

- Controller Safety_SLS_1Axis
 - SLS Example for text Uses simplified PackML
- Controller Fault Handler
- Power-Up Handler

Tasks

- MainTask
 - UN01_ExampleMachine
 - MainRoutine
 - CM04_SafetyInterface
 - Simulate_Panel
 - UP01_PackML
 - EM_Axis01
 - MainRoutine
 - CM00_Procedure
 - CM02_ServoAxisObject
 - CM03_ServoAxisJog

Manual Jog Control jogs the servo axis when the Unit is in Execute state
- SafetyTask
 - SafetyProgram
 - S0_Main

Unscheduled

Motion Groups

- Motion_Group
 - Axis_1
- Ungrouped Axes

Add-On Instructions

Data Types

- User-Defined
- Strings
- Add-On-Defined
- Module-Defined
 - AB:1734_3SLOT:I:0
 - AB:1734_3SLOT:O:0
 - AB:1734_4SLOT:I:0
 - AB:1734_4SLOT:O:0
 - AB:1734_IB8S:O:0
 - AB:1734_IB8S_Safety2:I:0
 - AB:1734_OB8S:O:0
 - AB:1734_OB8S_Safety1:I:0
 - AB:1756_DI:C:0
 - AB:1756_DI:I:0
 - AB:5000_HART_Command_Control_Struct:I:0
 - AB:5000_HART_Command_Control_Struct:O:0
 - AB:5000_HART_Static_Struct:I:0
 - AB:5000_String16_Struct:I:0
 - AB:5000_String32_Struct:I:0
 - AB:ENC1:SO:0
 - AB:Motion_Diagnostics:S:1
 - AB:SENC1:SI:0
 - CHANNEL_AI:I:0
 - CHANNEL_AI:O:0
 - CHANNEL_AI_CAL:O:0
 - CHANNEL_AI_CJ_DIAG:I:0
 - CHANNEL_AI_DIAG:I:0
 - CHANNEL_AI_DIAG_CAL:I:0
 - CHANNEL_AI_FT:I:0
 - CHANNEL_AI_FT:O:0
 - CHANNEL_AI_HART:I:0
 - CHANNEL_AI_NAMUR:I:0
 - CHANNEL_AI_NAMUR_FT:I:0

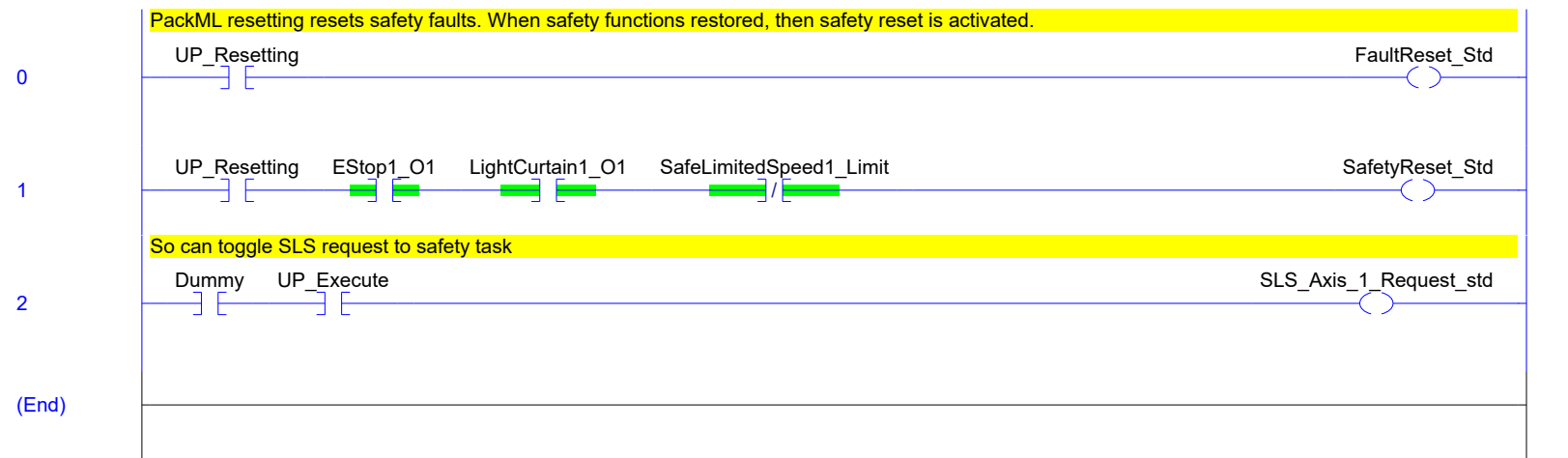
101 CHANNEL_AO:O:0
010
101 CHANNEL_AO_CAL:O:0
010
101 CHANNEL_AO_DIAG:I:0
010
101 CHANNEL_AO_DIAG_CAL:I:0
010
101 CHANNEL_AO_FT:I:0
010
101 CHANNEL_AO_FT:O:0
010
101 CHANNEL_DI:I:0
010
101 CHANNEL_DI_COUNTER:I:0
010
101 CHANNEL_DI_COUNTER:O:0
010
101 CHANNEL_DI_COUNTER_FT:O:0
010
101 CHANNEL_DI_FT:I:0
010
101 CHANNEL_DI_FT:O:0
010
101 CHANNEL_DI_TIMESTAMP:I:0
010
101 CHANNEL_DI_TIMESTAMP:O:0
010
101 CHANNEL_DI_TIMESTAMP_FT:I:0
010
101 CHANNEL_DI_TIMESTAMP_FT:O:0
010
101 CHANNEL_DO:I:0
010
101 CHANNEL_DO:O:0
010
101 CHANNEL_DO_DIAG:I:0
010
101 CHANNEL_DO_FT:I:0
010
101 CHANNEL_DO_FT:O:0
010
101 CHANNEL_DO_OVERRIDE:O:0
010
101 CHANNEL_DO_SCHEDULED:O:0
010
101 CHANNEL_ENC:O:0
010
101 CHANNEL_HSC:I:0
010
101 CHANNEL_HSC:O:0
010
101 PAX_HART_DEVICE:I:0
010
101 SENC_Channel:I:0
010

