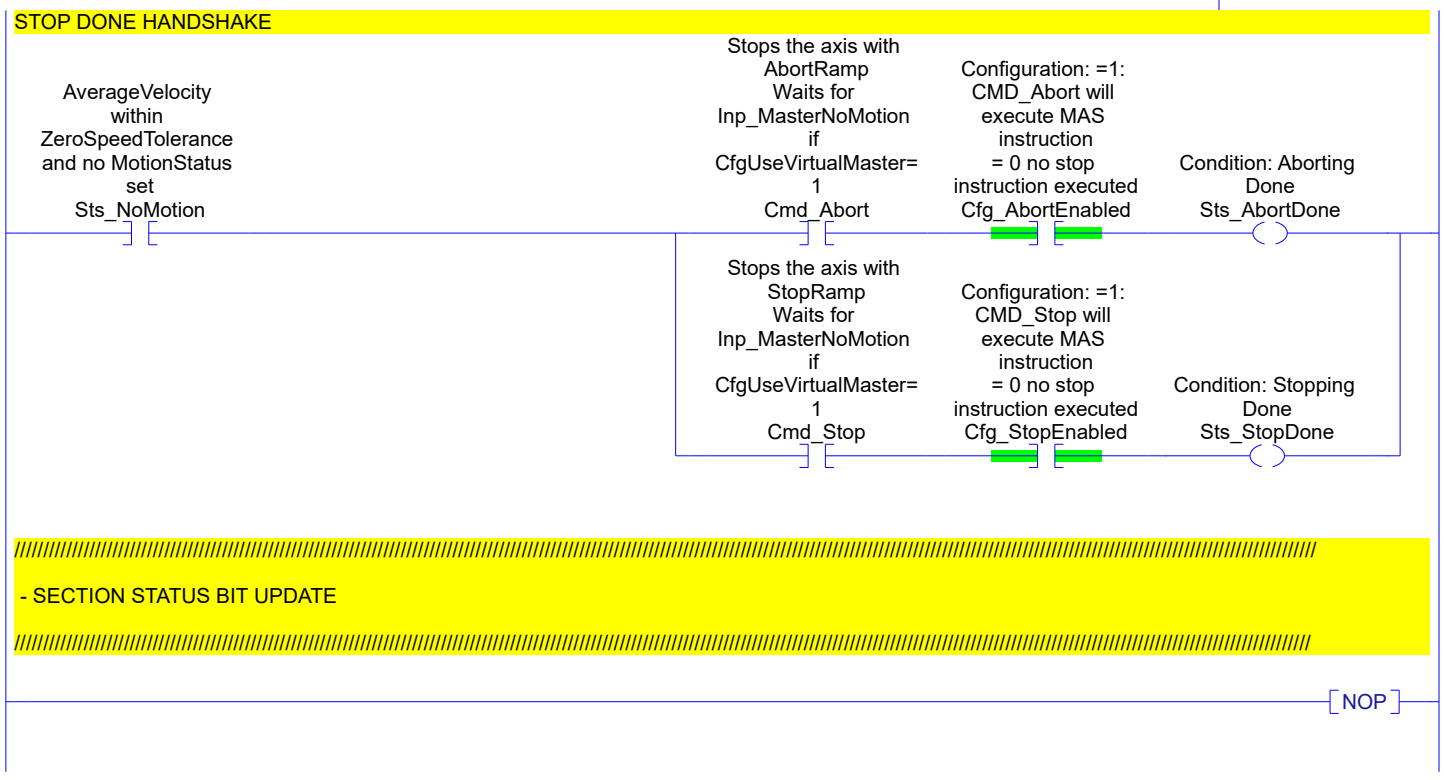
MOVE
Move
Source Cfg_StopRamp
20.0
Dest Wrk_DecelRate
0.0

If Cfg_UseVirtualMaster =1: Abort, Stop will wait for Inp_MasterNoMotion before executing MAS instruction
Inp_MasterNoMotion

Configuration: =1: Abort, Stop will wait for Inp_MasterNoMotion before executing MAS instruction
Cfg_UseVirtualMaster
/

Wrk_MI_Stop.ER


MAS
Motion Axis Stop
Axis Ref_Axis_CD
Motion Control Wrk_MI_Stop
Stop Type All
Change Decel Yes
Decel Rate Wrk_DecelRate
0.0
Decel Units % of Maximum
Change Decel Jerk No
Decel Jerk 100
Jerk Units % of Maximum
EN
DN
ER
IP
PC
MOVE
Move
Source 8
Dest Sts_Err
0
Motion instruction .ERR field if fault
MOVE
Move
Source Wrk_MI_Stop.ERR
0
Dest Err_MI_Err
0
Motion instuction .EXERR field if fault
MOVE
Move
Source Wrk_MI_Stop.EXERR
0
Dest Err_MI_ExErr
0


STOP DONE HANDSHAKE
AverageVelocity within ZeroSpeedTolerance and no MotionStatus set
Sts_NoMotion
Stops the axis with AbortRamp Waits for Inp_MasterNoMotion if CfgUseVirtualMaster= 1
Cmd_Abort
Configuration: =1: CMD_Abort will execute MAS instruction = 0 no stop instruction executed
Cfg_AbortEnabled
Condition: Aborting Done
Sts_AbortDone
11
Stops the axis with StopRamp Waits for Inp_MasterNoMotion if CfgUseVirtualMaster= 1
Cmd_Stop
Configuration: =1: CMD_Stop will execute MAS instruction = 0 no stop instruction executed
Cfg_StopEnabled
Condition: Stopping Done
Sts_StopDone
- SECTION STATUS BIT UPDATE
12
NOP

// CIP AXIS //

- NO AXIS MOVEMENT

Description : MotionStatus
Bit 00 AccelStatus
Bit 01 DecelStatus
Bit 02 MoveStatus
Bit 03 JogStatus
Bit 04 GearingStatus
Bit 05 HomingStatus
Bit 06 StoppingStatus
Bit 07 AxisHomedStatus
Bit 08 PositionCamStatus
Bit 09 TimeCamStatus
Bit 10 PositionCamPendingStatus
Bit 11 TimeCamPendingStatus
Bit 12 GearingLockStatus
Bit 13 PositionCamLockStatus
Bit 14 MasterOffsetMoveStatus
Bit 15 CoordinatedMotionStatus

65407 = 1111 1111 0111 1111

13

ABS
Absolute Value
Source Ref_Axis_CD.AverageVelocity
??
Dest Wrk_Velocity
0.0

LE
Less Than or Eql (A<=B)
Source A Wrk_Velocity
0.0
Source B Cfg_ZeroSpeedTolerance
0.1

Servo Axis, Data type Axis CIP Drive

MEQ
Mask Equal
Source Ref_Axis_CD.MotionStatus
??
Mask 65407
Compare 0

AverageVelocity within ZeroSpeedTolerance and no MotionStatus set Sts_NoMotion

- ABSOLUTE REFERNCE STATUS INFORMATION

14

Servo Axis, Data type Axis CIP Drive Ref_Axis_CD.APRFault

Absolute Feedback device shows Reference Ok Sts_AbsoluteReferenceStatus

15

Servo Axis, Data type Axis CIP Drive

NE
Not Equal
Source A Ref_Axis_CD.CIPStartInhibits
??
Source B 0

Servo Axis, Data type Axis CIP Drive

NE
Not Equal
Source A Ref_Axis_CD.CIPStartInhibitsRA
??
Source B 0

Sts_CIP_StartInhibitActive

- FAULTED

16

CipState

EQ
Equal
Source A Out_AxisCipState
0
Source B 8

Any Fault occured on this Axis
Sts_ER

Servo Axis, Data type Axis CIP Drive

LIMIT
Limit Test (CIRC)
Low Limit 11
Test Ref_Axis_CD.CIPAxisState
??
High Limit 0

Servo Axis, Data type Axis CIP Drive

NE
Not Equal
Source A Ref_Axis_CD.ModuleFaults
??
Source B 0

NE
Not Equal
Source A Sts_Err
0
Source B 0

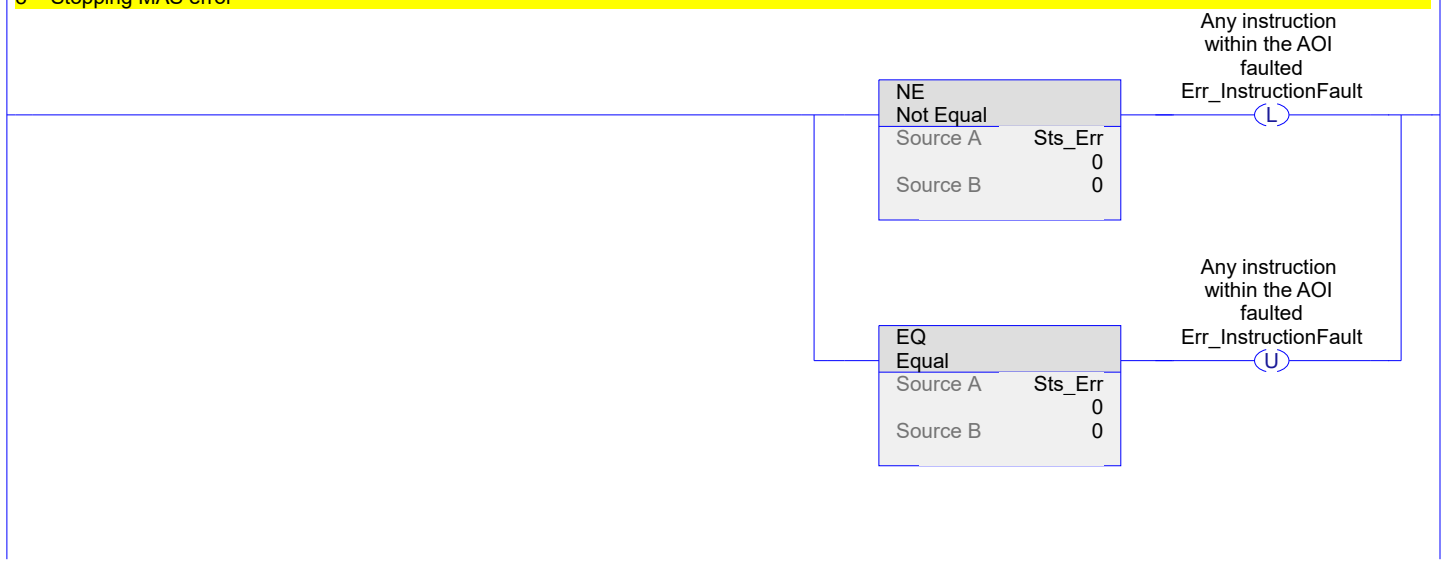
Servo Axis, Data type Axis CIP Drive

EQ
Equal
Source A Ref_Axis_CD.CIPAxisState
??
Source B 9

Sts_CIP_StartInhibitActive

- AOI INSTRUCTION FAULTS Sts_Err holds location of motion instruction fault
1 = Enable MSO error
2 = Enable timeout. MSO did not complete in 250 ms. Err_MI_Err and Err_MI_ExErr are zero.
3 = Disable MSF error
4 = Disable timeout. MSF did not complete in 250 ms. Err_MI_Err and Err_MI_ExErr are zero.
5 = Fault reset MASR error
6 = Fault reset MAFR error
7 = Homing MAH error
8 = Stopping MAS error

17



AXIS ERRORS

18

Any Fault occured on this Axis Sts_ER

Servo Axis, Data type Axis CIP Drive Ref_Axis_CD.SoftTravelLimitPositiveFault

Servo Axis, Data type Axis CIP Drive Ref_Axis_CD.HardwareOvertravelPositiveFault

Any positive Overtravel Fault Err_PosOvertravel (L)

Servo Axis, Data type Axis CIP Drive Ref_Axis_CD.SoftTravelLimitNegativeFault

Servo Axis, Data type Axis CIP Drive Ref_Axis_CD.HardwareOvertravelNegativeFault

Any neagtive Overtravel Fault Err_NegOvertravel (L)

Servo Axis, Data type Axis CIP Drive Ref_Axis_CD.FeedbackDeviceFault

Any Feedback Fault including Aux Feedback Err_FeedbackFault (L)

Servo Axis, Data type Axis CIP Drive

LIMIT
Limit Test (CIRC)
Low Limit 11
Test Ref_Axis_CD.CIPAxisState ??
High Limit 0

Any General Fault Err_DeviceCommunication (L)

Servo Axis, Data type Axis CIP Drive

NE
Not Equal
Source A Ref_Axis_CD.ModuleFaults ??
Source B 0

Any General Fault Err_DeviceCommunication (L)

Servo Axis, Data type Axis CIP Drive Ref_Axis_CD.ConverterPreChargeOverloadFLFault

Servo Axis, Data type Axis CIP Drive Ref_Axis_CD.MotorThermalOverloadFLFault

Servo Axis, Data type Axis CIP Drive Ref_Axis_CD.InverterThermalOverloadFLFault

Servo Axis, Data type Axis CIP Drive Ref_Axis_CD.ConverterThermalOverloadFLFault

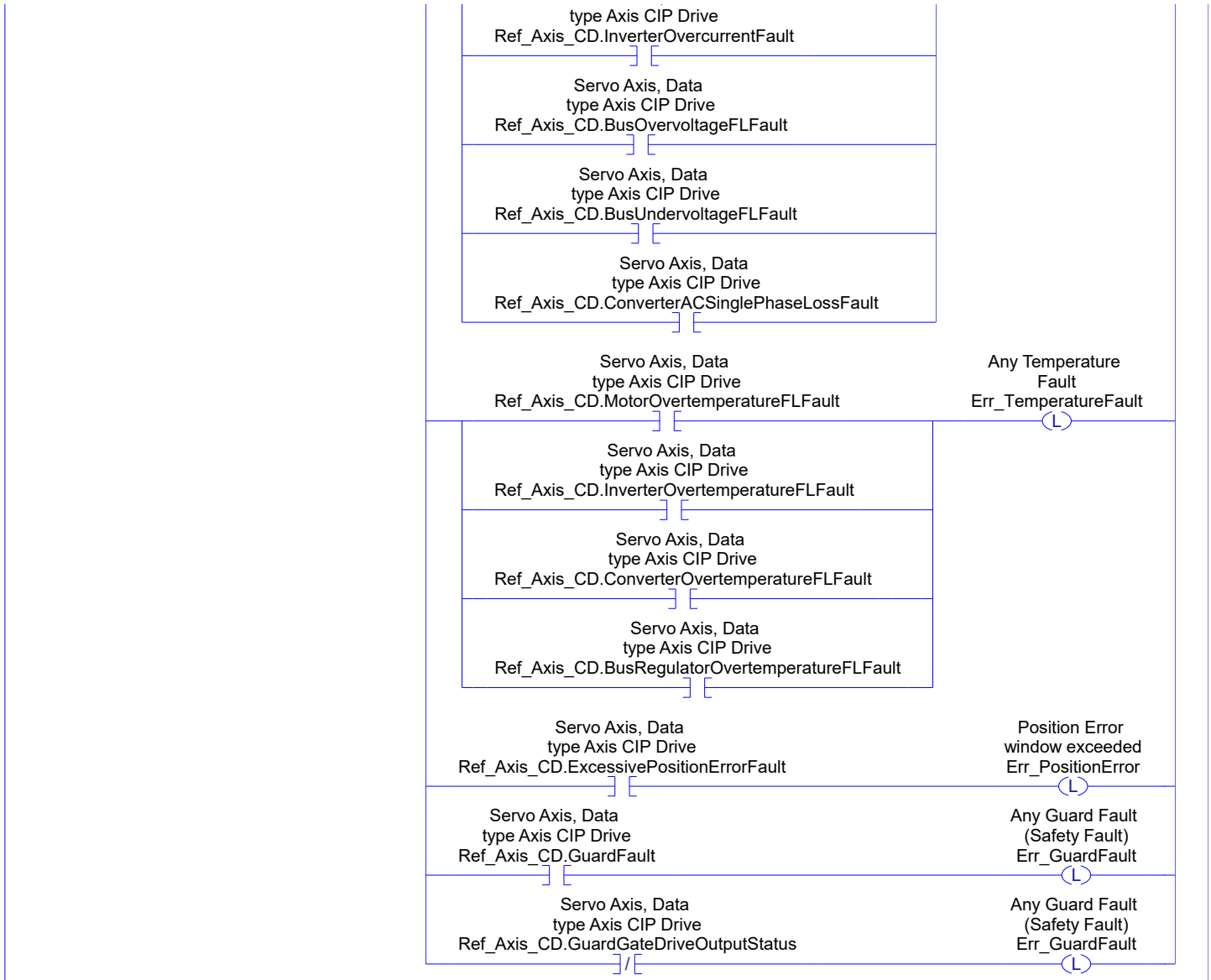
Servo Axis, Data type Axis CIP Drive Ref_Axis_CD.BusRegulatorThermalOverloadFLFault

Servo Axis, Data type Axis CIP Drive Ref_Axis_CD.ModuleVoltageMismatchFault

Servo Axis, Data type Axis CIP Drive Ref_Axis_CD.MotorCommutationFault

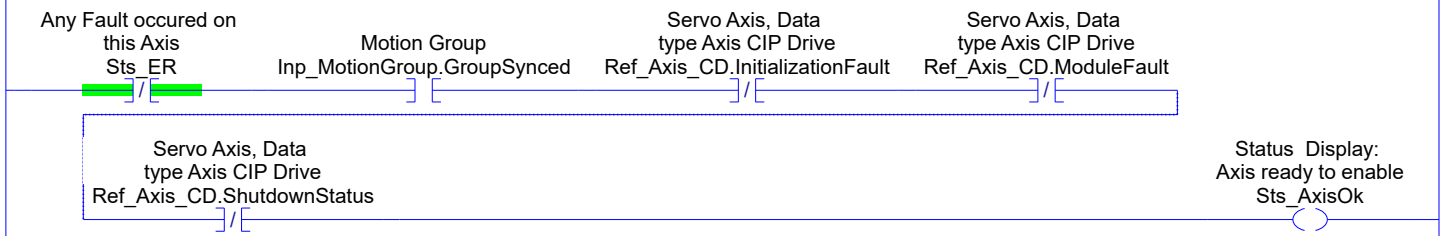
Servo Axis, Data

Any Overload/Voltage Fault Err_PowerFault (L)

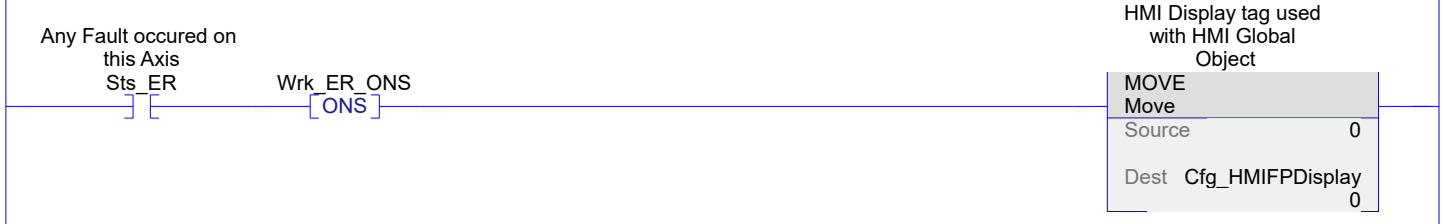


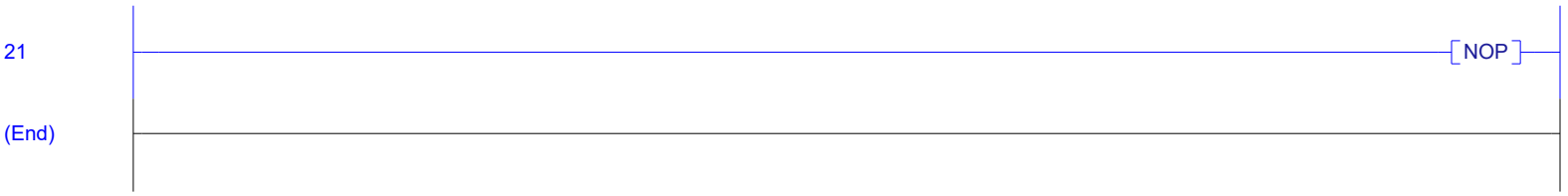
AXIS IS OK AND READY

19



20





//
COMPANY: Rockwell Automation
FUNCTION: AXIS_CIP_DRIVE AOI
AUTHOR: Rockwell Automation
DATE UPDATED: Jun 2011

FUNCTION:

Version Comments:

//

0 NOP

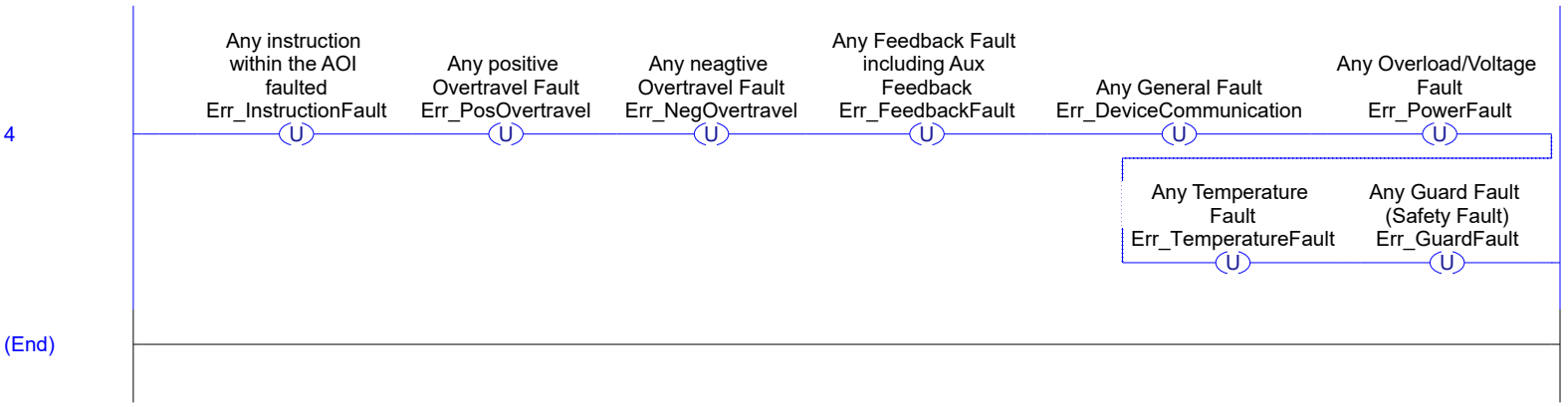
PRESCAN INIT - Motion Instruction

1
MOVE Move Source 0 Dest Wrk_MI_Init.FLAGS 0
MOVE Move Source 0 Dest Wrk_MI_Init.ERR 0
MOVE Move Source 0 Dest Wrk_MI_Init.STATUS 0
MOVE Move Source 0 Dest Wrk_MI_Init.STATE 0
MOVE Move Source 0 Dest Wrk_MI_Init.SEGMENT 0
MOVE Move Source 0 Dest Wrk_MI_Init.EXERR 0
COP Copy File Source Wrk_MI_Init Dest Wrk_MI_Disable Length 1
COP Copy File Source Wrk_MI_Init Dest Wrk_MI_Enable Length 1
COP Copy File Source Wrk_MI_Init Dest Wrk_MI_Home Length 1
COP Copy File Source Wrk_MI_Init Dest Wrk_MI_Stop Length 1
COP Copy File Source Wrk_MI_Init Dest Wrk_MI_FaultReset Length 1
COP Copy File Source Wrk_MI_Init Dest Wrk_MI_ShutdownReset Length 1

PRESCAN INIT - HomeSequence

2
MOVE Move Source 0 Dest Wrk_HomeSequence 0
Wrk_ONS_HomeStart (U)
The Axis has been homed
Sts_Homed (U)

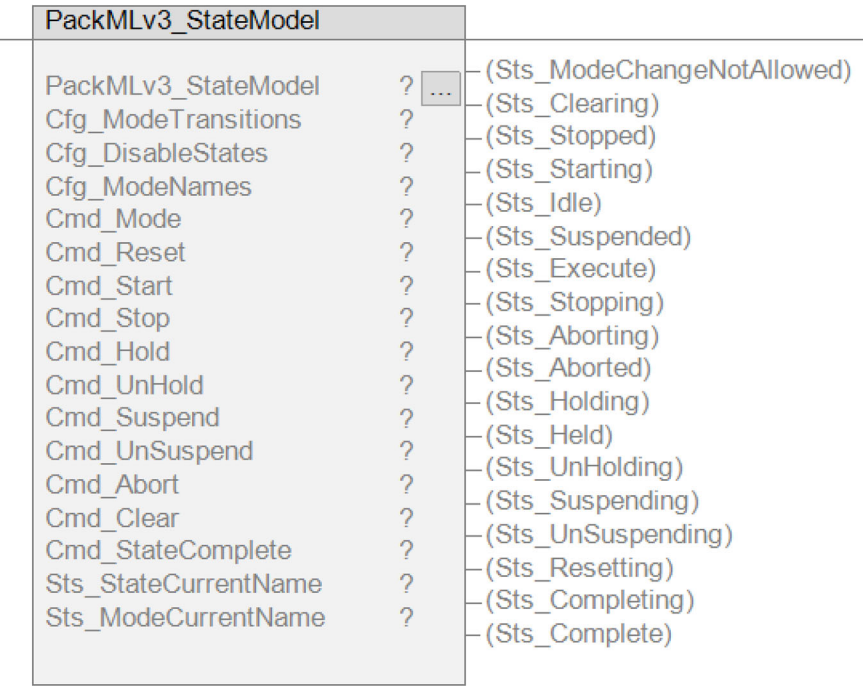
3
MOVE Move Source 0 Dest Sts_Err 0
Motion instruction .ERR field if fault
MOVE Move Source 0 Dest Err_MI_Err 0
Motion instuction .EXERR field if fault
MOVE Move Source 0 Dest Err_MI_ExErr 0


Any instruction within the AOI faulted
Err_InstructionFault
U
Any positive Overtravel Fault
Err_PosOvertravel
U
Any neagtive Overtravel Fault
Err_NegOvertravel
U
Any Feedback Fault including Aux Feedback
Err_FeedbackFault
U
Any General Fault
Err_DeviceCommunication
U
Any Overload/Voltage Fault
Err_PowerFault
U
Any Temperature Fault
Err_TemperatureFault
U
Any Guard Fault (Safety Fault)
Err_GuardFault
U
4
(End)

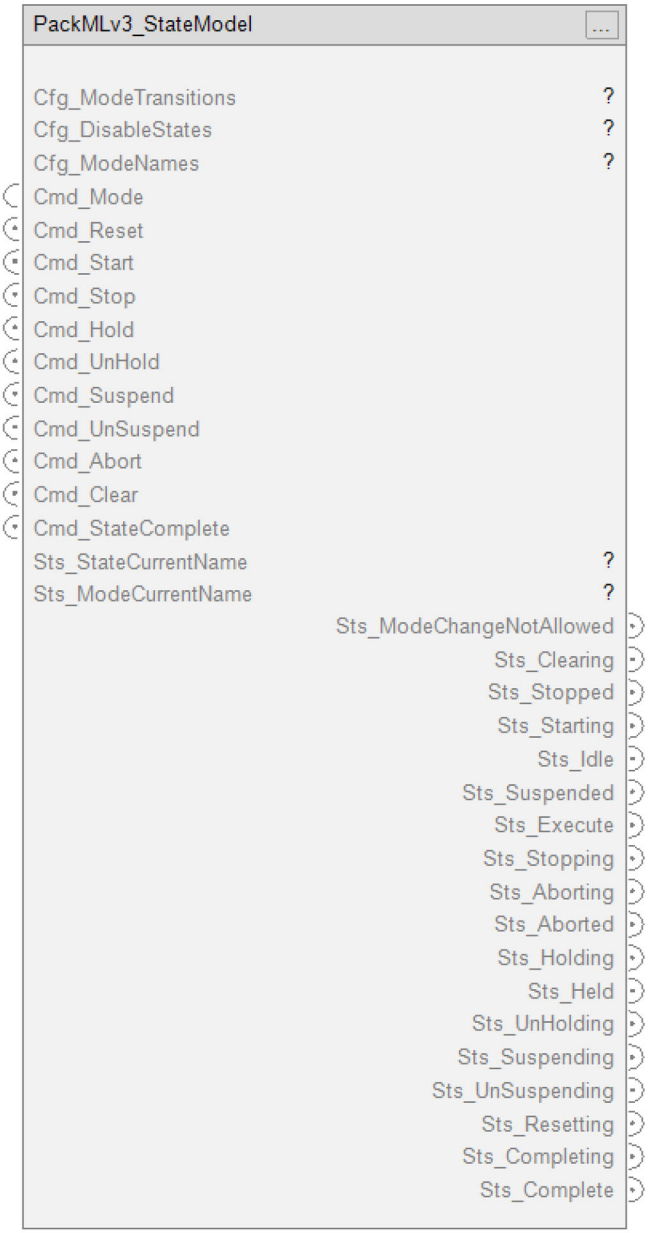
PackMLv3_StateModel v2.3
Rockwell Automation

Available Languages

Relay Ladder



Function Block



Structured Text

```
PackMLv3_StateModel(Cfg_ModeTransitions, Cfg_DisableStates, Cfg_ModeNames, Sts_StateCurrentName, Sts_ModeCurrentName);
```

Parameters

Required	Name	Data Type	Usage	Description
X	PackMLv3_StateModel	PackMLv3_StateModel	InOut	
	EnableIn	BOOL	Input	
	EnableOut	BOOL	Output	
X	Cfg_ModeTransitions	DINT	InOut	Acceptable States to Transition Between Modes
X	Cfg_DisableStates	DINT	InOut	Disable States for Different Modes
X	Cfg_ModeNames	String_Short	InOut	Mode Names
	Cmd_Mode	DINT	Input	Commanded Mode
	Cmd_Reset	BOOL	Input	Request that current state transition to Resetting
	Cmd_Start	BOOL	Input	Request that current state transition to Starting
	Cmd_Stop	BOOL	Input	Request that current state transition to Stopping
	Cmd_Hold	BOOL	Input	Request that current state transition to Holding
	Cmd_UnHold	BOOL	Input	Request that current state transition to Execute
	Cmd_Suspend	BOOL	Input	Request that current state transition to Suspending
	Cmd_UnSuspend	BOOL	Input	Request that current state transition to Execute

	Cmd_Abort	BOOL	Input	Request that current state transition to Aborting
	Cmd_Clear	BOOL	Input	Request that current state transition to Clearing
	Cmd_StateComplete	BOOL	Input	PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
	Cfg_RemoteCmdEnable	BOOL	Input	Enable Remote Commands
	Inp_RemoteModeCmd	DINT	Input	Mode Remote Command Interface
	Inp_RemoteModeCmdChangeRequest	BOOL	Input	Mote Remote Command Change Request
	Inp_RemoteStateCmd	DINT	Input	State Remote Command Interface
	Inp_RemoteStateCmdChangeRequest	BOOL	Input	State Remote Command Change Request
	Sts_StateCurrent	DINT	Output	Current State ID
	Sts_ModeCurrent	DINT	Output	Current Mode ID
	Sts_EnabledStates	DINT	Output	Currently Disabled States = 0
X	Sts_StateCurrentName	String_Short	InOut	Current State Name
X	Sts_ModeCurrentName	String_Short	InOut	Current Mode Name
	Sts_ClearingEnabled	BOOL	Output	Use of the Clearing state for the current mode is enabled
	Sts_StoppedEnabled	BOOL	Output	Use of the Stopped state for the current mode is enabled
	Sts_StartingEnabled	BOOL	Output	Use of the Starting state for the current mode is enabled
	Sts_IdleEnabled	BOOL	Output	Use of the Idle state for the current mode is enabled
	Sts_SuspendedEnabled	BOOL	Output	Use of the Suspended state for the current mode is enabled
	Sts_ExecuteEnabled	BOOL	Output	Use of the Execute state for the current mode is enabled
	Sts_StoppingEnabled	BOOL	Output	Use of the Stopping state for the current mode is enabled
	Sts_AbortingEnabled	BOOL	Output	Use of the Aborting state for the current mode is enabled
	Sts_AbortedEnabled	BOOL	Output	Use of the Aborted state for the current mode is enabled
	Sts_HoldingEnabled	BOOL	Output	Use of the Holding state for the current mode is enabled
	Sts_HeldEnabled	BOOL	Output	Use of the Held state for the current mode is enabled
	Sts_UnHoldingEnabled	BOOL	Output	Use of the UnHolding state for the current mode is enabled
	Sts_SuspendingEnabled	BOOL	Output	Use of the Suspending state for the current mode is enabled
	Sts_UnSuspendingEnabled	BOOL	Output	Use of the UnSuspending state for the current mode is enabled
	Sts_ResettingEnabled	BOOL	Output	Use of the Resetting state for the current mode is enabled
	Sts_CompletingEnabled	BOOL	Output	Use of the Completing state for the current mode is enabled
	Sts_CompleteEnabled	BOOL	Output	Use of the Complete state for the current mode is enabled
	Sts_ModeChangeNotAllowed	BOOL	Output	Mode Change Request Was Denied
	Sts_Clearing	BOOL	Output	The Clearing state is active.
	Sts_Stopped	BOOL	Output	The Stopped state is active.
	Sts_Starting	BOOL	Output	The Starting state is active.
	Sts_Idle	BOOL	Output	The Idle state is active.
	Sts_Suspended	BOOL	Output	The Suspended state is active.
	Sts_Execute	BOOL	Output	The Execute state is active.
	Sts_Stopping	BOOL	Output	The Stopping state is active.
	Sts_Aborting	BOOL	Output	The Aborting state is active.
	Sts_Aborted	BOOL	Output	The Aborted state is active.
	Sts_Holding	BOOL	Output	The Holding state is active.
	Sts_Held	BOOL	Output	The Held state is active.
	Sts_UnHolding	BOOL	Output	The Unholding state is active.
	Sts_Suspending	BOOL	Output	The Suspending state is active.
	Sts_UnSuspending	BOOL	Output	The UnSuspending state is active.
	Sts_Resetting	BOOL	Output	The Resetting state is active.
	Sts_Completing	BOOL	Output	The Completing state is active.
	Sts_Complete	BOOL	Output	The Complete state is active.