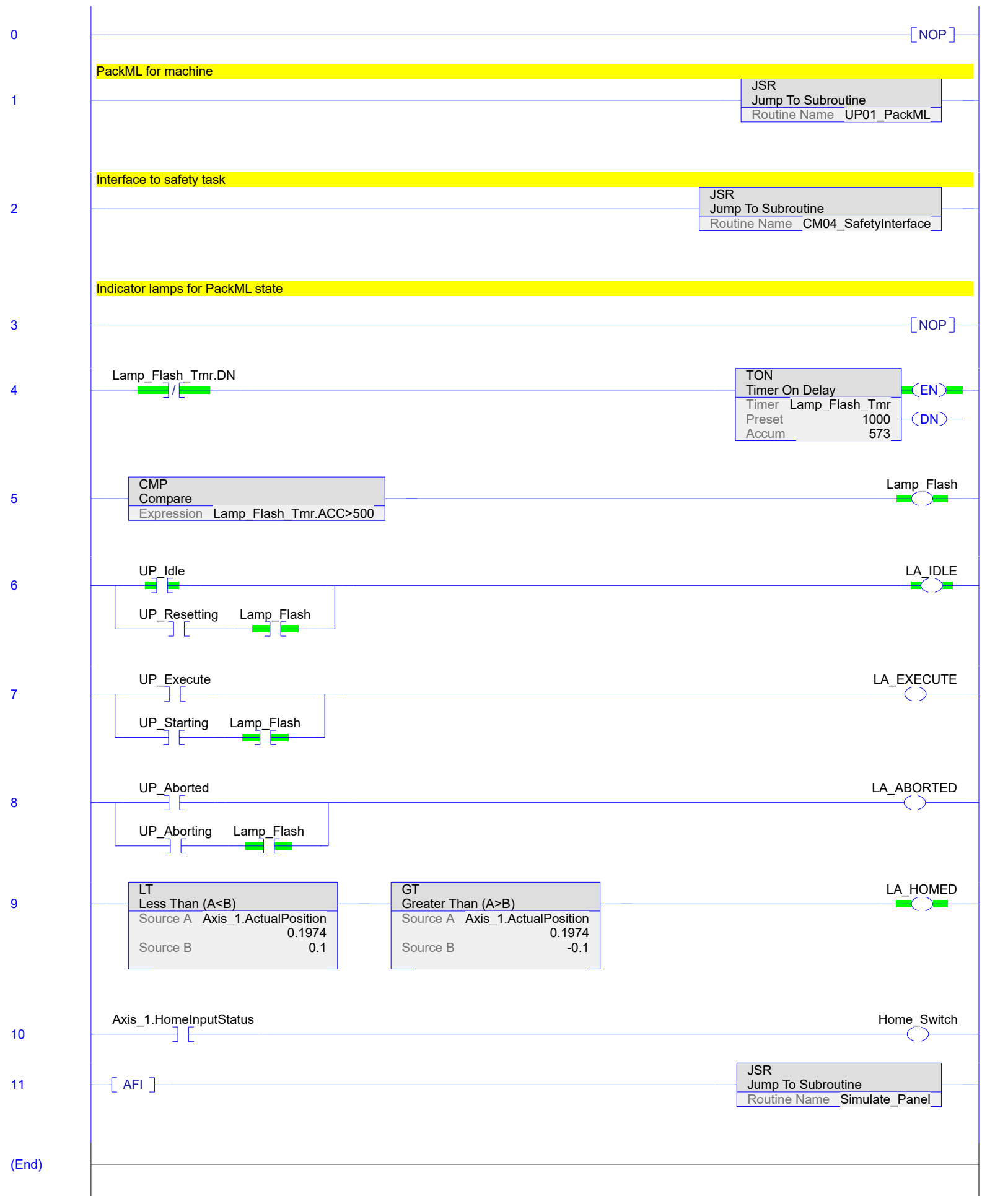
Trends

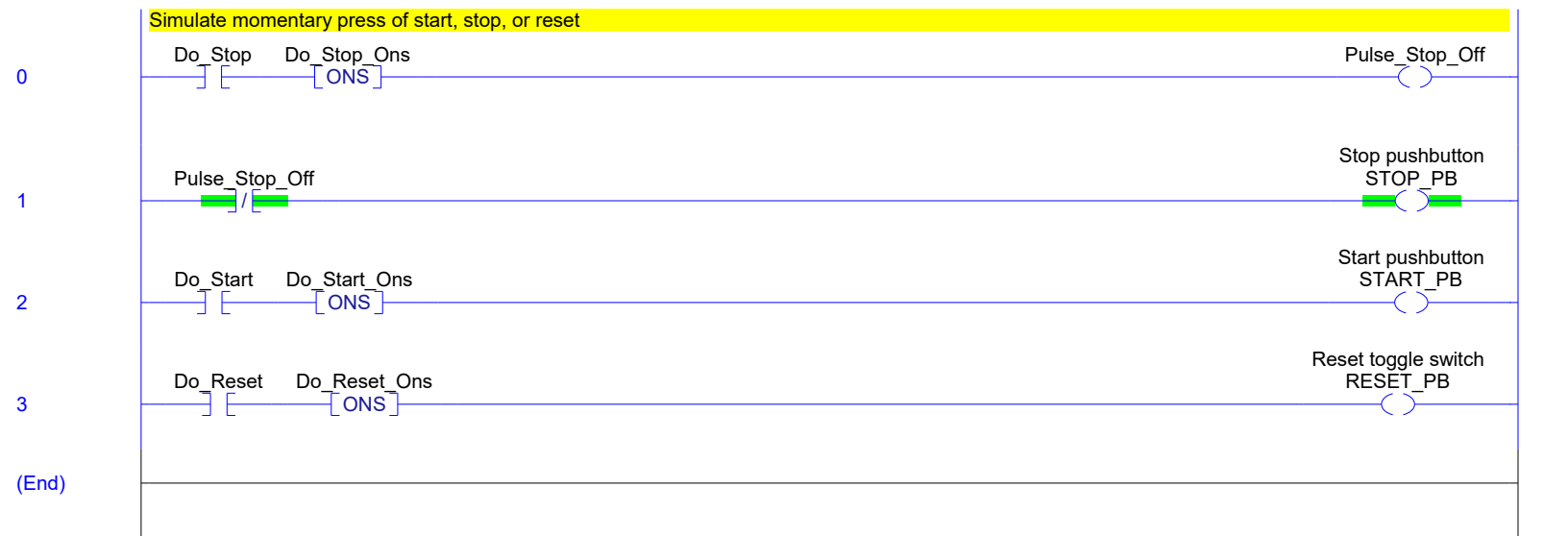
- ☒ Error_Trend
- ☒ Jerk_Trend
- ☒ New_Trend
- ☒ New_trend2
- ☒ Position_Trend
- ☒ Trial
- ☒ Tuning_Trend

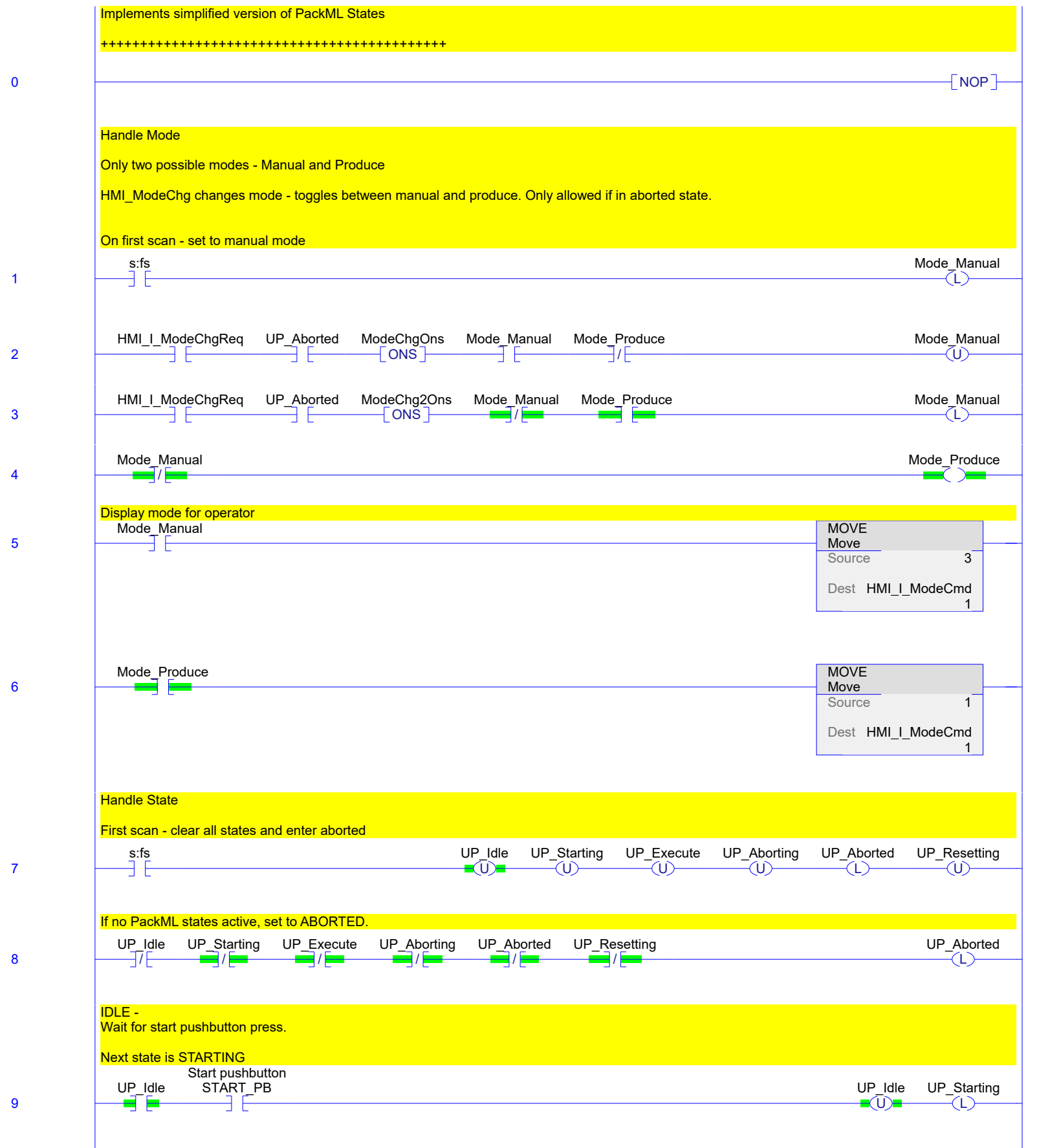
I/O Configuration

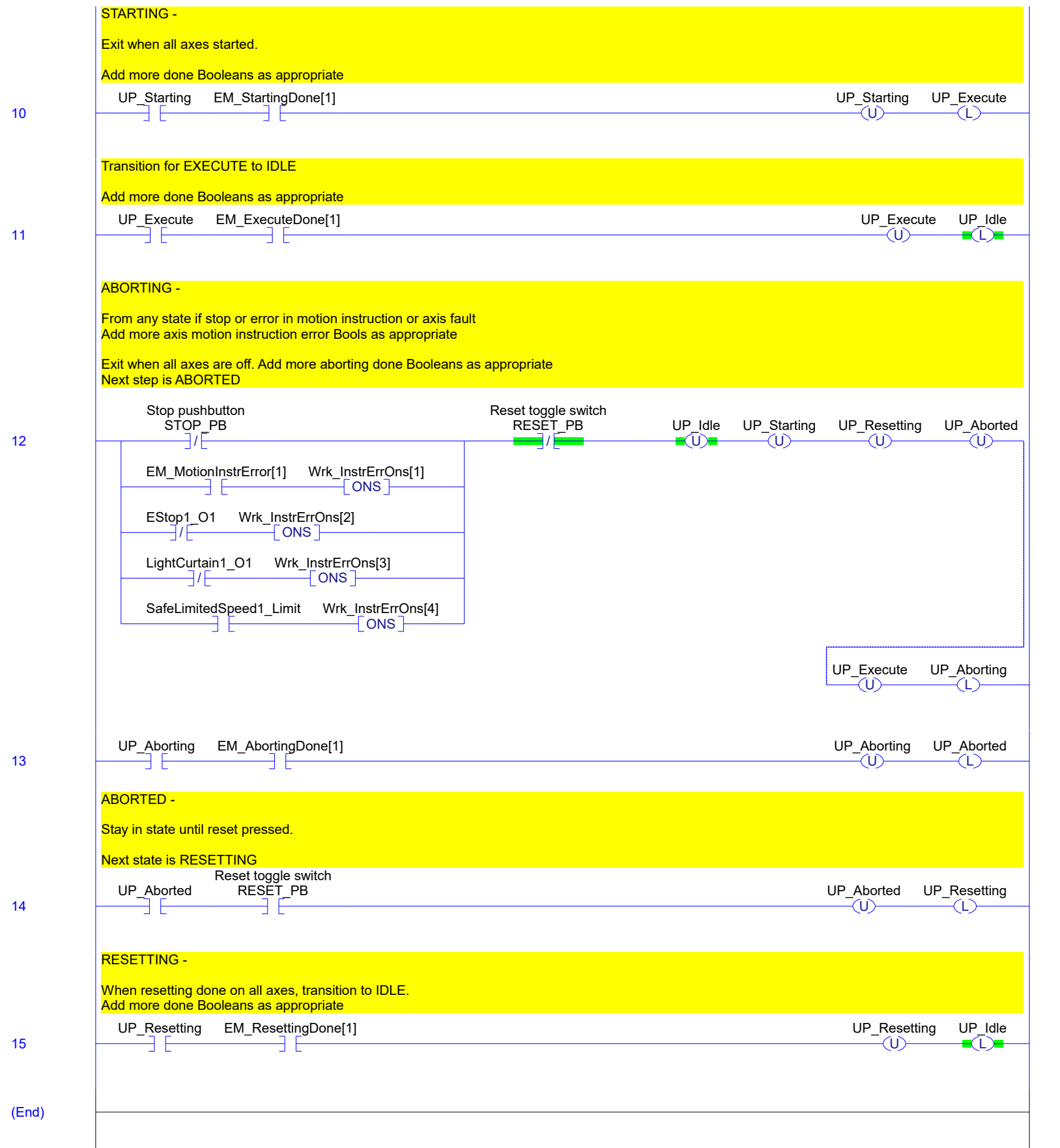
- 1756 Backplane, 1756-A10
 - [0] 1756-L81ES Safety_SLS_1Axis
 - [1] 1756-L8SP Safety_SLS_1Axis:Partner
SLS Example for text Uses simplified PackML
 - [5] 1756-EN2TR Motn_Scanner
 - Ethernet
 - 2198-H015-ERS Axis_1_Servo
 - 843ES-MIP11BA6/A Axis_1_SSEnc
 - 1734-AENTR/B SafetyIO
 - PointIO 3 Slot Chassis
 - [0] 1734-AENTR/B SafetyIO
 - [1] 1734-IB8S/B SafeIn_S01
 - [2] 1734-OB8S/B SafeOut_S02
 - 1756-EN2TR Motn_Scanner
 - [6] 1756-EN2TR PlantENet
 - Ethernet
 - Ethernet
 - 1756-L81ES Safety_SLS_1Axis