Extended Description

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Instruction Overview:

The PackML State Model Add-On Instruction provides an implementation of the Modes and States defined by PackML v3.0.

Instruction Execution:

This AOI is intended to be scanned unconditionally

Supplemental Descriptions:

These configuration tags need to be configured for the AOI to work correctly:
• Cfg_ModeNames
• Cfg_ModeTransitions
• Cfg_DisableStates

Cfg_ModeNames (Configure Mode Names)
The state model can operate in various modes. Up to 31 different modes can be used (array index 1…31). Array number 0 (zero) is reserved and cannot be used.
The template has two predefined modes, Produce and Manual. Additional modes either user defined or defined by ISA-TR88 can be added by the user.

Cfg_ModeTransitions (Configure Mode Transitions)
Cfg_ModeTransitions is used to define acceptable states to transition between modes. In this way you can allow a mode change, such as from Produce mode to Manual mode,
in the Execute state. The tag consists of an array of 32 DINT, each corresponding to one of the possible modes.
• Cfg_ModeName[1] = Cfg_ModeTransitions[1]
• Cfg_ModeName[2] = Cfg_ModeTransitions[2]
…
• Cfg_ModeName[31] = Cfg_ModeTransitions[31]
Each individual bit of the DINT corresponds to a specific state as follows.

The template has the following defined for both Automatic and Manual mode:
Cfg_ModeTransitions[1] = 516 [dec] = 0000 0000 0000 0000 0000 0010 0000 0100 [bin]
That means the template only allows a mode change in Stopped and Aborted state.

Cfg_DisableStates (Configure Disabling of States)
The template is very flexible and allows you to use only the states that are needed for a particular mode. The states that are not used will be jumped in the program and will not be visible on the state machine overview on the HMI application.

Each individual bit of the DINT corresponds to a specific state as follows.

Produce Mode
Cfg_DisableStates[1] = 228400 [dec] = 0000 0000 0000 0011 0111 1100 0011 0000 [bin]
That means the template disables the Idle, Suspended, Held, Un-Holding, Suspending, Un-Suspending, Completing, and Complete states.

Manual Mode
Cfg_DisableStates[3] = 228408 [dec] = 0000 0000 0000 0011 0111 1100 0011 1000 [bin]
That means the template disables the Starting, Idle, Suspended, Holding, Held, Un-holding, Suspending, Un-Suspending, Completing, and Complete states.

Cfg_RemoteCmdEnable (Configure Remote Commands)
The AOI can be controlled via remote commands outside the unit (machine) such as with a line control (cell control).
Cfg_RemoteCmdEnable
Behavior
0 Remote command control is disabled
1 Remote command control is enabled

Cmd_xx (Commands)
The AOI makes use of the following commands that will request a state or mode change:
Cmd_Mode
Cmd_Suspend
Cmd_Reset
Cmd_UnSuspend
Cmd_Start
Cmd_Abort
Cmd_Stop
Cmd_Clear
Cmd_Hold
Cmd_StateComplete
Cmd_UnHold

All commands but two (Cmd_Mode and Cmd_Reset) have the same behavior. If Cmd_xx is set, the respective command is initiated if the actual state allows this command.
According to PackML, the route in the state machine is dictated by the arrows.

Cmd_Mode
Cmd_Mode (command mode) will request a mode change and will only be accepted according to the configuration of Cfg_ModeTransistions. Here it is defined if the individual states allow a change. If Cmd_Mode is set and the active state does not allow it, the Sts_ModeChangeNotAllowed status bit will be set.

Cmd_Reset
If Cmd_Reset (command reset) is set, a reset command is initiated. According to PackML, this command is used in either Complete or Stopped state to initiate a Resetting state.
For a more intuitive mechanism, the template uses this command slightly differently, and will only allow this in Aborted. It will transition from Aborted to Clearing and is handled as a fault reset.

Inp_RemoteXX (Input)
Remote control of mode and state commands is possible.

Remote Mode

Inp_RemoteModeCmd
Usage: Input
Type: DINT
Description: Mode Remote Command Interface

Inp_RemoteModeCmdChangeRequest
Usage: Input
Type: BOOL
Description: Mode Remote Command Change Request
The local equivalent to Inp_RemoteModeCmd is Cmd_Mode, and its behavior is similar.
Inp_RemoteModeCmdChangeRequest is used to request a mode change – remote. There is no local equivalent to it.

Remote State

Inp_RemoteStateCmd
Usage: Input
Type: DINT
Description: State Remote Command Interface

Inp_RemoteStateCmdChangeRequest
Usage: Input
Type: BOOL
Description: State Remote Command Change Request
The local equivalent to Inp_RemoteStateCmd is Cmd_XX (the individual commands), and the behavior is similar.
The remote word is a DINT where the individual bits will correspond to a specific command.
Inp_RemoteStateCmdChangeRequest is used to request a state change – remote. There is no local equivalent to it.

Sts_XX (Status)
The AOI produces status for states and modes.
Status indicators for states
The AOI will produce an output status for each individual state. Only one of them can be set at any time, as it is the actual state of the state machine.
Sts_Aborted
Sts_Completing
Sts_Idle
Sts_Stopping
Sts_Aborting
Sts_Execute
Sts_Resetting
Sts_Suspended
Sts_Clearing
Sts_Held
Sts_Starting

Sts_Suspending
Sts_Complete
Sts_Holding
Sts_Stopped
Sts_UnHolding
Sts_UnSuspending

Sts_EnabledStates Currently Disabled States = 0
Sts_StateCurrent Current State ID
Sts_StateCurrentName Current State Name
Sts_StateCurrentName Current State Name

Status indicators for modes
Sts_ModeChangeNotAllowed
Usage: Output
Type: BOOL
Description: Mode Change Request Was Denied

Sts_ModeCurrent
Usage: Output
Type: DINT
Description: Current Mode ID

Sts_ModeCurrentName
Usage: InOut
Type: STRING
Description: Current Mode Name

States - Descriptions
The PackML state machine consists of 17 states. The description and intention of each is listed below.

State Name
STOPPED {Down}
State Type: Wait
The machine is powered and stationary. All communications with other systems are functioning (if applicable).

STARTING {STARTUP}
State Type: Acting
This state provides the steps needed to start the machine and is a result of a starting type command (local or remote). Following this command, the machine will begin to “execute”.

IDLE [READY]
State Type: Wait
This is a state which indicates that RESETING is complete. This state maintains the machine conditions which were achieved during the RESET state.

SUSPENDING
State Type: Acting
This state is a result of a command change from the EXECUTE state. This state is typically required prior to the SUSPENDED wait state, and prepares the machine (for example, stops glue cycles, stops carton feeds, etc.) prior to the SUSPEND state.

SUSPENDED [RUNNING] {STANDBY}
State Type: Wait
The machine may be running at the relevant setpoint speed, but there is no product being produced. This state can be reached as a result of a machine status, and differs from HELD in that HELD is typically a result of an operator request.

UN SUSPENDING
State Type: Acting
This state is a result of a request from SUSPENDED state to go back to the EXECUTE state. The actions of this state may include: ramping up speeds, turning on vacuums, the re-engagement of clutches. This state is done prior to EXECUTE state, and prepares the machine for the EXECUTE state.

EXECUTE [PRODUCING] {RUN}

State Type: Dual
State Once the machine is processing materials, it is deemed to be Executing or in the EXECUTE state. Execute refers to the mode in which the machine is in. If the machine is in the “Clean Out” mode, then “execute” refers to the action of cleaning the machine.

STOPPING {RUNOUT}
State Type: Acting
This state executes the logic which brings the machine to a controlled and safe stop.

ABORTING
State Type: Acting
The ABORTED state can be entered at any time in response to the Abort command or on the occurrence of a machine fault. The aborting logic will bring the machine to a rapid, controlled safe stop. Operation of the Emergency Stop will cause the machine to be tripped by its safety system. It will also provide a signal to initiate the ABORTING State.

ABORTED
State Type: Wait
This state maintains machine status information relevant to the Abort condition. The Stop command will force transition to the Stopped state.

HOLDING
State Type: Acting
When the machine is in the EXECUTE state, the Hold command can be used to start HOLDING logic which brings the machine to a controlled stop or to a state which represents HELD for the particular machine mode.

HELD
State Type: Wait
The HELD state is typically be used by the operator to hold the machine's operation temporarily while material blockages are cleared, or to stop throughput while a downstream problem is resolved.

UNHOLDING
State Type: Acting
UNHOLDING prepares the machine to re-enter the EXECUTE state. The UNHOLDING state is typically a response to an operator command to resume EXECUTE state.

COMPLETING
State Type: Acting
This state is typically an automatic response from the EXECUTE state. Normal operation has run to completion, that is, processing of material at the infeed will stop

COMPLETE
State Type: Wait
The machine has finished the COMPLETING state and is now waiting for a STOP command that will cause a transition to the STOPPED state.

RESETTING
State Type: Acting
This element is the result of a RESET command from the STOPPED state. RESETTING will typically cause a machine to sound a horn and place the machine in a state where components are energized awaiting a START command.

CLEARING
State Type: Acting
The procedural element has received a command to clear faults that may have occurred when ABORTING, and are present in the ABORTED state before proceeding to a STOPPED state.

Not all states are configured in this template, but the AOI supports it

HMI - PackML State Machine
The AOI comes with a face plate, where all states of the PackML state machine are shown. The active state is indicated with a green background. Only states that are not disabled will be shown. In this template, Automatic Mode will only show Aborting, Aborted, Clearing, Stopping, Stopped, Resetting, Starting, and Execute state.

Mode Selector
It is possible to change between the different modes that have been configured. The template has two different modes: Automatic and Manual. If you try to change mode in a state that does not allow a mode change, you will be notified by a red bar with the text: Requested Mode Change Not

Allowed.

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General Information - Parameter Prefixing:

Inp_

Input:
Generally used to designate a connection to a real I/O input point or an upstream block.

Set_

Setpoint:
Used as a setpoint coming into the instruction. May come from the operator via the HMI, or from the controller program itself.

Cmd_

Command:
Generally used to as a command input either from the operator via the HMI or from the program.

Cfg_

Configuration:
Generally used to designate a configuration value.
Typically, but not always, something that is only changed irregularly.

Par_

Parameter:
Equipment parameter or input parameter from Batching systems.
Generally used to designate a value that receives changes on a regular basis.

Wrk_

Working Register:
In many cases the control routine will require some internal working storage locations.
This is targeted at the control routine that lies inside a normal UDT.
In the case of AOI's, these registers can simply become "Local Tags".

Out_

Output:
Generally used to designate a connection to a real I/O output point or a downstream block.

Val_

Value:
Designates a value calculated inside the instruction, which may or may not be the primary output of the instruction.

Rpt_

Report:
Designates a value calculated inside the instruction that is typically used for batch reporting.

Sts_

Status:
Status of the instruction. Also contains two required members.
Ex.
Sts_Alarm - An alarm exists. (Boolean)

Sts_ER - The instruction itself has an error. (Boolean)

Alm_

Alarm:
Alarm indicators to display which actual alarm is occurring. All of these are Booleans.

Rdy_

Ready:
Command ready bits. Booleans determined inside the control routines to reflect whether the routine will allow state change commands.
Used with the HMI faceplates to enable or disable command buttons.
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Execution

Condition	Description
EnableIn	is true
Prescan	

Revision v2.3 Notes

2.3 - Help File Updates
2.2 - ReOrder Sts Tags to reflect numerical TR88 state value
2.1 - Enable status added to reflect instruction scan
2.0 - AOI name update to reflect PML Model version
1.0 - Improved execution scantime
09/04/2009 - ETP - Edited Rung 14 to Enable
a) Held State IF Holding or UnHolding is Enabled
b) Suspended State IF Suspending or UnSuspending is Enabled
c) Complete State IF Completing is Enabled

Name	Default	Data Type	Scope
Cfg_DisableStates		DINT[32]	PackMLv3_StateModel
Disable States for Different Modes			
Usage:	InOut Parameter		
Required:	Yes		
Visible:	Yes		
Constant	No		
OPC UA Access:	None		
*Cfg_DisableStates - PackMLv3_StateModel/Logic - *35(MOVE), 13(MOVE)*			
Cfg_DisableStates[0]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[1]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[2]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[3]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[4]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[5]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[6]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[7]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[8]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[9]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[10]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[11]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[12]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[13]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[14]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[15]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[16]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[17]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[18]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[19]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[20]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[21]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[22]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[23]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[24]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[25]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[26]	??	DINT	
Disable States for Different Modes			

Cfg_DisableStates (Continued)			
Cfg_DisableStates[27]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[28]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[29]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[30]	??	DINT	
Disable States for Different Modes			
Cfg_DisableStates[31]	??	DINT	
Disable States for Different Modes			
Cfg_ModeNames		String_Short[32]	PackMLv3_StateModel
Mode Names			
Usage:	InOut Parameter		
Required:	Yes		
Visible:	Yes		
Constant	No		
OPC UA Access:	None		
Cfg_ModeNames - PackMLv3_StateModel/Logic - 86(COP)			
Cfg_ModeNames[0]	??	String_Short	
Mode Names			
Cfg_ModeNames[0].LEN	??	DINT	
Mode Names			
Cfg_ModeNames[0].DATA		SINT	
Mode Names			
Cfg_ModeNames[1]	??	String_Short	
Mode Names			
Cfg_ModeNames[1].LEN	??	DINT	
Mode Names			
Cfg_ModeNames[1].DATA		SINT	
Mode Names			
Cfg_ModeNames[2]	??	String_Short	
Mode Names			
Cfg_ModeNames[2].LEN	??	DINT	
Mode Names			
Cfg_ModeNames[2].DATA		SINT	
Mode Names			
Cfg_ModeNames[3]	??	String_Short	
Mode Names			
Cfg_ModeNames[3].LEN	??	DINT	
Mode Names			
Cfg_ModeNames[3].DATA		SINT	
Mode Names			
Cfg_ModeNames[4]	??	String_Short	
Mode Names			
Cfg_ModeNames[4].LEN	??	DINT	
Mode Names			
Cfg_ModeNames[4].DATA		SINT	
Mode Names			
Cfg_ModeNames[5]	??	String_Short	
Mode Names			
Cfg_ModeNames[5].LEN	??	DINT	
Mode Names			
Cfg_ModeNames[5].DATA		SINT	
Mode Names			
Cfg_ModeNames[6]	??	String_Short	
Mode Names			
Cfg_ModeNames[6].LEN	??	DINT	
Mode Names			
Cfg_ModeNames[6].DATA		SINT	
Mode Names			
Cfg_ModeNames[7]	??	String_Short	

Cfg_ModeNames (Continued)		
Mode Names		
Cfg_ModeNames[7].LEN	??	DINT
Mode Names		
Cfg_ModeNames[7].DATA		SINT
Mode Names		
Cfg_ModeNames[8]	??	String_Short
Mode Names		
Cfg_ModeNames[8].LEN	??	DINT
Mode Names		
Cfg_ModeNames[8].DATA		SINT
Mode Names		
Cfg_ModeNames[9]	??	String_Short
Mode Names		
Cfg_ModeNames[9].LEN	??	DINT
Mode Names		
Cfg_ModeNames[9].DATA		SINT
Mode Names		
Cfg_ModeNames[10]	??	String_Short
Mode Names		
Cfg_ModeNames[10].LEN	??	DINT
Mode Names		
Cfg_ModeNames[10].DATA		SINT
Mode Names		
Cfg_ModeNames[11]	??	String_Short
Mode Names		
Cfg_ModeNames[11].LEN	??	DINT
Mode Names		
Cfg_ModeNames[11].DATA		SINT
Mode Names		
Cfg_ModeNames[12]	??	String_Short
Mode Names		
Cfg_ModeNames[12].LEN	??	DINT
Mode Names		
Cfg_ModeNames[12].DATA		SINT
Mode Names		
Cfg_ModeNames[13]	??	String_Short
Mode Names		
Cfg_ModeNames[13].LEN	??	DINT
Mode Names		
Cfg_ModeNames[13].DATA		SINT
Mode Names		
Cfg_ModeNames[14]	??	String_Short
Mode Names		
Cfg_ModeNames[14].LEN	??	DINT
Mode Names		
Cfg_ModeNames[14].DATA		SINT
Mode Names		
Cfg_ModeNames[15]	??	String_Short
Mode Names		
Cfg_ModeNames[15].LEN	??	DINT
Mode Names		
Cfg_ModeNames[15].DATA		SINT
Mode Names		
Cfg_ModeNames[16]	??	String_Short
Mode Names		
Cfg_ModeNames[16].LEN	??	DINT
Mode Names		
Cfg_ModeNames[16].DATA		SINT
Mode Names		
Cfg_ModeNames[17]	??	String_Short
Mode Names		
Cfg_ModeNames[17].LEN	??	DINT

Cfg_ModeNames (Continued)		
Mode Names		
Cfg_ModeNames[17].DATA		SINT
Mode Names		
Cfg_ModeNames[18]	??	String_Short
Mode Names		
Cfg_ModeNames[18].LEN	??	DINT
Mode Names		
Cfg_ModeNames[18].DATA		SINT
Mode Names		
Cfg_ModeNames[19]	??	String_Short
Mode Names		
Cfg_ModeNames[19].LEN	??	DINT
Mode Names		
Cfg_ModeNames[19].DATA		SINT
Mode Names		
Cfg_ModeNames[20]	??	String_Short
Mode Names		
Cfg_ModeNames[20].LEN	??	DINT
Mode Names		
Cfg_ModeNames[20].DATA		SINT
Mode Names		
Cfg_ModeNames[21]	??	String_Short
Mode Names		
Cfg_ModeNames[21].LEN	??	DINT
Mode Names		
Cfg_ModeNames[21].DATA		SINT
Mode Names		
Cfg_ModeNames[22]	??	String_Short
Mode Names		
Cfg_ModeNames[22].LEN	??	DINT
Mode Names		
Cfg_ModeNames[22].DATA		SINT
Mode Names		
Cfg_ModeNames[23]	??	String_Short
Mode Names		
Cfg_ModeNames[23].LEN	??	DINT
Mode Names		
Cfg_ModeNames[23].DATA		SINT
Mode Names		
Cfg_ModeNames[24]	??	String_Short
Mode Names		
Cfg_ModeNames[24].LEN	??	DINT
Mode Names		
Cfg_ModeNames[24].DATA		SINT
Mode Names		
Cfg_ModeNames[25]	??	String_Short
Mode Names		
Cfg_ModeNames[25].LEN	??	DINT
Mode Names		
Cfg_ModeNames[25].DATA		SINT
Mode Names		
Cfg_ModeNames[26]	??	String_Short
Mode Names		
Cfg_ModeNames[26].LEN	??	DINT
Mode Names		
Cfg_ModeNames[26].DATA		SINT
Mode Names		
Cfg_ModeNames[27]	??	String_Short
Mode Names		
Cfg_ModeNames[27].LEN	??	DINT
Mode Names		
Cfg_ModeNames[27].DATA		SINT

Cfg_ModeNames (Continued)			
Mode Names			
Cfg_ModeNames[28]	??	String_Short	
Mode Names			
Cfg_ModeNames[28].LEN	??	DINT	
Mode Names			
Cfg_ModeNames[28].DATA		SINT	
Mode Names			
Cfg_ModeNames[29]	??	String_Short	
Mode Names			
Cfg_ModeNames[29].LEN	??	DINT	
Mode Names			
Cfg_ModeNames[29].DATA		SINT	
Mode Names			
Cfg_ModeNames[30]	??	String_Short	
Mode Names			
Cfg_ModeNames[30].LEN	??	DINT	
Mode Names			
Cfg_ModeNames[30].DATA		SINT	
Mode Names			
Cfg_ModeNames[31]	??	String_Short	
Mode Names			
Cfg_ModeNames[31].LEN	??	DINT	
Mode Names			
Cfg_ModeNames[31].DATA		SINT	
Mode Names			
Cfg_ModeTransitions		DINT[32]	PackMLv3_StateModel
Acceptable States to Transition Between Modes			
Usage:	InOut Parameter		
Required:	Yes		
Visible:	Yes		
Constant	No		
OPC UA Access:	None		
*Cfg_ModeTransitions - PackMLv3_StateModel/Logic - *81(OTL), *82(OTL), 81(XIO), 82(XIO), 83(XIC), 83(XIC), 84(XIC), 84(XIC)*			
Cfg_ModeTransitions[0]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[1]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[2]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[3]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[4]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[5]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[6]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[7]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[8]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[9]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[10]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[11]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[12]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[13]	??	DINT	
Acceptable States to Transition Between Modes			

Cfg_ModeTransitions (Continued)

Cfg_ModeTransitions[14]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[15]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[16]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[17]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[18]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[19]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[20]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[21]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[22]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[23]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[24]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[25]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[26]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[27]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[28]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[29]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[30]	??	DINT	
Acceptable States to Transition Between Modes			
Cfg_ModeTransitions[31]	??	DINT	
Acceptable States to Transition Between Modes			

Cfg_RemoteCmdEnable	0	BOOL	PackMLv3_StateModel
Enable Remote Commands			
Usage:	Input Parameter		
Required:	No		
Visible:	No		
External Access:	Read/Write		
OPC UA Access:	None		
Cfg_RemoteCmdEnable - PackMLv3_StateModel/Logic - 2(XIC)			

Cmd_Abort	0	BOOL	PackMLv3_StateModel
Request that current state transition to Aborting			
Usage:	Input Parameter		
Required:	No		
Visible:	Yes		
External Access:	Read/Write		
OPC UA Access:	None		
Cmd_Abort - PackMLv3_StateModel/Logic - 60(XIC)			

Cmd_Clear	0	BOOL	PackMLv3_StateModel
Request that current state transition to Clearing			
Usage:	Input Parameter		
Required:	No		
Visible:	Yes		
External Access:	Read/Write		
OPC UA Access:	None		

Cmd_Clear (Continued)
Cmd_Clear - PackMLv3_StateModel/Logic - 58(XIC)

Cmd_Hold 0 BOOL PackMLv3_StateModel
Request that current state transition to Holding
Usage: Input Parameter
Required: No
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_Hold - PackMLv3_StateModel/Logic - 54(XIC)

Cmd_Mode 0 DINT PackMLv3_StateModel
Commanded Mode
Usage: Input Parameter
Required: No
Visible: Yes
External Access: Read/Write
OPC UA Access: None
*Cmd_Mode - PackMLv3_StateModel/Logic - *83(MOVE), *85(MOVE), 84(LIMIT), 84(MOVE), 84(NE), 84(XIC), 85(NE)*
*Cmd_Mode - PackMLv3_StateModel/Prescan - *0(MOVE)*

Cmd_Reset 0 BOOL PackMLv3_StateModel
Request that current state transition to Resetting
Usage: Input Parameter
Required: No
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_Reset - PackMLv3_StateModel/Logic - 51(XIC), 52(XIC)

Cmd_Start 0 BOOL PackMLv3_StateModel
Request that current state transition to Starting
Usage: Input Parameter
Required: No
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_Start - PackMLv3_StateModel/Logic - 53(XIC)

Cmd_StateComplete 0 BOOL PackMLv3_StateModel
PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
Usage: Input Parameter
Required: No
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_StateComplete - PackMLv3_StateModel/Logic - 37(XIC), 38(XIO)

Cmd_Stop 0 BOOL PackMLv3_StateModel
Request that current state transition to Stopping
Usage: Input Parameter
Required: No
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_Stop - PackMLv3_StateModel/Logic - 59(XIC)

Cmd_Suspend 0 BOOL PackMLv3_StateModel
Request that current state transition to Suspending
Usage: Input Parameter
Required: No
Visible: Yes

Cmd_Suspend (Continued)
External Access: Read/Write
OPC UA Access: None
Cmd_Suspend - PackMLv3_StateModel/Logic - 56(XIC)

Cmd_UnHold 0 BOOL PackMLv3_StateModel
Request that current state transition to Execute
Usage: Input Parameter
Required: No
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_UnHold - PackMLv3_StateModel/Logic - 55(XIC)

Cmd_UnSuspend 0 BOOL PackMLv3_StateModel
Request that current state transition to Execute
Usage: Input Parameter
Required: No
Visible: Yes
External Access: Read/Write
OPC UA Access: None
Cmd_UnSuspend - PackMLv3_StateModel/Logic - 57(XIC)

Inp_RemoteModeCmd 0 DINT PackMLv3_StateModel
Mode Remote Command Interface
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Inp_RemoteModeCmd - PackMLv3_StateModel/Logic - 82(OTL), 82(XIO), 83(LIMIT), 83(MOVE), 83(NE), 83(XIC), 85(NE)

Inp_RemoteStateCmd 0 DINT PackMLv3_StateModel
State Remote Command Interface
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Inp_RemoteStateCmd - PackMLv3_StateModel/Logic - 10(EQ), 11(EQ), 3(EQ), 4(EQ), 5(EQ), 6(EQ), 7(EQ), 8(EQ), 9(EQ)

Inp_RemoteStateCmdChangeRequest
0 BOOL PackMLv3_StateModel
State Remote Command Change Request
Usage: Input Parameter
Required: No
Visible: No
External Access: Read/Write
OPC UA Access: None
Inp_RemoteStateCmdChangeRequest - PackMLv3_StateModel/Logic - 2(XIC)

Sts_Aborted 0 BOOL PackMLv3_StateModel
The Aborted state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_Aborted - PackMLv3_StateModel/Logic - *70(OTE), 70(XIO)*

Sts_AbortedEnabled 0 BOOL PackMLv3_StateModel
Use of the Aborted state for the current mode is enabled
Usage: Output Parameter

Sts_AbortedEnabled (Continued)
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_AbortedEnabled - PackMLv3_StateModel/Logic - *24(OTE)*

Sts_Aborting 0 BOOL PackMLv3_StateModel
The Aborting state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_Aborting - PackMLv3_StateModel/Logic - *69(OTE), 69(XIO)*

Sts_AbortingEnabled 0 BOOL PackMLv3_StateModel
Use of the Aborting state for the current mode is enabled
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_AbortingEnabled - PackMLv3_StateModel/Logic - *23(OTE), 43(XIO)*

Sts_Clearing 0 BOOL PackMLv3_StateModel
The Clearing state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_Clearing - PackMLv3_StateModel/Logic - *62(OTE), 62(XIO)*

Sts_ClearingEnabled 0 BOOL PackMLv3_StateModel
Use of the Clearing state for the current mode is enabled
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_ClearingEnabled - PackMLv3_StateModel/Logic - *15(OTE), 39(XIO)*

Sts_Complete 0 BOOL PackMLv3_StateModel
The Complete state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_Complete - PackMLv3_StateModel/Logic - *78(OTE), 78(XIO)*

Sts_CompleteEnabled 0 BOOL PackMLv3_StateModel
Use of the Complete state for the current mode is enabled
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_CompleteEnabled - PackMLv3_StateModel/Logic - *34(OTE), 41(XIC), 52(XIO)*

Sts_Completing 0 BOOL PackMLv3_StateModel
The Completing state is active.

Sts_Completing (Continued)
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_Completing - PackMLv3_StateModel/Logic - *77(OTE), 77(XIO)*

Sts_CompletingEnabled 0 BOOL PackMLv3_StateModel
Use of the Completing state for the current mode is enabled
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_CompletingEnabled - PackMLv3_StateModel/Logic - *33(OTE), 49(XIO)*

Sts_EnabledStates 0 DINT PackMLv3_StateModel
Currently Disabled States = 0
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
Sts_EnabledStates.1 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.1 - PackMLv3_StateModel/Logic - *15(OTE)*
Sts_EnabledStates.2 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.2 - PackMLv3_StateModel/Logic - *16(OTE)*
Sts_EnabledStates.3 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.3 - PackMLv3_StateModel/Logic - *17(OTE)*
Sts_EnabledStates.4 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.4 - PackMLv3_StateModel/Logic - *18(OTE)*
Sts_EnabledStates.5 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.5 - PackMLv3_StateModel/Logic - *20(OTE)*
Sts_EnabledStates.6 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.6 - PackMLv3_StateModel/Logic - *21(OTE)*
Sts_EnabledStates.7 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.7 - PackMLv3_StateModel/Logic - *22(OTE)*
Sts_EnabledStates.8 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.8 - PackMLv3_StateModel/Logic - *23(OTE)*
Sts_EnabledStates.9 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.9 - PackMLv3_StateModel/Logic - *24(OTE)*
Sts_EnabledStates.10 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.10 - PackMLv3_StateModel/Logic - *26(OTE)*
Sts_EnabledStates.11 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.11 - PackMLv3_StateModel/Logic - *27(OTE)*
Sts_EnabledStates.12 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.12 - PackMLv3_StateModel/Logic - *28(OTE)*
Sts_EnabledStates.13 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.13 - PackMLv3_StateModel/Logic - *29(OTE)*

Sts_EnabledStates (Continued)

Sts_EnabledStates.14 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.14 - PackMLv3_StateModel/Logic - *30(OTE)*

Sts_EnabledStates.15 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.15 - PackMLv3_StateModel/Logic - *31(OTE)*

Sts_EnabledStates.16 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.16 - PackMLv3_StateModel/Logic - *33(OTE)*

Sts_EnabledStates.17 0 BOOL
Currently Disabled States = 0
*Sts_EnabledStates.17 - PackMLv3_StateModel/Logic - *34(OTE)*

Sts_Execute 0 BOOL PackMLv3_StateModel
The Execute state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_Execute - PackMLv3_StateModel/Logic - *67(OTE), 67(XIO)*

Sts_ExecuteEnabled 0 BOOL PackMLv3_StateModel
Use of the Execute state for the current mode is enabled
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_ExecuteEnabled - PackMLv3_StateModel/Logic - *21(OTE)*

Sts_Held 0 BOOL PackMLv3_StateModel
The Held state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_Held - PackMLv3_StateModel/Logic - *72(OTE), 72(XIO)*

Sts_HeldEnabled 0 BOOL PackMLv3_StateModel
Use of the Held state for the current mode is enabled
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_HeldEnabled - PackMLv3_StateModel/Logic - *27(OTE), 54(XIC)*

Sts_Holding 0 BOOL PackMLv3_StateModel
The Holding state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_Holding - PackMLv3_StateModel/Logic - *71(OTE), 71(XIO)*

Sts_HoldingEnabled 0 BOOL PackMLv3_StateModel
Use of the Holding state for the current mode is enabled
Usage: Output Parameter
Required: No

Sts_HoldingEnabled (Continued)
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_HoldingEnabled - PackMLv3_StateModel/Logic - *26(OTE), 44(XIO)*

Sts_Idle 0 BOOL PackMLv3_StateModel
The Idle state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_Idle - PackMLv3_StateModel/Logic - *65(OTE), 65(XIO)*

Sts_IdleEnabled 0 BOOL PackMLv3_StateModel
Use of the Idle state for the current mode is enabled
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_IdleEnabled - PackMLv3_StateModel/Logic - *18(OTE), 53(XIO)*

Sts_ModeChangeNotAllowed 0 BOOL PackMLv3_StateModel
Mode Change Request Was Denied
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_ModeChangeNotAllowed - PackMLv3_StateModel/Logic - *85(OTE)*

Sts_ModeCurrent 0 DINT PackMLv3_StateModel
Current Mode ID
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_ModeCurrent - PackMLv3_StateModel/Logic - *83(MOVE), *84(MOVE), 13(MOVE), 35(MOVE), 81(OTL), 81(XIO), 83(MOVE), 83(NE), 83(XIC), 84(NE), 84(XIC), 85(MOVE), 85(NE), 85(NE), 86(COP)*
*Sts_ModeCurrent - PackMLv3_StateModel/Prescan - *0(MOVE)*

Sts_ModeCurrentName ?? String_Short PackMLv3_StateModel
Current Mode Name
Usage: InOut Parameter
Required: Yes
Visible: Yes
Constant No
OPC UA Access: None
*Sts_ModeCurrentName - PackMLv3_StateModel/Logic - *86(COP)*
Sts_ModeCurrentName.LEN ?? DINT
Current Mode Name
Sts_ModeCurrentName.DATA SINT
Current Mode Name