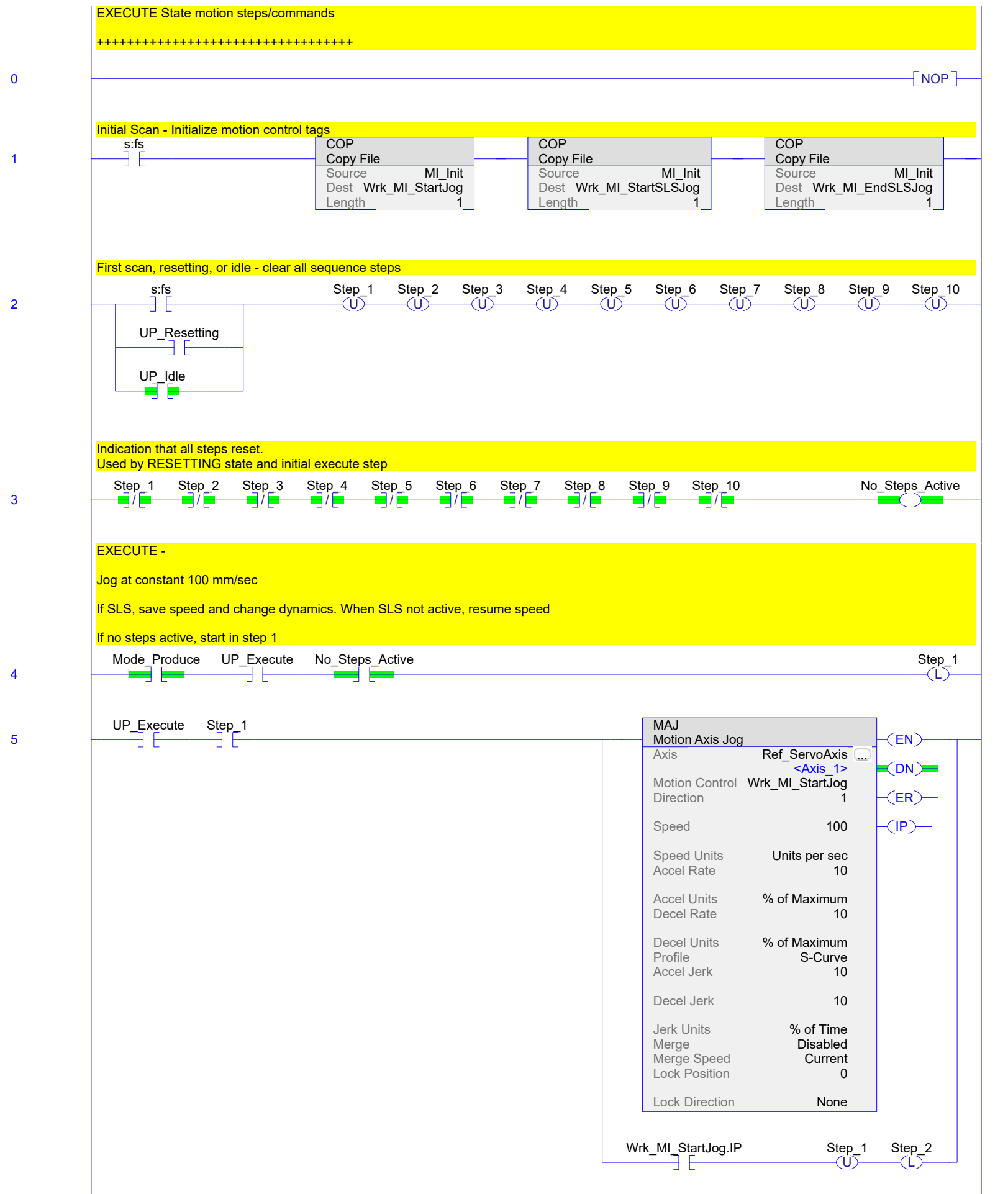


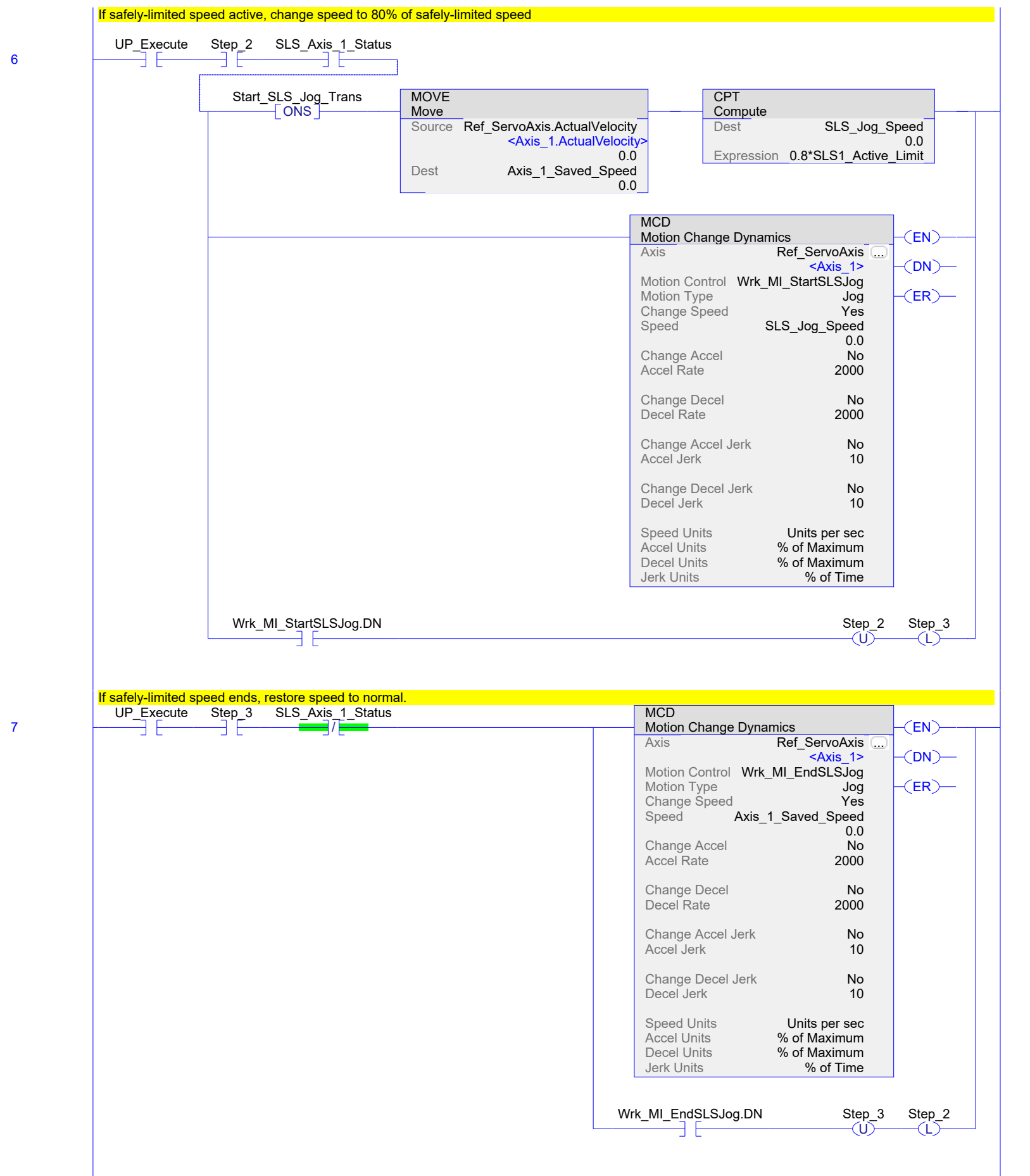


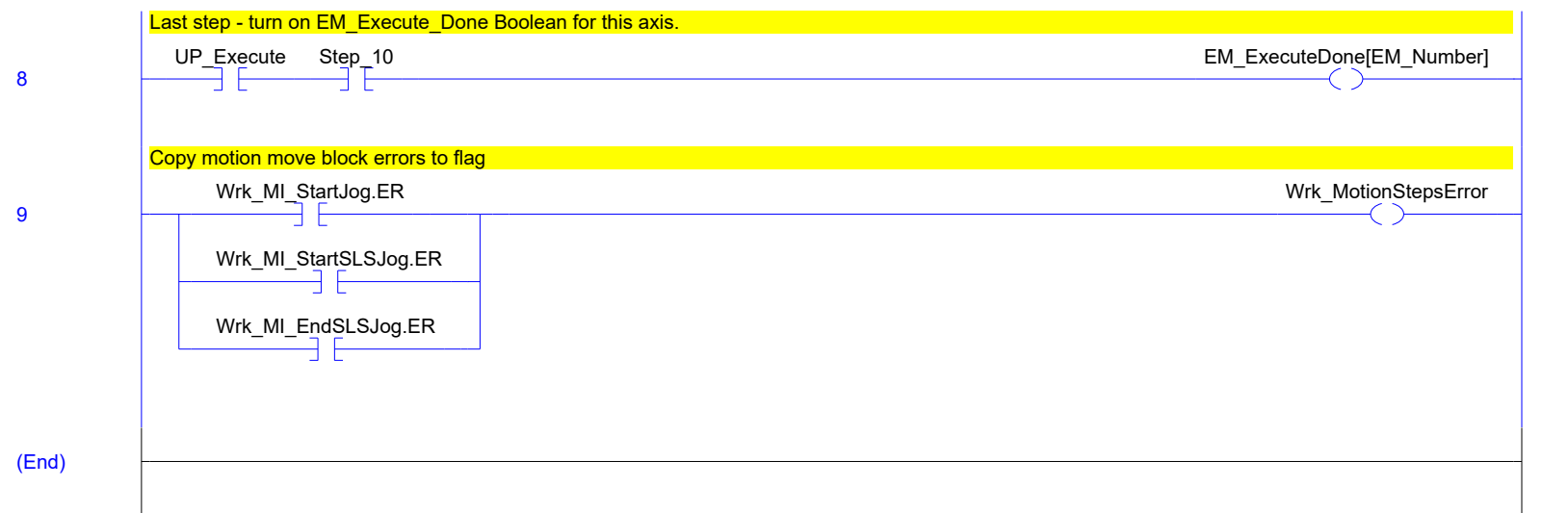












Axis-related blocks for PackML States

Note that EM_Number program tag contains the axis number. Index into Boolean arrays that communicate state "done" to main PackML state machine.

Ref_ServoAxis is aliased to the real Axis tag in the controller tags.

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[NOP]

First scan - initialize all motion control tags

s:fs

COP
Copy File
Source MI_Init
Dest Wrk_MI_Enable
Length 1

COP
Copy File
Source MI_Init
Dest Wrk_MI_Disables
Length 1

COP
Copy File
Source MI_Init
Dest Wrk_MI_Stop
Length 1

COP
Copy File
Source MI_Init
Dest Wrk_MI_MASR
Length 1

COP
Copy File
Source MI_Init
Dest Wrk_MI_MAFR
Length 1

COP
Copy File
Source MI_Init
Dest Wrk_MI_Home
Length 1

STARTING -

Any gearing would be done here

UP_Starting Ref_ServoAxis.DriveEnableStatus <Axis_1.DriveEnableStatus> Ref_ServoAxis.ServoActionStatus <Axis_1.ServoActionStatus> EM_StartingDone[EM_Number]

Copy any motion instruction errors or axis fault to axis error Boolean

Wrk_MI_Stop.ER

EM_MotionInstrError[EM_Number]