Sts_Resetting 0 BOOL PackMLv3_StateModel
The Resetting state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only

Sts_Resetting (Continued)
OPC UA Access: None
*Sts_Resetting - PackMLv3_StateModel/Logic - *76(OTE), 76(XIO)*

Sts_ResettingEnabled 0 BOOL PackMLv3_StateModel
Use of the Resetting state for the current mode is enabled
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_ResettingEnabled - PackMLv3_StateModel/Logic - *31(OTE), 48(XIO)*

Sts_Starting 0 BOOL PackMLv3_StateModel
The Starting state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_Starting - PackMLv3_StateModel/Logic - *64(OTE), 64(XIO)*

Sts_StartingEnabled 0 BOOL PackMLv3_StateModel
Use of the Starting state for the current mode is enabled
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_StartingEnabled - PackMLv3_StateModel/Logic - *17(OTE), 40(XIO)*

Sts_StateCurrent 0 DINT PackMLv3_StateModel
Current State ID
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_StateCurrent - PackMLv3_StateModel/Logic - *62(MOVE), *63(MOVE), *64(MOVE), *65(MOVE), *66(MOVE), *67(MOVE), *68(MOVE), *69(MOVE), *70(MOVE), *71(MOVE), *72(MOVE), *73(MOVE), *74(MOVE), *75(MOVE), *76(MOVE), *77(MOVE), *78(MOVE), 83(XIC), 83(XIC), 84(XIC), 84(XIC)*
*Sts_StateCurrent - PackMLv3_StateModel/Prescan - *1(MOVE)*

Sts_StateCurrentName ?? String_Short PackMLv3_StateModel
Current State Name
Usage: InOut Parameter
Required: Yes
Visible: Yes
Constant No
OPC UA Access: None
*Sts_StateCurrentName - PackMLv3_StateModel/Logic - *62(COP), *63(COP), *64(COP), *65(COP), *66(COP), *67(COP), *68(COP), *69(COP), *70(COP), *71(COP), *72(COP), *73(COP), *74(COP), *75(COP), *76(COP), *77(COP), *78(COP)*
Sts_StateCurrentName.LEN ?? DINT
Current State Name
Sts_StateCurrentName.DATA SINT
Current State Name

Sts_Stopped 0 BOOL PackMLv3_StateModel
The Stopped state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only

Sts_Stopped (Continued)
OPC UA Access: None
*Sts_Stopped - PackMLv3_StateModel/Logic - *63(OTE), 63(XIO)*

Sts_StoppedEnabled 0 BOOL PackMLv3_StateModel
Use of the Stopped state for the current mode is enabled
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_StoppedEnabled - PackMLv3_StateModel/Logic - *16(OTE)*

Sts_Stopping 0 BOOL PackMLv3_StateModel
The Stopping state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_Stopping - PackMLv3_StateModel/Logic - *68(OTE), 68(XIO)*

Sts_StoppingEnabled 0 BOOL PackMLv3_StateModel
Use of the Stopping state for the current mode is enabled
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_StoppingEnabled - PackMLv3_StateModel/Logic - *22(OTE), 42(XIO)*

Sts_Suspended 0 BOOL PackMLv3_StateModel
The Suspended state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_Suspended - PackMLv3_StateModel/Logic - *66(OTE), 66(XIO)*

Sts_SuspendedEnabled 0 BOOL PackMLv3_StateModel
Use of the Suspended state for the current mode is enabled
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_SuspendedEnabled - PackMLv3_StateModel/Logic - *20(OTE), 56(XIC)*

Sts_Suspending 0 BOOL PackMLv3_StateModel
The Suspending state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_Suspending - PackMLv3_StateModel/Logic - *74(OTE), 74(XIO)*

Sts_SuspendingEnabled 0 BOOL PackMLv3_StateModel
Use of the Suspending state for the current mode is enabled
Usage: Output Parameter
Required: No
Visible: No

Sts_SuspendingEnabled (Continued)
External Access: Read Only
OPC UA Access: None
*Sts_SuspendingEnabled - PackMLv3_StateModel/Logic - *29(OTE), 46(XIO)*

Sts_UnHolding 0 BOOL PackMLv3_StateModel
The Unholding state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_UnHolding - PackMLv3_StateModel/Logic - *73(OTE), 73(XIO)*

Sts_UnHoldingEnabled 0 BOOL PackMLv3_StateModel
Use of the UnHolding state for the current mode is enabled
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_UnHoldingEnabled - PackMLv3_StateModel/Logic - *28(OTE), 45(XIO)*

Sts_UnSuspending 0 BOOL PackMLv3_StateModel
The UnSuspending state is active.
Usage: Output Parameter
Required: No
Visible: Yes
External Access: Read Only
OPC UA Access: None
*Sts_UnSuspending - PackMLv3_StateModel/Logic - *75(OTE), 75(XIO)*

Sts_UnSuspendingEnabled 0 BOOL PackMLv3_StateModel
Use of the UnSuspending state for the current mode is enabled
Usage: Output Parameter
Required: No
Visible: No
External Access: Read Only
OPC UA Access: None
*Sts_UnSuspendingEnabled - PackMLv3_StateModel/Logic - *30(OTE), 47(XIO)*

Name	Default	Data Type	Scope
AbortRemoteCmd	0	BOOL	PackMLv3_StateModel
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
*AbortRemoteCmd - PackMLv3_StateModel/Logic - *10(OTE), 60(XIC)*			
Cfg_DisableStatesCopy	0	DINT	PackMLv3_StateModel
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
*Cfg_DisableStatesCopy - PackMLv3_StateModel/Logic - *13(MOVE), 35(MOVE)*			
Cfg_DisableStatesCopy.0	0	BOOL	
No State Associated			
Cfg_DisableStatesCopy.1	0	BOOL	
Clearing State 1 = Disabled State			
Cfg_DisableStatesCopy.1 - PackMLv3_StateModel/Logic - 15(XIO)			
Cfg_DisableStatesCopy.2	0	BOOL	
Stopped State 1 = Disabled State			
*Cfg_DisableStatesCopy.2 - PackMLv3_StateModel/Logic - *14(OTU), 14(XIC), 16(XIO)*			
Cfg_DisableStatesCopy.3	0	BOOL	
Starting State 1 = Disabled State			
Cfg_DisableStatesCopy.3 - PackMLv3_StateModel/Logic - 17(XIO)			
Cfg_DisableStatesCopy.4	0	BOOL	
Idle State 1 = Disabled State			
Cfg_DisableStatesCopy.4 - PackMLv3_StateModel/Logic - 18(XIO)			
Cfg_DisableStatesCopy.5	0	BOOL	
Suspended State 1 = Disabled State			
Cfg_DisableStatesCopy.5 - PackMLv3_StateModel/Logic - 19(XIC), 20(XIO)			
Cfg_DisableStatesCopy.6	0	BOOL	
Execute State 1 = Disabled State			
*Cfg_DisableStatesCopy.6 - PackMLv3_StateModel/Logic - *14(OTU), 14(XIC), 21(XIO)*			
Cfg_DisableStatesCopy.7	0	BOOL	
Stopping State 1 = Disabled State			
Cfg_DisableStatesCopy.7 - PackMLv3_StateModel/Logic - 22(XIO)			
Cfg_DisableStatesCopy.8	0	BOOL	
Aborting State 1 = Disabled State			
Cfg_DisableStatesCopy.8 - PackMLv3_StateModel/Logic - 23(XIO)			
Cfg_DisableStatesCopy.9	0	BOOL	
Aborted State 1 = Disabled State			
*Cfg_DisableStatesCopy.9 - PackMLv3_StateModel/Logic - *14(OTU), 14(XIC), 24(XIO)*			
Cfg_DisableStatesCopy.10	0	BOOL	
Holding State 1 = Disabled State			
*Cfg_DisableStatesCopy.10 - PackMLv3_StateModel/Logic - *25(OTL), 26(XIO)*			
Cfg_DisableStatesCopy.11	0	BOOL	
Held State 1 = Disabled State			
Cfg_DisableStatesCopy.11 - PackMLv3_StateModel/Logic - 25(XIC), 27(XIO)			
Cfg_DisableStatesCopy.12	0	BOOL	
UnHolding State 1 = Disabled State			
*Cfg_DisableStatesCopy.12 - PackMLv3_StateModel/Logic - *25(OTL), 28(XIO)*			
Cfg_DisableStatesCopy.13	0	BOOL	
Suspending State 1 = Disabled State			
*Cfg_DisableStatesCopy.13 - PackMLv3_StateModel/Logic - *19(OTL), 29(XIO)*			
Cfg_DisableStatesCopy.14	0	BOOL	
UnSuspending State 1 = Disabled State			
*Cfg_DisableStatesCopy.14 - PackMLv3_StateModel/Logic - *19(OTL), 30(XIO)*			
Cfg_DisableStatesCopy.15	0	BOOL	
Resetting State 1 = Disabled State			
Cfg_DisableStatesCopy.15 - PackMLv3_StateModel/Logic - 31(XIO)			
Cfg_DisableStatesCopy.16	0	BOOL	
Completing State 1 = Disabled State			
*Cfg_DisableStatesCopy.16 - PackMLv3_StateModel/Logic - *32(OTL), 33(XIO)*			
Cfg_DisableStatesCopy.17	0	BOOL	

Cfg_DisableStatesCopy (Continued)
Complete State 1 = Disabled State
Cfg_DisableStatesCopy.17 - PackMLv3_StateModel/Logic - 32(XIC), 34(XIO)

ClearRemoteCmd 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*ClearRemoteCmd - PackMLv3_StateModel/Logic - *11(OTE), 58(XIC)*

HoldRemoteCmd 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*HoldRemoteCmd - PackMLv3_StateModel/Logic - *6(OTE), 54(XIC)*

LocalAborted 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*LocalAborted - PackMLv3_StateModel/Logic - *43(OTL), *58(OTU), 58(XIC), 70(XIC)*
*LocalAborted - PackMLv3_StateModel/Prescan - *1(OTU)*

LocalAborting 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*LocalAborting - PackMLv3_StateModel/Logic - *43(OTU), *60(OTL), 43(XIC), 69(XIC)*
*LocalAborting - PackMLv3_StateModel/Prescan - *1(OTU)*

LocalClearing 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*LocalClearing - PackMLv3_StateModel/Logic - *39(OTU), *58(OTL), *60(OTU), 39(XIC), 60(XIC), 62(XIC)*
*LocalClearing - PackMLv3_StateModel/Prescan - *1(OTU)*

LocalComplete 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*LocalComplete - PackMLv3_StateModel/Logic - *49(OTL), *52(OTU), *59(OTU), *60(OTU), 52(XIC), 59(XIC), 60(XIC), 78(XIC)*
*LocalComplete - PackMLv3_StateModel/Prescan - *1(OTU)*

LocalCompleting 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*LocalCompleting - PackMLv3_StateModel/Logic - *41(OTL), *49(OTU), *59(OTU), *60(OTU), 49(XIC), 59(XIC), 60(XIC), 77(XIC)*
*LocalCompleting - PackMLv3_StateModel/Prescan - *1(OTU)*

LocalExecute 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*LocalExecute - PackMLv3_StateModel/Logic - *40(OTL), *41(OTU), *45(OTL), *47(OTL), *54(OTU), *56(OTU), *59(OTU), *60(OTU), 41(XIC), 54(XIC), 56(XIC), 59(XIC), 60(XIC), 67(XIC)*
*LocalExecute - PackMLv3_StateModel/Prescan - *1(OTU)*

LocalHeld 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None

LocalHeld (Continued)
*LocalHeld - PackMLv3_StateModel/Logic - *44(OTL), *55(OTU), *59(OTU), *60(OTU), 55(XIC), 59(XIC), 60(XIC), 72(XIC)*
*LocalHeld - PackMLv3_StateModel/Prescan - *1(OTU)*

LocalHolding 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*LocalHolding - PackMLv3_StateModel/Logic - *44(OTU), *54(OTL), *59(OTU), *60(OTU), 44(XIC), 59(XIC), 60(XIC), 71(XIC)*
*LocalHolding - PackMLv3_StateModel/Prescan - *1(OTU)*

LocalIdle 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*LocalIdle - PackMLv3_StateModel/Logic - *48(OTL), *53(OTU), *59(OTU), *60(OTU), 53(XIC), 59(XIC), 60(XIC), 65(XIC)*
*LocalIdle - PackMLv3_StateModel/Prescan - *1(OTU)*

LocalResetting 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*LocalResetting - PackMLv3_StateModel/Logic - *48(OTU), *51(OTL), *52(OTL), *59(OTU), *60(OTU), 48(XIC), 59(XIC), 60(XIC), 76(XIC)*
*LocalResetting - PackMLv3_StateModel/Prescan - *1(OTU)*

LocalStarting 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*LocalStarting - PackMLv3_StateModel/Logic - *40(OTU), *53(OTL), *59(OTU), *60(OTU), 40(XIC), 59(XIC), 60(XIC), 64(XIC)*
*LocalStarting - PackMLv3_StateModel/Prescan - *1(OTU)*

LocalStopped 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*LocalStopped - PackMLv3_StateModel/Logic - *39(OTL), *42(OTL), *51(OTU), *60(OTU), 51(XIC), 60(XIC), 63(XIC)*
*LocalStopped - PackMLv3_StateModel/Prescan - *1(OTL)*

LocalStopping 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*LocalStopping - PackMLv3_StateModel/Logic - *42(OTU), *59(OTL), *60(OTU), 42(XIC), 60(XIC), 68(XIC)*
*LocalStopping - PackMLv3_StateModel/Prescan - *1(OTU)*

LocalSuspended 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*LocalSuspended - PackMLv3_StateModel/Logic - *46(OTL), *57(OTU), *59(OTU), *60(OTU), 57(XIC), 59(XIC), 60(XIC), 66(XIC)*
*LocalSuspended - PackMLv3_StateModel/Prescan - *1(OTU)*

LocalSuspending 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*LocalSuspending - PackMLv3_StateModel/Logic - *46(OTU), *56(OTL), *59(OTU), *60(OTU), 46(XIC), 59(XIC), 60(XIC), 74(XIC)*
*LocalSuspending - PackMLv3_StateModel/Prescan - *1(OTU)*

LocalUnHolding 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write

LocalUnHolding (Continued)
OPC UA Access: None
*LocalUnHolding - PackMLv3_StateModel/Logic - *45(OTU), *55(OTL), *59(OTU), *60(OTU), 45(XIC), 59(XIC), 60(XIC), 73(XIC)*
*LocalUnHolding - PackMLv3_StateModel/Prescan - *1(OTU)*

LocalUnSuspending 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*LocalUnSuspending - PackMLv3_StateModel/Logic - *47(OTU), *57(OTL), *59(OTU), *60(OTU), 47(XIC), 59(XIC), 60(XIC), 75(XIC)*
*LocalUnSuspending - PackMLv3_StateModel/Prescan - *1(OTU)*

PreviousMode 0 DINT PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*PreviousMode - PackMLv3_StateModel/Prescan - *0(CLR)*

RemoteCmdChangeRequested 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*RemoteCmdChangeRequested - PackMLv3_StateModel/Logic - *2(OTE), 10(XIC), 11(XIC), 3(XIC), 4(XIC), 5(XIC), 6(XIC), 7(XIC), 8(XIC), 83(XIC), 85(XIC), 9(XIC)*

ResetRemoteCmd 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*ResetRemoteCmd - PackMLv3_StateModel/Logic - *3(OTE), 51(XIC), 52(XIC)*

StartRemoteCmd 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*StartRemoteCmd - PackMLv3_StateModel/Logic - *4(OTE), 53(XIC)*

StateComplete 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*StateComplete - PackMLv3_StateModel/Logic - *37(OTL), *38(OTU), *39(OTU), *40(OTU), *41(OTU), *42(OTU), *43(OTU), *44(OTU), *45(OTU), *46(OTU), *47(OTU), *48(OTU), *49(OTU), 39(XIC), 40(XIC), 41(XIC), 42(XIC), 43(XIC), 44(XIC), 45(XIC), 46(XIC), 47(XIC), 48(XIC), 49(XIC)*

StopRemoteCmd 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*StopRemoteCmd - PackMLv3_StateModel/Logic - *5(OTE), 59(XIC)*

StringAborted 'Aborted' String_Short PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
StringAborted - PackMLv3_StateModel/Logic - 70(COP)

StringAborting 'Aborting' String_Short PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
StringAborting - PackMLv3_StateModel/Logic - 69(COP)

StringClearing	'Clearing'	String_Short	PackMLv3_StateModel
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
StringClearing - PackMLv3_StateModel/Logic - 62(COP)			
StringComplete	'Complete'	String_Short	PackMLv3_StateModel
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
StringComplete - PackMLv3_StateModel/Logic - 78(COP)			
StringCompleting	'Completing'	String_Short	PackMLv3_StateModel
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
StringCompleting - PackMLv3_StateModel/Logic - 77(COP)			
StringExecute	'Execute'	String_Short	PackMLv3_StateModel
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
StringExecute - PackMLv3_StateModel/Logic - 67(COP)			
StringHeld	'Held'	String_Short	PackMLv3_StateModel
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
StringHeld - PackMLv3_StateModel/Logic - 72(COP)			
StringHolding	'Holding'	String_Short	PackMLv3_StateModel
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
StringHolding - PackMLv3_StateModel/Logic - 71(COP)			
StringIdle	'Idle'	String_Short	PackMLv3_StateModel
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
StringIdle - PackMLv3_StateModel/Logic - 65(COP)			
StringResetting	'Resetting'	String_Short	PackMLv3_StateModel
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
StringResetting - PackMLv3_StateModel/Logic - 76(COP)			
StringStarting	'Starting'	String_Short	PackMLv3_StateModel
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
StringStarting - PackMLv3_StateModel/Logic - 64(COP)			
StringStopped	'Stopped'	String_Short	PackMLv3_StateModel
Usage:	Local Tag		
External Access:	Read/Write		
OPC UA Access:	None		
StringStopped - PackMLv3_StateModel/Logic - 63(COP)			
StringStopping	'Stopping'	String_Short	PackMLv3_StateModel
Usage:	Local Tag		
External Access:	Read/Write		

StringStopping (Continued)
OPC UA Access: None
StringStopping - PackMLv3_StateModel/Logic - 68(COP)

StringSuspended 'Suspended' String_Short PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
StringSuspended - PackMLv3_StateModel/Logic - 66(COP)

StringSuspending 'Suspending' String_Short PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
StringSuspending - PackMLv3_StateModel/Logic - 74(COP)

StringUnHolding 'UnHolding' String_Short PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
StringUnHolding - PackMLv3_StateModel/Logic - 73(COP)

StringUnSuspending 'UnSuspending' String_Short PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
StringUnSuspending - PackMLv3_StateModel/Logic - 75(COP)

SuspendRemoteCmd 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*SuspendRemoteCmd - PackMLv3_StateModel/Logic - *8(OTE), 56(XIC)*

TON_ModeChangeNotAllowed TIMER PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*TON_ModeChangeNotAllowed - PackMLv3_StateModel/Logic - *85(TON)*
TON_ModeChangeNotAllowed.PRE
3000 DINT
*TON_ModeChangeNotAllowed.PRE - PackMLv3_StateModel/Prescan - *2(MOVE)*
TON_ModeChangeNotAllowed.DN 0 BOOL
TON_ModeChangeNotAllowed.DN - PackMLv3_StateModel/Logic - 85(XIC)

UnHoldRemoteCmd 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*UnHoldRemoteCmd - PackMLv3_StateModel/Logic - *7(OTE), 55(XIC)*

UnSuspendRemoteCmd 0 BOOL PackMLv3_StateModel
Usage: Local Tag
External Access: Read/Write
OPC UA Access: None
*UnSuspendRemoteCmd - PackMLv3_StateModel/Logic - *9(OTE), 57(XIC)*

PackML Logic
The following logic will manage PackML modes, states, and times.

0 NOP

Remote Command Processing Logic
Note: Cfg_EnableInternalRemoteCmdProcessing is used enable internal logic.

1 NOP

2 State Remote Command Change Request Inp_RemoteStateCmdChangeRequest | Enable Remote Commands Cfg_RemoteCmdEnable | RemoteCmdChangeRequested

3 RemoteCmdChangeRequested | State Remote Command Interface: EQ Equal, Source A Inp_RemoteStateCmd 0, Source B 1 | ResetRemoteCmd

4 RemoteCmdChangeRequested | State Remote Command Interface: EQ Equal, Source A Inp_RemoteStateCmd 0, Source B 2 | StartRemoteCmd

5 RemoteCmdChangeRequested | State Remote Command Interface: EQ Equal, Source A Inp_RemoteStateCmd 0, Source B 3 | StopRemoteCmd

6 RemoteCmdChangeRequested | State Remote Command Interface: EQ Equal, Source A Inp_RemoteStateCmd 0, Source B 4 | HoldRemoteCmd

7 RemoteCmdChangeRequested | State Remote Command Interface: EQ Equal, Source A Inp_RemoteStateCmd 0, Source B 5 | UnHoldRemoteCmd

8

RemoteCmdChangeRequested

State Remote Command Interface

EQ Equal
Source A Inp_RemoteStateCmd 0
Source B 6

SuspendRemoteCmd

9

RemoteCmdChangeRequested

State Remote Command Interface

EQ Equal
Source A Inp_RemoteStateCmd 0
Source B 7

UnSuspendRemoteCmd

10

RemoteCmdChangeRequested

State Remote Command Interface

EQ Equal
Source A Inp_RemoteStateCmd 0
Source B 8

AbortRemoteCmd

11

RemoteCmdChangeRequested

State Remote Command Interface

EQ Equal
Source A Inp_RemoteStateCmd 0
Source B 9

ClearRemoteCmd

State Disable Logic

Ensure Stopped, Execute, and Aborted States are not disabled.

12

NOP

13

MOVE Move
Source Cfg_DisableStates[Sts_ModeCurrent] ??
Dest Cfg_DisableStatesCopy 0

14

Stopped State 1 = Disabled State Cfg_DisableStatesCopy.2

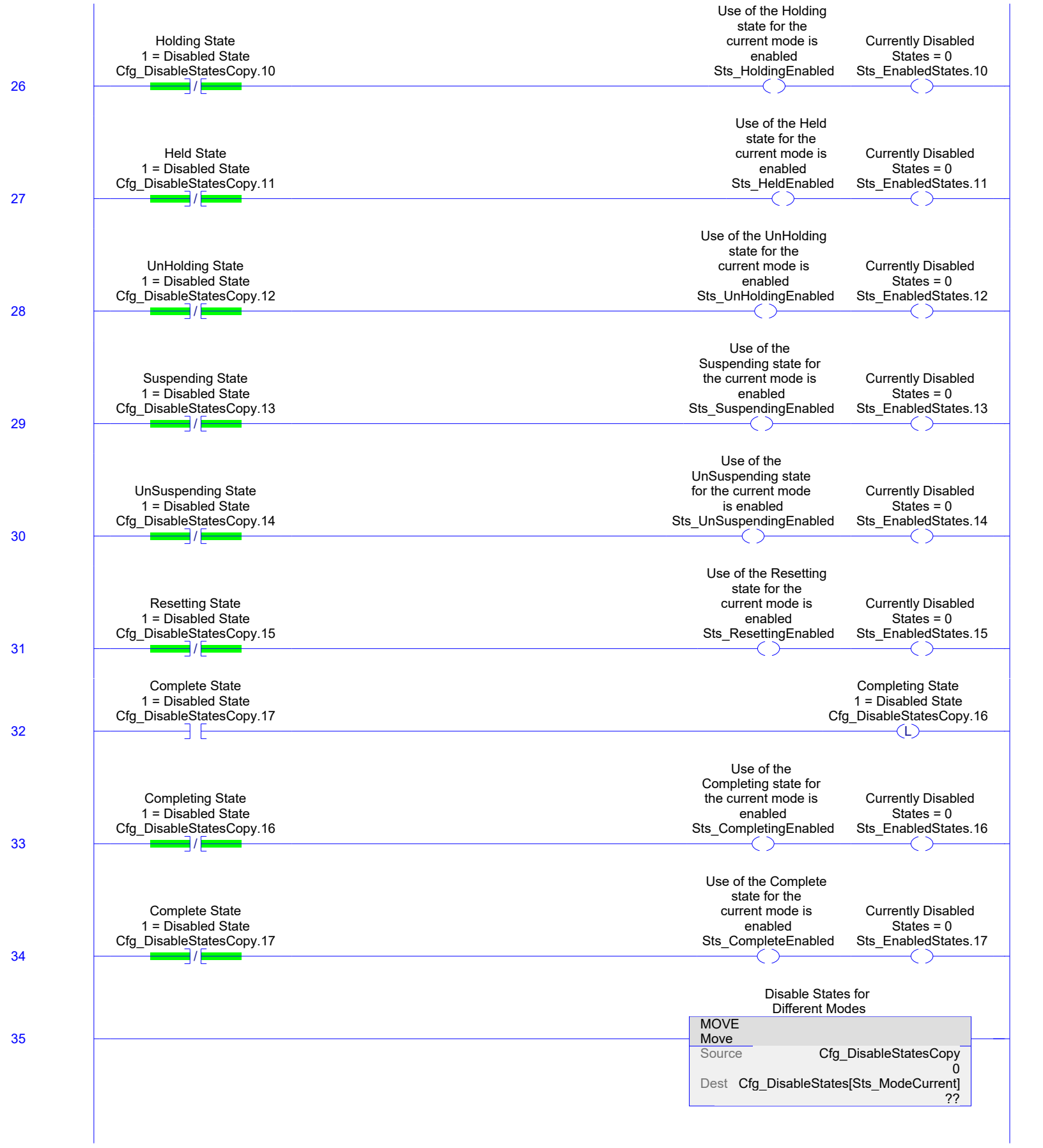
Stopped State 1 = Disabled State Cfg_DisableStatesCopy.2 (U)

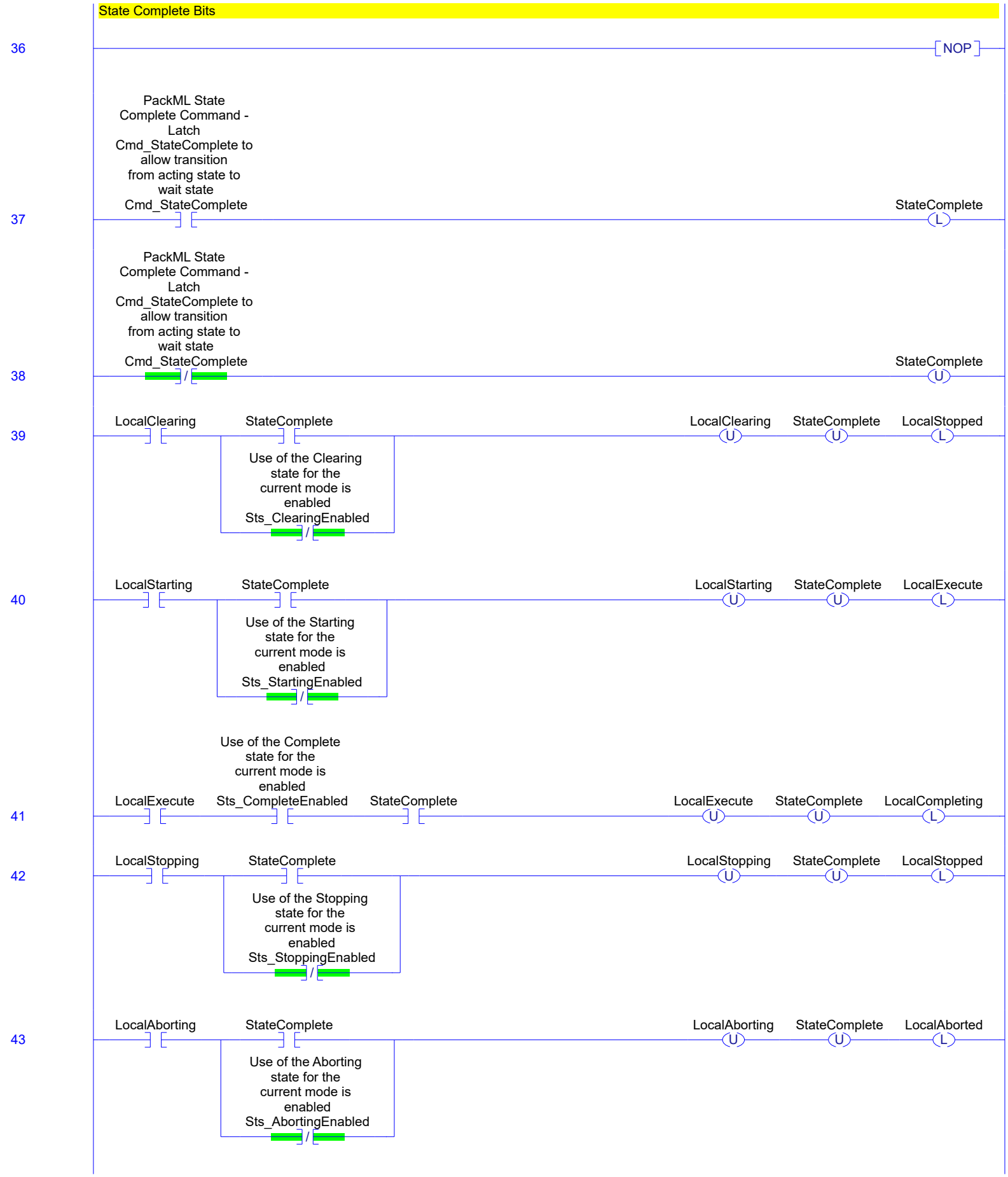
Execute State 1 = Disabled State Cfg_DisableStatesCopy.6

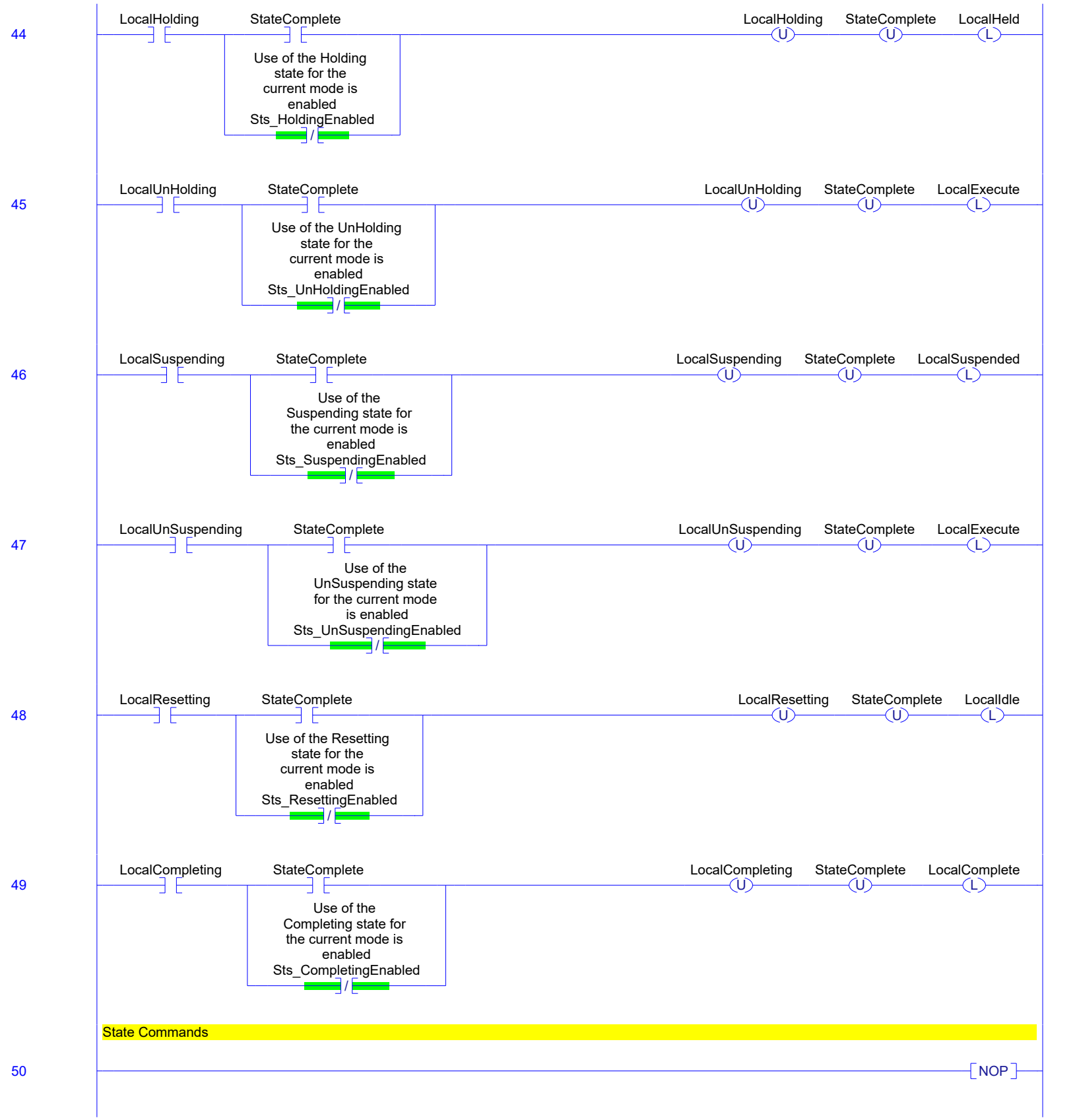
Execute State 1 = Disabled State Cfg_DisableStatesCopy.6 (U)