Wrk_MI_Disables.ER

Wrk_MI_MASR.ER

Wrk_MI_MAFR.ER

Wrk_MI_Enable.ER

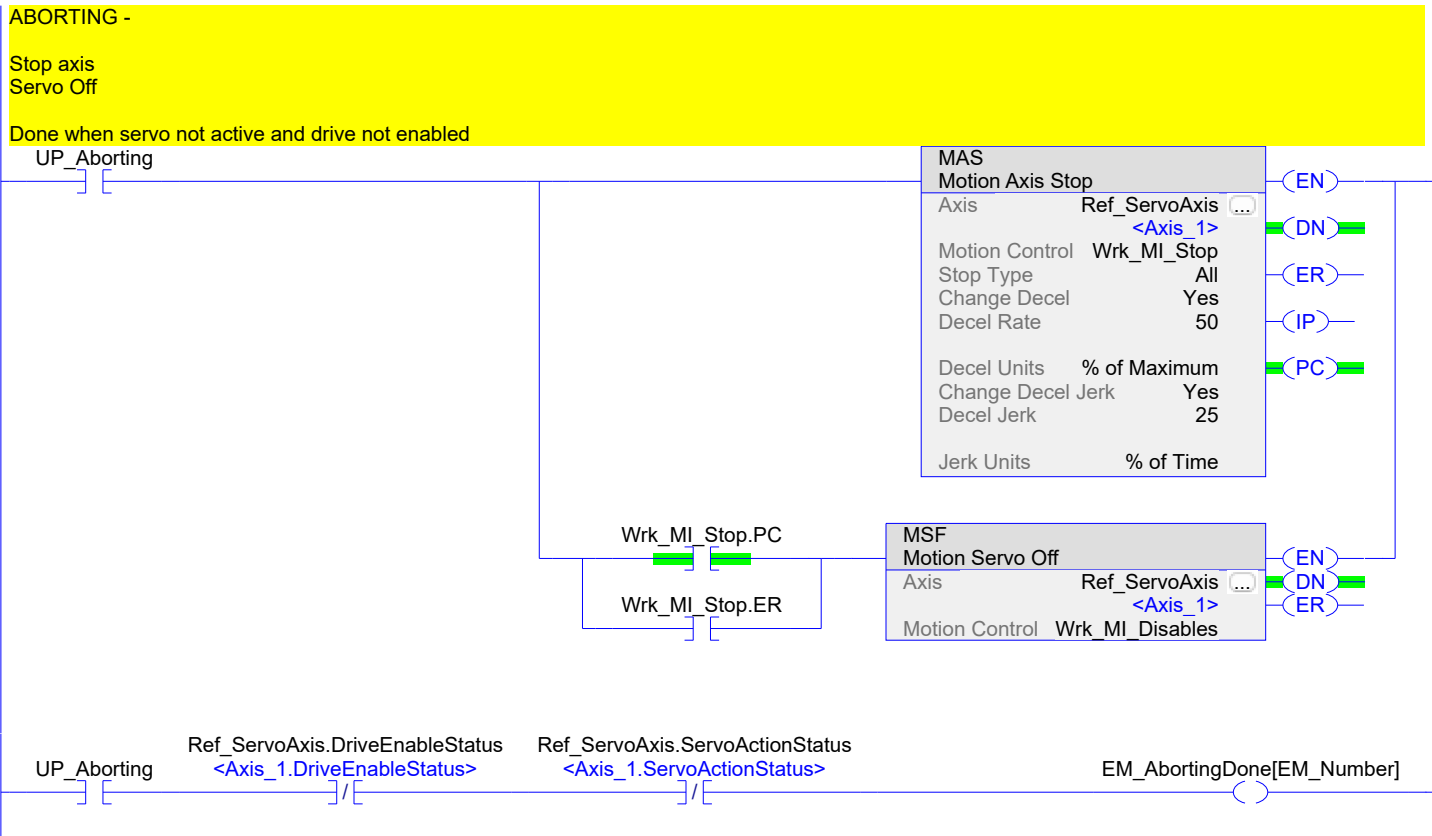
Wrk_MI_Home.ER

CMP
Compare
Expression Ref_ServoAxis.AxisFault<>0

Wrk_MotionStepsError

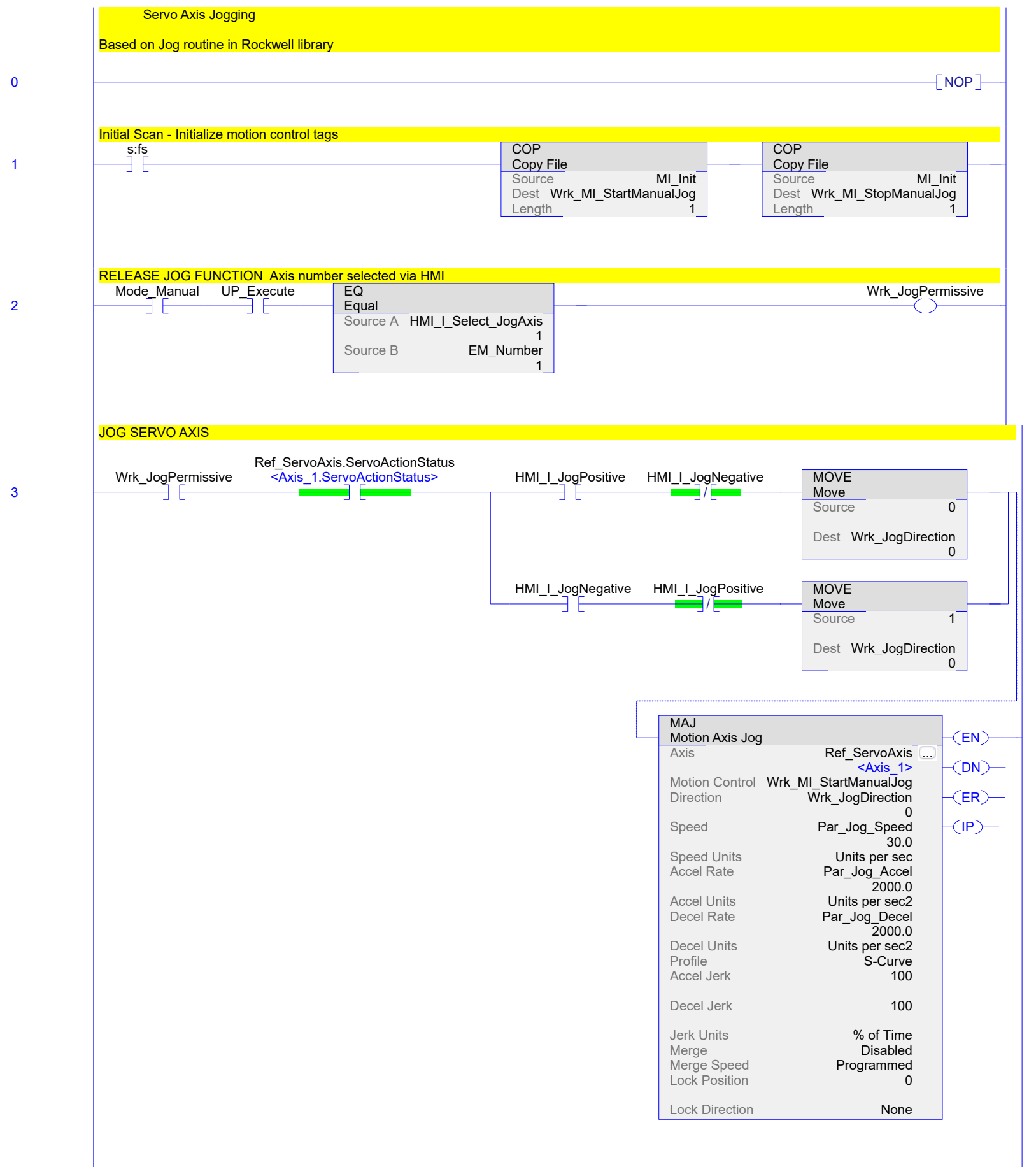
Wrk_JogFault

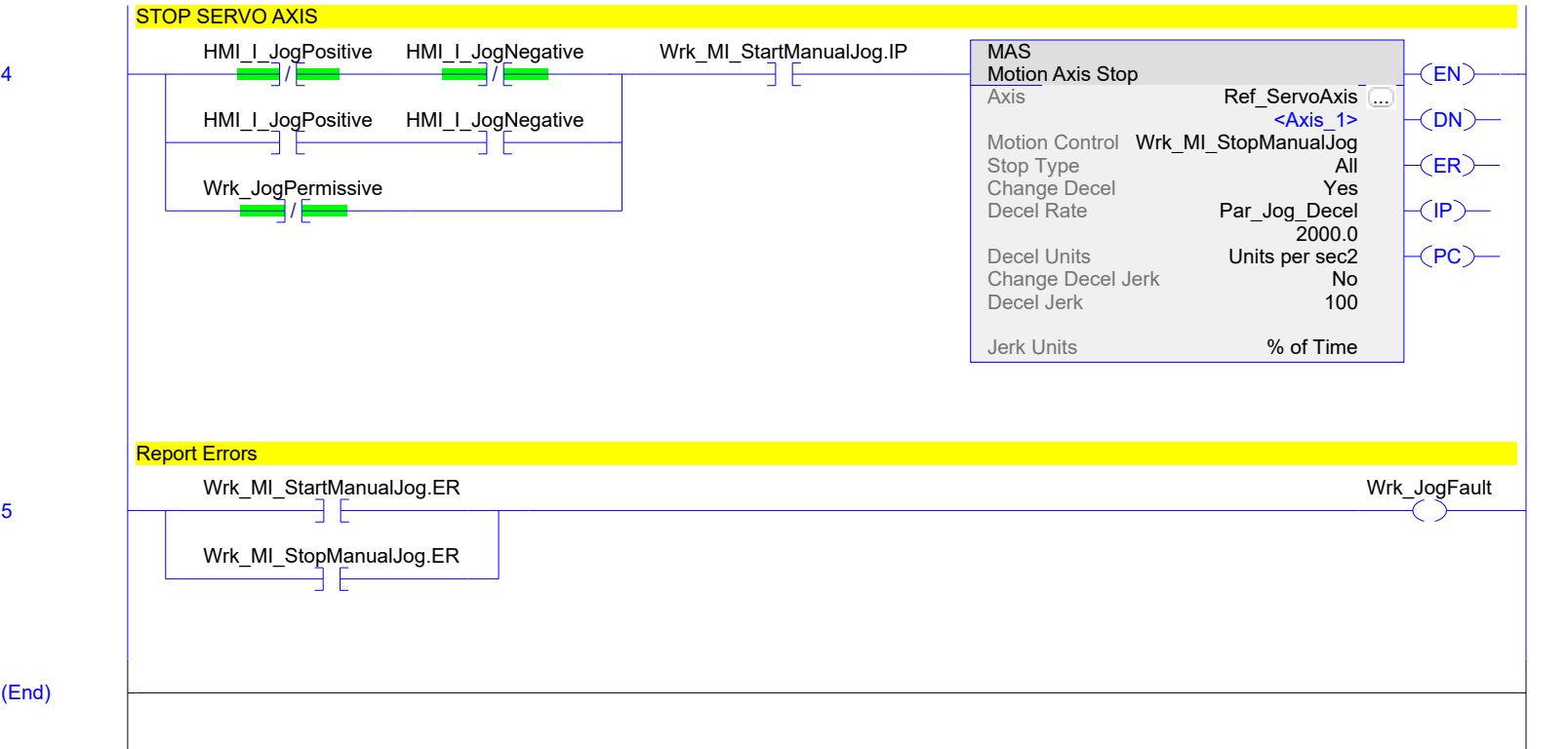
4

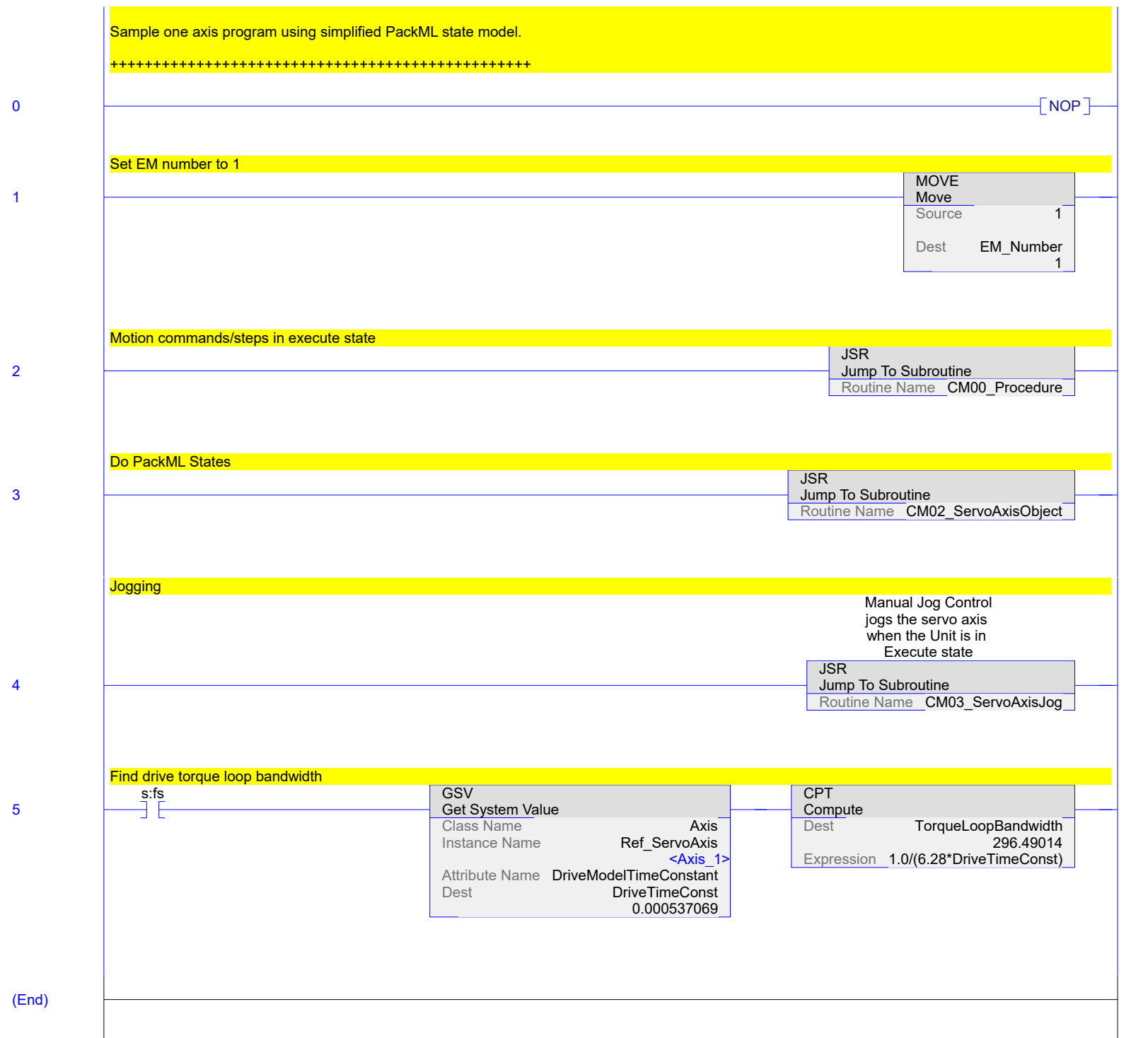


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ESTOP function

ESTOP		
Emergency Stop		
ESTOP	Estop1	(O1)
Reset Type	AUTOMATIC	
Channel A	EStop_1	(CI)
	<SafetyIO:1:I.Pt00Data>	
	0	(CRHO)
Channel B	EStop_2	(II)
	<SafetyIO:1:I.Pt01Data>	
	0	
Circuit Reset	1	(FP)
Fault Reset	1	

Light Curtain function

LC		
Light Curtain		
LC	LightCurtain1	(O1)
Reset Type	AUTOMATIC	
Channel A	LC_1	(CI)
	<SafetyIO:1:I.Pt02Data>	
	0	(CRHO)
Channel B	LC_2	(LCB)
	<SafetyIO:1:I.Pt03Data>	
	0	
Input Filter Time	0	(LCM)
Mute Light Curtain	LightCurtain1Mute	
	0	(II)
Circuit Reset	1	(FP)
Fault Reset	1	

Provides the actual speed to the SLS function.

SFX		
Safety Feedback Interface		
Safety Control	SFX_Axis_01	(O1)
Time Unit	Seconds	
Position Scaling	32768.0	(FP)
Feedback Resolution	32768	(SFH)
Unwind	32768	
Home Position	0.0	
Feedback Position	Axis_1_SSEnc:SI.Encoder.Position	
	0	
Feedback Velocity	Axis_1_SSEnc:SI.Encoder.Velocity	
	0.0	
Feedback Valid	Axis_1_SSEnc:SI.Encoder.Status	
	2#0000_0000	
Connection Faulted	Axis_1_SSEnc:SI.ConnectionFaulted	
	0	
Home Trigger	HomeTrigger	
	0	
Reset	FaultReset_Trans	
	0	
Safe Feedback Homed	SFX1_Homed	
SFX Fault	SFX1_Fault	
Actual Position	0.0	
Actual Cycles	0	
Actual Speed	0.0	
Fault Type	0	
Diagnostic Code	0	

Logic for request for SLS is not shown and captured by the first contact. Drop the request if SFX fault.