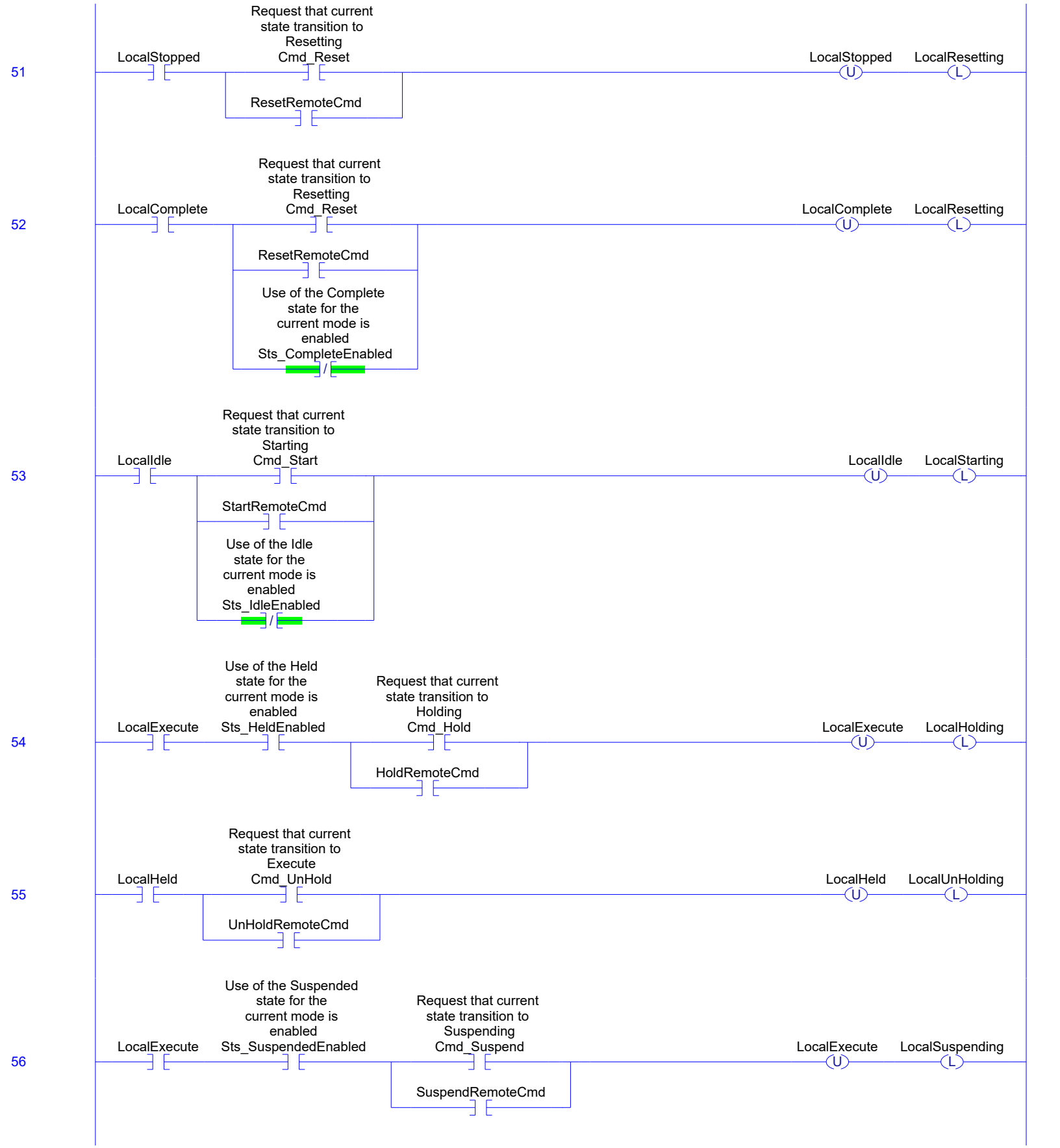
Aborted State 1 = Disabled State Cfg_DisableStatesCopy.9

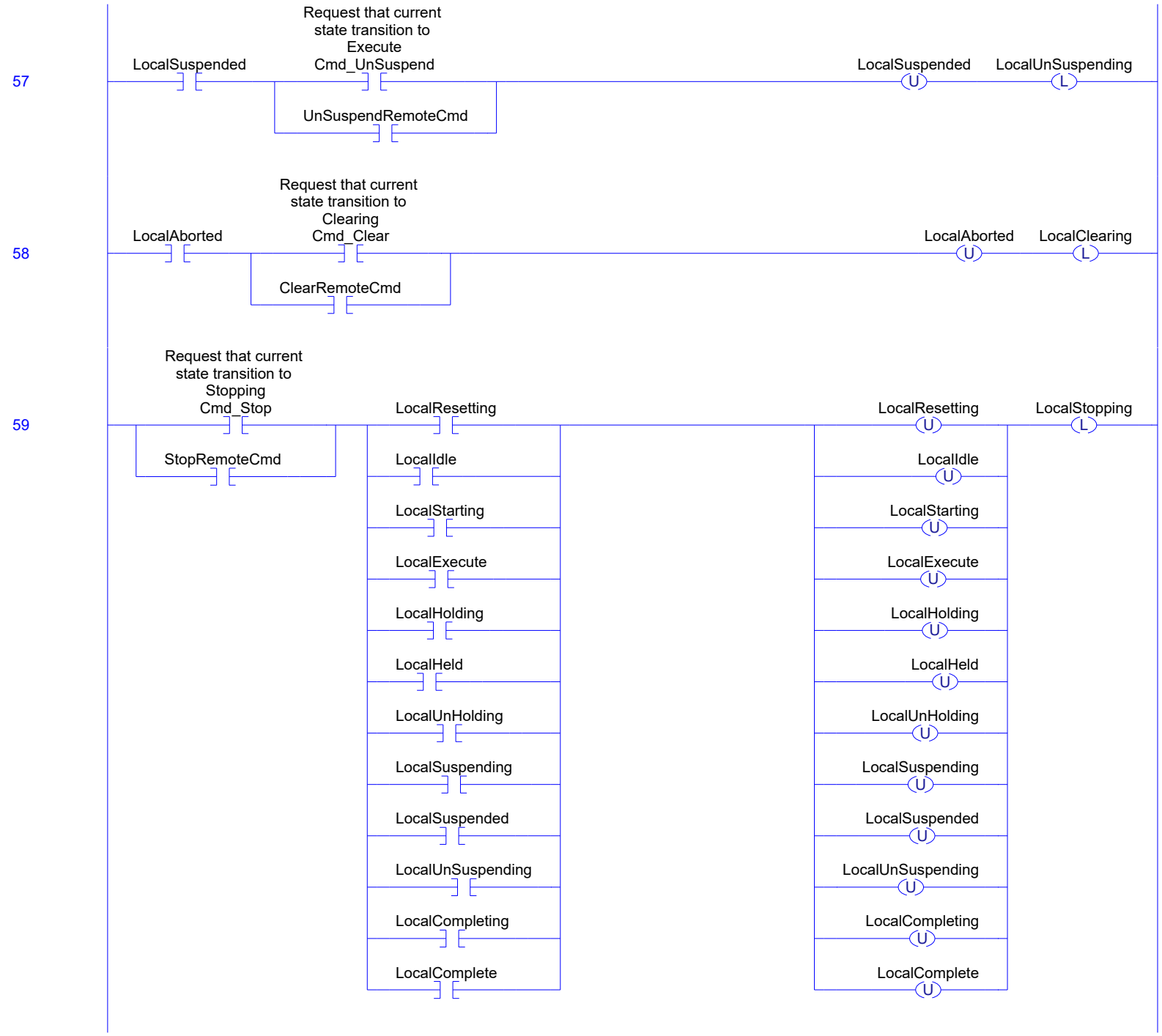
Aborted State 1 = Disabled State Cfg_DisableStatesCopy.9 (U)

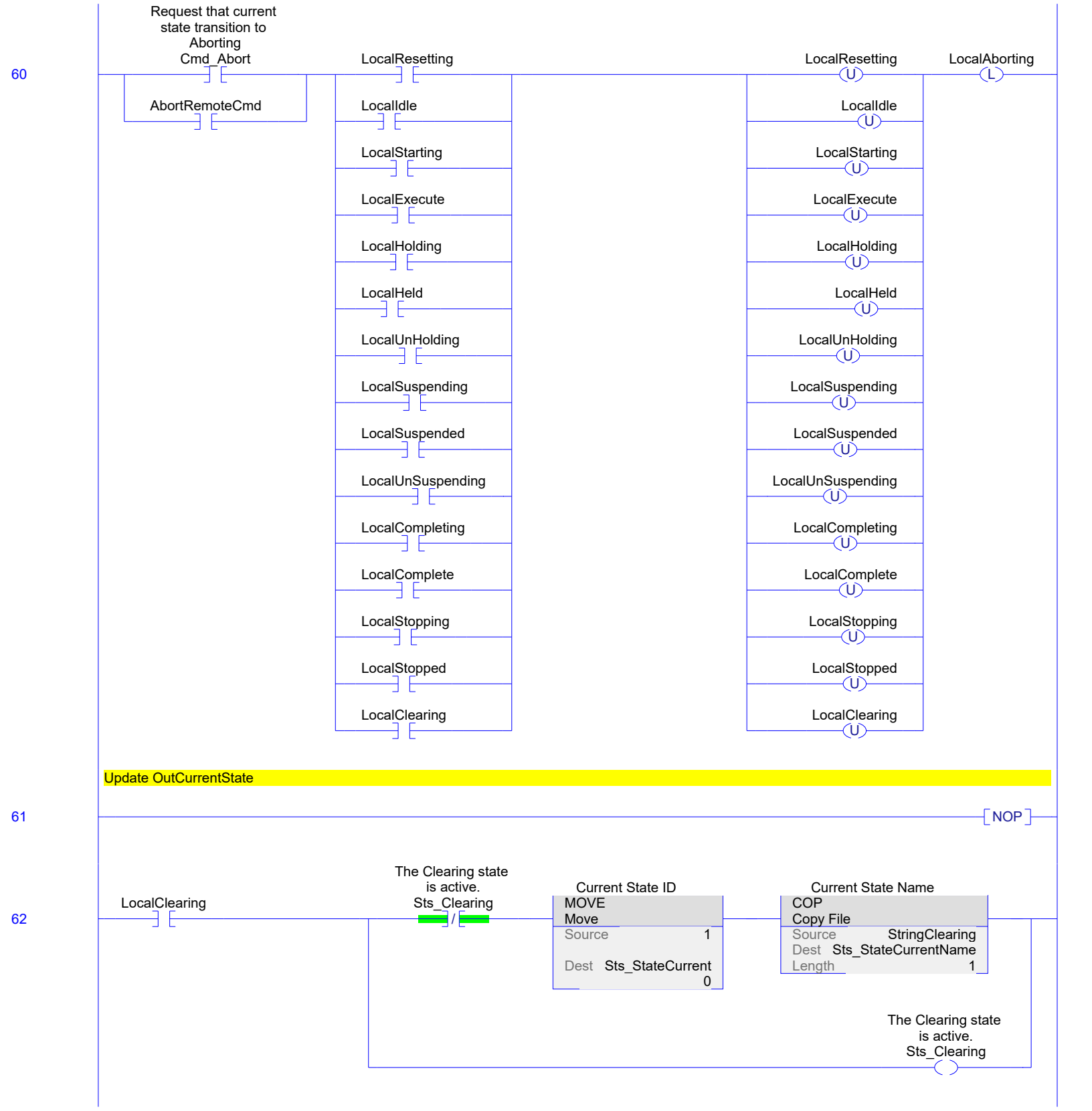


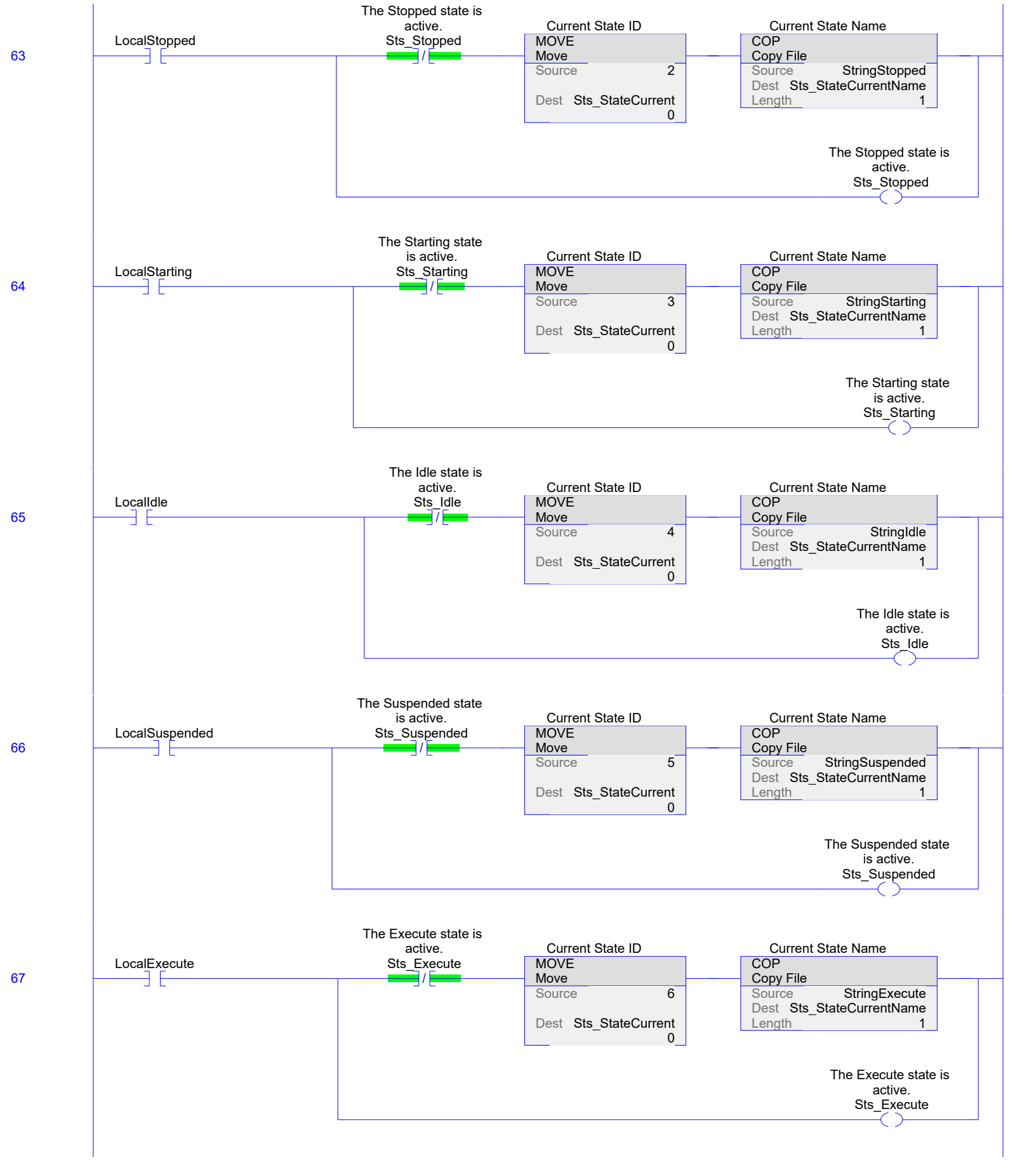

State Complete Bits
36
NOP
PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
Cmd_StateComplete
StateComplete
L
37
PackML State Complete Command - Latch Cmd_StateComplete to allow transition from acting state to wait state
Cmd_StateComplete
StateComplete
U
38
LocalClearing
StateComplete
LocalClearing
StateComplete
LocalStopped
U
U
L
39
Use of the Clearing state for the current mode is enabled
Sts_ClearingEnabled
LocalStarting
StateComplete
LocalStarting
StateComplete
LocalExecute
U
U
L
40
Use of the Starting state for the current mode is enabled
Sts_StartingEnabled
Use of the Complete state for the current mode is enabled
LocalExecute
Sts_CompleteEnabled
StateComplete
LocalExecute
StateComplete
LocalCompleting
U
U
L
41
LocalStopping
StateComplete
LocalStopping
StateComplete
LocalStopped
U
U
L
42
Use of the Stopping state for the current mode is enabled
Sts_StoppingEnabled
LocalAborting
StateComplete
LocalAborting
StateComplete
LocalAborted
U
U
L
43
Use of the Aborting state for the current mode is enabled
Sts_AbortingEnabled