SLS_Axis_1_Request_Safety_Task SFX_Axis_01.FP

SLS1_Request

When SLS requested (SLS_Request=1), and after the check delay expires, this block monitors that the actual speed is below the Active Limit value. If the speed exceeds the Active Limit when SLS_Request=1, the .O1 output of the block is de-energized. The SLS Active remains 1 as long as SLS_Request=1. When SLS_Request=0, speed monitoring stops.

SLS	
Safety-Limited Speed	
Safety Control	SLS_Axis_01
Restart Type	AUTOMATIC
Cold Start Type	AUTOMATIC
Check Delay	SLS1_Delay
	2000
Active Limit	SLS1_Active_Limit
	10.0
Feedback SFX	SFX_Axis_01
Request	SLS1_Request
	0
Reset	FaultReset_Trans
	0
SLS Active	SLS1_Active_Sts
	0
SLS Limit	SLS1_Limit_Sts
	0
SLS Fault	SLS1_Fault_Sts
	0
Fault Type	0
Diagnostic Code	0

Copy local status tag to controller tag to be used by the motion blocks in the standard program.

SLS1_Active_Sts

SLS_Axis_1_Status

When SLS is active and limit is exceeded or fault exists, abort is requested to initiate a SS1.

SLS1_Active_Sts

SLS1_Limit_Sts

SLS1_AbortRequest

SLS1_Fault_Sts

When SLS active and the check delay has expired, if the speed is below the limit, allow the door to be unlocked.

SLS1_Active_Sts

SLS_Axis_01.CheckDelayActive

SLS1_Limit_Sts

Hazard_Safe

Rising edge of the fault reset from PackML (transferred using Mapping Tool) generates a fault reset

FaultReset_Safety_Task

FaultReset_ONS

FaultReset_Trans

Rising edge of the safety circuit reset (either a button press or from PackML) (transferred using Mapping Tool) generates a safety circuit reset

SafetyReset_Safety_Task

CircuitReset_ONS

CircuitReset_Trans

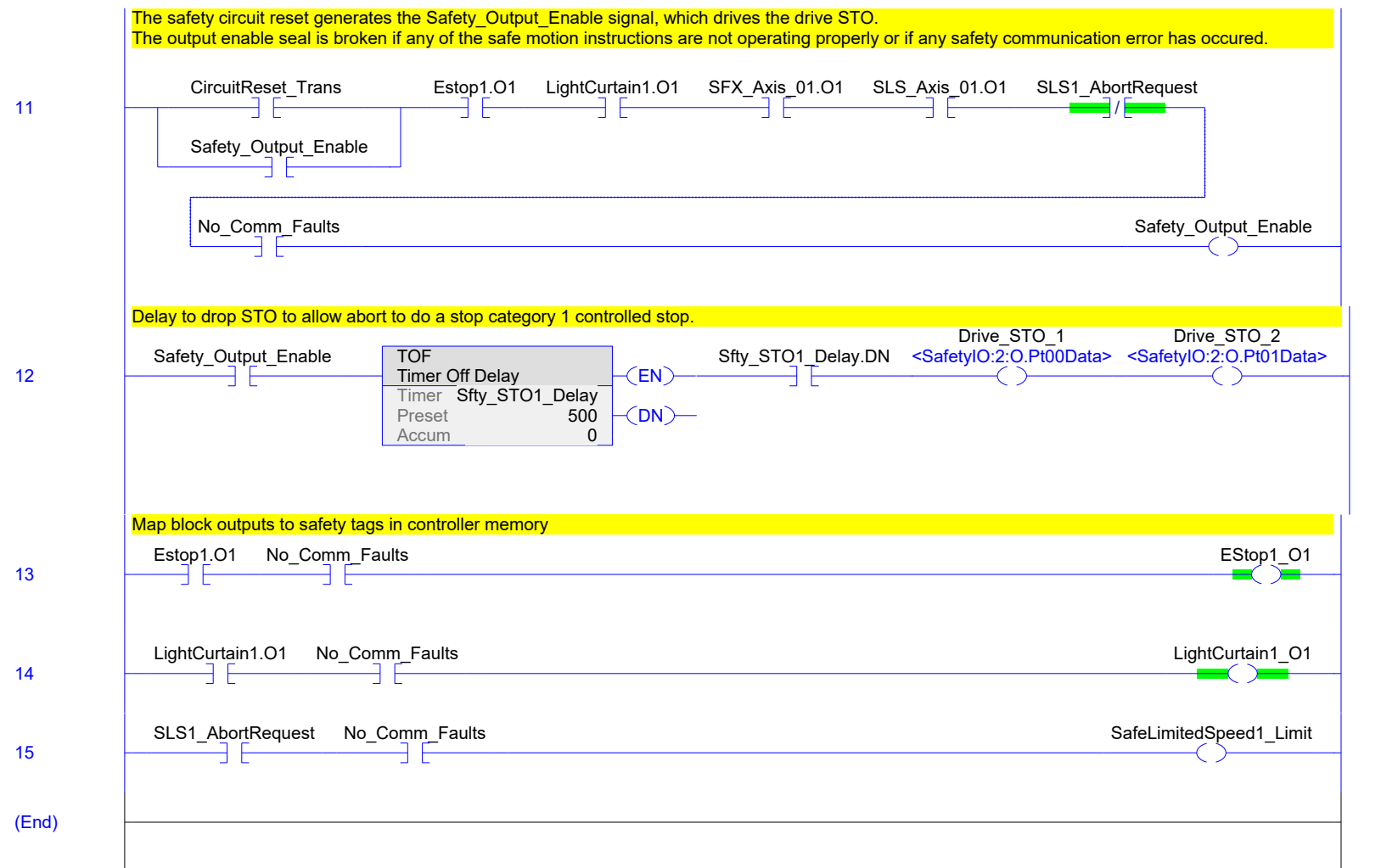
If any safety connection is lost, drop out No_Comm_Faults.

Axis_1_SSEnc:SI.ConnectionFaulted

SafetyIO:1:I.ConnectionFaulted

SafetyIO:2:I.ConnectionFaulted

No_Comm_Faults



Safety_SLS_1Axis	
Label does not exist	1
MainTask	
UN01_ExampleMachine	
CM04_SafetyInterface	
Ladder Diagram	3
MainRoutine	
Ladder Diagram	4
Simulate_Panel	
Ladder Diagram	5
UP01_PackML	
Ladder Diagram	6
EM_Axis01	
CM00_Procedure	
Ladder Diagram	8
CM02_ServoAxisObject	
Ladder Diagram	11
CM03_ServoAxisJog	
Ladder Diagram	14
MainRoutine	
Ladder Diagram	16
SafetyTask	
SafetyProgram	
S0_Main	
Safety Ladder Diagram	17