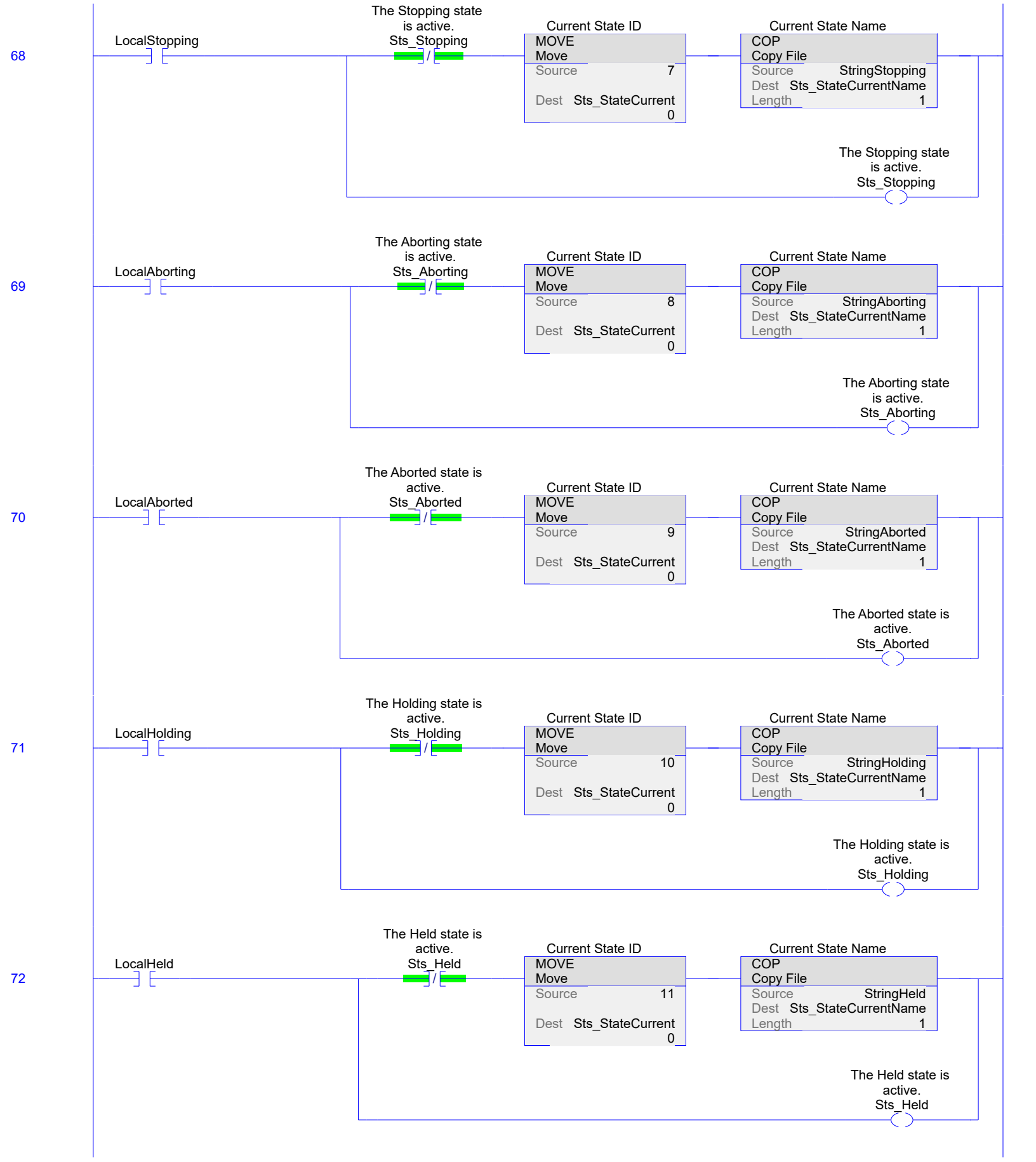


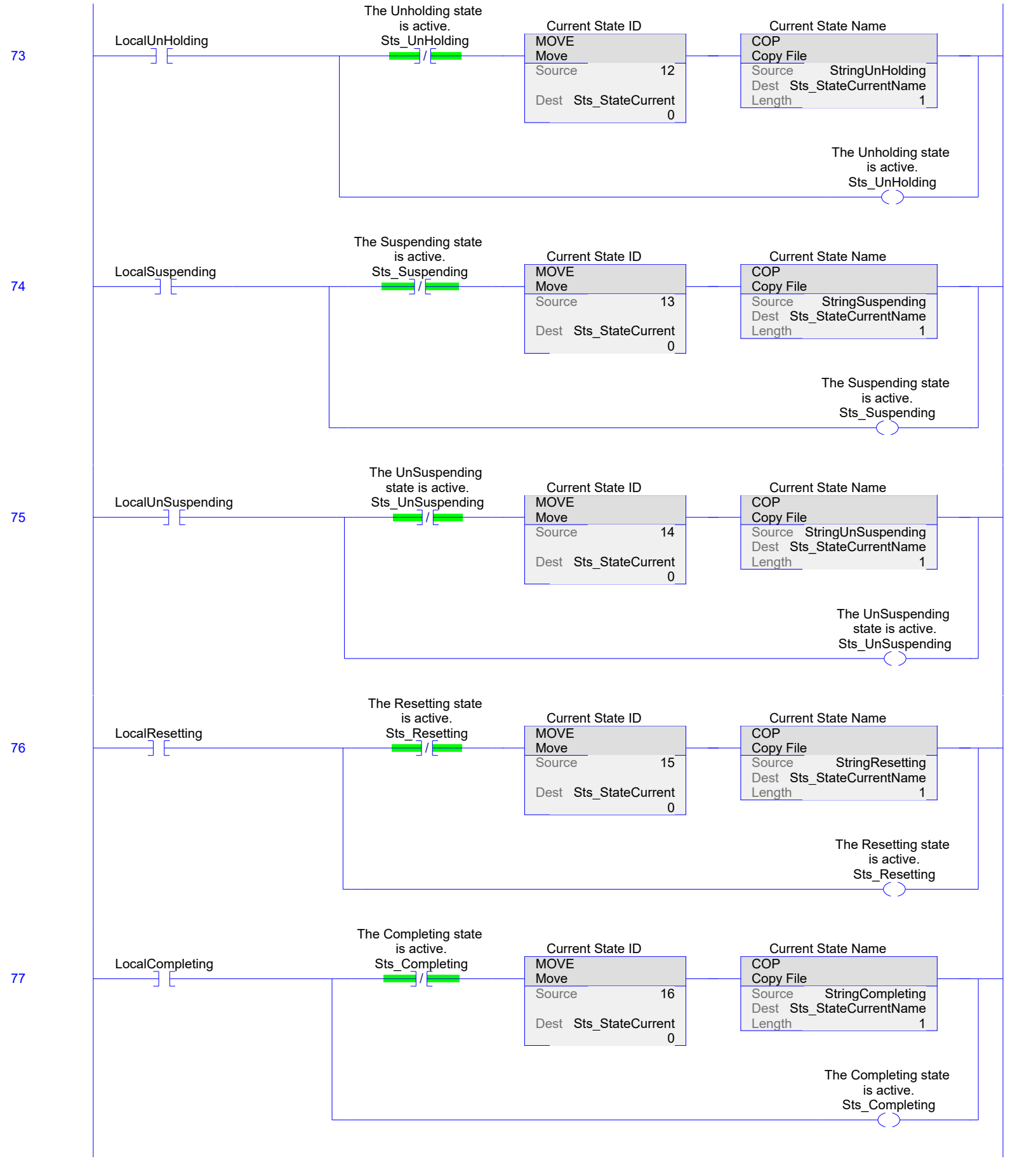





60
Request that current state transition to Aborting
Cmd_Abort
AbortRemoteCmd
LocalResetting
LocalIdle
LocalStarting
LocalExecute
LocalHolding
LocalHeld
LocalUnHolding
LocalSuspending
LocalSuspended
LocalUnSuspending
LocalCompleting
LocalComplete
LocalStopping
LocalStopped
LocalClearing
LocalResetting (U)
LocalIdle (U)
LocalStarting (U)
LocalExecute (U)
LocalHolding (U)
LocalHeld (U)
LocalUnHolding (U)
LocalSuspending (U)
LocalSuspended (U)
LocalUnSuspending (U)
LocalCompleting (U)
LocalComplete (U)
LocalStopping (U)
LocalStopped (U)
LocalClearing (U)
LocalAborting (L)
Update OutCurrentState
61
NOP
62
LocalClearing
The Clearing state is active.
Sts_Clearing
MOVE
Move
Source 1
Dest Sts_StateCurrent
0
COP
Copy File
Source StringClearing
Dest Sts_StateCurrentName
Length 1
Current State ID
Current State Name
The Clearing state is active.
Sts_Clearing







78
LocalComplete
The Complete state is active. Sts_Complete
Current State ID
MOVE Move
Source 17
Dest Sts_StateCurrent 0
Current State Name
COP Copy File
Source StringComplete
Dest Sts_StateCurrentName
Length 1
The Complete state is active. Sts_Complete

MODE MANAGER

79
NOP

Mode Manager

80
NOP

81
Acceptable States to Transition Between Modes Cfg_ModeTransitions[Sts_ModeCurrent].[2]
Acceptable States to Transition Between Modes Cfg_ModeTransitions[Sts_ModeCurrent].[2]

82
Acceptable States to Transition Between Modes Cfg_ModeTransitions[Inp_RemoteModeCmd].[2]
Acceptable States to Transition Between Modes Cfg_ModeTransitions[Inp_RemoteModeCmd].[2]

83
RemoteCmdChangeRequested
Mode Remote Command Interface
NE Not Equal
Source A Inp_RemoteModeCmd 0
Source B Sts_ModeCurrent 0
Mode Remote Command Interface
LIMIT Limit Test (CIRC)
Low Limit 1
Test Inp_RemoteModeCmd 0
High Limit 32
Acceptable States to Transition Between Modes Cfg_ModeTransitions[Sts_ModeCurrent].[Sts_StateCurrent]
Acceptable States to Transition Between Modes Cfg_ModeTransitions[Inp_RemoteModeCmd].[Sts_StateCurrent]
Current Mode ID
MOVE Move
Source Inp_RemoteModeCmd 0
Dest Sts_ModeCurrent 0
Commanded Mode
MOVE Move
Source Sts_ModeCurrent 0
Dest Cmd_Mode 0

84

Commanded Mode
NE
Not Equal
Source A Cmd_Mode 0
Source B Sts_ModeCurrent 0

Commanded Mode
LIMIT
Limit Test (CIRC)
Low Limit 1
Test Cmd_Mode 0
High Limit 32

Acceptable States to Transition Between Modes
Cfg_ModeTransitions[Sts_ModeCurrent].[Sts_StateCurrent]

Acceptable States to Transition Between Modes
Cfg_ModeTransitions[Cmd_Mode].[Sts_StateCurrent]

Current Mode ID
MOVE
Move
Source Cmd_Mode 0
Dest Sts_ModeCurrent 0

85

Commanded Mode
NE
Not Equal
Source A Cmd_Mode 0
Source B Sts_ModeCurrent 0

RemoteCmdChangeRequested

Mode Remote Command Interface
NE
Not Equal
Source A Inp_RemoteModeCmd 0
Source B Sts_ModeCurrent 0

TON
Timer On Delay
Timer TON_ModeChangeNotAllowed
Preset 3000
Accum 0
EN
DN

Mode Change Request Was Denied
Sts_ModeChangeNotAllowed

TON_ModeChangeNotAllowed.DN

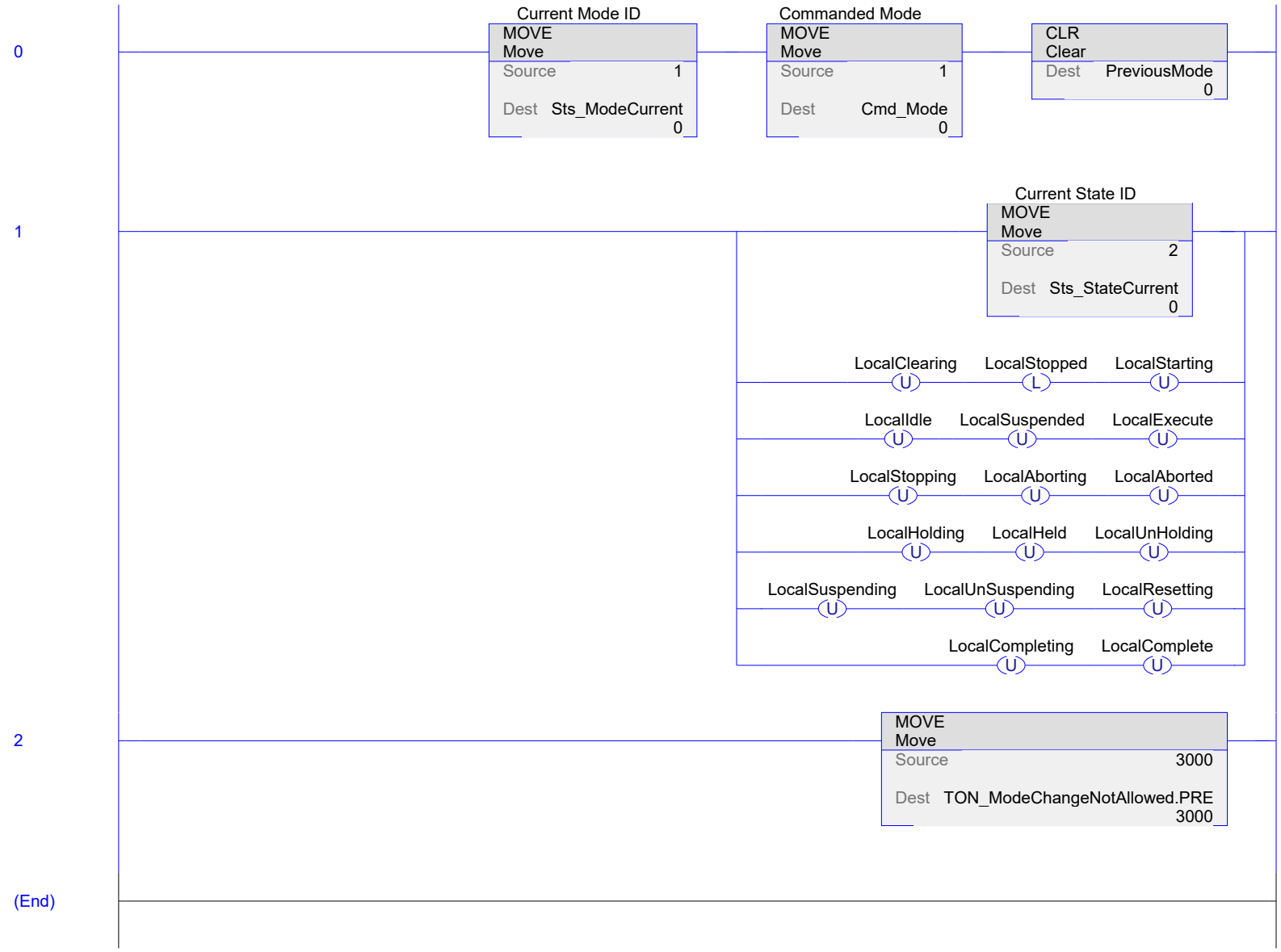
Commanded Mode
MOVE
Move
Source Sts_ModeCurrent 0
Dest Cmd_Mode 0

Update OutCurrentModeName

86

Current Mode Name
COP
Copy File
Source Cfg_ModeNames[Sts_ModeCurrent]
Dest Sts_ModeCurrentName
Length 1

(End)


0
Current Mode ID
MOVE
Move
Source 1
Dest Sts_ModeCurrent
0
Commanded Mode
MOVE
Move
Source 1
Dest Cmd_Mode
0
CLR
Clear
Dest PreviousMode
0
1
Current State ID
MOVE
Move
Source 2
Dest Sts_StateCurrent
0
LocalClearing
LocalStopped
LocalStarting
LocalIdle
LocalSuspended
LocalExecute
LocalStopping
LocalAborting
LocalAborted
LocalHolding
LocalHeld
LocalUnHolding
LocalSuspending
LocalUnSuspending
LocalResetting
LocalCompleting
LocalComplete
2
MOVE
Move
Source 3000
Dest TON_ModeChangeNotAllowed.PRE
3000
(End)

